



Village of Valemount
Towards a FireSmart - ForestWise Valley
Fire Hazard Risk Assessment and
Wildfire Protection Planning Project

**Project Funded by the Village of Valemount in
Partnership with the Regional District Fraser-Fort
George, the Ministry of Sustainable Resource
Management and the Ministry of Forests through the
Union of BC Municipalities**

Prepared by:

Rick Publicover, RPF

March 2005

ACKNOWLEDGEMENTS

The Ministry of Forests funded this work through the Union of BC Municipalities. I gratefully acknowledge the support of the following individuals and organizations: Robert Gray and Ray Mikolash – Ministry of Forests Robson Valley Fire Zone; Doug Fleming with the Corporation of Village of Valemount; Al Westhaver and staff, Jasper National Park; Rob Buchan, City of Langford; and Chris Duffy and staff of the Ministry of Forests Protection Branch for providing risk hazard mapping data upon special request. John McGuire of Llarix Solutions prepared the mapping. Recognition is also made to the public, Municipal, Provincial and Federal Government Staff and stakeholders that took the time to provide input into this plan as well as other jurisdictions that provided information on FireSmart initiatives undertaken in their communities.

Executive Summary

- The Village of Valemount is considered to be a high-risk community in relation to wildfire hazards
- The type of tree species, extent of continuous mature forest stands, timber age and health, topography, soils, and climate create high-risk fire conditions under certain circumstances
- Wildland / urban interface fires present a unique set of challenges and obstacles that must be addressed through practical, proactive, community based solutions that involve the public, government, industry and other community organizations
- FireSmart planning is not a destination, but an ongoing process requiring continued cooperation of all involved
- The Valemount – Tete Jaune Corridor includes four main Biogeoclimatic subzones, comprised of different forest ecosystems with corresponding fire risk and fire behaviour
- Fire is a naturally occurring event in most forest ecosystems in this region to initiate new forests or maintain specific forest composition and successional stages
- Human activities and fire suppression during the past century have resulted, in part, in extensive areas of older coniferous forests that are highly susceptible to insects, disease and fire
- The use of prescribed fire can be used to assist forest managers in developing improved forest conditions and diversity for wildlife, reduce risk of high intensity wildfires and return forests to a more natural state
- The 2003 fire season was the most catastrophic in BC's history involving lightning strikes, human carelessness, and arson contributing to 2500 fires, involving more than 10,000 fire fighters and support personnel and burning more than 265,000 hectares at a cost of 375 million dollars and resulting in the loss of three fire fighters, numerous homes and businesses, and affecting many people and communities
- The initiation of this plan is the first step in creating a FireSmart – ForestWise community that will allow for the future prosperity of residents, protect property values and land improvements, maintain healthy surrounding forests and scenic beauty of the area, provide habitat for wildlife populations as well as many other benefits

- A detailed wildfire threat analysis of the Valemount-Tete Jaune Corridor completed in 2003 identified the fire risk and potential impacts in terms of economic, social and biological factors
- The 2003 study indicates that the overall probability of wildfire threat and consequences for the Valemount to Tete Jaune Cache Corridor is rated as moderate consequences with moderate to high probability of wildfire in areas surrounding the two communities
- Wildfire risk hazard mapping assists in evaluation of fire risks and assists planners, private citizens, government and other community groups in developing strategies and priorities to develop FireSmart – ForestWise Communities
- The Ministry of Forests has completed risk hazard mapping for communities in BC detailing building densities, slope, fuel type codes, fire probability classes, spotting distance classes, spotting threshold classes and head fire intensity classes
- Wildfire planning must include prevention strategies to reduce fire risk from various ignition sources
- The impacts of wildfire events on individuals, businesses and communities can be devastating as identified by the public
- Consultation was held with the public, first nations, forest industry, resort developers, recreational interest groups, and municipal, regional and provincial government to solicit input into recommendations from this report
- There are a number of positive FireSmart programs and initiatives that have been undertaken by various sectors to date, however, the community needs to take further action
- A coordinated approach is required to develop a FireSmart community drawing on the experience and knowledge of other communities and organizations and building upon their success to achieve beneficial results at minimum cost
- Individual landowners and new developers have a responsibility to reduce fire hazards on their property or development by proper planning and location of buildings, including fuel free buffer zones, building with fire resistant materials and completing fire proof landscaping

- Forest Licensees have implemented a number of strategies to reduce wildfire risk and have identified a number of management tools that can be implemented to further enhance FireSmart forest conditions surrounding communities and rural areas
- Both the Village of Valemount and Regional District have undertaken a number of positive FireSmart initiatives within their jurisdiction
- It is recommended that the Village of Valemount and Regional District develop interface steering committees to help focus FireSmart Initiatives for their jurisdiction
- Interface Steering Committees could develop long range plans, initiate funding requests, promote public education and awareness, plan and undertake demonstration projects, promote partnerships with residents, private land owners, businesses, schools and government agencies
- It is recommended that the Village of Valemount and Regional District of Fraser-Fort George develop or amend their Official Community Plans to designate areas of high or extreme fire hazard and require development permits for developers and building permits in these areas
- It is recommended that the Village and Regional District consider covenants on developments or residential building similar to those used by the Cities of Langford and Kamloops including the requirement for detailed fire risk hazard assessments and mitigation plans and strategies to ensure that the principles of FireSmart Planning, building layout, construction and landscaping strategies are met
- It is recommended that the Provincial Government in cooperation with the Union of BC Municipalities assist communities and regional district with funding to meet the challenge of developing FireSmart communities
- It is recommended that the Ministry of Protection Branch partner with the Village of Valemount, Regional District, schools, businesses, residents to coordinate strategies to develop a FireSmart community
- It is recommended that the Provincial Emergency Program assist with funding for development of emergency plans and training as well as resources needed to improve communication in the event of a major wildfire

Table of Contents

Acknowledgments	i
Executive Summary	ii
Table of Contents	v
1.0 Introduction	1
1.1 Wildland/Urban Interface.....	1
1.2 Risk Hazard/Protection Planning Area.....	2
1.3 Valemount and Surrounding Population.....	2
1.4 Land Management and Economic Development.....	3
1.5 Provincial Fire Protection Services.....	3
1.6 Provincial Emergency Program.....	4
1.7 Valemount and District Fire Protection.....	4
2.0 Risk Analysis	5
2.1 Biogeoclimatic Subzones and General Forest Types.....	5
Valley and Eastern Slope Forests (Subboreal Spruce Subzone).....	5
Western Side Slopes (Cedar-Hemlock Subzone).....	6
Mid to Upper Eastern and Upper Western Side Slopes (Engelmann-Spruce / Subalpine Fir Subzone).....	6
Alpine (Alpine Tundra Subzone).....	6
2.2 Weather and Climate.....	6
Temperature.....	7
Precipitation.....	7
Rainfall.....	7
Snowfall.....	7
Wind.....	8
2.3 Fire In Nature.....	8
2.4 Prescribed Fire.....	9
2.5 The Provincial Perspective.....	10

2.6	Robson Valley History Wildfire Events.....	11
2.7	A Detailed Wildfire Threat Analysis for the Valemount to Tete Jaune Cache Corridor.....	12
	Overview Results of the Blackwell Study.....	13
	Fire Risk.....	13
	Fire Behaviour.....	13
	Fire Spread Rate.....	13
	Fire Intensity.....	13
	Crown Fraction Burned.....	13
	Combined Fire Behaviour.....	14
	Values At Risk.....	14
	Land Values.....	14
	Structures.....	14
	Improvement Value.....	14
	Special Places.....	14
	Recreation Potential.....	14
	Visual Sensitivity.....	14
	Suppression Capability.....	15
	Steepness.....	15
	Initial Attack.....	15
	Consequences of Wildfire.....	15
	Biological.....	15
	Economic.....	15
	Social.....	15
	Summary.....	16
2.8	Ministry of Forests Hazard Mapping.....	16
	Results.....	18
	Slope Class.....	18
	Fire Probability Class.....	18
	Fuel Type Codes.....	18
	Critical Surface Fire Intensity.....	19
	Head Fire Intensity Class.....	19
	Maximum Spotting Distance.....	19
2.9	Forest Fire Hazard Rating System.....	20
2.10	Potential Ignition Sources.....	20
2.11	Potential Impacts of Significant Wildfire Events.....	21
	Personal.....	21
	Business.....	21
	Government.....	21

3.0	Consultation Process.....	22
3.1	Public Input.....	22
	Wildfire Impacts on the Community Residents and Tourists.....	23
	Fire Risks in Valemount and Surrounding Area.....	24
	Sources for Ignition.....	24
	Human Cause.....	24
	Natural.....	25
	Public Discussion and Recommendations.....	25
	First Nations.....	26
3.2	Consultation with Municipal, Regional District and Provincial Agencies.....	27
	Village of Valemount Consultation.....	27
	Municipal Emergency Plan.....	27
	Review of Existing Fire Risks and Current Programs	28
	Burning Authorization and Other Administrative / Jurisdictional Issues.....	29
	Fire Smart Initiatives Implemented by Village to Date.....	30
	Regional District of Fraser-Fort George.....	31
	Provincial Ministries, Agencies and Crown Corporations.....	32
	MSRM, MSBED, Land and Water BC Inc, Provincial Emergency Program.....	32
	Ministry of Forest Protection Branch.....	32
	BC Parks.....	33
	Jackman Flats Provincial Park.....	33
	Mount Robson Provincial Park.....	33
3.3	Consultation with Elementary and Secondary Schools.....	34
	Elementary School.....	34
	Secondary School	35
3.4	Consultation with Other Organizations.....	36
	BC Timber Sales.....	36
	Canadian Forest Products Ltd.....	38
	Mill Operations.....	38
	Woodlands.....	38
	McBride Forest Industries Ltd.....	39
	Valemount and Area Recreation Association.....	40
	Canoe Mountain Area Developments.....	41
	Canoe Mountain Resorts Ltd.....	41

	Valemount Springs Resort.....	41
	Canadian Mountain Holidays Inc.....	42
3.5	Experience from Other Jurisdictions.....	43
	City of Langford.....	43
	City of Kamloops.....	45
	Jasper National Park.....	45
3.6	Issues and Strategies Identified by Provincial Government.....	48
	MOF Report to Premier’s Review of 2003 Fire Season.....	48
	Fire Smart Planning for Individual Homeowners, Farmers, Businesses and Communities.....	50
	Homeowners.....	50
	Farms.....	51
	Other General Publications for Residents and Businesses Communities.....	52
	Preparing for Interface Fires - Emergency Management.....	53
	Wildfire Act and Regulations.....	53
	Research in New Technology.....	54
	Remsat II.....	54
4.0	Recommendations.....	54
4.1	Education.....	54
	Public.....	54
4.2	Specific Recommendations.....	54
	Elementary and High School.....	57
	Private Land Owners.....	57
	New Developments.....	59
	Forest Licensee Management Strategies.....	60
	Village of Valemount.....	61
	Planning and Administration.....	62
	FireSmart Initiatives.....	63
	Regional District.....	66
	Provincial Government.....	68
	Ministry of Forests Protection.....	68
	Provincial Emergency Program.....	70
	Federal Government.....	70
	Royal Canadian Mounted Police (RCMP).....	70
5.0	Summary and Conclusions	71
	Bibliography.....	73
	List of Appendices.....	76

Village of Valemount
Towards a FireSmart – ForestWise Valley
Wildfire Risk Analysis and Protection Planning Project
Valemount and Area

1.0 Introduction

The Village of Valemount is considered to be a high-risk community in relation to wildfire hazards. Many homes and businesses enjoy the benefits of the wildland/urban interface. At the same time, this interface creates the potential for a devastating wildfire.

Recent fires such as the Swift Creek Fire near Valemount in 2004 and wildfire events in Kelowna, Barriere and Kamloops in 2003 have highlighted the need to identify the wildfire risk, and, develop a plan to reduce this risk for the community and surrounding residents. The Village of Valemount Municipal Emergency Plan¹ rated wildfire/forest fire as the second primary hazard only to power outages/extreme cold.

The type of tree species, extent of continuous mature and overmature forest stands, timber age and health, topography, soils, and climate create high-risk fire conditions under certain circumstances.

The Village of Valemount, in partnership with the Regional District of Fraser-Fort George, Land and Water BC, the Ministry of Sustainable Resource Management, and the Ministry of Forests through the Union of BC Municipalities is funding the preparation of this Wildfire Management Plan to identify wildfire risks and develop strategies and recommendations to reduce these risks for the Village, Regional District and other government agencies, private landowners and businesses.

1.1 Wildland/Urban Interface

Wildland/urban interface exists wherever residential, commercial, industrial, recreational or agricultural structures are located within, or adjacent to, trees and other combustible vegetation. Wildfires that have the potential to involve buildings and wildland vegetation simultaneously are known as interface fires. Interface fires may start in forested areas and move into developed and

¹ Village of Valemount Municipal Emergency Plan, Revised November 2004

residential areas, or conversely, fires may result from human activity within residential interface subdivisions and spread into adjacent forested areas.

The growing desire of the population to locate residences in forested areas increases the threat of interface fires. The social, biological and economic impacts from interface fires and the disruption to regular activities of residents, businesses and government can be devastating.

Wildland / urban interface fires present a unique set of challenges and obstacles that must be addressed through practical, proactive, community based solutions. There needs to be a collective will to address FireSmart planning for a community that involves participation at all levels of government from municipal to provincial as well as involvement of individual residents, businesses, and community organizations. FireSmart planning must draw on many resources and to be effective, must have a “champion” to lead the cause and coordinate efforts. Lastly, FireSmart planning is not a destination, but an ongoing process that will take time to reap the benefits. Many communities such as Jasper, Langford, Kamloops and Logan Lake have implemented FireSmart planning and programs for a number of years and are only now seeing the benefits of reduced fire risk around their communities. Strategies must be implemented so that new developments are designed with FireSmart principles in mind to minimize future costs and fire risk.

1.2 Risk Hazard Analysis / Protection Planning Area

The planning area encompasses an area from Canoe Mountain in the south to Tete Jaune Cache in the north and the height of land of the immediate mountains to the east and west along the valley. An overview map is located in **Appendix 1**. The area is located within the Robson Valley of the Rocky Mountain Trench at the junction of three mountain ranges – The Caribou Mountains to the west, the Rocky Mountains to the east and the Monashee Mountains to the south. The planning area is characterized by a relatively flat broad valley extending northwest/southeast with steep sloped mountainous areas along the mid to sides of the valley. Kinbasket Reservoir and Canoe Mountain are located at the south extremity of the planning area.

1.3 Valemount and Surrounding Population

The Village of Valemount is located 320 kilometres north of Kamloops and 289 kilometres east of Prince George at an elevation of 800 meters. The population within the village is 1195 people and a total of 1900 people reside within the wildfire prevention planning area². There are a number of large rural private land holdings between the Village of Valemount and Tete Jaune Cache. The main population outside of the village is located in Tete Jaune Cache and along

² Village of Valemount Website <http://www.valemount.org/>

Highway 5 corridor, which runs southeast from Tete Jaune Cache to just south of Valemount.

Two new resort developments are planned for Canoe Mountain area south of Valemount. Canoe Mountain Resorts is developing a gondola project and Valemount Springs is planning a hot springs destination resort.

Population in the Valemount to Tete Jaune Corridor is expected to increase to between 2700 to 3400 people as a result of general growth trends for this area and the development of the two new resorts.³ The population growth will create added fire risks, not only in within the village, rural and resort areas, but also in the surrounding forests frequented by recreational users, new residences, tourists and industrial operations. All new residential, rural and resort developments have an excellent opportunity to incorporate strategies to minimize fire risk at the planning and development phases, thus protecting property values and investments.

1.4 Land Management and Economic Development

A number of agencies are involved in land management and economic development within the planning area. These include the Village of Valemount, the Regional District of Fraser-Fort George, as well as a number of provincial ministries and crown corporations including the Ministry of Forests (MOF), Ministry of Sustainable Resource Management (MSRM), Water, Land and Air Protection (WLAP), Ministry of Small Business & Economic Development (MSBED), BC PARKS, and Land and Water BC Inc.

FireSmart programs developed must be coordinated with the various government agencies.

1.5 Provincial Fire Protection Services

The Village is located within the fire protection zone of the Ministry of Forests Prince George Fire Centre (PGFC). The Ministry of Forests Robson Valley Fire Zone (RVFZ), situated just north of the Village, is the local office of the PGFC. The local office is responsible for responding to fires on crown lands including the Robson Valley Timber Supply Area (TSA), provincial parks and private property.

The RVFZ employs two full time staff at the base. During summer months, from April until end of September, the RVFZ employs two three-person fire suppression crews and three fire line supervisors. During the remainder of year, the RVFZ has an emergency call-out list to address fire situations. The Prince George Fire Centre provides additional support and resources for the RVFZ. The closest air tanker bases are located in Kamloops or Prince George,

³ Personal communication with Silvio Gislimberti, EDC Co-ordinator, Corporation of Village of Valemount

approximately 45 to 60 minutes by air. Under special circumstances, a temporary air tanker base could be set up at Valemount or Blue River.

The Ministry of Forests Headwaters Forest District Office, located in Clearwater, administers all MOF non-protection functions for the Robson Valley TSA.

Emergency contact numbers for the Ministry of Forests Prince George Fire Centre and Robson Valley Fire Centre are included in **Appendix 2**. Information on reporting a forest fire is also included in **Appendix 2**⁴.

The Ministry of Forests Protection Branch Website located at <http://www.for.gov.bc.ca/protect/> has information on publications, fire danger class, fire weather information, FireSmart publications and other information related to fire conditions and planning.

1.6 Provincial Emergency Program

The Province operates a Provincial Emergency Program (PEP). The function of PEP is to maintain effective awareness, preparedness, response and recovery programs to reduce the human and financial costs of actual or imminent emergencies and disasters. In this role, from its Victoria headquarters and its regional offices, PEP works closely with local governments, provincial ministries and agencies, federal departments and volunteers.

The Provincial Emergency Program office for the Valemount area is based out of Prince George. In a critical wildfire event, PEP would be responsible for providing additional resources and assistance to the Village.

The Emergency contact number for PEP is located in **Appendix 2**.

1.7 Valemount and District Fire Protection

The protection planning area described in this report is within the administration boundaries of the Regional District of Fraser-Fort George (RDFFG). The RDFFG operates a volunteer fire department and contracts its services to the Village of Valemount. The volunteer fire department responds to fires within the Village and surrounding fire protection area. A copy of Bylaw 1163 outlining the establishment of the fire protection local service and map of the Fire Protection Area is included in **Appendix 3**. The fire department currently has a total of 25 paid on call volunteers.

