Mountain Pine Beetle Media Analysis:
Articles Published from 2000-2008 in Alberta Newspapers

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1.0 Introduction

The mountain pine beetle (*Dendroctonus ponderosae*) is endemic to lodgepole pine (*Pinus contorta*) forests of western Canada. Recently, the province of British Columbia has experienced the most extensive outbreak of the insect ever recorded in North America (British Columbia Ministry of Forests and Range, 2006). The forests in British Columbia were particularly vulnerable to the mountain pine beetle as a result of favourable climate conditions and an abundance of the primary host species, lodgepole pine (Carroll et al., 2004). As a result of conditions favourable to the mountain pine beetle it has extended beyond its historical range into the neighbouring province of Alberta.

To date, it is estimated that within British Columbia the mountain pine beetle has killed a total of 620 million cubic metres of timber covering an area of approximately 14.5 million hectares since the beginning of the infestation (Ministry of Forests and Range, 2009). However, based on survey information collected between 2007 and 2008 an observed decrease (from 10.1 million to 7.8 million hectares) in attacked trees suggest that the infestation within British Columbia has peaked and is slowing (Ministry of Forests and Range, 2009). As a result of the extent and magnitude of the epidemic, the mountain pine beetle has had profound impact in economic, social, political, and ecological terms for forest-based communities in British Columbia (Parkins and MacKendrick, 2007). Now regions of Alberta are also at risk of experiencing impacts as the mountain pine beetle has continued to spread within the province.

Studies conducted on the social dimensions of the mountain pine beetle infestation in western Canada have focused on particular sectors of the infestation in British Columbia such as economic impacts (Patriquin et al. 2007), community vulnerability assessment (Parkins and MacKendrick, 2007), and local resident and national park visitor attitudes and management preferences (McFarlane et al. 2006; McFarlane and Watson 2008). These studies have provided valuable information relevant for policy and management. There is a lack of research, however, focusing on how the media has played a role in disseminating information between the experts and the public. Given that there are multiple perspectives and issues to negotiate in dealing

with natural resource management strategies it is important to gain an understanding of perceptions, attitudes, knowledge and preferences of local stakeholders. Understanding these characteristics are critical to effective management and communication strategies.

Media plays an important role because the news media reflects and shapes the views of the public (Bengston and Xu, 1995). Previous studies have identified that residents in rural areas and small towns in Alberta rely on their local newspapers for much of their information on community issues (McFarlane et al. 2008). The public also relies largely on the media to interpret complex scientific information yet few studies have examined if the media and public understanding reflect expert knowledge. The objectives of this study are to:

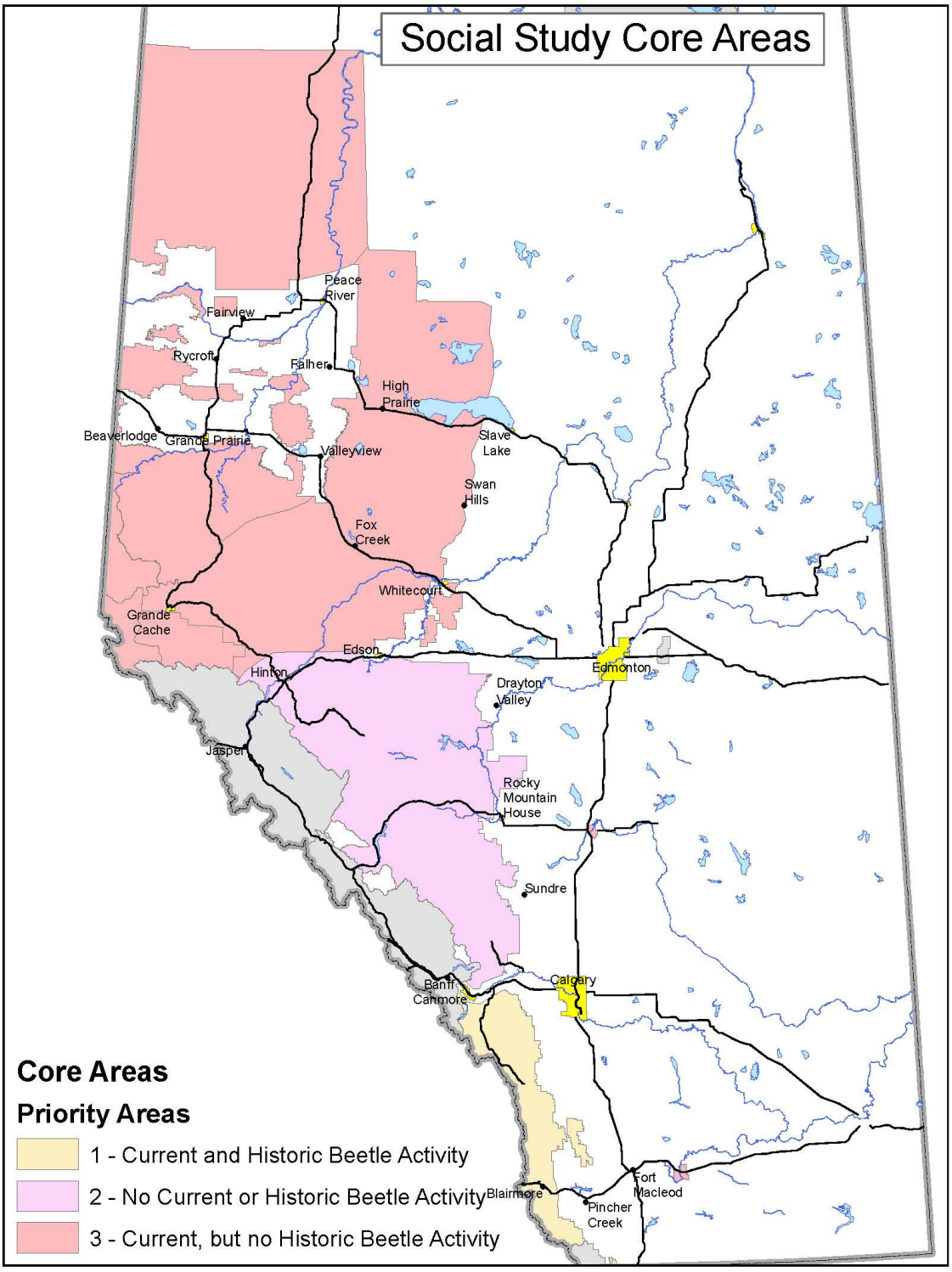
1. Identify mountain pine beetle messages that have been communicated to the public via newspaper media
2. Identify when these messages emerged
3. Identify concerns regarding mountain pine beetle management in Alberta

2.0 Methods

The focus of this research is to identify Mountain Pine Beetle messages that have been communicated to the public via the print media in Alberta. This study focuses on an area along the western region of the province (Figure 1). In collaboration with the Foothills Research Institute (FRI) Mountain Pine Beetle Activity Team the area was further divided into three regions based on historic and current infestation. The regions represent no current and no historic activity (Core Area 2; central); current and historic activity (Core Area1; southwest); and current but no historic activity (Core Area 3; northwest).

Major national and regional newspapers were included in this study based on their broad availability within Alberta. Community newspapers were then selected based on their location within or in close proximity to the study region boundaries.

Figure 1 Map of study regions and towns with newspapers used in the study.



The newspapers that were included in this study were:

Canada's only two national daily newspapers, *The Globe and Mail* and *The National Post*,

Four regional Alberta newspapers which are published in Alberta's two major urban centres, the *Edmonton Journal*, *Edmonton Sun*, *Calgary Herald*, and the *Calgary Sun.,* The national and regional newspapers are readily available to all Albertans.;

and twenty-seven community newspapers located within or near the three study regions (Table 1): *Banff Crag and Canyon, Beaverlodge Advertiser, Canmore Rocky Mountain Outlook, Canmore Leader, Crowsnest Pass Herald, Crowsnest Pass Promoter, Drayton Valley Western Review, Edson Leader, Fairview Post, Falher Smoky River Express, Fort Macleod Gazette, Fox Creek Times, Grande Cache Mountaineer, Grande Prairie Daily Herald-Tribune, High Prairie South Peace News, Hinton Parklander, Jasper Booster, Peace River Record Gazette, Pincher Creek Echo, Rocky Mountain House Mountaineer, Rycroft Central Peace Signal, Slave Lake Lakeside Leader, Slave Lake Scope, Sundre Round-Up, Swan Hills Grizzly Gazette, Valleyview Valley Views,* and the *Whitecourt Star*. The community newspapers are all circulated weekly, with the exception of the *Grande Prairie Daily Herald-Tribune* which is circulated daily.