Emergency contact numbers for the Valemount and District Fire Protection is included in **Appendix 2**.

⁴ BC Ministry of Forests Website <http://www.for.gov.bc.ca/protect/reporting/>

2.0 Risk Analysis

2.1 Biogeoclimatic Subzones and General Forest Types

The Valemount – Tete Jaune Corridor includes four main Biogeoclimatic Subzones⁵ comprised of different forest and alpine ecosystems. These subzones are Subboreal Spruce (SBS), Interior Cedar-Hemlock (ICH), Engelmann-Spruce Subalpine Fir (ESSF) and Alpine Tundra (AT). Each subzone generally includes different flora and tree species with corresponding fire behaviours. The main valley floor and lower slopes of the eastern side of the valley are largely within the Subboreal Spruce Subzone and characterized by dry well-drained soils and hot temperatures during the summer months. The lower slopes of the western side of the valley are primarily Cedar-Hemlock forests with moist moderately drained soils and have generally a cooler microclimate than the SBS subzone. The ESSF Subzone is located mid to upper slope on the eastern side of the valley, and, above the ICH Subzone on the western side of the valley. This subzone has generally wetter poorly drained soils and colder climate with more precipitation during the year than the valley floor and lower side slopes.

Valley Floor and Lower Eastern Slope Forests (Subboreal Spruce Subzone)

The valley floor and lower slopes are generally comprised of a mixture of lodgepole pine, aspen, Douglas-fir forests on the drier well-drained sites and cottonwood and spruce forests along major drainages and low lying wetter areas. There are isolated small pockets of black spruce swamps in poorly- drained soil types.

Lodgepole pine forests are generally the highest risk forest type to wildfire due to this species' resinous fibre, dryer ground vegetation, higher stand densities (number of stems per hectare), full crown closure⁶ and prevalence of ladder fuels⁷. These forests are generally located on sandy or other well-drained soils that do not retain moisture for long periods of time. The area receives minimal snowfall during winter months. Forest health issues such as bark beetle, mistletoe and blowdown increase the risk of catastrophic fires.

Douglas-fir, with its thick bark is more resistant to fire, however, once ignited it may burn very hot. Stands mixed with Lodgepole pine are generally a higher

⁵ Biogeoclimatic Ecosystem Classification System uses a combination of climate, topography, soils and vegetation to classify different ecosystems

⁶ Density of trees where the crowns of the trees are touching or overlapping allowing minimal light to the forest floor

⁷ Ladder fuels refer to the presence of variable height understory vegetation and intermediate height timber which may create conditions for a fire to move from the ground into the crown of the forest

wildfire risk. Any ladder fuels present in these stands may create a “wick” to move the fire from the ground up to the crown increasing fire intensity and spread rate.

Aspen and Cottonwood stands are more fire resistant and less likely to carry a crown fire. Being a lower risk to wildfire events, these forests will generally stop or slow a rapidly advancing fire from an adjacent coniferous forest. However, during extreme fire events these stands will also burn.

Western Side Slopes (Interior Cedar-Hemlock Subzone)

The western side slopes contain mixtures of Cedar, Hemlock, White Spruce and Subalpine Fir. While these stands may be generally less likely to burn due to moist soils and ground vegetation, the fuel loading and dead and decaying material within these stands may create intense fires during extreme dry conditions.

Mid to Upper Eastern and Upper Western Side Slopes (Engelmann-Spruce/Subalpine Fir Subzone)

Engelmann-Spruce/Subalpine Fir forests generally receive the highest rainfall in the area and are generally less susceptible to fire compared to higher risk forest types identified above. However, during hot dry summers, these forests may be highly susceptible to lightning strikes as identified in the Valemount Detailed Wildfire Threat Analysis⁸. The fuel loading in these stands is generally moderate to high depending on stand density and age of the stand.

Alpine (Alpine Tundra Subzone)

Low ground vegetation, mosses and lichen characterize the Alpine Tundra. These areas are not generally high risk to large wildfires due to location at the top of mountains and presence of primarily ground vegetation with only occasional scattered trees.

2.2 Weather and Climate

The Valemount area is characterized by cool winters and warm summers with moderate amounts precipitation, relative to other communities in the area. Environment Canada⁹ collected comprehensive weather information for Valemount during the period of 1951 to 1980. Since then, there has been very little comprehensive weather data collection. Currently, residents on behalf of Environment Canada have collected weather records for approximately the past 10 years in the Spittle Creek area¹⁰ and near McBride¹¹. Weather and climate

⁸ B.A. Blackwell and Associates March 2003 (See bibliography)

⁹ Information provided by Ross Klock (see bibliography)

¹⁰ Linda Nelson on District Lot 9185 (Carr Road) in the vicinity of Spittle Creek and Fraser River

information in the report is based on the 30 year information provided by Environment Canada (**See Appendix 4**).

Temperature

Average daily minimum and maximum temperatures range from –15 to –7 degrees Celsius in the winter to 8 to 24 degrees Celsius respectively in the summer months. Extreme summer maximum temperatures can reach between 35 to 41 degrees creating significant wildfire risks and suppression challenges during these conditions.

Precipitation

Total average annual precipitation for the period of 1951 to 1980 was 503 millimetres (mm) of which 322 mm was rain (64%) and the remaining 181 mm (36 %) fell as snow.

Rainfall

Two thirds of the average annual rainfall of 322 mm for the period of 1951 to 1980 occurred during the period of May until September. The average number of days with rain during the summer months is 8 in May, 11 in each of the months of June, July and September and 12 in August. Monthly average rainfall during the summer is 30 mm in May, between 42 to 45 mm during the months of June to August and 52 mm in September.

The frequency of rain events and amount of precipitation affects the moisture content of the fine fuels on the forest floor. Extended periods without rain coupled with dry soils on the valley floor will result in high to extreme fire risk conditions for coniferous forests. “Dry” lightning storms associated with strong winds during weather changes after extended dry periods are more likely to start wildfires with potentially devastating effects.

Snowfall

Average monthly snowfall¹² for the period 1951 to 1980 was 53 mm in January, 32 mm in February, 18 mm in March, 10 mm in April, 5 mm in October, 26 mm in November and 36 mm in December.

The amount of snow influences early spring fire risk conditions and the amount of moisture in the mountains affecting run-off during the summer. Low snow years may be an early indication of higher fire risk in the summer, unless it is counteracted by frequent rain during the summer months.

¹¹ Rick and Heather Thompson in the vicinity of McBride

¹² Measured in mm of precipitation

Wind

The meteorological data collected for Valemount does not include wind information. The general prevailing winds are either from the southeast or northwest. Constant winds are often present as a result of the “wind channelling” effect of the straight, wide valley “trough” of the Rocky Mountain trench that extends from Mica Dam north past McBride. The smooth surface of Kinbasket Reservoir provides little resistance to wind and the regional weather patterns result in significant wind events within the Robson Valley Corridor. Cross valley winds are generally not significant but may play a role in fire behaviour on sidehills depending on the time of day (up valley winds during the day and down valley winds during the cooler evening periods).

The prevailing wind patterns are important considerations in the design of fuel breaks for the communities of Valemount and Tete Jaune Cache, new resort and residential developments, individual landowners, forest residents, and farmers.

2.3 Fire In Nature

Fire is a naturally occurring event in most forest ecosystems in this region. It is beneficial and often necessary to maintain healthy forests and diversity of plant and animal life. Through evolution and exposure to wildfires, many ecosystems have adapted to fire and actually depend on it. Wildfires burn in varying intensities across the landscape, thereby increasing biodiversity by changing the composition, density, and age class distribution of forests.

Trees such as Douglas-fir have developed thick bark that insulates living tissue, allowing them to survive surface fires. Prior to fire suppression activities, fires naturally occurred in Douglas fir stands every 5 to 20 years keeping the forest floor relatively clean of combustible material. Lodgepole pine requires fire to a certain extent to disperse its seeds, even though the trees are usually killed by it. Heat from the fire melts the resinous material that holds the cone scales together, thereby releasing the seeds for a new forest.

Fires release the nutrients locked up in slowly decaying logs and other organic material. Fires can open up thickly treed forests, letting in the sunlight to encourage the growth of shrubs and grasses – forage for wild and domestic animals. Cattle, moose, deer and elk benefit from the browse created by fire.

Naturally occurring fires also help to keep insects and disease in check by killing pathogens infecting a stand. This is critical when considering that more than five

times as much timber has been lost to insects and disease than has been consumed by wildfire¹³.

Fire is often a new stand initiating event that consumes old growth forests affected by beetle or other forest health issues. It creates conditions for new regeneration of pioneer tree species and vegetation to thrive. The “pioneer forests” change over time through various successional stages to a “climax forest”. Competition between light intolerant pioneer tree species results in shading and tree mortality within the pioneer stands. This partially opens the canopy allowing the ingress of shade tolerant tree species to form a climax forest¹⁴. As discussed above, reoccurring fires in Douglas fir stands reduce the build-up of fuels on the forest floor and maintain the forest composition at a specific successional stage, known as stand maintaining fires.

Stand initiating and stand maintaining processes result in a mosaic of forests with different species composition, age class distribution and successional stages across the landscape. This natural landscape, because of the variability of generally smaller timber types and age classes, is much more fire proof than the present vast areas of mature and overmature coniferous forests. Prior to human intervention, the frequency and size of wildfires was variable from very small spot fires to extensive fires in excess of 100,000 hectares. Even extremely large fires leave patches of unburnt timber creating a diverse timber mosaic. Prior to fire suppression activities, the historic fire frequency in the valley was 25 to 75 years¹⁵, based on fire scar analysis completed by Ministry of Forests Protection Branch and the Canadian Forest Service.

During the railway construction era in the Valemount – Tete Jaune Cache Corridor in the early 1900's and prior to the establishment of the BC Forest Service, large areas were intentionally burned to increase visibility for surveyors and for ease of access. Since the establishment of the Forest Service in 1912, prevention and control of forest fires has resulted in the dangerous build-up of forest fuels in fire dependent ecosystems. In addition, fire suppression activities have facilitated the trend of forests to older age classes and later successional stages. This has resulted in extensive areas of older coniferous forests that are highly susceptible to insects and disease and have large fuel loadings.

2.4 Prescribed Fire

Prescribed fire¹⁶ can be applied in specific circumstances to reduce slash loadings on harvested areas. Prescribed fire is also used to assist forest and other land managers to develop greater diversity of forest stands, create better habitat conditions for wildlife and domestic animals, reduce the risk of high

¹³ BC Ministry of Forests Protection Website

¹⁴ Tree species that can grow and reproduce under a full closed forest canopy

¹⁵ Personal communication with Bob Gray, Zone Protection Officer, RVFZ, Valemount

¹⁶ Ministry of Forests Website <http://www.for.gov.bc.ca>.

intensity naturally occurring wildfires, and return forest conditions to a more natural state.

BC Parks and Jasper National Park, for example, are reintroducing fire within their management areas. The objectives are to ensure that essential ecological processes are maintained, to enhance biological diversity, and, to reduce fire risk on land outside park boundaries that is used for commercial timber harvesting, recreation, wildlife, settlement areas and for other human activities. This requires the balance of fire use for ecological integrity without compromising values outside parks.

2.5 The Provincial Perspective¹⁷

The 2003 fire season was one of the most catastrophic in BC's recorded history. Due to an extended drought in the southern half of the province, forest firefighters faced conditions never seen before in Canada.

Lightening strikes, human carelessness, and arson contributed to igniting nearly 2500 fires, involving more than 10,000 fire fighters and support personnel and burning more than 265,000 hectares (ha) at a cost of \$375 million. The extreme volatility of the dry forests, compounded by the province's difficult terrain, created unprecedented fire behaviour and made fire suppression almost impossible.

The **Okanagan Mountain Park Fire**, during the 2003 fire season, was the most significant interface wildfire event in BC history. The fire's final size was 25,600 hectares. Much of BC was affected by the fire but the communities of Naramata and Kelowna suffered the largest effect when the blaze caused the evacuation of 33,050 people (4,050 of these people were also evacuated for a second time) and 238 homes were lost or damaged. The fire also claimed 12 wooden trestles and damaged two other steel trestles in the historic Myra Canyon.

The **McClure Fire** in 2003 caused the devastating loss or damage of 72 homes and nine businesses including the loss of a major sawmill. Due to this fire, 3,800 people were evacuated (880 of these people were also evacuated for a second time) from the small communities of McClure, Barriere and Louis Creek. The fire reached a final size of 26,420 hectares.

Another significant fire event in British Columbia, the **Salmon Arm Fire**, occurred in 1998. It damaged over 6,000 hectares, caused the evacuation of approximately 7,000 people, destroyed 40 buildings, and cost over \$10 million to extinguish.

Also known as the Garnet fire, the **Penticton fire** occurred in 1994. Over 5,500 hectares were burned, over 3,500 people were evacuated and 18 homes and

¹⁷ Ministry of Forests Protection Branch Website

structures were lost. The fact that the fire occurred in an interface area increased the severity of the damage.

Conditions such as those stated above identify the need to ensure that rural/forest communities such as Valemout, considered high-risk to fire events, undertake proactive steps to reduce fire risks and develop strategies to manage fuel loadings surrounding the community. The initiation of this plan by the Village of Valemout is the first step in creating a **FireSmart - ForestWise Community** that will allow for the future prosperity of residents, protect property values and land improvements, maintain healthy surrounding forests and the scenic beauty of the area, provide habitat for wildlife populations as well as many other benefits.

2.6 Robson Valley Historical Wildfire Events

The Ministry of Forests has recorded previous wildfire events within the Valemout – Tete Jaune Cache Corridor for the period of 1950 to 1999. A copy of the map identifying location of larger fires within the Robson Valley is found in **Appendix 5**. A map identifying the fires within the planning zone is also included in **Appendix 5**.

2.7 A Detailed Wildfire Threat Rating System for the Valemout to Tete Jaune Corridor¹⁸

A detailed Wildfire Threat Rating System (WTRS) was developed for the Valemout to Tete Jaune Corridor by B.A. Blackwell, F.M. Steele and A.J. Needoba, Blackwell and Associates Ltd. 2003. The rating system incorporates real data and predictive models in a framework to quantify wildfire risks within a geographically spatial context. The WTRS is a Geographic Information System (GIS) based model that spatially quantifies and analyzes the relationships that exist between the critical factors affecting wildfire threat as it relates to human lives, natural resources and human infrastructure. Inputs include information on fuels, fire occurrence, fire behaviour, suppression resources, weather, and resource values. The WTRS identifies the severity of wildfire threat within a specified area to allow managers to analyze and explore the implications of different management strategies in relation to wildfire threat (Blackwell et al. 2003).

The Valemout WTRS includes the integration of risk management theory. The WTRS can be applied as a risk assessment tool and allows evaluation of different management options in terms of their effects on probability and consequence of wildfire events. Although the WTRS does not manage risk, it does provide information about fire risk that allows managers to make informed decisions about risk management. The Valemout WTRS integrates components such as fire behaviour, biological and other values that are given a scaled value

¹⁸ See bibliography

to identify the relative contribution or importance and then are weighted by component to provide an overall rating. Changing the weighting or the scale value will provide a sensitivity analysis of the impact of that factor to the overall results. This provides modellers information on where it is most important to ensure assumptions are correct and where data needs to be improved.

The study examined two causes of wildfires: lightning and man caused. The probability of ignition was categorized by either man or lightning caused. The combined probability was used as an input into the model.

Fire behaviour components, including fire intensity, rate of spread and the crown fraction burned outputs of the model. Fire behaviour was based on the Canadian Fire Behaviour Prediction System¹⁹, which uses 16 national benchmark fuel types to predict fire behaviour. Fuel types in this study were derived by running BC Ministry of Forests forest cover types through an algorithm developed in 1999 by the Ministry of Forests Protection Branch. Fire behaviour is based on the 90th percentile fire weather data (temperature, relative humidity, precipitation and wind speed) for each of the Subboreal Spruce, Interior Cedar Hemlock and Engelmann Spruce Subalpine Fir Subzones. No data was collected for the Alpine Tundra Subzone. The prediction system identifies how wildfire would behave under the 90th percentile weather conditions (historic fire weather representing 90% of the most extreme conditions recorded).

Fire suppression capability is based on the following factors – speed of detection, terrain, accessibility and availability of resources. In British Columbia, fires are detected primarily by aircraft or the public. Suppression capability was based on four components: proximity to water sources, helicopter arrival time, steepness of terrain and road access.

The consequences of a wildfire event were evaluated in terms of biological, economic and social impacts. The weighting of the three factors were 20% for biological, 70% for economic and 10% for social impacts.

The biological factors included impacts on red and blue listed species and Provincial Parks. Economic values included impacts on timber values, land improvement value and wildland/urban interface density. Timber values were largely based on a combination of leading species, volume per hectare, biogeoclimatic zone, and in some cases tree heights. Structure density identified the relative density of housing development (number of structures / km²) ranging from undeveloped (0-1), isolated (1-2), mixed (10-100), developed (100-1000) and urban (>1000). Social values (10 % of the total weighting) are based on three attributes: visual sensitivity, special features and recreational potential. Visual sensitivity was based on a combined Corridor Visual Sensitivity Rating and the Visual Sensitivity Rating. Special features (80 % of the total weighting), identified through the local Land and Resource Management Plan process for the

¹⁹ See bibliography for Canadian Forest Fire Prediction System

Robson Valley Forest District, were evaluated to determine the impact of fire on each special feature. Recreational potential was assigned base on the Ministry of Forests Recreation Opportunity Spectrum System, which delineates 4 classes to measure differences in potential for various types of recreation.

The results are presented both by individual layer and all combined. A series of maps detailing the various parts of the inputs and results are available as part of the Blackwell Report and provide a comprehensive overview of the critical risk areas for the Valemount/Tete Jaune Cache Corridor.

Overview Results of the Blackwell Study

Fire Risk

The results indicate that the highest risk of human caused wildfire is, as expected, along the most heavily populated corridor and major accesses. Probability of ignition was the highest around the communities of Valemount and Tete Jaune Cache. Based on analysis of lightning strike input information, the highest risk of lightning strikes igniting wildfires is along the Caribou mountains on the west side of the Valemount/Tete Jaune Cache Corridor. The combined human caused and lightning risk is extreme along the central corridor of the valley and high along the valley sidehills.

Fire Behaviour

Fire Spread Rate

Fire spread rate is variable along the main corridor from low to extreme. This reflects the various forest types and corresponding fire behaviour. Along the steep sidehills of the corridor, the fire spread rate is considered extreme. This is due to affect of slope in fire spread rate as evidenced in 2004 Swift Creek Fire.

Fire Intensity

The fire intensity is generally considered to be low to moderate within the Corridor. However, it is extreme immediately east and north of Valemount along the midslope areas. At higher elevations, along the western side of the valley, the fire intensity is considered high.

Crown Fraction Burned²⁰

The crown fraction burned is overall low throughout the valley although there are pockets of high to extreme ratings within the vicinity of Valemount and Tete Jaune Cache.

²⁰ Measure of the percentage of the forest crown consumed in wildfires

Combined Fire Behaviour

Combining the results of the analysis of fire spread rate, fire intensity and crown fraction burned for the Valemount/Tete Jaune Cache Corridor indicates that in general, fire behaviour is low to moderate along the main valley floor with high fire behaviour along the mid to upper slopes on the west side of the valley. Combined fire behaviour is high to extreme immediately around Valemount and to the north along the eastern side of the valley, which is generally drier.

Values at Risk

Land Values

As expected, the Blackwell analysis indicates that land values are extreme to high ranking along the central core of the Valemount –Tete Jaune Corridor due to the population densities and low ranking extending up the non-populated valley sides.

Structures

The number of structures is moderate to high ranking along the main corridor and high to extreme in the vicinity of Valemount. All other locations within the planning area are low.

Improvement Value

The improvement value is high to extreme ranking along the central part of the corridor and low in all other parts of the planning area.

Special Places

Special places are mainly high to extreme ranking around Valemount and to the southeast of the community and extreme in the vicinity of Tete Jaune Cache.

Recreation Potential

Recreation potential is largely extreme to high ranking throughout the valley with low areas along the river corridor and at extremely high elevations to the northeast of Valemount.

Visual Sensitivity

Visual sensitivity is high to extreme ranking along the main corridor and lower in regions not visible from Highway 5 travel corridor.

Suppression Capability

The suppression capability is rated as low to moderate based on the combined factors of speed of detection, terrain, location of initial attack crews, proximity to water source and roads, and helicopter arrival time. Suppression capability was rated as having the greatest chance of initial attack success around population centres and along the main Valemount/Tete Jaune Cache Corridor.

Steepness

The major steepness issues affecting suppression are along middle to upper slopes of the Rocky and Caribou Mountains.

Initial Attack

The Ministry of Forests Protection Branch base just north of Valemount provides the Valemount/Tete Jaune Cache Corridor with excellent initial attack capabilities. Initial attack on non-roaded areas is affected by availability of rotary aircraft and landing locations for initial attack crews.

Consequences of Wildfire

Biological

Jackman Flats Provincial Park is home to a unique lichen species²¹ that could be negatively impacted or lost in the event of a severe wildfire. The unique geological formation of sand dunes coupled with climatic conditions has created conditions suitable for the prosperity of this lichen species. The delicate balance of this ecosystem could be threatened as a result of a significant wildfire event.

Economic

The Village of Valemount is the main economic centre for the area. Any major wildfire events would have a significant impact on economic activity in the region including sawmilling and forest operations, tourism and recreation, transportation as well as the many small businesses located within the community.

Social

The visual sensitivity rating in the valley is very high with the forested landscape and rugged peaks of the three mountain ranges encompassing the valley. The recreation and tourism values have been long recognized as opportunities for growth within the community. Large scale fires would have a significant negative

²¹ *Stereocaulon condensatum*

impact on tourism and recreation operators. The local residents that enjoy the rural lifestyle and wide variety of recreational opportunities within the valley would also be impacted.

Summary

The overall probability of wildfire threat and consequences for the Valemount / Tete Jaune Cache Corridor is rated as moderate consequences with moderate to high probability of wildfire in the areas surrounding the communities of both Valemount and Tete Jaune Cache. The forested interface between the two communities and to the south of Valemount is rated as moderate probability with low consequences. Immediately around the communities of Valemount and Tete Jaune Cache, the wildfire risks are high with moderate to high consequences. The Canoe Mountain area to the south is presently rated as low consequences and low to moderate probability of wildfire. As resorts are developed, the risks and consequences for this area will increase.

B.A. Blackwell states in his report "Of greatest concern and of management significance is the concentration of moderate to high probability and moderate consequence associated with the population centres and existing infrastructure. No area contained the combination of high consequence and moderate to high probability. This is more likely the result of the weighting system rather than the probability and consequence results. The most effective way to further evaluate the results would be to model both the probability and consequence layers dynamically to test changes in weighting against the final outcome"²²

2.8 Ministry of Forests Risk Hazard Mapping

The Ministry of Forests Protection Branch, in cooperation with the Union of BC Municipalities, has recently completed risk hazard mapping project for interface communities across the province. The strategic risk analysis looks at interface areas, fire risk, fire behaviour potential, combined risk and fire behaviour and spotting potential into the wildland/urban interface. This builds on the work completed by Blackwell et al. in 2003 described in **Section 2.7** above.

The MOF Protection Branch is making this information available to communities through downloads expected to be available from a web-based system commencing in March 2005 to assist with community wildfire risk assessment and fire risk reduction strategies. Upon special request, the MOF Protection Branch provided the data directly to the author for preparation of maps to be included as part of this report.

The analysis examines several factors to determine an overall risk hazard. The fire probability class is divided into three categories – low, moderate and high based on the Canadian Fire Behaviour Prediction System fuel type

²² B.A. Blackwell et al. page 27

classifications, weather parameters (temperature, relative humidity, and precipitation) and spotting distance (based on tree species information). The building density class is based on the same parameters developed by B.A. Blackwell and Associates as described in **Section 2.7** above. The building density classes are classed as undeveloped, isolated, mixed, developed, urban and lakes and rivers. The next layer of mapping information is probability of human caused fire ignitions based on historical fire information. The probability of ignition used in the analysis model is assigned a weighted value based on the frequency of previous human caused fires within the analysis area. The values are “0” for no ignitions, “3” for 1 to 2 ignitions per hectare, “7” for 3 to 4 ignitions, and “10” for 4 or greater ignitions per hectare. This weighting is combined with the weighting of the probability of lightning caused ignition (using the same categories as the probability of human caused fires) to arrive at a composite risk value that is used as part of the Wildfire Threat Risk Rating System. The combined probability of ignition is between the numbers 0 and 10 where “0” is low and “10” is high.

Slope generally increases the rate of fire spread by preheating fuels upslope. This information is utilized to modify the rate of fire spread. Slope is divided into the following 4 slope categories: 0 to 10%, 11 to 30%, 30 to 60% and greater than 60%. The data is based on provincial Terrain Resource Inventory Mapping (TRIM).

The rate of fire spread depends often on whether the fire has “crowned”. As the fire spread rate increases, a point is eventually reached at which the crown becomes involved in the fire. This point is defined as the critical surface fire intensity (CSI) for crowning²³. This is dependent upon the predicted surface fire intensity, the foliar moisture content, and the height to the live crown base. Often fires are not strictly either surface or crown fires but a combination depending on the variability in slope, wind, fuel types, ladder fuels, height to the live crown base and other factors. This calculated value does identify potential risk of areas that have higher risk of exceeding the threshold required for a fire to crown.

The next category of information utilized in the Wildfire Threat Rating System is the head fire intensity class, which is rated between 0 and 10. Head fire intensity ratings were developed by Forestry Canada and is detailed in the Development and Structure of the Canadian Forest Fire Behaviour Prediction System (CFFBPS)²⁴. The head fire intensity rating includes computation of the heat of combustion, total fuel consumption and equilibrium rate of spread. Fire intensity, which the CFFBPS also terms the frontal fire intensity and line fire intensity, is one the standard gauges used by forest managers to estimate the difficulty of controlling a fire and to select the appropriate suppression action. Head Fire

²³ Development and Structure of the Canadian Forest Fire Behaviour Prediction System 1992 pages 34 and 35

²⁴ Development and Structure of the Canadian Forest Fire Behaviour Prediction System, 1992 (page 38)

Intensity is the rate of heat energy released per unit time per unit length of fire front. This is measured in Kilowatts/ meter² (Kw/m²). The head fire intensity rating classes used in the analysis are as follows: rating of “0” is 0 to 9 Kw/m², “2” is 10 to 500 Kw/m², “4” is 501 to 2000 Kw/m², “6” is 2001 to 4000 Kw/m², “8” is 4001 to 10,000 Kw/m², and “10” is greater than 10,000 Kw/m².

Ownership information, provided by the MOF, will assist private landowners in assessing the wildfire risk on their properties so that the landowners may take appropriate action to reduce risks.

Many homes are ignited via sparks and embers, in many cases some distance in advance of the active front of a wildfire. This is referred to spotting distance of a fire and may be as far as 1 to 2 kilometres in front of an active fire. The Ministry, as part of its analysis, has identified “forest polygons”²⁵ that may spot into the urban/wildland interface. The spotting distance is 2 km for high category fuel types (Canadian Fire Behaviour Prediction System fuel types C1, C2 and C4)²⁶. The spotting distance for moderate fuel types (CFBPS fuel types C3, C6, and M1 to M4)²⁷ is 1.2 kilometres. A complete summary of the CFBPS fuel types is included in **Appendix 6**.

The maps illustrating the fire probability class, building density class, probability of human and lightning caused fires, slope class, head fire intensity rating and combined wildfire threat rating are included in **Appendix 6**.

Results

Slope Class

The map indicates that slope is generally less than 10 percent gradient on the main valley floor and generally is moderate with steeper slopes higher in the valley.

Fire Probability Class

The fire probability class map indicates a moderate to high rating around the Village of Valemount and Tete Jaune Cache. The Canoe Mountain Area is also moderate, however, risk will increase with the development of the resorts.

²⁵ Forest Polygons refer to forest stands of similar composition, height, age class, crown closure and density that can be clearly identified by inventory

²⁶ C1 – Spruce-lichen woodland; C2- Boreal Spruce; C4- Immature Jack or Lodgepole Pine

²⁷ C3 – Mature Jack or Lodgepole Pine; C6 – Conifer plantation; M1 – Boreal mixedwood – leafless; M2 – Boreal Mixedwood – green; M3 – Dead Balsam Fir mixedwood – leafless; Dead Balsam Fir mixedwood - green

Fuel Type Codes

The fuel type indicates the forest/ground cover and interface zones within the study area. It is noted that there are some limitations to the information based on the vintage of the Ministry of Forests forest inventory database. The map does provide, however, an excellent overall view of the forest types, grass and other vegetation. Used in conjunction with the Fire Probability Class maps and Head Fire Intensity maps, the Fuel Type Code maps provide an excellent tool to assist landowners, government and forest companies in developing strategic plans to enhance fire breaks and reduce fuel loadings.

Critical Surface Fire Intensity

The critical surface fire intensity threshold map identifies that there are extensive areas adjacent to the Village, within Tete Jaune Cache and along the main valley with characteristics that pose a high risk for crowing. As a result, these areas have potential for higher rates of spread. Strategies that reduce fuel loading and elimination of ladder fuels will enhance fire proofing of these forested areas.

Head Fire Intensity Class

The head fire intensity class, as indicated above, is one the standard gauges used by forest managers to estimate the difficulty of controlling a fire and to select the appropriate suppression action. The head fire intensity map indicates that fuel loadings and fire intensity is rated in the very high to extreme ratings throughout the valley and on the sidehills (rating classes 8 and 10), with the exception of cleared areas, agriculture development and settlement areas. This indicates that once ignited, a wildfire will produce significant heat energy and will create challenges for fire control and suppression. This emphasizes the need for reduced fuel loadings and early detection and initial attack to minimize size of a wildfire.

Starratt's Wildlife Sanctuary to the south and grassy areas to the west of timber areas and east of town are rated as moderate (rating class 6). These areas would be candidates for enhancing fire breaks as well as similar areas within Tete Jaune Cache.

Maximum Spotting Distance

The Maximum Spotting Distance Maps have four spotting distance classes. They are "0", up to 250 meters, 251 to 500 meters, and 500 to 2000 meters. This map will assist landowners to identify potential spotting risk from an active wildfire front. The map is a tool that can be used to guide owners in developing strategies to minimize this risk by establishing fuel free zones and reducing fuel loadings outside of the fuel free zones.

Areas within the Village are rated as “0” with the exception of timbered areas within the Village boundaries that are rated as up to 250 meters spotting distance. The area west of the Village and to the north along Swift Creek is rated as between 500 up to 2000 meter spotting distance.

2.9 Forest Fire Hazard Rating System

The Ministry of Forests utilizes a standard four category rating system for identifying forest fire danger class, namely:

- 1) **Low** Low Fire Danger
- 2) **Moderate** Carry out any forest activities with caution
- 3) **High** Fire Hazard is serious. Extreme caution must be used in any forest activities. Burning permits and industrial activities may be restricted
- 4) **Extreme** Extremely high fire hazard. General forest activities may be restricted, including burning permits, industrial activities and campfires

The public is kept informed about the forest fire danger level throughout the province using road-side signs, Danger Class Report²⁸ and news bulletins.

2.10 Potential Ignition Sources

FireSmart programs must include prevention strategies to reduce fire risk from various ignition sources. The following is a summary of potential ignition sources:

Natural

- Lightning

Human Caused

- **Mill Operations**
 - Spontaneous combustion in abandoned sawdust and chip piles (e.g. mills that are no longer active)
- **Forest Operations**
 - Road construction
 - Harvesting
 - Post harvesting treatments
 - Silviculture operations
- **Rail Operations**
 - Installation, removal and disposal of ties
 - Right of way maintenance and debris disposal
 - Derailments
- **Road Construction**
 - Construction and debris disposal

²⁸ Information available on the BC Ministry of Forests Protection Website

- **Home**
 - Refuse burning
 - Barbequing
 - Land clearing
 - Bonfires
- **Agriculture and Farming**
 - Land clearing and debris disposal
 - Spontaneous combustion in hay bales
- **New Development**
 - Road and land clearing and debris disposal
- **Recreational**
 - Campfires
 - Cooking
- **General Public**
 - Cigarettes
 - Youth
 - Vehicle accidents

2.11 Potential Impacts of Significant Wildfire Events

The impacts of wildfire events on individuals, businesses and communities can be devastating. The following is a brief summary of some of potential impacts:

Personal

- Serious injury and/or loss of life
- Loss of livestock and animals
- Destruction of homes and land improvements
- Employment and livelihood negatively affected
- Direct financial costs
- Potential emergency evacuation
- Potential future insurance coverage issues
- Temporary travel restrictions
- Temporary and/or long term loss of recreational opportunities
- Open burning restrictions
- Visual sensitivity of area impaired

Business

- Disruption and/or loss of businesses (e.g. Community of McClure and Barriere – loss of mill)
- Loss of equipment (including logging equipment)
- Curtailed harvesting and other forest related operations
- Highway or rail closures resulting in restricted personal transport and transportation of goods

- Reduced revenues
- Unplanned expenses
- Reduced tourism
- Potential imbalance in future timber supply affecting harvesting and milling operations
- Forest closures to recreation
- Campfire bans
- Open burning restrictions
- Forest road closures
- Forest use restrictions

Government

- Government revenues negatively impacted
- Unplanned direct financial burden
- Impacts to infrastructure (e.g. buildings and bridges)
- Additional burden on staff and other limited resources
- Negative impact to regular government services and programs

Developing strategies to minimize the threat of wildfire will minimize impacts identified above.

3.0 Consultation Process

The author conducted two public meetings, consulted with Valemount Mayor and Council, Village Staff, Regional District Staff, Simpcw First Nation representatives, provincial government agencies, Forestry Canada, local elementary and high school principals and teachers, forest companies, individual landowners, and other stakeholders to solicit input into the plan.

In addition, the author met and or contacted several communities that have implemented FireSmart plans for some time including Langford, Kamloops, Logan Lake, Prince George, and Jasper, Alberta.

A field trip to Jasper was arranged with the Village of Valemount Chief Administrator Officer, a Village Councillor, Ministry of Forests Zone Protection Officer, and the author to meet with Jasper Parks Services Staff. The group discussed FireSmart initiatives that Parks Canada is presently implementing and toured demonstration and operational programs.

A list of individuals and organizations contacted are included in **Appendix 7**.

3.1 Public Input

A public meeting was held at the commencement of the project on December 7th at the Village Office Council Chambers. The Mayor, Council Members, Village Staff and approximately 25 members of the public attended a presentation about

the project. The Council and public provided input on issues regarding potential wildfire threats. Discussion included the types of ignition sources and strategies to reduce fire risks. **Appendix 7** includes copies of minutes from the meeting as well as newspaper articles discussing the meeting from the Robson Valley Times and the Valley Sentinel.