Table 1 Core Study Regions

Core Area 1 (Southwest)	Core Area 2 (Central)	Core Area 3 (Northwest)
(Blairmore) Crowsnest Pass Herald	Banff Crag and Canyon	Beaverlodge Advertiser
(Blairmore) Crowsnest Pass Promoter	Canmore Rocky Mountain Outlook	Fairview Post
Canmore Leader	Drayton Valley Western Review	Falher Smoky River Express
Fort Macleod Gazette	Edson Leader	Fox Creek Times
Pincher Creek Echo	Jasper Booster	Grande Cache Mountaineer
	Hinton Parklander	Grande Prairie Daily Herald Tribune
	Rocky Mountain House Mountaineer	High Prairie South Peace News
	Sundre Round up	Peace River Record Gazette
		Rycroft Central Peace Signal
		Slave Lake Lakeside Leader
		Slave Lake Scope
		Swan Hills Grizzly Gazette
		Valleyview Valley Views
		Whitecourt Star

Articles were searched by using the keywords “mountain pine beetle” within a timeframe from January 1, 2000 to December 31, 2008. The timeframe was selected to capture early news stories relating to current mountain pine beetle activity in Alberta. Based on the availability of community newspapers the timeframe for each community paper varies. A table in the Appendix B notes the date of the first article that was retrieved for every paper included in this study.

A variety of methods were used to collect the articles. The first method used to source articles was done by searching the *Canadian Newsstand* electronic database for the *Globe and Mail, The National Post, The Edmonton Journal* and the *Calgary Herald*. The second method required identifying newspapers published by Sun Media

Corporation (listed in Appendix A). Sun Media Newspaper Archive and Research provided a bibliographic reference list of articles for a fee. Hardcopies of the articles were then collected by making copies from microfilms or from the newspaper collection at the Alberta Legislative Library and Alberta Sustainable Resource Development. The third method for sourcing articles was done by using an online digital archive called *AWSOM*. *AWSOM* is an electronic database of searchable Canadian newspapers (Alberta Weekly Newspapers, 2008). Two newspapers required additional effort: Rocky Mountain House Mountaineer articles were obtained directly from the newspaper and the *AWSOM* database and articles from the Sundre Round-up were collected by manually searching the original newspaper hardcopies located at the Alberta Legislative Library. A detailed table indicating the source of the newspaper can be found in Appendix A.

News articles, editorial/opinion columns and advertisements were all included in the media database.

All the articles that were copied from microfilm and the original hardcopies were converted into digital document files. This was done so that the newspaper articles would be in a format compatible with QSR NVivo 8 software. QSR NVivo 8 software is a software package that supports qualitative research analysis and can act as a digital storage database for articles.

The first step of the conversion process was to scan the hardcopy version of the newspaper articles using Microsoft Document Imaging Software. This software has the ability to perform optical character recognition (OCR), also known as text recognition, as the document is being scanned. Optical character recognition converts the image of text into the actual text characters. Once the image had been scanned and converted into text it was copied into a Microsoft Word document, formatted and saved. The success of this conversion process is related to the quality of the hardcopy. Hardcopies that were distinctly black and white (contrasted images) had good results. Articles that copied grey-scale did not convert as well but with editing and formatting these articles were also converted.

Mountain pine beetle messages are explored through an in-depth content analysis. Content analysis involves identifying, coding and categorizing patterns within the data (Cope, 2005). Codes are the smallest unit of analysis. For this project there were a total of 197 codes. Some examples of the codes that were used for this project are: the title of the newspaper, the date the article was published, mountain pine beetle-lifecycle, mountain pine beetle-physiology, consequences of fire suppression, historical infestations, temperature as natural management, and so on. Additionally these codes are then grouped into themes/topics and sub-themes which are summarized from the articles and presented as results. Content analysis also involves determining the frequency and context of codes (Cope, 2005) and this determines what topics emerged as significant issues relating to the pine beetle.

3.0 Results

The results of this project are presented in two sections. The first section describes and analyzes the number of articles that were collected and when the mountain pine beetle emerged as an issue in Alberta. The second section of the results identifies the main topics presented in the newspaper articles as they relate to the mountain pine beetle. All of the topics and descriptions presented were summarized from the newspaper articles.

3.1 Spatial and Temporal Distribution of Articles

3.1.1 Articles Collected by Region

A total of 1458 articles were collected from all 33 newspapers (See Appendix B for a detailed listing of newspapers, number of articles published during each year and the date of the first article collected). Table 2 identifies the number of articles collected from each paper.

Table 2 Total Number of Articles Collected from Each Newspaper

	Newspaper	Number of Articles
National papers	The Globe and Mail*	28
	National Post*	87
Regional papers	Calgary Herald*	159
	Calgary Sun*	41
	Edmonton Journal*	174
	Edmonton Sun*	62
Southwest Region	Crowsnest Pass Herald	31
	Crowsnest Pass Promoter	24
	Fort Macleod Gazette	6
	Pincher Creek Echo	11
Central Region	Banff Crag & Canyon	25
	Canmore Leader	35
	Canmore Rocky Mountain Outlook	72
	Drayton Valley Western Review	10
	Edson Leader	20
	Hinton Parklander	39
	Jasper Booster	24
	Rocky Mountain House Mountaineer	85
	Sundre Round-up	24
Northwest Region	Beaverlodge Advertiser	9
	Fairview Post	20
	Falher Smoky River Express	9
	Fox Creek Times	42
	Grande Cache Mountaineer	22
	Grande Prairie Daily Herald-Tribune*	173
	High Prairie South Peace News	16
	Peace River Record Gazette	11
	Rycroft Central Peace Signal	77
	Slave Lake Lakeside Leader	29
	Slave Lake Scope	23
	Swan Hills Grizzly Gazette	10
	Valleyview Valley Views	21
	Whitecourt Star	39
Total Number of Articles		**1458**

*Newspapers that are circulated daily

Figure 2 illustrates the total number of articles published by geographic region defined in Table 2.

Figure 2 Total Number of Articles Collected from Each Newspaper

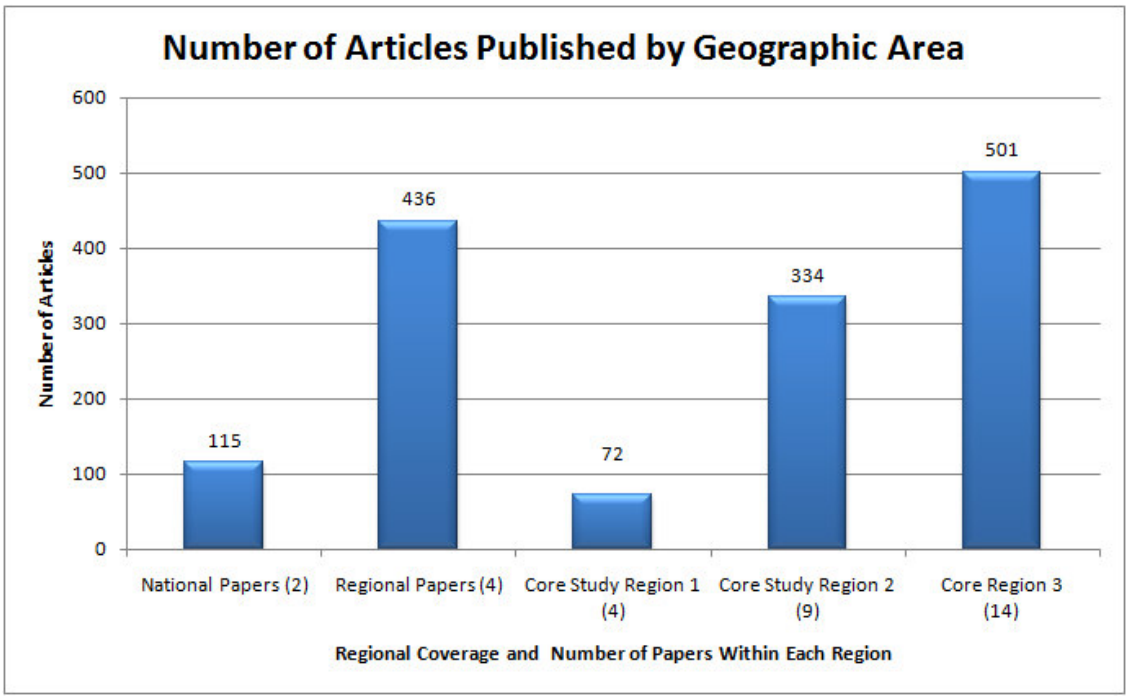
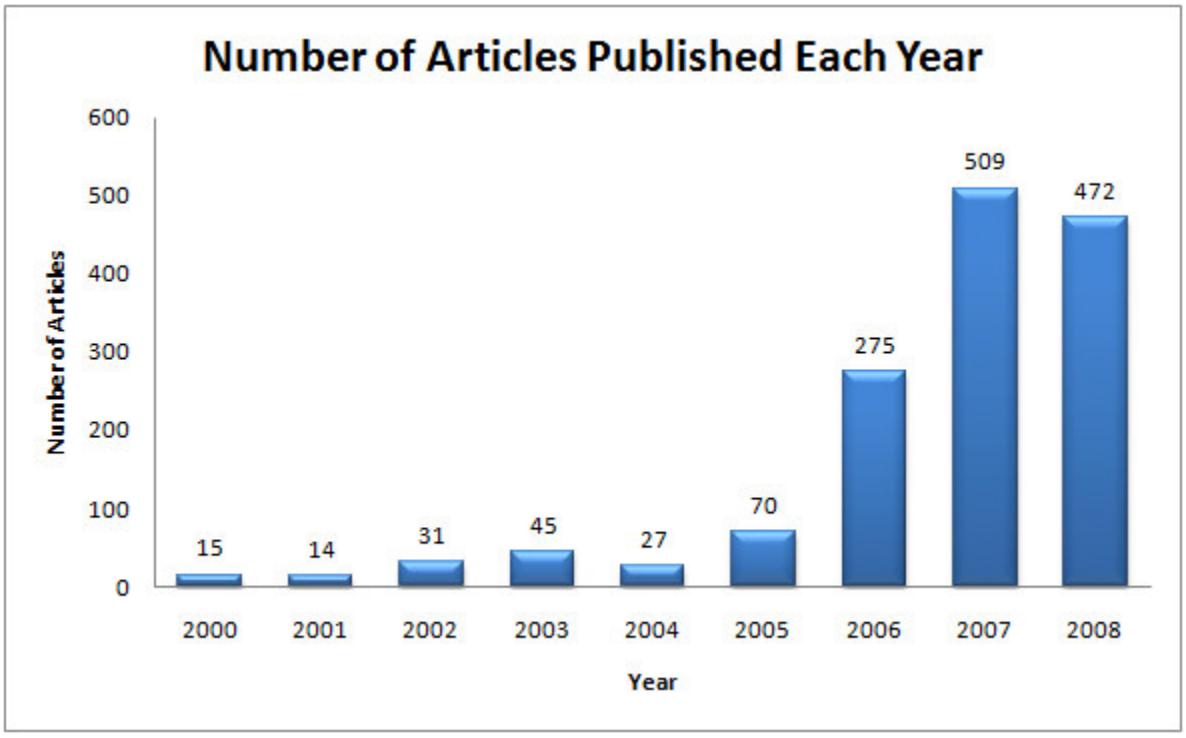


Figure 2 shows that Core Region 3 (northwest) had more articles (501) that mentioned the mountain pine beetle than the national, regional, or other study regions. However, 173 of these appeared in the Grande Prairie Daily Herald Tribune which is published daily. The 13 weekly papers in this region published the remaining 328 articles. This is similar to the number of articles (334) published in the 9 weekly papers in Core Region 2 (central). The regional daily papers from Edmonton and Calgary also published a significant number of articles (436). Core Region 1 (southwest) published fewer articles than the other regions.

3.1.2 Articles Examined Through Time

Figure 3 highlights the trend in reporting from 2000 to 2008. Between 2000 and 2005, the mountain pine beetle issue was not significantly reported in Alberta. The majority of the articles that were published during that time focused on issues that were emerging from British Columbia. Articles that focused on British Columbia discussed the impacts of the mountain pine beetle infestation. Some of these issues were the size of the infestation either described in terms of geographic area, or wood volume, or dollar value of affected wood. Other topics that emerged from the situation in British Columbia were how the province intended to manage the infestation and the issues that were arising from those decisions. These included increasing the allowable limit of logging within British Columbia in order to limit the outbreak and use already infested trees. An issue that arose from this strategy was from small logging companies who were concerned that contracts would go to the larger companies (Grande Prairie Daily Herald Tribune, 2001 08 21). There were also concerns for the forestry-based communities within the Interior of British Columbia. As the trees became infested and were dying the

Figure 3 Number of Articles Published Each Year



environmental and economic impacts are poised to be a problem for many years to come because once the trees have died-off it will take another 80 years for the forests to return.

Another issue highlighted in these early articles was the ban of tree imports into Alberta. At that time the government of Alberta was concerned with the mountain pine beetle infestation in British Columbia and were taking proactive steps to reduce the vulnerability of forests in Alberta. This included banning loads of commercial logs into Alberta because the beetles could be transported into the province in infested trees and spread to Alberta's forests. These articles also advised the public not to transport wood from outside the province. The concern was that as people travelled for summer vacations and camped that they may transport infested firewood into Alberta.

Although these early articles generally focused on the situation in British Columbia there had been a small pocket of infestation in Alberta. The first pine beetles identified in Alberta during this infestation were in Banff National Park in 1998 (Calgary Herald, 2001 07 18). At first the infestation was very small, only 10 trees, however in 2001 there were between 500 and 700 trees infested (Calgary Herald, 2001 07 18). In 2001 the priority was to confine the spread of this infestation to areas within Banff National Park (Calgary Herald, 2001 07 18). In order to do that Parks Canada and the government of Alberta modified existing prescribed burn schedules to focus on areas vulnerable to the mountain pine beetle (Calgary Herald, 2001 07 18). Parks Canada also used pheromone baiting to limit the beetles dispersal onto provincial lands (Banff Crag and Canyon, 2008 03 11). Parks Canada and the Government of Alberta also requested that anyone visiting the National Parks, Banff and Jasper, and Kananaskis Country (west central Alberta) be on the lookout for signs of mountain pine beetle infestation.

Figure 4 illustrates the number of articles published between January 2006 and December 2008 in more detail. This time period is highlighted because prior to 2006 newspaper articles largely identified the mountain pine beetle as a problem in British Columbia. In 2006 as the pine beetle was making its way into Alberta the media

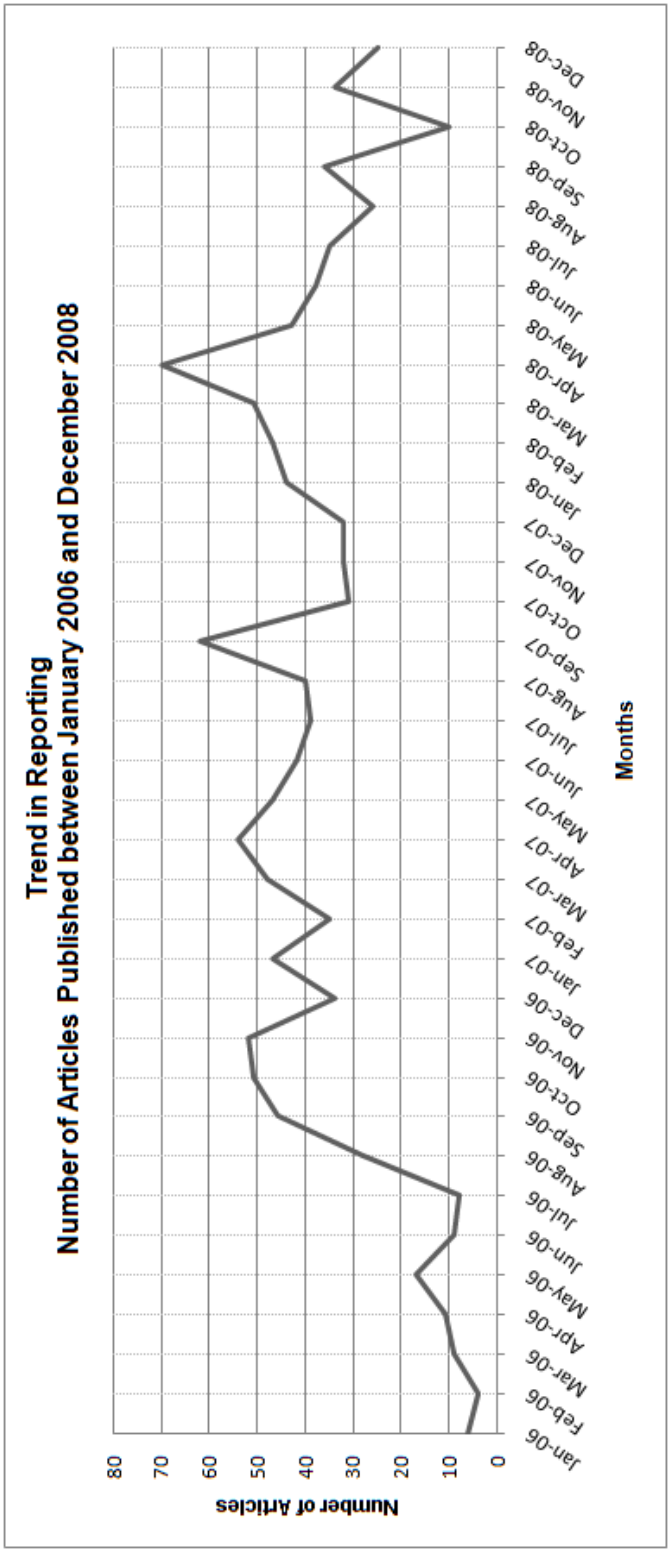
coverage shifted its focus to the situation in Alberta. The major topics highlighted from 2006 to 2008 are presented in the next section of the results.