Wildfire Impacts on the Community, Residents, Businesses and Tourists

Issues raised by Councillors, Village Staff, residents and the public, at the public meeting on December 7th included the following:

- Panic and stress on families
- Emotional and physical health and well-being issues as a result of a major wildfire event
- Safety Issues and risk of serious injury or loss of life
- Potential loss of property, livestock, domestic animals, and wildlife
- Loss of irreplaceable personal effects
- Reduced property values due to destruction of home and land improvements
- Potential major loss of parts of community due to wildland / urban interface
- Potential long term negative impacts on economy
- Potential loss of existing employment and opportunities for new employment
- Potential immediate negative impact on sawmilling operations and other businesses' livelihoods
- Loss of future timber supply affecting long term milling opportunities and employment
- Potential loss of businesses and equipment
- Forest closures affecting recreation, road use and other forest use restrictions including open burning and campfire bans
- Curtailed harvesting and other forest related operations
- Tourism may be positively affected in the short term by people travelling to witness a large fire event
- Tourism would be negatively affected in the long term as a result of a wildfire affecting the scenic beauty of the area and recreational opportunities (affects local residents also)
- Potential power loss and cellular telephone service interruption
- Potential loss of communication concerning information about fire behaviour, impact and information on potential evacuations during wildfire events
- Potential positive impact on Mountain Pine Beetle population (if timber is burnt killing the beetle)
- Potential negative impact on population levels of Valemount or Tete Jaune areas

Fire Risks in Valemount and Surrounding Area

The public and Village Council and Staff identified a number of fire risks including:

- Accumulated grass in Cranberry Marsh (Starratt's Wildlife Sanctuary) immediately south of Village of Valemount boundary
- Strong winds from the south that funnel through the Valemount/Tete Jaune Cache Corridor
- Extensive continuous stands of mature and immature Lodgepole Pine throughout the Village and surrounding valley
- Forest health issues including Mountain Pine Beetle and Mistletoe
- Aggressive wood piles on private land and location of wood piles close to houses, fences and outbuildings
- Lack of weed/grass control along the highways, railways and other rights of ways
- Dry wood from previous harvesting located in the vicinity of Main Street and along Swift Creek
- Debris in the vicinity of the Old Dump
- Open campfires permitted on property
- Type of construction materials on existing homes and buildings and for new construction
- Access issues regarding fire suppression and evacuation
- Increased number of human caused fires
- Increased tourism and recreational use of forests
- Trees falling on hydro lines, grounding and causing fires
- Fires resulting from sparks from chimneys
- Timbered areas along 17th Avenue and other areas surrounding the Village

Sources for Ignition for Wildfires

Wildfire ignition sources may be natural or human caused. Sources may be within the community, along transportation corridors or from the forest. Ignition sources identified at the meeting included:

Human caused

- Cigarettes
- Kids and matches
- Railroad activities including hot brakes and clearing
- Vehicle and highway traffic
- Hikers and campers
- Controlled burns particularly during high fire hazard periods
- Land clearing and burning of garbage and debris
- Campfires, open fires, bonfires and parties
- Arsonists and employment seekers
- Chainsaws, logging and road construction equipment

- Sparks from chimneys
- Spontaneous combustion (e.g. hay bales and decaying wood chip piles)

Natural caused

- Lightning

Potential sources of ignition must be examined in the development of specific strategies to minimize impact of wildfire affecting communities. As well, ignition sources within the community that can cause fires to spread to forested areas must also be considered in developing a FireSmart community.

Public Discussion and Recommendations

A number of public recommendations and strategies were suggested at the public meeting including:

- Have a team of experts identify and develop an assessment of wildfire hazards within and around the Village of Valemount (including addressing mature pine with forest health issues)
- Develop a program to assist removing trees from private property where residences do not have financial resources or equipment to remove timber
- Encourage entrepreneurial ventures to partner with landowners to remove pine affected by Mountain Pine Beetle
- Provide assistance to home owners in identifying safe fire practices and precautions
- Include an information sheet to be sent out with building permit applications regarding fire safe construction (both building materials and location of houses in relation to forests)
- Develop and maintain fire breaks around the community (e.g. Two Mile Hill and McLennan Forest Road)
- Review opportunities to strengthen existing fire breaks including Starratt's Marsh, along the old highway, Highway 5 and other existing natural or man made fire breaks
- Revise forest harvesting strategies to take into consideration fire prevention measures
- Develop education and awareness programs for the general public
- Provide a public information session on how to assess wildfire risks and implement recommendations of the FireSmart Manual²⁹ and specific suggestions for residents living on steeper slopes
- Encourage the Regional District to implement wildfire protection strategies
- Encourage wildfire prevention treatment (spacing and pruning) on private land including Canoe Mountain Resort

²⁹ Produced by the Ministry of Forests

- Establish emergency escape routes in the event of wildfire
- Establish emergency communications (e.g. low wattage emergency radio broadcast equipment)
- Establish safety marshalling points for the community in the event of wildfire events
- Initiate FireSmart education programs in the Elementary School
- Develop a “Block Parent” type program to champion the FireSmart Program within the community

A second public meeting was held on February 21, 2005 to review the initial results of the risk hazard analysis and draft recommendations of the report. A summary of the comments of the meeting and copies of newspaper reports of the meeting are included in **Appendix 7**.

A summary of the final report findings and recommendations was presented to the Council at a council meeting held March 22, 2005.

First Nations

A meeting was held with Simpcw First Nation Band Manager and Fish and Wildlife Technician to discuss the location of traditional sites, the scope of the wildfire risk analysis and protection planning project, and to learn from the experiences of the Simpcw First Nation as a result of the Barriere Fire in 2003.

The planning area for this report is within the traditional area of the Simpcw First Nation. Historical sites are located at Tete Jaune Cache.

The Band Manager and Fish and Wildlife Technician identified a number of issues and recommendations as a result of their experience of the Barriere Fire, namely:

- The Barriere Fire was a 1 in 100 year event
- Rapid rates of fire spread were experienced on pipeline and hydro rights of ways, fence lines and other grassy areas
- The band lost 8 houses in the vicinity of Louis Creek where the fire jumped the North Thompson River and spread along a fence line and grassy area (identifies that fire break width is not the only consideration in fire proofing a community – fire spotting distance can be 1 to 2 km in large fires from the active fire front)
- Burn grass areas early in the spring each year to reduce fire risks at peak hazard times (rate of spread in the grass areas was extremely rapid in the Barriere Fire)
- Fire hazard changes quickly depending on conditions and fire behaviour can be very erratic identifying the need for effective communication for fire suppression crews and the public

- Establishing an emergency water storage in the event of power failure is paramount for fire suppression and community water supply
- During a fire, fire hose lines need to be located in low fire risk areas and require monitoring to prevent water supply from being disrupted due to rapid and sporadic fire advances (burning hose lines)
- Arrange for a back-up emergency Incident Command System Centre in the event the primary location is not available
- It is very important for emergency response services to have knowledge of location of residents and the public in order to communicate effectively in the event of a wildfire (The set-up of a 1-800 telephone number was very valuable for people to contact emergency services for information during the Barriere Fire)
- Security needs to be established immediately after a large fire event has occurred to ensure public safety and prevent thefts
- A strong recommendation is to draw heavily on local personnel in suppressing a fire due to their knowledge of the area and fire fighting resources that are available
- Ensure that S100 training for firefighters is completed prior to the commencement of each fire season
- Ensure that businesses / governments are able to continue with regular wage and other payments during a wildfire event to assist with financial stability of employees and residents (bills don't stop in the event of a wildfire – usually they increase)
- Ensure that there is a designated person responsible for the Wildfire Protection Plan and that the Plan is updated and tested on an annual basis

3.2 Municipal, Regional District and Provincial Government Agencies

Consultation was conducted with representatives of the Village, Regional District, Provincial Ministries, Crown Corporations and Agencies to:

- 1) solicit input for the wildfire risk analysis and the formulation of recommendations,
- 2) discuss issues that affect the various government agencies and identify strategies to implement recommendations, and,
- 3) identify synergies and linkages between the various organizations.

Village of Valemount Consultation

Municipal Emergency Plan

The Village of Valemount revised its Municipal Emergency Plan in November 2004. The plan outlines responsibilities and procedures in the event of a major emergency. As indicated in **Section 1.0** above, wildfire risk is rated as the second primary hazard to the community, only to power outage / extreme cold. The primary concern is based on fuel types, geographical factors and population

density covering the area from Tee Pee Creek to Camp Creek. The concern extends to all interface fires throughout the region.

Recommendations from this report should be considered in revisions to the Municipal Emergency Plan with regards to fire risks and implementing strategies to reduce these risks.

Review of Existing Fire Risks and Current Programs

A meeting was held with a Village Councillor, the Building Inspector/Bylaw Enforcement/Fire Prevention Officer, Public Works Superintendent, and the Regional District Fire Chief to identify high fire risk areas and discuss FireSmart initiatives that have been implemented to date for the community. Discussion also included recommended strategies for the future. The meeting was followed by a field trip around Valemount with the Councillor and Fire Chief to discuss specific issues identified at the meeting.

The Councillor and Village Staff identified a number of fire risks for Valemount and surrounding area, namely:

- Fire risk exists on a number of non-resident properties and larger land holdings that have not been subdivided within the village limits.
- The un-subdivided private land between 14th to 17th Avenues and Ash to Dogwood Streets consists of an immature pine forest with understory vegetation, dead and down timber and ladder fuels
- There are no fire breaks immediately behind the houses on the south side of 14th Avenue creating an interface risk for these residents
- The un-subdivided property from 9th to 13th Avenues and Ash to Dogwood Streets consists of mistletoe infected mature pine with understory vegetation, dead and down timber, mistletoe, ladder fuels and may contain some beetle infested timber
- The above area has no established access for fire trucks, there are no fire breaks and the area is a moderate to high fire risk due to the fuel types and use by children
- The right of way for 10th Avenue between Ash and Dogwood has been cleared, however, clearing debris still remains within the right of way and there is no access for emergency vehicles
- The area north of 13th Avenue to Bevan Crescent and bounded on the east by the CNR and on the west by Ash is also emerging as a high-risk area with the construction of the new high school. It is expected that this area will see increased use by children once the new school opens, increasing fire risk potential
- The “old dump” site near Starratt’s Marsh is identified as an area of high risk due to use by local young residents
- The area east of Main Street to the eastern fire protection limits is considered a high fire risk with limited access. The area consists of

approximate 15 year old mixed forest of pine and deciduous species with moderate to heavy slash from previous harvesting

- The forested area south of Swift Creek from Dogwood to Highway 5, particularly near Grenfell Place is identified as an area of urban / forest interface which is difficult to control a wildfire. There is limited access and the forest edge is adjacent to residences creating challenges for fire suppression
- Grass along the CNR right of way from Canfor's mill to the north part of the village is considered a fire risk. Access is limited south of the CNR maintenance yard
- Starratt's Wildlife Sanctuary is considered a high fire risk early in the season (from spring snowmelt until grass green-up, usually in June)
- In general, properties with only one access create additional risks for suppression crews and evacuation of residents during a wildfire event

Burning Authorizations and Other Administrative/Jurisdictional Issues

A number of administrative / jurisdictional issues were raised during the meeting with the Village Councillor, Staff and Regional District Fire Chief regarding the responsibility and authority of the Village, Regional District and province concerning fire suppression on crown and private land. They are:

- The absence of Regional District or Provincial Government pre-burning inspections of piles / areas outside the village limits before issuance of a provincial burning reference number was raised as an issue that may result in higher fire risks for adjacent landowners or the community³⁰
- The issue of Regional District / Ministry of Forests overlapping fire fighting jurisdiction and downloading of fire fighting responsibility from the Province to the Regional District was raised as an administrative issue that requires further clarity due to the small size and financial resources of the local fire department (This includes the issue of cost reimbursement for fires fought on provincial crown land by the Regional District which is the responsibility of the province)
- An issue was identified regarding availability of Ministry of Forests' firefighters to take action on fires during periods outside the high fire hazard season (i.e. before April and after September)

³⁰ Prior to the establishment of the issuance of burning reference numbers, there was an education component for the applicant as part of the burning permit issuance process (i.e. forest officials would discuss equipment required and other safeguards with private land owner to achieve safe burning)

FireSmart Initiatives Implemented by Village and Regional District Fire Department to Date

A number of FireSmart initiatives have been implemented by the Village to date. Specific programs, although some not formalized, have been ongoing for a number of years. These include the following:

- A Municipal Emergency Plan was updated November 2004
- An Emergency Operations Centre has been established at the Village Office equipped with a back-up emergency generator
- The Village has participated in the past with the MOF and other agencies to conduct mock fire emergencies
- The Village has established Bylaw No. 560, 2004, amending Bylaw 377, 1994, which outlines requirements for burning of wood debris from land clearing projects (Bylaw minimizes risk of fire escape and identifies permitting requirements including approval of burning site, size of piles, burning windows, and equipment required for safe burning) **(See Appendix 8)**
- The Regional District Fire Department (RDFD) has initiated discussions with McBride, Prince George, Jasper and Blue River to develop mutual aid agreements for manpower and other resources
- All Regional District firefighters have completed the Ministry of Forests S100 training. Some firefighters have completed the MOF S215 and Emergency Response Incident Command System (ICS) 100 and 200 training
- The Regional District fire crews have completed cross training with the Ministry of Forests Staff and both organizations are familiar with the other agencies' type of fire equipment (last training was completed in 1999)
- The Village has implemented a non-formalized program, and is leading by example, to reduce fire risk by removing debris, pruning and cutting grass on residential and commercial lots that it owns (currently budgets \$5000 annually)
- The Village requires new residential subdivision proposals to have major thoroughfares established for emergency response and evacuation purposes
- The Building Inspector advises that the Village has just commenced providing copies of FireSmart Manuals for new home developers
- The Village Public Works Department has created a fire break by clearing a right of way connecting Ash Street to the old railway right of way immediately south of the new high school location
- Public Works has reduced fire risk along the CNR mainline by clearing and grass cutting (North of 5th Avenue and adjacent to Main Street)
- The Village is scheduling to harvest additional timber next to the water reservoir to reduce fire risk in this area in 2005

- The Village Fire Protection Officer inspects piles prior to burning and owners must identify what kind of suppression equipment is available prior to the Village issuing a burning permit
- The Village faxes a copy of approved burning authorizations to the RDFD to advise the department of approved burning locations
- The Village water supply has been upgraded and there are no anticipated water supply issues for the next 15 years based on current population growth estimates
- The major water infrastructure including fire hydrants has been extended to 17th Avenue and south along some right of way developments improving fire suppression capability (currently over 70 hydrants within the Village)
- The Village has initiated this fire protection / prevention planning study

Regional District of Fraser-Fort George

The Regional District has undertaken a number of FireSmart initiatives regarding planning, working with the Ministry of Forests and training of Regional District Fire Department Staff.

In 2002, the Regional District of Fraser-Fort George amended the Robson Valley-Canoe Mountain Official Community Plan Bylaw No. 842 by creating a Development Permit Area on Canoe Mountain. The main guidelines for the issuance of Development Permits within this area are to protect the natural environment, protect areas and developments from wildfire hazard, and ensure that the form and character of development does not detract from the high scenic values of the area. A copy of page 29A of Schedule 'A' of Bylaw 842 outlining the Canoe Mountain Development Permit Area is included in **Appendix 9**.

The Regional District provides copies of FireSmart brochures with all building permit and subdivision applications. Developers are also referred to the FireSmart Manual on the Internet.

The Regional District is currently working with the Ministry of Forests to develop a reciprocal mutual aid agreement to maximize the resources available to attend fires within the overlapping fire jurisdiction. In addition, the RDFD is working with other communities to develop mutual aid agreements covering personnel and equipment. As discussed above, the RDFD has completed basic forest fire training, cross-training with the Ministry of Forests regarding use of both agencies' fire suppression equipment and some members of the department have received higher levels of forest fire suppression training.

Provincial Ministries, Agencies and Crown Corporations

MSRM, MSBED, Land and Water BC Inc, Provincial Emergency Program

Meetings were held in early December with representatives of Ministry of Sustainable Resource Management, Ministry of Small Business and Economic Development, Land and Water BC, Provincial Emergency Program, and Regional District of Fraser-Fort George to provide an overview of the project and solicit comments and recommendations for the report. Discussion ensued about coordinating efforts of all agencies regarding strategies to reduce fire risk around Valemount, Tete Jaune Cache and with private landowners.

Ministry of Forests Protection Branch

Ministry of Forests Staff have indicated that the fire risk within the valley is moderate to high depending on weather and other factors. The Robson Valley Fire Zone Protection Staff have been active in promoting FireSmart initiatives within the Valemount and Tete Jaune Cache communities. These initiatives include public education on FireSmart planning; distribution of the Homeowner's FireSmart Manual to all residents in Valemount and Tete Jaune Cache; and, partnering with Valemount Community Television to air programs dealing with FireSmart awareness and risk reduction strategies for residences, businesses and the community. Protection Staff have also provided educational training at the elementary and high school levels. This includes providing S100 Basic Fire Suppression and Safety Training to high schools in the Robson Valley.

Protection Staff have assisted residents living in the interface to complete fire risk assessments and help homeowners develop strategies to make their home and property more FireSmart.

Robson Valley Fire Zone Staff, in partnership with the Village, Regional District and other emergency services, have conducted mock wildfire emergency training sessions.

In the summer of 2003, the Robson Valley Fire Zone Staff, in cooperation with the Enhanced Forest Management Pilot Project, completed a fuel modification demonstration project along a section of Cedarside Road to show residents and builders how to reduce fuel loading in forest stands. This demonstration project shows how residents can modify fuel loading in the 2nd and 3rd zones identified in the BC Homeowners FireSmart Manual.

Protection Staff are actively working with BC Parks to develop and implement prescribed fire plans within Mount Robson Park to reduce wildfire risks and to enhance biodiversity.

The Ministry of Forests Protection established operating guidelines for wildfire suppression with local governments in 1998. A copy of the guidelines is included in **Appendix 9**. The Prince George Fire Centre has established a standard operating guideline for compensation for non-tax based response agencies. A copy of the guideline is also included in **Appendix 9**.

BC Parks

A meeting with the Area Supervisor and Senior Park Ranger for Mount Robson Park was held on January 18th to discuss strategies BC Parks is implementing in Jackman Flats and Mount Robson Parks.

Jackman Flats Provincial Park

Jackman Flats Provincial Park, located within the Corridor, is a geological sand dune formation found only in this area. It is home to a unique lichen species³¹ and two to three other rare lichen communities, the primary reason for establishment of the Park.

BC Parks has been proactive in addressing beetle infestations and developing fire proofing initiatives within Jackman Flats. During the winter of 2003/04 BC Parks conducted a fall and burn program to remove 525 beetle infested trees. The entire park was probed in late 2004 at a 100 meter grid to assess beetle populations. An estimated 900 to 1100 affected trees are scheduled for removal in 2005. The parks program includes thinning, spacing and fire proofing through the removal of infected trees down to 4 inch diameter, removal of potential ladder fuels, and thinning of Lodgepole Pine in the Subboreal Spruce forest type adjacent to the CNR right of way. Removing the beetle killed trees will reduce the north-south fire conduit.

Parks plans to leave wildlife trees (attacked pine trees that are no longer harbouring overwintering brood stock) as part of its initiative to maintain biological diversity in the park.

Mount Robson Provincial Park

Mount Robson Park is outside the study area of this planning project but does have influence for the Valemount/Tete Jaune Cache Corridor. BC Park's Staff advise that the wind patterns are from the west, 97 % of the time. Therefore, under normal circumstances the risk of a wildfire event in the Park spreading west or southwest affecting residents of Tete Jaune Cache or Valemount is extremely low. However, residents and businesses located along the Swift Current Creek Subdivision/Mount Robson Park interface or near the park should always be prepared as witnessed by events in Kelowna and Barriere.