The first significant factor illustrated by the graph is the increased number of articles published after July 2006. In July 2006, there was a massive flight of mountain pine beetle into northern Alberta (Government of Alberta, 2006). As a result the number of mountain pine beetle infested trees jumped significantly from 19,000 in 2005 to 150,000 by mid-October 2006 and by the end of 2006 the number of beetle infested trees was between 800,000 and 1.5 million (Government of Alberta, 2006). Also attributing to the increase was a large number of articles printed in September 2006; 70% of which were published in the main regional papers (from Edmonton and Calgary) and newspapers in the northwest study region. This may be explained by the fact that within the northwest study region, primarily around Grande Prairie and Fairview, this was the first time mountain pine beetle had been detected and it was the area affected by the mountain pine beetle flight from British Columbia (Government of Alberta SRD, 2006).

By 2007, the number of infested trees had jumped to around three million. This large increase in the mountain pine beetle population corresponds with an increase in newspaper media coverage (Fig. 3) when the number of news articles peaked at 509. Many of the articles written in 2007 focused on this rapid population growth. Another area of focus within the articles was the management strategies that were to be employed in the various regions. With the discussion of mountain pine beetle management strategies in the media there were also notes of concern countering the governments intended plans to deal with the pine beetle. Generally these opinions were noted by environmental organizations (within the primary articles) and concerned citizens (in Editorials and Opinion pieces). Management strategies and the concerns related to these strategies are described in section two of the results.

Figure 4 Trend in Reporting:

Number of Articles Published between January 2006 and December 2008



The second highest peak in the number of newspaper articles occurred in September 2007 (Fig. 4). One of the reasons for the increase in articles could be that this time of year corresponds with the signs of infested trees, particularly the red tree stands. At this point in time some management plans, such as prescribed burns, were being highlighted in the media.

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The third and largest peak of media articles occurred in April 2008, 70 articles. These articles are varied in focus but there are two themes to note that may explain the increase in coverage. The first explanation is that in April 2008 the Alberta provincial budget was announced and funding had been allocated by the province for mountain pine beetle management. As a result, many news articles are related to the funding announcement. The second factor that influenced the increase in articles is that April is at the end of the winter season. Cold winter temperatures play a role in controlling mountain pine beetle populations and many of the articles discuss how cold it had been and what impacts that the cold may have had on the mountain pine beetle mortality.

3.2 Themes

The following section identifies the main themes (or topics) that were identified and described within the newspaper articles. As stated in an article, “In a sense, the story of the mountain pine beetle encompasses the environmental challenges that lay before Alberta in 2006. From climate change to water to logging to grizzly bears, the beetle weaves a path through all of these theme,” (Calgary Herald, 2006 12 31). These themes have been summarized from the articles and presented in the following section. It is important to note that these topics appeared, to some degree, in every study region from 2000 to 2008. See Appendix C for a sample of codes used to determine the major themes for this report. The themes included are: the mountain pine beetle, natural management, historical infestations, climate change, aims and goals of government, Parks Canada, municipal government and community response, forestry industry, mountain pine beetle management strategies, and concerns regarding the government’s MPB management strategies.

3.2.1 The Mountain Pine Beetle

In the media the mountain pine beetle is described as the “most destructive insect for North America's forests” (Edmonton Journal, 2002 06 19).

The mountain pine beetle is a very small black beetle, the size of a grain of rice, indigenous in western Canada. The majority of articles describe the mountain pine beetle in an extremely negative way but in a few articles it was noted that generally the mountain pine beetle is a beneficial species because it plays a role in culling weakened and older trees (Calgary Herald, 2007 09 08). However, as a result of mild winters and an abundant food supply (mature lodgepole pine) the mountain pine beetle has become an epidemic.

In many articles some degree of description is given about the mountain pine beetle but very few outline the details that explain what characteristics of the beetle make it such an efficient killer. Below is a comprehensive summary of the mountain pine beetle that appeared in the newspaper articles.

A major contributor to the spread of mountain pine beetle in Alberta was a flight of the beetles into northern Alberta from British Columbia. Flight occurs in July and August as pine beetles are looking for mates and new trees to infest. All species of pine including Lodgepole, Jack Pine, Scots pine, and Ponderosa Pine are vulnerable. In both Alberta and British Columbia the primary food source has been mature lodgepole pine. Once a beetle has found a suitable tree, it will live in that tree for the remainder of its life and lay eggs.

The female of the species begin the attack by finding the trees. Once they have found the tree and begin eating, they emit a pheromone to attract male beetles and the males in turn emit a pheromone to attract more females. Soon there is a swarm of insects attacking a tree. As the beetles begin to eat and burrow into the tree there are two techniques that the beetles use to kill the tree. The first is that as female beetles burrow horizontally into the tree they create tunnels or galleries and these tunnels cut off the flow of nutrients and water within the tree. The trees defence to this attack is to produce a pitch that carries chemicals toxic to the beetles. If the number of beetles attacking the tree is low then the tree may be able to fight off the beetles. However, "The insects have an incredibly sophisticated set of chemical and biological weapons to get past the tree's defences" (Calgary Herald, 2003 07 14). The second way that pine beetles kill trees is by infecting the tree with a fungus, called blue-stain fungus. Beetles carry this fungus in their mouths and as the beetles chew into the bark the fungus spores grow and it disables the trees ability to produce the pitch. Ultimately, the growth and feeding of the beetles slowly starves the tree, depriving it of nutrients and water. Once a tree has been attacked it will usually die within a year and an infested tree can produce enough beetles to infest approximately five other trees. The first most visible sign of pine beetle destruction is the red forest that is left in its wake.

3.2.2 Natural Mortality

Two types of natural management that can kill or limit the beetle were reported. The first was natural predators such as woodpeckers and the second, was cold temperatures. It is important to note that amongst the articles there is inconsistency in

reporting what temperature needs to be reached and the length of time that the temperature needs to be maintained. Within one newspaper an article stated that temperatures of -40C for about a week need to be reached (Calgary Herald, 2005 03 05) and in another article that a temperature of -38C for 96 hours (Calgary Herald, 2004 10 26) and in yet another article that a temperature around -30C for a month is needed (Calgary Herald, 2005 03 19). These inconsistencies may be reflective of scientific and expert uncertainty regarding the exact conditions required for mortality.

Within the newspaper articles two explanations were identified as helping the mountain pine beetle survive the cold temperatures. The first is a physical characteristic of the mountain pine beetle. In order to deal with cold winter temperatures mountain pine beetles can produce a type of “antifreeze” that can protect them from the cold weather potentially explaining the discrepancies in the media reports. Secondly, cold temperatures can be more effective during specific times of year. For instance, during the fall before the beetle has had a chance to properly “winter” itself the beetle may be more vulnerable to a cold snap.

3.2.3 Historic Infestations

Although the current mountain pine beetle infestation has been described as the most destructive infestation western Canada has ever dealt with it is not the first time the mountain pine beetle has been a problem. The last major outbreak occurred between 1977 and 1985 in south-western Alberta. Prior to that there had been an infestation in the 1940s. Both of these infestations were stopped by severe, cold winter temperature. The concern with the current infestation, as noted in many of the articles, is that during there have not been any significant cold temperatures or if there have been cold temperatures, they have not been maintained for a long enough period to have significant impact on population numbers. The current infestation also differs from past infestations because the pine beetles have extended beyond their historical range. During the current infestation, the pine beetle has expanded into northern Alberta, a region that has never dealt with the pine beetle.

According to the experts there are two main factors that have been helping the mountain pine beetle survive and thrive during this infestation. These factors are older trees (abundant food source) and a climate that favours their survival (mild winters).

3.2.4 Climate Change

Climate change and global warming is another major theme in the media. This issue was noted as an area of concern in many articles as the infestation has been aided by milder winter temperatures. In the media these mild winters are presented as an indicator of global warming. It also serves to explain how the pine beetle has been able to extend its range into northern Alberta where typically colder temperatures has kept the pine beetle out. "The mountain pine beetle is the best example in Canada of a species that appears to be benefiting from climate change," stated Hugh MacIsaac, a University of Windsor biologist (Calgary Sun, 2007 10 29). Some articles go as far as to portray the mountain pine beetles as a symbol of climate change.

Another concern relating to climate change is that Jack pine, which thrives in the vast northerly or boreal forests of Canada, may become susceptible to the pine beetles as they search for alternate food sources. The implication is that as pine beetles adapt, the boreal forest may be the next vulnerable ecosystem. If this transition occurs before the mountain pine beetle population crashes, the pine beetle may be able to spread all the way to the east coast of Canada within the boreal forest. Dr. Allan Carroll, one of Canada's foremost mountain pine beetle experts with the Canadian Forest Service stated, "Certainly the climatic suitability's of the boreal forest, based on the climate change projections, looks as though the mountain pine beetle can spread, and will spread across, the boreal in the next several decades but we're not sure what sort of impacts it will have" (Calgary Herald, 2007 03 03a). The concern is that the pine beetles may be of more detriment in the boreal forest because the vegetation has not evolved defences against the pine beetle.