³¹ *Sterocaulon condensatum*

BC Parks are implementing a number of strategies to reduce fire risk and address beetle populations in Mount Robson Park. The management team has a 10 year plan to address forest health issues at the east and west ends of the Park and to work with local residents on fire proofing in the interface zones.

Plans include reducing fuel loading in forest stands at the west end of the Park over the next 5 years. Parks are scheduling thinning operations next winter inside the Park along the interface with the permanent/seasonal residents at Swift Current Creek. BC Parks has identified a concern of fire entering the park from the Swift Current Creek subdivision. In this regard, BC Parks is scheduling FireSmart training with Swift Current Creek residents this year.

Other strategies include on-going single tree removal of beetle attacked trees within campgrounds. BC Parks also conducted a successful prescribed burn at the east end of Moose Lake in 2004 to reduce beetle populations, provide a fire break and maintain ecological integrity. The management group is coordinating their efforts with Jasper National Park regarding ecosystem management.

3.3 Consultation with Elementary and Secondary Schools

Elementary School

A meeting was held with the Principal and Teachers of the Valemount Elementary School on January 5th to discuss opportunities to introduce FireSmart education in the primary grades. The educators had the following recommendations for implementing a FireSmart program in the school:

- Identify why fire smart planning for the home and community is important to students (impacts of a fire on family, friends, pets, etc.)
- The age group that is most appropriate to introduce FireSmart concepts to elementary school students is from grades 4 to 7 (suggest focusing a program in only one of these grades)
- The recommended course length to provide students with an introductory level of understanding of FireSmart concepts is 3 lessons of 30 to 45 minutes each
- Students would require evaluation on their understanding and knowledge at the end of the sessions to ensure student learning accountability
- The types of activities that would be best suited to students in grades 4 to 7 are:
 - Hands on materials
 - Video presentations
 - FireSmart Home and Property Model that has parts that can be added to or removed from the model
 - Pictures of fire safe houses and communities
 - Interpretive walk or field trip around the community

- Interactive computer station that can be loaned to the school for a period of 1 to 2 weeks after initial FireSmart presentations to allow students to practice developing FireSmart homes and properties
- Training in completing the BC Homeowner's FireSmart Assessment Checklist for their own residence
- Map for the students to plan an escape route
- The school program best suited to introduce the FireSmart concept in is any one of the following curriculum:
 - Health and Safety
 - Science
 - Personal Planning
 - Social Responsibility

Secondary School

A meeting was held with the Principal at the Valemount Senior Secondary School on January 11, 2005 to discuss teaching opportunities regarding wildland /urban interface wildfire issues and solutions. The students in these grades will soon be renting, purchasing or constructing new homes. It is important that they have an understanding of the key issues and solutions for living in a wildland/urban interface. The following are recommendations for implementing FireSmart education at the high school level:

- Implement FireSmart program in grade 10 or 11 as the students in these grades are most receptive to learning new concepts
- Suggested format for the module is a maximum 2 week course as part of the science curriculum
- Suggest developing course material in concert with local BC Ministry of Forests Protection Branch with the following considerations:
 - Hands on project with forestry staff and teachers (conducted in the fall)
 - Conduct a cleaning operation (could be a demonstration project in the immature pine stands adjacent to the new high school location)
 - Students would participate in piling and burning (would require endorsement from Parent Advisory Group and students' parents due to risk and school safety issues)
 - Minimize class time and maximize field time for this activity
 - Project could include each student assessing their own house (using the checklist in the FireSmart Manual) and identifying strategies to rectify any deficiencies
- Suggest Introducing the FireSmart program with a video of houses burning to "spark" interest of the students

The Principal is very supportive of introducing this program into the school curriculum. Safety issues must be addressed and such a project would require approval by the School District and Parent Advisory Committee. It is suggested

that a partnership with the Ministry of Forests Robson Valley Fire Zone and the Village of Valemount be established to plan, coordinate and implement a “hands-on” demonstration project in the pine forests adjacent to the high school. The program could be implemented as early as the fall of 2005.

3.4 Consultation with Other Organizations

Presentations to representatives and or meetings with the following agencies, organizations and individual companies were made to solicit input into the plan:

BC Timber Sales (BCTS)
Canadian Forest Products Ltd. (Canfor)
McBride Forest Industries Ltd. (MFI)
Valemount and Area Recreation Development Association (VARDA)
Valemount Springs/Terra Nova Management Ltd.
Canadian Mountain Holidays
Terracana Ranch Resort
Valemount and Area Recreation Association
Yellowhead Realty

A literature review, meetings, field trips and contact with other communities regarding FireSmart programs in areas of the province and in Alberta was completed, including the following communities:

Meeting with the Director of Planner, City of Langford
Communication with City of Kamloops Planning and Recreation Departments
Meeting with Manager of Environmental Services, City of Prince George
Field Trip to Jasper National Park
Review of Logan Lake Wildfire Protection Plan
Review of Provincial Information on Wildfires and FireSmart Planning

BC Timber Sales

BC Timber Sales (BCTS) is operating within a number of planning cells in the Valemount to Tete Jaune Cache Corridor. The corporation plans are focused on harvesting beetle-infested timber for the next three years based on current beetle survey information. BCTS, under its mandate, must also tender timber sales to include other species to meet timber species and size profile balance required by its customers and to meet the objectives of the market pricing system (mixture of conventional and high lead harvesting). It is harvesting other species primarily outside the main valley corridor.

The corporation is scheduling partial harvests in the Corridor and clearcut with reserves³² outside of the main valley. BCTS is working towards a total chance

³² Harvest pattern where individual or patches of trees are reserved from harvesting to maintain biological diversity

planning concept³³ in its road and block layout on the landscape. Roads scheduled for development will provide good access for fire suppression, provided the roads are not deactivated at the end of operations. BCTS recognizes that road issues are concerns for all users. However, liabilities to maintain road access without active harvesting or silviculture operations may lead to a road being recommended for deactivation or being returned to the Ministry of Forests jurisdiction for their needs.

BCTS has included a number of strategies in its plans to address the beetle epidemic and create future diversity in regenerated stands. This will provide reduced fire risk in the future. The company plans to remove all pine in its partial harvests. Only 10 percent of Douglas-fir is scheduled to be cut to meet Workers Compensation Board safety requirements, reduce windthrow, address root rot issues, and to remove fir needed for the construction of roads and landings. The company is also harvesting spruce to minimize windthrow and retaining subalpine fir as shade and nurse trees for regeneration in frost pockets³⁴. The company is working on developing uneven age management guidelines and partial harvest guidelines similar to those developed in the Invermere area. This will convert the continuous pine forest types to a mosaic of stands with different tree species and age classes across the landscape. This will afford greater fire protection in the future, and at the same time meeting visual quality, forest health, other forest management objectives, and public interests.

The company is working with the Small Scale Salvage Licensee to harvest small isolated pockets of beetle infested timber within BCTS operating areas. BCTS is also working with McBride Forest Industries to address beetle in the Tee Pee Creek/Crooked Creek area. BCTS only plans to address beetle attack above the present operability line³⁵ within its planning cells in conjunction with strategies developed by the Defined Forest Area Management cooperative. BCTS is not actively engaged with private land owners or the Village to address beetle salvage or FireSmart initiatives, as it is not within the general mandate of the Crown Corporation. Any demonstration projects that BCTS may consider participating in, would require meeting “Fair Market Value” criteria for tendered sales under BCTS’s mandate. The company has expressed interest in participating in an interface committee, if one is established.

The company plans to address beetle infestations north of Cedarside Road in conjunction with Crown Lands. The company recommends that strategies to address bark beetle and fire management could be implemented by other agencies around Cranberry Lake and north to Starratt’s Wildlife Sanctuary. The

³³ Planning concept where layout of roads and blocks takes into account future harvesting patterns to minimize long term road development

³⁴ Generally low lying areas subject to frequent cold air pooling and frost affecting reforestation success

³⁵ Operability line refers to areas within the Timber Supply Area that are considered economically viable to harvest

company has also raised the issue of beetle epidemic within Wildlife Reserves that may provide a breeding ground for beetle and a future fire risk if no active beetle management strategies are employed.

The Company plans to complete road debris disposal and concurrent burning of landing debris thus reducing beetle population levels and removing the fire hazard associated with these operations.

BCTS indicates that fishery issues must be included in harvesting and wildfire management plans. As part of wildfire management plans developed, the company indicates the need to review impacts of spring burning, burning with the proper venting index, addressing smoke management issues and public health concerns.

Canadian Forest Products Ltd.

Mill Operations

Canadian Forest Products Ltd. (Canfor) mill and adjacent owned properties located south of town in the Cedarside area provides a fire break to the south of Valemount. The company has been very proactive in fire prevention strategies by removing debris and locating log decks and lumber piles away from timber edges. The company's waste burner is designated as a community burner. This provides small sawmill operators and other companies with opportunities to burn waste material from their operations thereby reducing fire hazard on their own properties.

Woodlands Operations

Canfor operating areas are largely outside the wildfire planning area with the exception of the Canoe Mountain area. The company is concentrating its operations on Mountain Pine Beetle infested timber as part of the Defined Forest Area Management strategy of all licenses in the Robson Valley TSA. The focus is to salvage affected timber, reduce beetle populations and reduce the associated fire hazard. Harvesting operations such as partial harvest techniques are being employed to reduce the amount of ladder fuels and break up the canopy to reduce forest continuity, thereby reducing fire risk.

The company annually harvests approximately 50-60,000 cubic meters of pine including both large and small scale salvage. The company also conducts a fall and burn program in inaccessible areas, and, in areas of low infestation that are not scheduled for harvesting within immediate timeframe to short term period.

The company has raised the issue of build-up of fuels in the forest as a result of the exclusion of fire through suppression efforts during the past century. Although representatives consider the Valemount to Tete Jaune Corridor overall

a moderate fire risk (6 out of 10 with 10 being the highest), the strong winds experienced in the valley coupled with steep sides of the valley may potentially create conditions for a lightning or human caused fire to expand quickly to become a large wildfire event.

The company has partnered with Canoe Mountain Resorts to carry out small scale salvage and fall and burn programs on Canoe Mountain Resorts property to reduce beetle infested areas thereby reducing fire risk in this area. The company, as part of the coordinated licensees Defined Forest Area Management cooperative, is also attempting to work with individual private land owners within the Valemount to Tete Jaune Cache Corridor to address beetle infestations. The company has identified, however, that this is a slow process as there is no private land owners' cooperative to identify the serious issue of the beetle to land owners and provide needed information to them. There are a number of non-resident landowners that are difficult to contact and many landowners are only aware of the beetle issue from their neighbours or "word of mouth". It is therefore difficult to implement a coordinated approach of salvaging beetle infested timber on private land, thereby protecting the land owner's investment at the same time reducing fire risk and beetle population levels.

McBride Forest Industries Ltd.

McBride Forest Industries (MFI) foresters indicate that there is the potential of high fire risk within pine stands located in the Valemount – Tete Jaune Cache Corridor due to the continuous mature or overmature forests with full crown closure, bark beetle, heavy mistletoe and presence of ladder fuels.

The company is conducting partial harvest operations on the east side of the Canadian National Railway (CNR) mainline north of the railway overpass on Highway 5 to salvage beetle infested timber. MFI has focused its operations within beetle infested stands during the past two years and is taking the lead role in assessing beetle infestation levels in all licensee operating areas as part of the Defined Forest Area Management cooperative. These assessments will assist all licensees in developing strategies specific to their operating areas. In 2004, the company targeted 70 % of its harvest in pine leading stands. MFI is working with other licenses including BCTS to prioritize the most heavily beetle infested stands for harvest.

The company suggests that combining partial and clearcut harvesting strategies can reduce fire risks. For example, designing two partial cuts (50% tree removal) with a clearcut opening (minimum of 400 meters wide) in the middle would provide a fire break and reduce fire risk of the harvested stands. A "zigzag" design of harvest blocks to break up continuous forest types and create diversity would also enhance fire proofing of the forested landscape. Introducing aspen and other fire resistant deciduous species in strategic locations enhance fire breaks would also provide landscape fire proofing. An example includes

deciduous stands located adjacent to Gosnell Creek. MFI representatives indicated that the lower combustible “Wall of Cottonwood” surrounding Gilbert Smith’s mill in Barriere, was in part, instrumental in saving the mill by preventing the 2003 Barriere Fire from spotting ahead into the mill yard.

MFI foresters estimate that the fire risk in partial harvests due to increased fuel loading on the ground exists for 2 to 3 years following harvest until the fine fuel content of slash decomposes. The company indicates that one of the downsides of partial harvests is the increased airflow through a stand, which may create a “hot fire” if fanned by winds. However, on the positive side, it appears that the Mountain Pine Beetle does not prefer the increased air flow in partially harvested stands, thereby improving resistance to further attack by the insect.

The company is disposing of roadside debris and burning logging slash in accordance with standard legislated requirements, which the company believes are adequate to reduce fire hazards along roads and within harvest blocks. MFI is planting mixed species where possible to increase the diversity on site. The company suggests that amending the regeneration stocking standards to accept more deciduous species in predominately coniferous stands will improve fire proofing of regenerated stands.

MFI is working with Canfor and small scale salvagers to encourage private landowners to salvage beetle infested timber within the Valemout – Tete Jaune Corridor. The company suggests that there needs to be some drastic measures taken by government to solicit private land owners’ attention to address bark beetle on their property. It is estimated that only 60 to 70 percent of the private land owners are aware of the issue, and, are prepared to implement strategies to reduce the beetle populations. Many of the landowners do not understand that their timber investment is threatened by not removing beetle infested trees, and at the same time, failure to remove the affected trees will result in a heightened fire risk on their property.

Valemout and Area Recreation Association

A presentation was made to the Valemout and Area Recreation Association (VARDA) Board of Directors on December 15th to outline the hazard assessment and protection planning project and to solicit input. VARDA recommends that a series of trails be established surrounding the Village of Valemout that would provide both recreational opportunities for snowmobilers and act as fuel breaks. VARDA recommends that maintaining harvest road systems that can also be utilized for recreational purposes will provide a control point for fire suppression and access for fire fighting personnel and equipment.

Canoe Mountain Area Developments

Two developments are proposed for the Canoe Mountain area. Canoe Mountain Resorts Ltd. signed an agreement with the Province in December 2003 for the development of a resort and gondola. Terra Nova Management Ltd., a principal investor, is proposing to develop Valemount Springs Resort, during the next 5 to 10 year period in the vicinity of the Canoe Mountain Area.

Canoe Mountain Resorts Ltd.

Canoe Mountain Resorts is presently in the planning stage of their gondola resort project. Discussions with the Project Manager indicate that no specific strategies have been incorporated to date in the design phase. The company is committed to a process of including FireSmart initiatives in the planning and design phase as well as during construction and lot sales for single residences and multiple-family dwellings.

The company plans to review the fire risk hazard mapping component of this report in the context of its resort development plans, and, develop specific strategies for location roads, golf courses and other open areas to act as fuel breaks wherever possible. Additional options may include reducing fuel loading and ladder fuels in dense stands along main road corridors and heavy public use areas. Reservoirs developed for watering golf courses will also act as water sources for fire suppression. Specific FireSmart requirements will be included as a condition in single and multi-family dwelling land sales to protect investments of both the landowner and the resort developer.

The company, in partnership with Canfor is actively removing beetle infested timber, reducing future fire risks in its development area.

Canoe Mountain Resorts has expressed interest in partnering with government and other agencies to establish a FireSmart demonstration area on their property. This will provide local residents with examples of strategies that can be implemented on their property to reduce fire risk.

Valemount Springs Resort

Valemount Springs Resort development is proposed on the bench to the north of Canoe Mountain and east of Canoe Mountain Resorts Ltd. property. Management recognize the issue of strong winds from the south-east during hot and dry conditions when Kinbasket Reservoir is low and the resulting high fire risk potential under these conditions. The company has included a number of FireSmart initiatives in their proposal, namely:

- The company plans to establish a number of “meadows” that afford scenic views of Canoe Mountain at the same time providing fire breaks
- Deciduous species are planned to be planted along the edges of meadows to create a “natural” effect as well as providing a reduced fire risk at forest / residential interfaces
- Fairways for future golf course development are planned to be cleared at the commencement of the project and will provide additional fire breaks to development areas
- The road network will meander through the development providing a fire break
- In addition, three main egress points from the resort will be developed that will act as evacuation routes in the event of a wildfire
- The main water sources for residential and commercial development is planned to be derived from either surface water from Canoe Mountain collected in a reservoir from gravity feed, or, pumped up in a pressurized system from Camp Creek
- Limitations are recognized for both gravity feed and pressurized pumping systems and planning will incorporate back-up strategies for water delivery in the event of power failure or other events
- The development will include installation of fire hydrants throughout the residential and resort area
- An artificial lake is planned to be developed that will also provide a water source in the event of a wildfire
- A trail system will also provide access to low hazard areas for residents, tourists, and the public in the event of an emergency evacuation due to a wildfire
- FireSmart development requirements will be required for residential land owners

Canadian Mountain Holidays Inc

Canadian Mountain Holidays Inc (CMH) operates two lodges in the Valemount area servicing its customers in helicopter skiing, hiking and mountaineering. The Valemount Lodge is 7 km south of town on Highway 5 and the Caribou Lodge is located in the Canoe River drainage approximately 24 km by road to the west.

Canadian Mountain Holidays recognize issues regarding wildfire risk within their local and remote operations. The company is currently working on plans to reduce fire hazard risks around their two facilities. Measures include expanding fire free zones, removing ladder fuels, enhancing safe storage of all fuels, and examining options for securing additional fire equipment and fire retardant foams. CMH is also revising safety plans to increase monitoring fire risk during high or extreme conditions and developing contingency and evacuation plans to ensure the safety for their clients, staff and visitors in the event of a wildfire.

Canadian Mountain Holidays advise that their lodges may also provide staging areas and accommodation for fire suppression crews in the event of a wildfire. The lodges are fully equipped with helicopter landing pads and aviation fuel storage. The Valemount Lodge and Caribou Lodges can accommodate up to 10 and 44 fire fighters respectively.

3.5 Experience From Other Jurisdictions

City of Langford

The author met with the Director of Planning for the City of Langford on December 23, 2004 to discuss initiatives developed by the City for wildfire risk reduction. The City of Langford was one of the first communities in BC to initiate wildfire risk strategies in the late 90's. In 2002 the City produced a report entitled *An Interface Fire Hazard Planning Model: A Case Study of the City of Langford* which reviews a number of tools available to municipalities and FireSmart strategies implemented by the City. The Langford experience indicates that public education and community involvement can lead to homeowners in interface fire risk areas undertaking their own preventative measures thus reducing government's need for intervention. A large part of the City's focus has been on new development projects.