3.2.5 Economic Impact in British Columbia

In western Canada the mountain pine beetle infestation has been the worst in British Columbia. Many of the early articles published in Alberta were reporting on the situation in British Columbia, however, articles regarding the situation in British Columbia were not limited to that timeframe. Articles also focused on scale of the infestation and the economic costs within British Columbia. The most affected area has been the B.C. Interior. The infested area covers 13.5 million hectares of lodgepole pine in the province — an area more than four times the size of Vancouver Island. It is estimated that by 2015, 80% of the lodgepole pine forest in B.C. will be destroyed and billions of dollars will have been lost. This infestation has and will continue to have devastating impacts in many interior communities. However, the articles published in Alberta did not detail specific impacts in British Columbia other than to say that approximately $42 billion dollar worth of trees have been infested (Calgary Herald, 2006 05 26).

3.2.6 Aims and Goals of Government

As the infestation expanded and moved from British Columbia into Alberta, Sustainable Resource Development and Parks Canada (the two major players in mountain pine beetle management in the articles) have been monitoring and tracking the spread of the mountain pine beetle in Alberta.

The mountain pine beetle is a problem that the province has dealt with in the past. During this current infestation in western Canada the expectations were that Alberta would experience this problem before the infestation subsided in British Columbia. However, in 2005, as the government Alberta government was partnering with British Columbia to fund and manage the issue along the border there were still questions as to whether the pine beetle would be a significant problem in Alberta. “Some may be sceptical about the potential devastation. Premier Ralph Klein thought it was a joke when he first heard about it,” (Edmonton Journal, 2005 11 03). After meeting with B.C. Premier Gordon Campbell he stated, “I laughed, as many of you did, when this item was first brought up,” and he continued, “I never realized how serious

this issue is. It has cost millions and millions of dollars to the B.C. economy," (Edmonton Journal, 2005 11 03). At the same time other government officials were well aware of the risk posed to Alberta. A spokesman for Sustainable Resource Development stated, "There are about two million hectares of pine forest at risk along the eastern slopes of the Rockies and they have a commercial value of $23 billion" (Edmonton Journal, 2005 11 03).

During that time, in 2005, it seemed that there was anticipation that the infestation may become more of a problem in Alberta. What took many government officials and experts by surprise was the speed with which the pine beetle infested trees within the province just a year later. "We just had this massive blow-over from the Prince George area…We never thought they would hit us this hard, this fast," a senior forester with Weyerhaeuser Co. Ltd. stated (The Globe and Mail, 2006 10 19). Within the same article it was noted that "While this infestation has been slowly spreading across the Rocky Mountains in Alberta since 2002, the recent outbreak in Grande Prairie and surrounding areas profoundly worries the forestry industry and provincial government because the beetle is heading farther north than it was expected to go" (The Globe and Mail, 2006 10 19). The infestation in the northern Alberta began in spring/summer of 2006 when a "swatch of beetles, so large it showed up on radar, rode a wind gust over the mountains from B.C." (Grande Prairie Daily Herald Tribune, 2007 11 27) and "some residents near Grande Prairie said the sky was darkened with bugs, and they sounded like rain on the roof" (Edmonton Journal, 2007 03 07).

In 2007 it seemed that government officials were concerned about the problem within Alberta. One Alberta forest health officer stated, "One lesson learned, is the MPB infestation is underestimated" (Fox Creek Times, 2007 05 16). It was also emphasized that the government would take aggressive steps to prevent the problem from becoming any worse. The primary goal of the provincial government is to control the situation in Alberta and prevent the pine beetle from spreading beyond Alberta's borders.

Because the Government of Alberta is trying to avoid the environmental and economic impacts that have occurred in British Columbia, one of the first strategies was to consult experts who had been making decisions related to pine beetle management

in B.C. to gain insight and learn from their experiences. The general sentiment from these experts and the advice that they passed along to Alberta officials was to be aggressive at the beginning of the infestation because once an outbreak begins it will be difficult, if not impossible, to stop. John Rustad, an MLA from British Columbia told Alberta officials, “Don’t be timid. If this thing gets happening in Alberta…this thing could go right across the country” (Calgary Herald, 2006 05 27). This idea was supported by Rob DeBoice, British Columbia’s beetle boss, who said “If I had to do it all over again I’d be doing exactly what these guys are doing. We’ve got to burn them now while we still can” (Canmore Leader, 2007 09 04).

As the numbers of mountain pine beetle increased government spokespeople often emphasized that they did not want to see the problem reach the levels that it had in British Columbia. Therefore, government management strategies were aggressive and funding support was significant. As a result of increasing pine beetle numbers in 2007 the province declared a state of emergency (Calgary Herald, 2007 04 12). By declaring a state of emergency the government could access additional funds from both the provincial and federal government to manage the problem.

Government initiatives also seemed to be motivated and justified by the potential economic impact of a mountain pine beetle infestation. Specifically, impacts to the forestry sector which is the third largest industry in Alberta. Many articles described the current problems that the forestry industry had been dealing with, not limited to mountain pine beetle, and how those impacts could have devastating consequences to forestry-based communities of which there are 50 or so in Alberta. As a result the government made forest companies a partner in beetle management.

The Government of Alberta also created a Mountain Pine Beetle Advisory Committee in May 2006. The advisory committee includes representatives from federal, provincial and municipal governments, First Nations, industry, environmental groups and members of the public. The purpose of the group was to provide advice and input on the issues and solutions related to the beetles in Alberta. The Committee’s viewpoint as presented in the media was support for aggressive management strategies

because the consequences of doing little seemed to carry too great a risk and they did not want the impacts in Alberta to be the same as those in B.C.

However, in 2007, Sustainable Resource Minister Ted Morton stated, “I don’t pretend for a minute that what we’re doing is a 100 per cent cure-all to wipe out pine beetle...but what we can do is slow it up, control it, slow up the spread. Then with an assist from Mother Nature, either in terms of cold weather or the decline in intensity over in B.C.---which we think we’ll see in another five years as the beetles sort of eat themselves to death---we can buy that time” (Calgary Herald, 2007 08 30). To date the goal of the Alberta government is, “This is the front line –our strategy is to hold the line and be aggressive until those beetle populations start declining,” said Dan Lux, the province’s pine beetle co-ordinator, “We are not done this fight yet. We’re going to have beetles for the next several years and our management goal is to be very aggressive while the beetle populations are relatively small to keep them from outbreaking,” (Calgary Sun, 2008 08 03).

3.2.6.1 Funding

Funding was also a major topic referenced in the news articles. Funding was an important topic in relation to the mountain pine beetle issue because it illustrated that the government was committed to providing the resources to manage the pine beetle infestation.

Funding for mountain pine beetle management has been distributed by each level of government. A spokesperson for Alberta Sustainable Resource Development, Michel Proulx stated that “The mountain pine beetle issue is not just a B.C. issue, not just an Alberta issue, it’s a Canadian issue” (Calgary Herald, 2007 02 05). By April 2007 the federal government had pledged $1 billion dollars over 10 years on a national scale to combat the infestation and fight the spread east (Calgary Herald, 2007 04 12). On a provincial scale the Alberta government spent approximately $138 million between 2006 and 2008 to fight mountain pine beetle in an attempt to spare approximately $23 billion worth of commercial timber in Alberta (Calgary Herald, 2008 04 05) as well as prevent the spread of the pine beetle into eastern Canada.

3.2.6.2 Government Messages

The provincial government also conveyed messages to the public regarding what they can do to help prevent the spread of mountain pine beetle if they see an infested tree on their own property or within parks and other wilderness areas. In June 2008, advertisements developed by the Government of Alberta were printed in newspapers (See Appendix D). These advertisements included information to identify mountain pine beetle infested trees. The three characteristics that were outlined were (1) Cream-coloured resin from mountain pine beetle entry holes, (2) Greyish-blue stained sapwood, and (3) Small creamy-white larvae/pupa under the bark. Photos of what to look for were also included. Publishing the articles in June is an important factor because the beetles begin to take flight and spread in the later summer months. If the beetle infested trees can be identified prior to the flight then the trees and beetles can be destroyed. By bringing awareness to the mountain pine beetle issue the public could play a role in mountain pine beetle management. Advertisements also included information on what the public can do to help reduce the spread of the mountain pine beetle. These actions include: burning or chipping all infested wood, debarking the tree and burning the bark or tarping the wood from June 15 until October 1 (when the beetles fly). The advertisements also included a website where people could access more information. Other advertisements or notices included information regarding the signs of infestation to look for but they did not include what individual property owners could do, rather there was usually a phone number provided to report an infested tree.