Since 1998, local governments have been able to establish zoning or Development Permit Areas in high-risk wildfire areas of the community. The zoning is established within an "Official Community Plan"³⁶ as provided for in the *Local Government Act*. Langford has mapped and designated "Interface Fire Hazard Zones" for all areas within its jurisdiction as part of its Official Community Plan. All lands identified as extreme or high hazard are designated a Development Permit Area pursuant to the provisions in the *Local Government Act*. This permits city council the ability to regulate development within high and extreme wildfire hazard risk areas in a way that minimizes the risk associated with these hazards. Langford has established two land management focuses of the Development Permit Area designation (within the Fire Interface Hazard Zones), namely to:

- 1) Manage in a way that minimizes the risk of damage to property or people from fire hazards; and
- 2) Manage in a way that mitigates interface fire hazards while still addressing environmental issues

Within specific Development Permit Areas for the City of Langford, a number of guidelines have been established including:

- 1) Requiring removal of all land clearing debris resulting from development be completed prior to registration of subdivision plans

³⁶ Development Permit areas must be designated in an Official Community Plan

- 2) Requiring developer to submit a report prepared by a qualified professional to assess the interface fire hazard and make recommendations to mitigate the hazard in the development plan
- 3) Establishing Section 219 Covenants³⁷ prohibiting outdoor burning
- 4) Requiring specific spatial density and clustering of residences in new multiple-dwelling developments
- 5) Encouraging all hydro development to be underground to minimize potential for loss of power due to interface wildfires
- 6) Option of proponent developing a trail system around new developments, which would accommodate vehicle access for fighting wildfire in interface areas
- 7) Requiring roofing and insulation material to meet the Class “B” fire rating requirements contained within the current *B.C. Building Code*.
- 8) Establishing fuel reduced buffers around homes to the property line or 10 meters in distance, whichever is the lesser. The area may contain natural tree cover in locations approved by the City, but the owner must landscape and maintain the area with the intent of eliminating accumulation of combustible debris
- 9) Requiring all eaves, attics, decks and opening under floors must be screened to prevent the accumulation of combustible debris
- 10) Requiring all wood burning appliances to be installed with approved spark arresters
- 11) Requiring building design and construction to be consistent with *National Fire Protection Association Standard 299* (standard for protection of life and property from wildfire)
- 12) Approving officers potentially requiring a Section 219 covenant of property owners to ensure the 10 meter fuel restriction zone around houses and buildings is maintained and if not maintained, they may require payment of annual rent charge
- 13) Requiring proponents, in design of new subdivisions and neighbourhoods within designated high or extreme hazard areas, to consider incorporation of fire breaks adjacent to residential areas. These may be in the form of cleared parkland, roads, or trails
- 14) In high or extreme fire hazard areas, the option of requiring landscape plans be prepared in consultation with both Registered Professional Biologist and a Registered Professional Forester, and providing recommendations for ensuring minimal fuel loading within landscaped areas, ongoing protection from interface fire hazards, and outlining the type and density of fire resistive plantings that may be incorporated within landscaped areas to help mitigate the interface fire hazard

A copy of the Development Permit Area Guidelines for Interface Fire Hazard Zones (Bylaw No. 635) is included in **Appendix 9**. Also included in **Appendix 9**

³⁷ Section 219 of the *Land Title Act* permits local governments including regional districts to request Section 219 covenants which may be used to manage how land is sub-divided and built upon

are examples of a Development Permit issued for a new subdivision development and a single-family dwelling.

The City of Langford also provides an information pamphlet for landscaping entitled “FireSmart Landscaping on South-eastern Vancouver Island” which is designed to provide guidance for developers, planners, builders, landscapers, homeowners and gardeners in the wildland/urban interface of south-eastern Vancouver Island.³⁸ A copy of the pamphlet is included in **Appendix 9**.

City of Kamloops

The author contacted the City of Kamloops Planning and Recreation Departments regarding bylaws enacted for fire smart planning in wildland / urban interfaces. The City of Kamloops has enacted Bylaw 5-1-2121 to amend its Official Community Plan. The bylaw establishes Development Permit Area Guidelines to balance maintaining some forest cover and minimizing wildfire risks. Development permits issued in wildland / urban interfaces must be in accordance with guidelines. These include removal of trees within specific distances from location of buildings, landscaping requirements, planting of fire-resistant deciduous trees and recommendation for the use of fire-resistant plants for all landscaping. A copy of the City of Kamloops Bylaw 5-1-2121 is included in **Appendix 9**.

In addition to the above bylaw, the City of Kamloops developed a Council Policy in 1992 that outlines the requirements for restrictive covenants as conditions of subdivision and building permit approvals. A copy of Council Policy No. EDS-15 is included in **Appendix 9**.

Jasper National Park

A field trip to Jasper was conducted on January 10, 2005 with a Councillor and the Chief Administrative Officer for the Village, Robson Valley Zone Protection Officer for the Ministry of Forests and the author to review FireSmart practices being conducted to safeguard the Town of Jasper and seasonal property at Edith Lake. The group met with the Project Manager for the Foothills Model Forest: FireSmart /ForestWise Communities Project (who is also the Vegetation/Fire Specialist for Jasper National Park), Media Relations Specialist and Revenue Staff for Parks Canada and then toured fire proofing demonstration projects in progress near the Town of Jasper and Edith Lake.

The work reviewed is part of the Foothills Model Forest FireSmart/ForestWise Communities Project. The goal of the project is to develop, implement and assess innovative, ecologically-based methods for managing forest fuels in ways that reduce wildfire risk but also optimize or improve ecological conditions,

³⁸ Prepared by Strathcona Forestry Consulting, Shawnigan Lake, BC, 2004

wildlife habitat, and aesthetic qualities in the narrow fringe of forest lands located immediately adjacent to the Town of Jasper and other major developments.

The Vegetation/Fire Specialist provided an overview of the objectives of the FireSmart program for the Town of Jasper. He stressed the importance of reintroducing fire to maintain ecological integrity and biological diversity, at the same time reducing fire risk. Stands in early history, prior to fire suppression efforts, were much more “fire safe” due to the frequency of fire and absence of fuel build-up within forests. The Vegetation/Fire Specialist identified the need to reintroduce fire into ecosystems by thinning out the stands and having small prescribed burns to reduce fuel build-up.

Jasper has similar issues as the Valemount to Tete Jaune Cache Corridor with a “trench-like” main valley, steep mountainsides and side valleys. Jasper also experiences wind funnelling along the valley corridor similar to the planning area in this report. Parks Canada has identified two areas of focus for its FireSmart/Forest Wise initiatives: the Jasper Townsite and seasonal dwellings at Edith Lake. Both Jasper and Edith Lake have established their own Interface Steering Committees to address specific FireSmart initiatives in each of the communities. FireSmart planning and implementation of projects has been ongoing in these two communities for over 5 years. A copy of the Jasper Interface Steering Team Terms of Reference and a fact sheet from the interface steering committee entitled *Hot Topic* is included in **Appendix 10**.

A number of demonstration projects have been set-up with participation by Jasper National Park Service, corporate sponsors, local residents, environmental groups and other interested parties. Education of the public and public input into the planning process to identify projects and develop prescriptions has been an important component of Jasper Park’s success in implementing this process. Jasper Park Staff have ensured that the public was active in the planning and implementation process so that residents have “ownership” of the projects.

The Vegetation/Fire Specialist indicated there is no “silver bullet” that will make a community FireSmart – it is not just having fire proof shingles, adequate water supply, but, a coordinated strategy developed that involves all levels of government, the residents, businesses and volunteer organizations. Communication strategies need to be tailored to various groups depending on whether the target audience is residents or businesses. In some cases, Park Staff have gone door to door and met one on one to discuss the issues and enlist support and participation in the projects.

The Jasper FireSmart Program initiated 1hectare demonstration areas to raise public awareness. Each area had a prescription developed with public input. A one day “work bee” was held for each project involving residents clearing and burning along side initial attack crews and other government workers. In some projects, debris was trucked away and chippers were tested to break down larger

fuel sources. During dry days public turn-out to the events was between 75 to 80 people and on wet days even 30 people turned out. Demonstration projects were focused on specific neighbourhoods within the community to ensure that the projects were visible to the general public. Some ideas to promote the events included barbeques supported by corporate sponsors. Total costs for each demonstration project was approximately \$2000. Each demonstration project had signage erected to identify the fuel and fire conditions prior to the FireSmart work being implemented, detailing the involvement of the public, and explaining the results of each project. Signage that includes pictures of local residents has gone a long way to publicizing the message in a personal way.

As indicated above, the Edith Lake residents started their own community FireSmart steering committee. The committee plans work bees, distributes a newsletter identifying upcoming projects and lets the residents know how they can participate. The steering group also has a subgroup working on communication with insurance companies to discuss reduced insurance costs as a result of lower fire risk in the area. The Vegetation / Fire Specialist identified the need to build on “nodes of interest” within each community and focus on a neighbourhood approach for FireSmart planning and implementation to be successful. One key ingredient in the process is to have fun.

Jasper Park Services have offered to conduct hazard assessments for residents in cooperation with the property owners. It is important that the residents be present so that they have ownership of the process and are driving the strategies to reduce fire risk on their property. Timelines with a follow-up review are critical to the success of fire proofing on private land.

In addition to the neighbourhood projects, Jasper Park Service is now working on widening existing fire breaks, completing partial harvest of adjacent stands and maintaining deciduous timber along the edge of the fire breaks. The slash from harvesting is piled and burned. The Park Service is working with first nations to burn the piles on site. Revenue from the merchantable timber sold offsets the cost of each project, and is returned directly to the park for environmental mitigation projects including FireSmart initiatives. Costs associated with the thinning projects are \$6500 per hectare, which includes \$4000 per hectare for mechanical thinning and \$2500 per hectare for manual piling and burning. Jasper Park has found the best results using shortwood harvesting systems. The smaller machines are more applicable for sensitive sites. Less ground is disturbed and the machinery can easily meander through the stand creating a random harvest pattern without damaging the reserve timber. Other equipment tested includes medium sized feller bunchers and skid cats on roadside harvest operations.

Parks Canada has completed a prescribed burn three times along a fireguard established in 1980, which is located near the Jasper townsite. A fuel management program is now in place to burn along the fireguard and underburn in the thinned timber edge adjacent to the guard.

The cost to date for the FireSmart /Forest Wise Program in Jasper is \$750,000 of which 80 per cent has been recovered through the sale of the wood. The costs include \$120,000 in planning.

Some of the non-wildfire benefits of completing the fire proofing projects include:

- 1) Easier to see wildlife resulting in reduced human / wildlife interactions
- 2) Opening the canopy increases vegetation and berries expected to increase bear populations (expect abundant food source for bears)

Jasper Park Service is implementing wildfire risk reduction strategies outside the 10 km zone. It is extending the zone of interest to include a “Meso Zone” up to 30 kilometres around the Jasper Townsite. This is “Jasper’s Wildfire Insurance Policy”. Jasper Parks plans to reintroduce fire into the ecosystem using prescribed burning to create diversity of forest cover and provide greater fire resistance for some distance outside the town.

3.6 Issues and Strategies Identified by Provincial Government

MOF Report to Premier’s Review of 2003 Fire Season

In its report to the Premier’s Review of the 2003 Fire Season³⁹ the Ministry of Forests identified wildfire issues, programs and initiatives that it had undertaken to address wildfire situations and results as well as strategies for the future, including:

- The Ministry has led a variety of awareness, planning, cross-training, hazard identification and fuel management projects such as thinning, pruning and controlled burns over the past 15 years⁴⁰
- Public response has often been less than enthusiastic – proposals to deal with potentially dangerous fuel conditions through controlled burns and limited action wildfires were regularly met with public resistance due to smoke and visual impact concerns
- Previous experiences can be used to assist local governments to make the mitigation of interface fire risk a priority, and to gain more knowledge and experience, not only in assessing the risks, but also to responding to public concerns
- Greater efforts on community planning, homeowner responsibility, fuel management along with better understanding and more coordination between levels of government on prevention could have reduced the risk and possibly mitigated some damage
- Early warnings of heightened fire season can be indicated by:
 - Snowpack levels

³⁹ See bibliography

⁴⁰ MOF Report to Premier’s Review of the 2003 Fire Season (page 8)

- Increased Fire Risks associated with beetle infested areas
- Area burned in 2003 (266,000 ha) – 10 year average (25,300)
- Improvements to the MOF procedures to be implemented in 2004:
 - Proper resources at critical times during the fires
 - More type I crews (Type 1 interagency training standards and requirements)
 - Improve danger tree assessment and removal process
 - Main challenges to reduce risk of future wildfire events:
 - Understanding and monitoring drought and fire behaviour conditions
 - Addressing fuel conditions near communities and across the landscape
 - Improving level of resources available to deal with fires
 - Improving coordination between agencies
 - Extremely dry conditions contribute in three very significant ways:
 - Fires will ignite much more easily, requiring increased vigilance in preventing fires, and in being alert to detecting and reporting them when they happen
 - Fires spread much more quickly under dry conditions – rates of spread of more than 7 kilometres per hour and in one instance jumped ahead 2.5 kilometres were witnessed on the Kelowna Fire
 - High fire intensity conditions exist under extreme drought which requires extra crews and resources to attack fires and often is too dangerous to work close to the fire
 - Forest fuel build-up provide the following challenges:
 - Fuel loading or the increase in combustibles in the forest, has been identified as a significant factor in the 2003 forest fires and contributed to much of the difficult fire behaviour, often making fires impossible to control
 - Fuel management is an issue in local government areas as well as Crown forests
 - The Mountain Pine Beetle infestation and other pests are having a profound effect on trees in many parts of the province. Few of the most infected forests were burned in 2003, leaving a potentially significant fire hazard in the coming years
 - Fuel management is not only a provincial government responsibility but also involves a wide variety of stakeholders including federal agencies, local governments, First Nations, private landowners, and the forest industry (and other forest related industries)
 - It is critical that the communities, and the Provincial and Regional Interface Committees work together to solve the fuel management problem. This is a key prevention measure that will help to avoid catastrophic fires in the future.

- The MOF is responsible for management and control of open fire on Crown Land outside of local government controlled areas
- Interface planning and preparation including dealing with new developments as well as improving the safety of existing community areas – needs to be integrated into program priorities and funding.
- Increased role of MOF for initial attack and fire control in Provincial Parks without any additional resources
- Partnerships with forest industry need to be developed to expand the number of reserve firefighters and improve their deployments
- Improved guidelines are needed for imposition and implementation of forest use restrictions with the use of extensive closures (MOF plans to standardize protocols in the future for ordering, posting and lifting restrictions under the proposed Wildfire Act in consultation with Provincial Parks)
- Effective interface fire action requires the cooperation, coordination and contributions of a wide range of agencies on lands with multiple jurisdictions. The challenges are not just to suppress the fires, but to also handle the needs of evacuees, to manage the significant infrastructure disruptions and to tackle the communication requirements and to share information in a timely manner (need to develop a flow chart)
- Communications with the public and communities as well as availability and coordination

Fire Smart Planning for Individual Homeowners, Farmers, Businesses and Communities

Homeowners

The Ministry of Forests has developed a number of publications for the homeowner as self-help guides. Publications include *In 3 minutes a Wildfire will be at your door! – Are you ready?*, and *The Home Owner's FireSmart Manual*.

Farms

The Ministry of Forests, on its protection website, has identified a number of strategies entitled *Protecting Your Farm*⁴¹. These strategies include:

1) Insurance

- It is important that land owners obtain and confirm insurance coverage is up to date for all farm resources at risk from fire

⁴¹ <http://www.for.gov.bc.ca/protect/>

including crops and livestock. Government disaster financial assistance is limited and only covers uninsurable perils.

2) **Livestock**

- Planning for livestock safety prior to a wildfire event is paramount. If animals cannot be moved into a safe area on the owner's property, the owner needs to ensure and confirm transportation and feeding arrangements in advance.
- Loss of farm animals can most easily be prevented by following these simple steps:
 - Preparing and maintaining low fuel areas where livestock can be moved and contained during a fire
 - Using a ploughed or heavily grazed field with a minimum of grass or stubble – if possible, this field should be located well away from any forested areas, and on the leeward side of the property
 - Using pastures with shade and water available for sheltering livestock, especially in the event that the owner is required to be evacuated from the property and the animals cannot be moved
 - Constructing concrete or metal structures, located away from the forest edge provides another animal shelter option, and the ability to be cooled with sprinklers during wildfire events
 - Horses and cattle fare relatively well during wildfire events while pigs, sheep and poultry are more vulnerable, often succumbing to heat stress before the fire even arrives
 - As a last resort situation where the owner is unable to move livestock into a fire safe area, and as long as there is no danger to people or vehicular traffic, it is recommended that fences be cut allowing the animals to take their chances with the fire.

3) **Feed Crops**

- Hay stacks, hay sheds and silos must be protected. The reserves they contain may be on the only stock feed available after a large fire
- Surround fodder reserves with a bare area at least 5 meters wide with another 20 meter wide fuel reduced strip around this. Do not attempt to burn off around these areas. Graze, mow and slash grass to desired height
- Dry hay before it is baled and stored to prevent spontaneous combustion. Store hay away from roads and boundary fences
- Grazing livestock can be used to reduce flammable grass around building, fence lines and haystacks. A temporary fence can be erected to enable stock to graze up to fodder reserves to reduce the fire risk.

Other General Publications and Videos for Residents and Businesses

In addition to above information, the Ministry of Forests and other agencies have developed a number of publications and videos including the following to assist residents and businesses in fire proofing and reducing fire risks:

Publications and Pamphlets

- Campfires and Backyard Burning
- Industrial / Agriculture Burning
- Open Fires in BC
- How to make your Forest Home and Property Fire Smart
- Defensible Space – Planning and Managing Your Fire Safe Landscaping⁴²
- Beware and Prepare⁴³
- Fire Wise Construction⁴⁴
- Evacuation Alerts... What to Do⁴⁵

Videos

- BC Forest Service “Beware & Prepare” (16:51) Third Wave Communications (A video/print information kit for presentation to wildland/urban interface zone residents (1988))
- BC Forest Service “Interface Fires” (14:31) May 21, 1999
- FireWise Communities “Wildfire: Preventing Home Ignitions” (19:00) January 2002. Jack Cohen’s research at the Fire Sciences Laboratory, Missoula, MT. USA (www.firelab.org) Production of NBC / Hearst-Argyle Television Productions
- Firestorm 2003 Thank You Video, Mr. Stuerle’s Grade 5 Class, Rose Valley Elementary School, Kelowna, BC. Firestorm Video produced by Laura Staring & Andrew Hochhalter

Communities

Fire Smart: Protecting Your Community from Wildfire was published by Partners in Protection, an Alberta-based coalition dedicated to raising awareness and providing information that will reduce the risk of wildfire losses in the wildland / urban interface⁴⁶. This guide is widely used throughout Canada to assist communities in developing strategies to address wildfire planning, protection and fuel management.