3.2.7 Parks Canada

Parks Canada was the first agency to deal with the current mountain pine beetle infestation as it was first detected in 1998 in Healy Creek and Brewster Creek in Banff National Park (Calgary Herald, 2008 02 16). The first management strategies that were employed by the Park were to modify prescribed burn plans to limit the infestation to within the Park preventing the spread eastward onto provincial lands. National Parks in Alberta are particularly vulnerable because there are large numbers of lodgepole pine within the borders and as stated by one Parks official, “It’s about being good

neighbours," (Canmore Rocky Mountain Outlook, 2008 02 07). However, the goal of Parks Canada is to contain the pine beetle not to completely eradicate the beetle because it is an endemic species and fills an ecological role (Canmore Leader, 2008 03 19).

The overall attitudes represented by the Government of Alberta and Parks Canada is that the mountain pine beetle is a significant problem that could have dire consequences within Alberta and that Alberta does not want potential mismanagement of the situation to lead to the spread of the pine beetle across Canada.

3.2.8 Municipal Government and Community Response

Due to the scope of the mountain pine beetle issue and the resources needed to deal with its management, communities and municipalities within Alberta joined forces to share resources to strategize and conduct mountain pine beetle management.

There are two such collective municipal groups. The first is the Grande Alberta Economic Region (GAER). GAER is an alliance of 14 municipalities stretching from Drayton Valley and Brazeau County in the east to Jasper and Grande Cache in the west. One goal of this group is to assess the risk posed by the beetle to the area's economy and to help communities prepare and adapt. As the beetle began to spread into west-central Alberta GAER launched an initiative to help its member communities prepare for the beetles' potential impacts.

The second such group is the South Peace Municipality Group. The South Peace Municipality (SPM) group consists of the County of Grande Prairie, Birch Hills County, Saddle Hills County, Municipal District of Greenview and the Municipal District of Spirit River. Collectively the SPM covers an area of over a million hectares. In 2006, these 5 municipalities formed a working partnership to coordinate efforts to battle the mountain pine beetle infestation in their areas. The County of Grande Prairie is the managing partner of the plan.

3.2.9 Forestry Industry

The mountain pine beetle infestation has had, and is anticipated to have negative consequences on the forestry industry within Alberta. In the majority of articles relating to mountain pine beetle in the context of forestry, the mountain pine beetle was usually a secondary or supplemental topic. The reason is that the forestry sector in Alberta has been experiencing extended financial difficulties. These difficulties are a result of lower product prices, soaring costs, softwood duties, the appreciation of the Canadian dollar and labour shortages. The mountain pine beetle is only serving to exacerbate the problems that already exist in the industry. These factors, either individually or in combination, were mentioned in approximately 98 newspaper articles.

Within Alberta there are approximately 50 communities that rely on forestry. These communities are at risk of suffering from the declines in forestry. The risk is that mills within these communities may close, resulting in unemployment and increasing economic uncertainty for municipalities.

The issue of mountain pine beetle was also discussed in the context of how the forestry industry was helping manage the problem. Approximately 77 articles discuss the management of mountain pine beetle by forest companies. Within Alberta “The provincial department of Sustainable Resource Development has asked forest companies to change their harvest plans to help contain the beetles from moving in from British Columbia” (Drayton Valley Western Review, 2007 11 06). Ken Vanderwell, operator of Vanderwell Contractors (1971) Ltd. and current president of the Alberta Forest Products Association highlighted the significance of the pine beetle problem to the forest industry by stating, “Mountain pine beetle is the mad cow disaster of the forest industry. So far the industry has been able to respond to infestations by altering harvest plans to target susceptible stands, but this also means higher operating costs” (Slave Lake Scope, 2007 04 14).

Some good news with respect to trees damaged by the mountain pine beetle is that the wood is still harvestable. So “Alberta’s forestry companies have been asked to focus their logging on infested pine stands, rather than healthy ones” (Calgary Herald, 2006 11 10). This has also led to the development of technologies and alternative uses

for the wood. There are not many articles that relate very positively to the mountain pine beetle but there were a few articles, 37 in total, that highlighted the opportunities for people to benefit from this problem. For example, the blue-stained wood can be used by artists, people have built homes from the infested wood, and new research has been examining the strength of using the damaged wood in other construction applications. The Alberta Newsprint Company in Whitecourt, Alberta had partnered with the Alberta government to develop new technologies to utilize the damaged wood to turn it into high grade paper.

3.2.10 Mountain Pine Beetle Management Strategies

In order to deal with the magnitude of the mountain pine beetle infestation many different management strategies have been used. Below is a description of each of these strategies as they have been presented in the newspaper articles, as well as a summary of the positive and negative aspects of these strategies.

3.2.10.1 Surveying

The first step in mountain pine beetle management is surveying for infestation. Within the newspaper article this step in the management process was mentioned the most in approximately 139 articles. Surveying is an important step in mountain pine beetle management because it allows forest managers to track changes in the mountain pine beetle populations and helps in prioritizing management areas. Surveying can be done on the ground as well as in the air. Aerial surveys are generally used to access the damage that has already been done because from the air the red trees are those which have already died. Surveying from the ground requires workers and contractors trekking into the forest to look for signs of pine beetle infestation. The signs include masses of the sticky resin, called pitch tubes, where the beetle tunnels into the pine. Trees are then marked or recorded on GPS units and then management decisions can be made.

3.2.10.2 Pheromones

Pheromones affect the spread of mountain pine beetle in two ways. Mountain pine beetle emit a pheromone that draw other mountain pine beetle to the tree indicating that there is a food source. Pheromones are also emitted by the beetles that repel other mountain pine beetle's indicating the tree is already infested and there is no space for more beetles. This pheromone is called verbenone. Pheromones were mentioned as a management strategy in approximately 58 newspaper articles.

Both the Government of Alberta and Parks Canada have used pheromones to bait and trap the pine beetle. Baiting involves attaching a special bag, which emits pheromones, to a tree. The insects then gravitate towards a single tree, which is cut down and burned after it is fully colonized. Parks Canada has been using this technique since 2001 (Banff Crag and Canyon, 2008 03 11). Baiting is also used as a method of surveying mountain pine beetle. The downside of this technique is that it can be very costly and it requires a lot of manpower to set the baits. It is also best suited for smaller areas of infestation.

3.2.10.3 Fire Suppression and Prescribed Burns

Some articles that focused prescribed burns were also articles that discussed the negative consequences of fire suppression. As stated in one of the articles fire suppression was a result of early government policy that was driven by the aesthetics of the forest (Banff Crag and Canyon, 2008 08 05). In the newspaper media, government and Parks officials recognize that previous fire suppression techniques have had negative impacts on modern forests. As a consequence the forests we see today have a disproportionate number of older, larger trees (Calgary Herald, 2007 04 13).

In relation to the mountain pine beetle outbreak, fire suppression policy has been highlighted as one of the primary reasons the mountain pine beetle has been thriving. The consequences of fire suppression were highlighted in 59 newspaper articles. As a result of fire suppression in Alberta the lodgepole pine, the mountain pine beetles primary food source, have become an abundant forest species. Both Parks Canada and

the Government of Alberta support the practice of prescribed burns because fire is viewed as a natural process that is needed to maintain a healthy, balanced ecosystem.

Within the newspaper articles prescribed burns are described as serving multiple purposes. In addition to mountain pine beetle management or prevention, fire is also used to rejuvenate the ecosystem (restore natural fire cycles) which leads to diversifying vegetation and benefiting habitat for wildlife (specifically grizzly bears, elk and bighorn sheep). Prescribed burns are also described as creating fire breaks that reduce the vulnerability of communities to large scale fires.

In the media Parks Canada is most often referenced in terms of prescribed burning within the National Parks. However, prescribed burns in National Parks are not strictly for mountain pine beetle management. Each Parks Canada planned burn goes through a peer-review process with an environmental assessment and is open to public scrutiny. The approval process normally takes at least a year. Throughout 2007 and 2008 although there were prescribed burns scheduled to take place many had to be postponed because of cold, wet weather. Prescribed burns are usually scheduled during the fall and spring to limit the fire risk.

3.2.10.4 Logging and Clear-cutting

Logging and clear-cutting were identified as being potential forms of mountain pine beetle management. With respect to logging activities they were discussed in terms of mitigation, clearing stands of trees and creating a forest break at the leading edge of the infestation, and recovering or salvaging already infested trees. The majority of articles that described logging as a method of mitigating the spread of the pine beetle were in reference to the state of the infestation in Alberta. However, the majority of the articles that discussed logging in terms of recovery or salvage were reflective of the stage of the infestation in British Columbia. In British Columbia the government encouraged salvage logging so the trees could be used before they rotted (National Post, 2008 04 24). The media also emphasized that as the infested trees die the timber begins to dry posing a significant fire hazard. These trees also burn at a higher temperature (Canmore Leader, 2007 09 05) and are “drier than kindling”, as stated by

Alberta Sustainable Resource Development spokesperson, Duncan MacDonnell (Canmore Leader, 2007 10 31). Logging is seen as a viable option because it reduces the risk of forest fires.