⁴² Sponsored by Weyerhaeuser Canada – A project of Office of the Fire Commissioner, BC Forest Service and Your Local Fire Department

⁴³ See 40 above

⁴⁴ See 40 above

⁴⁵ See 40 above

⁴⁶ Partners in Protection July 2003

Preparing for Interface Fires - Emergency Management ⁴⁷

Emergencies occur rapidly without notice and place great stress on public and private services and resources. Emergency management is the process of preparing and providing for the prevention, mitigation, response and recovery phases of emergencies or disasters that threaten the lives and property of citizens. In BC there are eight recognized goals of emergency management:

- 1) Provision for the safety and health of all responders
- 2) Saving of lives
- 3) Reduction of suffering
- 4) Protection of Public Health
- 5) Protection of Government Infrastructure
- 6) Protection of Property
- 7) Protection of the Environment
- 8) Reduction of economic and social issues

The Provincial Emergency Program (PEP) is the designated agency set up to assist municipal and regional jurisdictions in formulating effective emergency plans to achieve the above goals. The Auditor General's Report 2001/2002: Managing Interface Fire Risks noted the need to set up emergency plans in several recommendations. Key to many of the recommendations was community involvement in the assessment and mitigation of interface fire risk, planning of emergency response, and the establishment of working relations.

Wildfire Act and Regulations

The Ministry of Forests has proclaimed the *Wildfire Act* and deposited the *Wildfire Regulations* (BC Regulation 38/2005) which are due to come into force on March 31, 2005. The *Act* consolidates legislation and regulations pertaining to industrial and non-industrial use, prevention, and control of fire as well as administrative functions of the government pertaining to approval of the use of fire, and prevention and control of wildfire.

Part 1 of the *Act* pertains to forest and range protection requirements including fire reporting, use of open fires, non-industrial use of open fires, industrial activities and hazard assessment and abatement. Part 2 provides the authority of government for fire prevention and fire control while Part 3 sets out administrative remedies and cost recovery for fire fighting expenses. Part 4 outlines offences, court orders and proceedings under the *Act* and Part 5 provides general provisions of the *Act*. Part 6 sets out the authority of the Forest Practices Board to conduct audits and special investigations. Part 7 sets out the power of government to make regulations, exemptions, criteria for exercise of discretionary powers, protection of forest resources, notification requirements, administrative remedies, reconsideration, forms and furnishing of information,

⁴⁷ Firestorm 2003 Provincial Review

fees for service, security, preservation of remedies, proceedings for damages caused by fire and limitation on proceedings. Part 8 outlines transitional provisions for the implementation of regulations under the *Act*.

Research in New Technology

REMSAT II⁴⁸

The MOF is partnering with the Canadian Space Agency (CSA) and conducted by the European Space Agency to foster the use of space in responding to emergencies and managing large events. REMSAT II (Real-time Emergency Management via Satellite) features the combined use of satellite communication, navigation / localization, and earth observation space technologies for emergency management.

For Remsat II, a Canadian project team has undertaken the development and deployment of an advanced emergency response communications and computing system that will allow wildfire fighters in BC to more effectively respond to the over 3,500 wildfires that occur annually in the Province. REMSAT II has also been developed to ensure that the system can be utilized for other emergency management such as floods, etc.

4.0 Recommendations

4.1 Education

Public

A FireSmart awareness campaign needs to involve a number of initiatives to reach the variety of public residents and stakeholders utilizing the wildland / urban interface and forested areas.

The Firestorm Report⁴⁹ indicated that urban dwellers such as cabin owners, campers and other seasonal residents, visitors and tourists must be educated about the risks they face and the precautions that they must take. Regular information about basic responsibilities and escape routes must be stressed for residents within the wildland / urban interface and forested areas.

Public education on the role and ability of fire fighters to control or suppress wildfires is important. The need for the public to report fires early can not be underemphasized so that fire suppression crews can have the greatest opportunity for controlling and extinguishing wildfires. Firefighters told the Filmon Review Team during the 2003 Firestorm Review that many people falsely believe that human intervention could halt any fire and the failure to do so was because

⁴⁸ Ministry of Forests Protection Website

⁴⁹ See bibliography

of human error. Whereas in reality, a rank five or six fire can only be stopped by Mother Nature.

The Filmon Report identified the “strong need to better inform and educate the general public, and interface residents, in particular, about the dangers, risks and realities of forest fires. Public education is also needed to explain the preventative measures that individuals who live in the interface can adopt to make their lives safer.”⁵⁰

Recommendation regarding public education from the Filmon Review Team⁵¹ included the following:

- 1) A cooperative public education program should be undertaken, building on material already available in various BC government departments and agencies as well as from external sources
- 2) The education campaign must inform interface residents about the risks and their responsibilities in planning and preparing for and responding to interface fires
- 3) The campaign should be delivered to school children as well as adults
- 4) Municipal and regional governments should regularly distribute educational materials to interface residents
- 5) Insurance agents should distribute educational materials with each policy renewal of an interface dwelling

The public needs to know that they can make a difference in their community and can make their own home FireSmart. In addition to the above strategies, developing a “FireSmart Focused Neighbourhood” initiative, where local residents join forces together and work with the Village, adjacent landowners, and the Fire Department to plan and initiate FireSmart programs for their neighbourhoods would go a long way to taking ownership of the local issues and improving fire proofing within the community.

Communication to the public may take many forms. There is a large amount of information that can be accessed through the internet. There are a number of videos, pamphlets and general information for homeowners, farmers, ranchers and agricultural land owners, forest home dwellers, campers and forest recreational users and others. There are also a number of pamphlets and publications on designing and constructing homes with FireSmart building materials, fire safety in installing wood stoves, industrial and agriculture clearing guidelines, and preparing your farm and ranch for potential of a wildfire.

4.2 Specific Recommendations

Specific recommendations in the report have been numbered sequentially to assist the various agencies in their review of the recommendations.

⁵⁰ Page 50, Firestorm 2003 Provincial Review

⁵¹ Page 51, Firestorm 2003 Provincial Review

It is recommended that:

- 1) The Village and Regional District, in partnership with the Ministry of Forests and other provincial government agencies, distribute information to landowners and the general public through tax notices, public announcements or information articles in the newspaper, on radio and television regarding fire risks, reporting fires, and how residents and businesses can make their homes, work places and properties fire safe
- 2) The Village and Regional District, in partnership with the Ministry of Forests and Forest Licensees, continue to develop coordinated strategies to inform private landowners of Mountain Pine Beetle and encourage landowners to address infestations on their properties thereby reducing fire risks
- 3) The Regional District Fire Department Fire Chief and Staff be trained to assist educating land owners on how to complete Fire Smart assessments for areas under Regional District and Village jurisdiction
- 4) The Regional District Fire Department, in partnership with the Ministry of Forests Protection Staff, provide hands on educational information sessions such as Public Meetings, workshops and follow-up sessions to assist homeowners in completing fire risk assessments and developing strategies and timelines to make their homes FireSmart
- 5) The Village Fire Prevention Officer and Regional District Planning Department Staff be trained in providing guidance for new residential developers and house builders regarding FireSmart principles
- 6) The Village and Regional District, in partnership with the Ministry of Forests, provide information to the general public at the visitor information booth regarding fire safety in the forest and ensure that staff are trained about fire risks and communicating this information to the public
- 7) The Valemount Visitor Information Staff ensure that all visitors receive a briefing about the importance of fire safety in the area, particularly during moderate to extreme fire hazard periods, and how to report a fire
- 8) The Village and Regional District, in partnership with the Ministry of Forests, initiate demonstration projects that involve local residents, businesses and communities to provide on the ground training for all involved, promote ownership of FireSmart initiatives, as well as

generate new ideas that may be useful for other residents and the public for the future

- 9) The Ministry of Forests advise the public through television, radio, newspaper adds on how to report a wildfire and the importance of early reporting
- 10) The Union of BC Municipalities and the Province partner with Television Networks to air educational videos on fire safety with specific strategies for individual homeowners and businesses to reduce fire risks

Elementary and High School Education

It is important to educate children about FireSmart concepts at an early age. Children utilize the wildland / urban interface extensively. Some wild and brush fires have resulted from children playing with matches without knowledge of the consequences of their actions. Children will be our next generation of homeowners and builders, so, some level of understanding of risks and FireSmart principles is important to learn prior to being faced with these issues.

It is recommended that:

- 11) Prince George School District 57 School Board endorse the inclusion of FireSmart education initiatives in both elementary and high school curriculum and provide the necessary resource material and training for teachers to deliver the programs
- 12) The Ministry of Forests Robson Valley Fire Zone Staff partner with the elementary and high schools to initiate FireSmart training at both levels of school. The Ministry Staff could assist educators in developing content of course material and mentoring teachers in the delivery of the material
- 13) The Ministry of Education, in cooperation with the Ministry of Forests, develop a training package for teachers to implement standardized FireSmart education program in the elementary and secondary schools, taking into consideration recommendations summarized by principals and teachers in **Section 3.3** above

Private Land Owners

Private land owners have a responsibility to ensure that their property is free from clutter and fire hazards, to construct buildings with fire proof materials as well as implement FireSmart landscaping. It is recommended that homeowners:

- 14) Complete a FireSmart risk assessment of home and property utilizing the Ministry of Forests FireSmart Manual and develop a plan to address any fire risks with defined specific tasks and timelines to complete work
- 15) Initiate a “FireSmart Focused Neighbourhood” with neighbours to identify and prioritize interface fire risk issues within the neighbourhood, develop a neighbourhood emergency plan, and develop a written action plan with defined timelines, milestones, and responsibilities to rectify these issues
- 16) Ensure that FireSmart plans and strategies are communicated to all neighbours and the fire department
- 17) Ensure that landowners have emergency contract numbers posted near their telephone and are knowledgeable about providing information when reporting a fire including size, location, fire behaviour, action taken (if any) and observing location
- 18) Ensure that all individual property addresses are properly marked for emergency services
- 19) Ensure that proper fuel free zones are established and maintained around each home and building and ladder fuels are removed from timbered areas on property as recommended by the BC FireSmart Manual
- 20) Establish an emergency evacuation plan in advance of a fire situation to ensure that all important documents and family possessions can be quickly accessed and removed in the event of a wildfire
- 21) Ensure that a fuel free access zone is established for resident evacuation and safety of emergency services
- 22) Annually assess timber on property for bark beetle or other forest health issues and salvage timber with beetle or forest health issues thereby protecting property investments and reducing fire risks
- 23) Land owners constructing new homes include FireSmart landscaping techniques in their plans to maintain a low fire risk buffer around their residence and other structures, and utilize fire resistant building materials such as metal roofs and other fire retardant materials in construction

- 24) Rural residents establish a secondary water source to assist fire suppression efforts. The water source may be located on a hill to provide a gravity feed

New Developments

The increased population associated with resorts and new developments will result in increased risk of human caused wildfires. The higher wildfire risk will not only occur within the property limits of the developers, but in the surrounding areas used for recreation and enjoyment of the valley. It is paramount that the resort developers include FireSmart strategies in the conceptual design and planning phases. This will maximize the benefits of incorporating natural fire resistant features into plans and providing long term fire risk reduction solutions in a cost effective manner. Strategies such as those utilized by Langford or Kamloops can be incorporated into development plans to reduce fire risk thus protecting the investments of both the developer and individual residential land owners.

In order to ensure that proper planning and design is completed by land developers for new projects it is recommended that the Village and Regional District take the following actions:

- 25) Develop new bylaws, similar to those enacted by the Cities of Langford and Kamloops to address wildfire risks in high and extreme hazard areas as identified in the risk hazard mapping
- 26) Amend Official Community Plans to identify high and extreme fire hazard risk for wildfire planning, protection and fuel reduction management purposes within each local government jurisdiction
- 27) Require developers to complete wildfire interface risk assessments using a qualified professional in high or extreme fire hazard risk areas, and, that the wildfire risk assessments provide specific recommendations and strategies to the developer and appropriate government agency for minimizing wildfire fire risks, implementing fuel management and protection planning strategies
- 28) That the Village and Regional District provide information brochures for developers planning new subdivisions and land owners seeking building permits that outline FireSmart strategies for development, construction and landscaping
- 29) Require development permits for designated high and extreme fire hazard areas outlining specific awareness information and include specific covenants for developers and building permits to ensure

appropriate FireSmart planning, construction and landscaping is completed

- 30) Require real estate companies and developers to advise potential purchasers of residences or properties located within urban / wildland interface zones of fire risks, FireSmart requirements and obligations prior to purchase

Forest Licensee Management Strategies

The forest industry has implemented a number of forest management strategies that will reduce fire risk. Maintaining the present forest practices will minimize risk of forest fires, namely:

- 31) Continue harvest priority of beetle infested timber where possible, and, implement fall and burn programs for affected timber that is not scheduled for harvest in the near future or is inaccessible
- 32) Continue with new road development and maintain long term road access after completion of harvest operations where possible to provide access for fire suppression activities
- 33) Continue with landing burning and roadside debris disposal concurrent with operations to minimize build-up of fuels on site
- 34) Continue to partner with private land owners, Village, Regional District and Ministry of Forests to promote strategies to salvage beetle infested stands on private land thereby reducing fire risk
- 35) Continue to partner with major land developers to address beetle infestations and reduce fire risks

The following are a number of forest management strategies that can be implemented to further address fire risk:

- 36) Incorporate strategies at the planning phase for forest harvesting operations to take in considerations fire prevention measures based on the fire hazard mapping analysis completed as part of this report
- 37) Implement stand modification techniques through patch and partial / clearcut harvesting combinations to reduce the amount of ladder fuels and break-up continuity of forest crowns. This strategy will reduce crown fire intensity and provide improved fire control⁵²

⁵² Ground fuel fire risk may be initially higher until the fine fuel component decomposes (generally 2 to 3 years subsequent to harvesting and may be longer in dry fuel types such as pine forest types)

- 38) Work with the Ministry of Forests to develop strategies to reduce ground fuel loading in partial harvests, particularly high risk stands such as pine and harvests resulting in high fuel loadings
- 39) Work with the Ministry of Forests to encourage acceptance of more deciduous species in regeneration stocking standards where appropriate
- 40) Consider planting multiple species where appropriate to increase diversity of newly regenerated forests to reduce future forest health issues and fire risk
- 41) Implement strategies that promote maintenance of deciduous stands in conjunction with non-vegetated areas or swamps to reduce fire risks and provide fuel breaks in areas of continuous coniferous stands
- 42) Work with the Regional District and the Ministry of Forests to review opportunities to implement fire-proofing of stands adjacent to natural or man made fuel breaks to increase width of fuel breaks
- 43) Increase the number of industry staff trained in fire suppression

Village of Valemount

As identified in **Section 3.2** above, the Village of Valemount has been active in initiating strategies to address specific aspects that will assist in fire proofing and reducing high fire risk situations within the community. It is recommended that the Village continue its present efforts in this regard, namely:

- 44) Update the Emergency Plan annually prior to fire season to ensure contact lists and procedures are appropriate and current. Incorporate new strategies to address fires in the wildland / urban interface where appropriate
- 45) Continue partnering with the Regional District, Ministry of Forests, and other provincial government agencies to conduct mock emergency fire situations prior to the commencement of fire season each spring
- 46) Ensure that bylaws for safe burning are enforced and consistently applied
- 47) Continue with the Village's program to install fire hydrants along rights of ways in newly developed areas in advance of road development to provide water source for improved fire suppression within the Village

- 48) Continue with the annual capital expenditure program to clear and fire proof Village owned property and continue with grass cutting on right of ways

It is recommended that the following supplemental strategies to those listed above be implemented by the Village to improve fire preparedness, reduce fire risk and make interface fire suppression activities more effective in the future:

Planning and Administration

- 49) Designate a Village Staff person responsible for planning and implementing FireSmart program for the community
- 50) Ensure the Municipal Emergency Plan considers recommendations included in this report
- 51) Designate emergency marshalling points and establish emergency escape routes in the event of major wildfire
- 52) Review the emergency contact numbers in the Municipal Emergency Plan each year prior to fire season and ensure updated lists are communicated to all holders of the plan and posted in appropriate places
- 53) Identify a back-up location for the Village Emergency Operations Centre in the event that the Village Office is unavailable.
- 54) Ensure that all alternative water supplies are mapped on Emergency Plan maps
- 55) Have the Fire Chief, Fire Protection Officer and Public Works Superintendent annually review high risk fire hazards on both public and private property within the Village prior to fire season and report findings to the Chief Administrative Officer with recommendations for further action as appropriate
- 56) Develop an Official Community Plan designating high and moderate fire risks areas requiring specific fire smart planning by developers and builders (also referred to in Recommendation 26 under New Developments)
- 57) Enact bylaws similar to other jurisdictions (e.g. Cities of Langford and Kamloops) to ensure that new developments and subdivisions complete fire risk assessments by qualified professionals that include

fire smart strategies to reduce fire risk to existing and new residences and businesses (also referred to in Recommendation 25 under New Developments)

- 58) Enact a bylaws permitting the Village to remove or reduce significant wildfire risks on private property at the landowner's cost in situations where the landowner is not prepared to address the situation themselves
- 59) Provide an information pamphlets regarding the use of FireSmart building materials and landscaping guidelines with all applications for building permits (also referred to in Recommendation 28 under New Developments)
- 60) Designate "Priority Zones"⁵³ based on the fire risk hazards mapping to assist in developing specific strategies to reduce fire risk within and adjacent to the Village