Logging of susceptible forests was discussed in the context of the government allowing and even requesting forest companies to log these areas. Typically these areas were already scheduled for logging but the schedules were expedited to deal with mountain pine beetle infestation. Logging and clear-cutting of the trees was also justified by citing the impacts in British Columbia, "I say to Albertans ... if you see us in the park removing trees, it's about pine beetle mitigation. We are trying to stop this infestation because in B.C. we know it destroyed 80% of their pine forest eventually," said Alberta Parks Minister Cindy Ady (Calgary Sun, 2008 11 28). Within the same article it is noted that the government uses the term "stand-level harvesting" for logging/clear-cutting practices (Calgary Sun, 2008 11 28).

3.2.10.5 Selective Cut and Burn and Heli-logging

Other techniques that are reported for the management of mountain pine beetle are selective methods of cut and burn, and heli-logging. Cut and burn techniques require contractors and personnel to go into the forest and cut down infested trees which they then cut into small pieces and burn on-site. Heli-logging is the process where individually-infested trees are felled by chainsaw and transported by helicopter to centralized sites and burned to kill the MPB larvae living under the tree bark. The advantages of using helicopters are their speed and efficiency. The benefit cited for both cut and burn on site and heli-logging techniques are that they leave less of a footprint on the environment.

3.2.11 Concerns Regarding Mountain Pine Beetle Management Strategies

The majority of articles that spoke to the concerns residents have were editorials, opinion pieces, and letters to the editor. There was a total of 56 such articles distributed across the national, regional, and study region newspapers (Table 3). Concerns were

expressed since 2000 but have increased in recent years peaking at 22 articles in 2008 (Table 4).

Table 3 Editorials, opinion pieces, and letters to the editor published by region

Geographic Area	Number of Editorials, opinion pieces and letters to the editor
National Papers (2)	9
Regional Papers (4)	17
Core Study Region 1 – Southwest (4)	10
Core Study Region 2 – Central (9)	9
Core Study Region 3 – Northwest (14)	11
Total Number	56

Table 4 Distribution of editorials, opinion pieces and letters to the editor through time

2000	2001	2002	2003	2004	2005	2006	2007	2008
1	1	1	3	0	2	13	13	22

However, concerns were not limited to these types of articles; they were also noted as counter-points in other news articles where the journalists sourced multiple opinions. Within other newspapers articles concerns about management strategies were highlighted in approximately 63 news articles. These articles critiqued the government response to the situation and their concerns with specific management techniques. Environmental groups/organizations, such as the Alberta Wilderness Association, Greenpeace, Bragg Creek Environmental Coalition, Federation of Alberta Naturalists, Canadian Parks and Wilderness Society were sources of criticism within the articles. The concerns of residents and business owners were also highlighted within the editorials, opinion pieces and letters to the editors. Many of their concerns parallel those of the environmental groups.

Some of the concerns expressed by citizens and environmental groups were focused on environmental repercussions of mountain pine beetle management. However, concerns about management strategies may not have been limited to just these groups. As reported “Surveys conducted in the plan indicate that the public

supports a reactive plan to the beetle more than a proactive approach, meaning that people are wary of controlling procedures like prescribed burns and tree thinning" (Banff Crag and Canyon, 2006 08 22). Criticisms of logging or clear-cutting forests are that these practices will negatively affect watersheds by causing increased erosion and decreased water quality. Calgary-Varsity Liberal MLA Henry Chase was concerned about proposed logging activities stating, "This is a menacing, long-term attack on our watershed. This is our recreational backyard and our watershed backyard. It cannot become just a pile of lumber" (Calgary Herald, 2006 06 24).

There is also concern that wildlife like elk, grizzly bears, wolves, whitetail deer, mountain goats, will suffer from disturbances in the forest and that the government has not taken that into account.

Other concerns were related to communities and how industries such as tourism will suffer. For one resident the prospect of logging and burning trees near recreational areas in Crowsnest Pass could be extremely detrimental to the local tourism economy. "We have operated an environmentally-respectful trail-riding business on the Crowsnest Mountain for 16 years. Ours is but one of many that will be ruined and bankrupted by clear-cut logging in the area. Fishing guides and tackle shops, bed and breakfasts, resorts, campgrounds – indeed, anyone whose clients are drawn by the natural beauty and bounty of the area will be seriously affected. Gas stations, gift shops, restaurants, guest lodges and other businesses that get any of their income from tourism will certainly see a decline in business as the tourists find other more appealing areas to enjoy," David Seal, concerned resident (Crowsnest Pass Herald, 2008 11 04). The argument presented is that tourists come to the area to enjoy the beauty of the outdoors. However, if logging and/or burning was allowed to take place then tourists will find other areas to enjoy. Parks Canada faced criticism for igniting prescribed burns and tourists being deterred because of the smoke (Calgary Herald, 2003 09 12).

Some opinions were also focused on larger issues, specifically global warming and climate change, indicating that the mountain pine beetle is simply a symptom of a much larger problem.

Other articles expressed a general distrust in the government to manage the problem. These opinions were highlighted by various environmental organizations, "Our biggest concern is we really don't believe there is a true mountain pine beetle plan in Alberta," said Glen Semenchuk of the Federation of Alberta Naturalists (Calgary Herald, 2007 03 03).

The vice-president of the Alberta Wilderness Association was concerned that the money available for mountain pine beetle management would be used to cut down forests and reduce habitat, "I don't know the details of the program, but if it's fighting pine beetle it's money that's being unwisely spent. . . . The problem is our land management, climate change and fire management" (Calgary Herald, 2008 09 15).

One area that was of specific concern to some environmental groups was Willmore Wilderness Park, located north-west of Jasper. The Alberta Wilderness Association stated, "We are concerned that Willmore could be sacrificed as a fireguard and/or insect barrier to protect private financial interests outside the park" (Edmonton Journal, 2006 05 27).

Generally, the opposition from environmental groups is in response to logging or clear-cutting large areas of forest and the speed with which decisions were being made. “We were a bit concerned that things were going to be rushed through,” Nigel Douglas, a conservation specialist with the Alberta Wilderness Association (Calgary Herald, 2006 09 21). The concern from environment groups is that the government is exaggerating the problem and spreading fear to encourage support for the management strategies that they have chosen. Some even blame logging for the mountain pine beetle problem. “The Globe should investigate into the causes of this outbreak, one of which is logging. According to various studies, these beetles thrive in the stumps of logged areas, as Alberta has found in Cypress Hills Provincial Park. Yet another example of how human intervention has thrown natural systems out of balance,” written by Shaun C. Fluker (The Globe and Mail, 2001 04 12). Highlighted in one article, “The solution is allowing natural systems to prevail, prescribed burning and tree thinning, piling and burning on site. Let us also hope that colder winters return. Yes, the beetle outbreak is serious and is threatening the stability of some interior communities, but clear cutting

large swaths and accessing timber in B.C.'s provincial parks won't solve the problem," which was written by the Executive Director, Canadian Parks and Wilderness Society, B.C. Chapter (The Globe and Mail, 2003 10 01). The environmental groups argue that the mountain pine beetle should be allowed to progress naturally noting that Alberta is not British Columbia, with respect to climate, so government officials should not assume that what happened in B.C. will happen in Alberta. This sentiment was also noted by Dr. Ralph Cartar, an ecologist at the University of Calgary, "It seems likely that pine trees in Alberta are generally smaller and of lower quality to beetles than those in B.C. and also our climate is colder, so beetles are unlikely to have the same impacts on Alberta forests as in B.C." (Grande Cache Mountaineer, 2007 08 28). Ultimately, some individuals and groups feel that mountain pine beetle issues are being promoted by the forest industry to justify clear-cut logging in affected areas.

3.2.12 Conclusion

To summarize, the mountain pine beetle has been an issue in western Canada since the late 1990's. Newspaper articles prior to 2006 focussed on the outbreak in BC and its impacts in that province. More recently, 2006 to 2008, as the mountain pine beetle population exploded in Alberta the newspaper media coverage in Alberta also increased. As highlighted previously the main themes identified in the report were found within newspaper articles across all three study regions.

The messages that were highlighted by the media were issues directly related to mountain pine beetle biology and ecology and the management strategies that have been used to deal with this infestation. The mountain pine beetle problem was also reported indirectly as an additional problem to other issues such as forestry and climate change. Newspaper articles also highlighted concerns from residents and environmental groups and provided insights to how these stakeholders prioritize environmental, aesthetic and economic factors. Management uncertainties were presented primarily as counter-opinions to the government's approach and were voiced mainly by environmental groups and concerned residents.

Generally the residents within communities in western Alberta have been exposed to many messages and issues related to the mountain pine beetle's presence, its potential impacts, the management strategies that have been employed to deal with the problem, and concerns regarding these strategies. These were the themes that were conveyed to the public via newspaper media.

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APPENDIX A Newspapers

Newspaper	Community	Website	Circulation	Method of Sourcing Articles
The Globe and Mail	National	http://www.theglobeandmail.com/		Canadian Newsstand
National Post	National	http://www.nationalpost.com/		Canadian Newsstand
Calgary Herald	Calgary and area	http://www.calgaryherald.com/	123,793	Canadian Newsstand
Calgary Sun	Calgary and area	http://www.calgarysun.com/	61,235	Sun Media/Alberta Legislative Library
Edmonton Journal	Edmonton and area	http://www.edmontonjournal.com/	124,822	Canadian Newsstand
Edmonton Sun	Edmonton and area	http://www.edmontonsun.com/	68,342	Sun Media/Alberta Legislative Library
Banff Crag & Canyon	Banff Crag & Canyon	http://www.banffcragandcanyon.com/	5,536	Sun Media/Alberta Legislative Library
Beaverlodge Advertiser	Beaverlodge	No website	733	AWSOM digital archive
Canmore Leader	Canmore	http://www.canmoreleader.com/	6,791	Sun Media/Alberta Legislative Library
Canmore Rocky Mountain Outlook	Canmore	http://www.albertalocalnews.com/rockymountainoutlook/	11,501	AWSOM digital archive
Canmore Leader	Canmore	http://www.canmoreleader.com/	6,791	Sun Media/Alberta Legislative Library
Crowsnest Pass Herald	Crowsnest	http://www.passherald.net/	2,260	AWSOM digital archive
Crowsnest Pass Promoter	Crowsnest	http://www.crowsnestpasspromoter.com/	1,581	Sun Media/Alberta Legislative Library
Drayton Valley Western Review	Drayton Valley	http://www.draytonvalleywesternreview.com/	4,112	Sun Media/Alberta Legislative Library
Edson Leader	Edson	http://www.edsonleader.com/	2,948	Sun Media/Alberta Legislative Library
Fairview Post	Fairview	http://www.fairviewpost.com/	2,201	Sun Media/Alberta Legislative Library
Falher Smoky River Express	Falher	http://www.smokyriverexpress.com/	2,225	AWSOM digital archive
Fort Macleod Gazette	Fort Macleod	http://www.fortmacleodgazette.com/	1,372	AWSOM digital archive
Fox Creek Times	Fox Creek	http://foxcreektimes.awna.com/index.html	804	AWSOM digital archive
Grande Cache Mountaineer	Grande Cache	http://grandecachenews.awna.com/	1,196	AWSOM digital archive
Grande Prairie Daily Herald-Tribune	Grande Prairie	http://www.dailyheraldtribune.com/	7,625	Sun Media/Alberta Legislative Library
High Prairie South Peace News	High Prairie	http://www.southpeacenews.com/	1,863	AWSOM digital archive
Hinton Parklander	Hinton	http://www.hintonparklander.com/	2,385	Sun Media/Alberta Legislative Library
Jasper Booster	Jasper	http://www.jasperbooster.com/	3,900	Sun Media/Alberta Legislative Library
Peace River Record Gazette	Peace River	http://www.prrecordgazette.com/	2,402	Sun Media/Alberta Legislative Library
Pincher Creek Echo	Pincher Creek	http://www.pinchercreekecho.com/	2,400	Sun Media/Alberta Legislative Library
Rocky Mountain House Mountaineer	Rocky Mountain House	http://rmh-mountaineer.awna.com/	4,274	Editor/AWSOM digital archive
Rycroft Central Peace Signal	Rycroft	http://www.centralpeacesignal.com/	2,451	AWSOM digital archive
Slave Lake Lakeside Leader	Slave Lake	http://www.lakesideleader.com/	3,329	AWSOM digital archive
Slave Lake Scope	Slave Lake	No website	987	AWSOM digital archive
Sundre Round-up	Sundre	http://www.sundreroundup.ca/	2,000	Alberta Legislative Library
Swan Hills Grizzly Gazette	Swan Hills	No website	513	AWSOM digital archive
Valleyview Valley Views	Valleyview	http://valleyviews.awna.com/	1,342	AWSOM digital archive
Whitecourt Star	Whitecourt	http://www.whitecourtstar.com/	2,746	Sun Media/Alberta Legislative Library

Data Compiled from Alberta Weekly Newspaper Association website (2008).

APPENDIX B Yearly Breakdown of Published Articles

Newspaper	Community	First Article (Date)		Number of Articles								
			TOTAL	2000	2001	2002	2003	2004	2005	2006	2007	2008
The Globe and Mail	National	2000-09-28	28	2	3		1	2	3	5	7	5
National Post	National	2000-11-10	87	3	4	8	5	1	2	17	27	20
Calgary Herald	Calgary and area	2000-11-10	159	1	2	9	15	6	12	28	45	41
Calgary Sun	Calgary and area	2002-10-10	41			1	1	1		4	14	20
Edmonton Journal	Edmonton and area	2000-05-25	174	1	1	7	4	5	13	38	72	33
Edmonton Sun	Edmonton and area	2000-09-29	62	1		2	3	1	6	12	18	19
Banff Crag & Canyon	Banff Crag & Canyon	2005-04-19	25						3	7	9	6
Beaverlodge Advertiser	Beaverlodge	2007-06-20	9								3	6
Canmore Leader	Canmore	2005-02-23	35						4	5	12	14
Canmore Rocky Mountain Outlook	Canmore	2007-01-04	72								23	49
Crowsnest Pass Herald	Crowsnest	2006-03-25	31							2	5	24
Crowsnest Pass Promoter	Crowsnest	2006-09-29	24							9	8	7
Drayton Valley Western Review	Drayton Valley	2006-12-27	10							1	5	4
Edson Leader	Edson	2007-01-01	20								10	10
Fairview Post	Fairview	2006-11-14	20							4	10	6
Falher Smoky River Express	Falher	2007-01-24	9								4	5
Fort Macleod Gazette	Fort Macleod	2006-07-05	6							2	2	2
Fox Creek Times	Fox Creek	2003-08-12	42				1			3	20	18
Grande Cache Mountaineer	Grande Cache	2007-02-27	22								12	10
Grande Prairie Daily Herald-Tribune	Grande Prairie	2000-08-17	173	6	3	1	7	8	15	37	61	35
High Prairie South Peace News	High Prairie	2006-10-18	16							2	4	10
Hinton Parklander	Hinton	2006-10-02	39							2	19	18
Jasper Booster	Jasper	2006-10-04	24							5	12	7
Peace River Record Gazette	Peace River	2006-10-31	11							4	3	4
Pincher Creek Echo	Pincher Creek	2007-01-05	11								4	7
Rocky Mountain House Mountaineer	Rocky Mountain House	2000-05-30	85	1	1	3	7	2	7	18	25	21
Rycroft Central Peace Signal	Rycroft	2006-08-22	77							43	18	16
Slave Lake Lakeside Leader	Slave Lake	2003-09-24	29				1	1	5	7	9	6
Slave Lake Scope	Slave Lake	2007-02-10	23								11	12
Sundre Round-up	Sundre	2006-04-11	24							6	8	10
Swan Hills Grizzly Gazette	Swan Hills	2007-02-20	10								2	8
Valleyview Valley Views	Valleyview	2006-08-16	21							8	7	6
Whitecourt Star	Whitecourt	2006-08-30	39							6	20	13

APPENDIX C Example of Codes and Code Frequency

Examples of Codes	Code Frequency
Mountain Pine Beetle-lifecycle	84
Signs of MPB Infestation	112
Temperature Natural Management	283
Historical Infestations	53
Climate Change	187
Alberta and BC Knowledge sharing	40
Parks Canada	96
Forestry Industry Management of MPB	112
Concerns Regarding MPB Management	75
Funding Provincial	114
Funding Federal	94

Sample

Mountain Pine Beetle Management Strategies	**Code Frequency**
Surveying for MPB	171
Stripping the bark	4
Prescribed burns	204
Pheromones	46
Trapping	5
Baiting	19
Cut and Burn	61
Logging	29
Clear cutting	13

APPENDIX D Government of Alberta MPB Advertisement

HELP REDUCE THE SPREAD OF MOUNTAIN PINE BEETLE

The Province is asking Albertans to take steps to help reduce the spread of the mountain pine beetle (MPB) infestation.

Between June and August, the beetles will emerge from under the bark of pinewood. They will then fly to infest other healthy pine trees.

Recognize the signs of MPB:

Cream-coloured resin from MPB entry holes.

Greyish-blue stained sapwood.

Small creamy-white larvae/pupa under the bark.

Take the following action by the end of June to help reduce the spread of MPB:

- Burn or chip all infested wood, or
- Debark the wood and burn the bark, or
- Tarp wood from June 15 until October 1.

The Alberta Government can restrict the transportation of MPB infested wood with attached bark.

The Province appreciates Albertans' assistance in protecting our natural resources.

For more information on MPB visit www.mpb.alberta.ca.

Alberta

MOUNTAIN Pine Beetle Action