FireSmart Initiatives

- 61) Initiate an Interface Committee to review recommendations from this report, apply for available funding for specific projects and coordinate input from various stakeholders in the implementation of FireSmart plans for the Village in liaison with a Regional District Interface Committee. Stakeholders on the Interface Committee may include representatives from the following sectors: Village of Valemount Staff and or Elected Officials, Ministry of Forests Protection Staff and other provincial government ministries and agencies, Regional District, Forest Licensee representatives, Chamber of Commerce, Community Organizations and the Public
- 62) Apply for Pilot Project Funding from the Ministry of Forests Protection Branch / Union of BC Municipalities for initiating fire proofing demonstration projects within the Village, on Crown owned areas, or in partnership with other landowners or stakeholders. The purpose would be to provide local examples of FireSmart methods and concepts for residents and businesses to use on their own properties. These projects could be initiated under the guidance of an Interface Committee. Some potential options for consideration are:
- 63) Identify pilot projects for implementation, include the following options:
 - o Partner with large private landholders within the Village limits to implement thinning, spacing and pruning projects to remove ladder fuels. Examples include the timbered area directly north of the

⁵³ Priority Zone concept as identified in the FireSmart: Protecting Your Community from Wildfire Publication

baseball field on Dogwood near 13th Avenue and south of the trailer court (Sandy Acres property); property on the south side of 9th Avenue in the vicinity of Highway 5 (Kwan Property); property south of 14th Avenue between Ash and Dogwood (Peterson property); timbered area south side of Swift Creek from Dogwood to just east of Highway 5

- Consider removal or pruning and spacing of 14 meter timbered strip on south side of 13th Avenue between Ash and Dogwood to reduce fire risk
- Facilitate partnerships between residences adjacent to the landowners identified above (1st bullet) and with the owners of the undeveloped property to undertake tree thinning and ladder fuel removal
- Partner with the Valemount High School and Ministry of Forests Protection Staff to complete demonstration projects as part of the school curriculum for grade 10 or 11 students. Objectives would be to educate the students in fire risks associated ladder fuels and the value of spacing young pine forests to minimize fire risk
- Review option of establishing a trail along the Village boundary adjacent to Starratt's Wildlife Sanctuary from the lookout near the Holiday Inn to Ash Street to provide a fuel break between the marsh and the Village boundary. This would provide access for fire fighters and equipment in the event of a wildfire
- Partner with the landowners east of Main Street to the eastern fire protection boundary to improve fire access and reduce fuel loading

- 64) Develop mandate for proposed Interface Committee including the following potential activities:
- Develop strategic long term goals, objectives, strategies and priorities for fire proofing the community
 - Identify budgets to implement programs
 - Initiate an education and awareness programs for residents and the general public including the use of FireSmart building materials in construction and suggestions for residents in high risk areas such as steep slopes
 - Promote public awareness of FireSmart initiatives by holding public meetings and airing FireSmart videos, distributing brochures in the newspapers or via the mail, providing internet links and posting awareness information on bulletin boards
 - Provide public information sessions on how to determine wildfire risks on private property and how residents can implement recommendations of the FireSmart manual
 - Promote "FireSmart Focused Neighbourhood" concept within the community to encourage residents to develop emergency plans and FireSmart initiatives in each local neighbourhood

- Provide FireSmart resource material for residents through the library, video stores or other venues
 - Encourage major landowners to work on strategies with the Regional District Fire Department to improve access for emergency services
 - Initiate FireSmart pilot project funding request proposals for consideration by the Village
 - Solicit corporate participation and sponsorship and public involvement in community fire proofing projects
 - Design and install educational signs for demonstration projects outlining issues, objectives and results
 - Develop partnerships with educational institutions and other stakeholders to promote FireSmart initiatives in the schools, and on school and adjacent properties
 - Develop recommended updates and links for the Village of Valemount website regarding FireSmart publications, community FireSmart initiatives and building permit guidelines and information
- 65) Work with the Ministry of Forests Robson Valley Fire Zone Staff and the Regional District Fire Department to implement FireSmart education programs for Valemount citizens and the public through information sessions to identify safe fire practices and precautions
- 66) Update the Village of Valemount website with current information on FireSmart initiatives, provide online copies or links to FireSmart manuals for homeowners and developers, and provide links to sites of government agencies regarding other FireSmart or emergency information (e.g. Ministry of Forests Protection Branch, Provincial Emergency Program)
- 67) Ensure that there is a secondary water delivery mechanism in the event of a power failure affecting the main Village water supply. This may include a back-up generator for the water supply or other alternatives
- 68) Contact the cellular phone service provider to encourage the company to install a back-up generator at its transmission site to provide service in the event of a power failure as a result of an interface wildfire
- 69) In conjunction with the Regional District, pursue funding from the Provincial Emergency Program to obtain a low wattage radio transmitter as part of Emergency Response Plans. The radio transmitter could be used during an extended power outage to communicate with residents and the general public regarding fire information, safety or evacuation alerts

- 70) Work with the CNR and the Regional District to expand the area of grass control along the CNR from Cedarside Road to areas currently maintained by the Village
- 71) Work with the Regional District and Ministry of Transportation and Highways to control grass along Highway 5 in the vicinity of the Village of Valemount
- 72) Proceed with plans to harvest additional timber adjacent to the water reservoir to reduce fire risk affecting the water supply
- 73) Designate a “FireSmart Clean-Up Week” during the winter months to encourage residents to reduce fire risks on their property. The Village may consider the option of assisting with removal of debris for residential landowners during this week or other incentives
- 74) Review options of partnerships with Human Resource Development Canada or other federal or provincial government agencies to develop a program to assist removing beetle killed trees from private property where residences do not have financial resources to safely remove timber
- 75) Seek funding from the Provincial Government to assist implementing FireSmart initiatives within the community
- 76) Through the Union of BC Municipalities, support the Ministry of Forests in its requests for FireSmart program funding for communities
- 77) Encourage entrepreneurial ventures to partner with landowners to remove pine affected by Mountain Pine Beetle

Regional District

It is recommended that the Regional District continue with the following:

- 78) Provide copies of FireSmart brochures with all building permit and subdivision applications and refer developers to FireSmart Manual on the internet
- 79) Continue cross-training Regional District Firefighters with Ministry of Forests Fire Suppression Crews regarding the use of both agencies’ fire equipment on an annual basis
- 80) Participate in mock fire emergency drills with the Village of Valemount, provincial agencies and other emergency services prior to fire season on an annual basis

- 81) Provide training initiatives and funding for fire department personnel to obtain higher levels of Ministry of Forests fire suppression skills

In addition to the above actions, it is recommended that the Regional District pursue the following:

- 82) Initiate an awareness program through taxation notices or other methods to inform land owners of beetle issues, associated fire risk and strategies to reduce fire hazards
- 83) Initiate a Regional Interface Committee to develop and implement specific FireSmart strategies for the community of Tete Jaune Cache and areas outside the Village of Valemount boundary with liaison to the Valemount Interface Steering Committee. Stakeholders on the Regional Interface Committee may include representatives from the following sectors: Regional District Elected Officials and Staff, Ministry of Forests Protection Staff, other provincial government ministries and agencies, Forest Licensee representatives, businesses, residents and the public
- 84) Identify potential pilot projects for funding application to the Ministry of Forests / Union of BC Municipalities, including the following options:
 - Thin and remove ladder fuels on crown lands north of Cedarside Road in cooperation with BC Timber Sales, MOF Protection and Crown Lands
 - Thin heavy timbered areas and remove bark beetle attacked pine and ladder fuels within Cranberry Lake Regional Park
 - Work with BC Timber Sales and Crown Lands to increase the existing fire break along McLennan Road / Forest Service Road between Highway 5 and the Valemount Airport and south of the Airport by partial harvesting to reduce continuous crown closure and ladder fuels
 - Work with BC Timber Sales to increase the existing fire break on 2 Mile Hill east of the Village by partial harvesting to reduce continuous crown closure and ladder fuels
 - Partner with private land owners such as Canoe Mountain Resorts and the Ministry of Forests to initiate FireSmart demonstration projects at the entrance to the resort for education of new landowners and the public
- 85) Update the Regional District's Official Community Plan to establish Development Permit Areas for high and extreme fire hazard areas as identified in the risk hazard mapping component of this project (also referred to in Recommendation 26 under New Developments)

- 86) Enact Development Permit Areas requiring fire risk assessments by qualified professions for new developments in high and extreme fire hazard zones (also referred to in Recommendation 27 under New Developments)
- 87) Require new developers and house builders to meet FireSmart standards and specifications for development of new subdivisions, house construction, and landscaping (based on principles used by the Cities of Langford and Kamloops) (also referred to in Recommendation 25 under New Developments)
- 88) Complete Regional District Fire Department mutual aid agreements covering manpower and resources with surrounding jurisdictions (e.g. Jasper, McBride, Blue River and Prince George) prior to commencement of the 2005 fire season
- 89) Formalize a reciprocal mutual aid agreement between the Regional District Fire Department and Ministry of Forests Protection Branch regarding sharing of resources on fires within the Regional District Fire Boundary, and, clarify roles and responsibilities of each agency
- 90) Ensure that a training ledger is kept and maintained up to date for all fire fighting and suppression training of Regional District Firefighters
- 91) Develop guidelines for burning and conduct inspections of piles and areas to be burned within Regional District jurisdiction prior to authorization of burning

Provincial Government

Ministry of Forests Protection

In addition to the strategies identified by the Ministry of Forests that it is already implementing as identified in its submission to the Premier's Review of 2003, it is recommended that the Ministry of Forests undertake the following:

- 92) Clarify strategies to address wildfires during periods outside the provincially recognized fire season with the Regional District Fire Department
- 93) Partner with the Village and Regional Districts to form Interface Committees to implement recommendations and strategies identified in this report

- 94) Develop strategies in cooperation with the Village and Regional District to educate the public about the importance of early fire detection and reporting, communication of wildfire information needed to assist initial attack fire suppression crews, and how to report fires
- 95) Develop strategies in cooperation with the Village and Regional District planning and approval departments to inform residents and businesses about methods to conduct FireSmart planning to reduce fire hazards, manage fuels, and implement protection programs
- 96) Partner with the elementary and high schools to introduce FireSmart education programs in the schools
- 97) Partner with the Village, Regional District and other provincial government agencies and private landowners to set-up demonstration projects to educate the public and involve the local residents and businesses in the goal of creating ownership of a FireSmart community
- 98) Work with the Regional District and Village to develop a coordinated strategy to address bark beetle infestations on private land within these jurisdictions
- 99) Partner with the Village and Regional District on Interface Steering Committees to further FireSmart objectives within the planning area
- 100) Continue to mentor landowners on how to complete fire hazard assessments on their property and develop realistic fuel modification / fuel reduction strategies with defined timelines; and, ensure a periodic Ministry follow-up to monitor progress and provide feedback to residents. As part of the program, residents seeking assistance may be required to provide a commitment to implement the strategies identified, in order to justify the Ministry's participation in the process
- 101) Conduct "train the trainer" sessions to train Regional District Fire Department Staff and the Village Building / Fire Prevention Officer on how to assist residents in completing FireSmart Hazard Assessments
- 102) Develop joint beetle management programs with Ministry of Environment and BC Parks to ensure that affected pine is salvaged where possible within Wildlife Reserves, Old Growth Management Areas, Wildlife Corridors and Parks and fuel build-up is reduced in affected stands within and adjacent to these areas
- 103) Pursue a Remsat II pilot program with Protection Branch to test use of this technology in an isolated community such as Valemount

- 104) In addition to providing Internet web-based fire hazard mapping completed by the Province to communities, make this information also available to individual landowners and potential purchasers to download fire risks for their properties or intended purchases. The Province may consider funding a pilot program to assist landowners and potential purchasers on how to access this information from the web
- 105) Seek funding from Treasury Board to assist Community Based FireSmart Programs as identified in the submission to the Filmon Commission

Provincial Emergency Program

It is recommended that the Provincial Emergency Program consider the following:

- 106) Fund installation of a low wattage transmission system for use by the Village and Regional District in the event of a wildfire or other emergency
- 107) Provide funding for community based emergency training and planning initiatives
- 108) Partner with the Ministry of Forests, Village, Regional District and other provincial government agencies to conduct mock emergency fire situations prior to the commencement of fire season each spring
- 109) In the event of a major fire event, assist the Village and Regional District with set-up of emergency communication including a toll free telephone number to communicate with residents and the public

Federal Government

Royal Canadian Mounted Police (RCMP)

The following recommendations regarding wildfire management are made with respect to the RCMP:

- 110) Partner with the Ministry of Forests, Village, Regional District and other provincial government agencies to conduct mock emergency fire situations including testing evacuation and security provisions prior to the commencement of fire season each spring

- 111) In the event of a wildfire requiring evacuation of residents and public, ensure that security is quickly established maintained to protect lives and property

5.0 Summary and Conclusions

Human activity, fire suppression initiatives and government policies during the past century have contributed to the present fire risk situation of the Valemount to Tete Jaune Cache Corridor. Fire is a natural component forest ecosystems in the valley, and, the absence of fire has resulted in continuous mature and overmature coniferous forest types with insect, disease and high fuel loading levels which are prone to fire. Fire intensity in these stands will be higher.

The greater desire of residents to live within the urban / wildland interface coupled with new resort developments, increased recreational and industrial use of the forest creates new risks for the start of wildfires. Wildfires may start in the forest and spread to the rural / urban areas, or conversely, may be initiated by human activity within settlement areas and move into forest areas.

There is a moderate to high potential for a devastating wildfire to occur in the Valemount to Tete Jaune Corridor. It will take the collective will of the community to develop a FireSmart valley that will have a dramatically reduced fire risk and lower impact in the event of a major wildfire. This includes private landowners, businesses, local, regional and provincial governments and community organizations taking responsibility and working together to make the Valemount to Tete Jaune Cache Corridor FireSmart. The Fire Risk Hazard Analysis and preparation of this report is the first step in developing effective strategies to make Valemount and Area FireSmart.

There are a number of programs and initiatives that various communities have already undertaken to implement FireSmart initiatives within their area. It is important to understand the information and programs that currently exist in these communities, and, to gather the information and build on their successes to achieve maximum benefit at minimum cost.

Making a community and valley FireSmart involves four main activities:

- 1) Informing and mobilizing all sectors of the community, government, and the public
- 2) Planning
- 3) Fuel management
- 4) Fire Prevention

The Village may want to develop a three “R” slogan to market three principles in fire hazard reduction⁵⁴ within the community:

- Reduce – Fuel Hazards
- Remove - Make a Fuel Free Zone
- Replace - Conifers with Deciduous

And lastly, making a community FireSmart is not a destination but an ongoing process with the continued support and cooperation of all involved.

⁵⁴ Personal Communication with Robert Gray, Ministry of Forests Robson Valley Fire Zone Protection Officer

Bibliography

A Detailed Wildfire Threat Rating System of the Valemount to Tete Jaune Corridor, Produced by B.A. Blackwell & Associates Ltd., North Vancouver, BC

An Interface Fire Hazard Planning Model: A Case Study of the District of Langford, 2002, Published by the District of Langford, Victoria, BC ISBN 0-9730327-0-7

BC Government Ministry of Forests Protection Branch website:
<http://www.for.gov.bc.ca/protect>

BC Government Ministry of Forests Protection Branch Website Prescribed Fire
<http://www.for.gov.bc.ca/burning/prescribedfire.htm>

BC Government Ministry of Forests Protection Branch Website Protect Your Farm
<http://www.for.gov.bc.ca/protect/safety/FarmResources.htm>

BC Government Provincial Emergency Program Website <http://www.pep.bc.ca/>

Beware and Prepare, Fire Brochure, Prepared by the Office of the Fire Commissioner, BC Forest Service and Local Fire Departments, Sponsored by Weyerhaeuser Canada

British Columbia Meteorological Data, National Service Office, Meteorological Services of Canada, 3140 University Way, Kelowna, BC V1V 1V9 (personal communication with Ross Klock)

Campfires and Backyard Burning Brochure, 2004, BC Ministry of Forests

City of Prince George Information For Residents – Mountain Pine Beetle Brochure, City of Prince George, Prince George, BC

City of Prince George Website: <http://www.city.pg.bc.ca>

Defensible Space, Planning & Managing Your Fire Safe Landscaping Brochure, Prepared by the Office of the Fire Commissioner, BC Forest Service and Local Fire Departments, Sponsored by Weyerhaeuser Canada

Development and Structure of the Canadian Forest Fire Behaviour Prediction System. Forestry Canada Danger Group Information Report ST-X-3. Published by Forestry Canada Science and Sustainable Development Directorate, Ottawa, 1992. Catalogue No. Fo29-33/3-1992E. ISSN 1192-1064.

Environmental Screening Report, FireSmart – ForestWise Community Protection and Forest Restoration Project, Foothills Model Forest, Jasper National Park, Park Registry Fire J03-004, Jasper National Park, April, 2003

Evacuation Alerts... What to Do Brochure, Prepared by the Office of the Fire Commissioner, BC Forest Service and Local Fire Departments, Sponsored by Weyerhaeuser Canada

Field Guide to the Canadian Forest Fire Behaviour Prediction (FBP) System, S.W. Taylor, R.G. Pike, and M.E Alexander. Special Report 11. Fire Management Network, Canadian Forest Service, Northern Forestry Centre, 1997 Published by the Canadian Forest Service, Northern Forestry Centre, 5320 – 122 Street, Edmonton, Alberta T6H 3S5

FireSmart: Protecting Your Community from Wildfire, 2nd Edition, May, 2003, Produced by Partners in Protection, Edmonton, Alberta

FireSmart Landscaping on Southeastern Vancouver Island in the Wildland/Urban Interface Brochure, 2004, Strathcona Forestry Consulting, Shawnigan Lake, BC

Firestorm 2003 Provincial Review, The Honourable Gary Filmon P.C., O.M. February 15, 2004, Vancouver, BC

FireWise Construction, Prepared by Office of the Fire Commissioner, BC Forest Service and Local Fire Departments, Sponsored by Weyerhaeuser Canada

How to Make Your Forest Home and Property Fire Safe Brochure, 2003, BC Ministry of Forests

In 3 Minutes A Wildfire will be at Your Door, Are You Ready? Pamphlet, BC Ministry of Forests

Industrial/Agriculture Burning Pamphlet, General Guide to Responsible, May 1999, British Columbia Ministry of Forests

Ministry of Forests Report to the 2003 FIRESTORM PROVINCIAL REVIEW, Submitted by the Forest Protection Program January, 2004

Natural Resources Canada Canadian Forest Service Fire Research Website:
<http://fire.cfs.nrcan.gc.ca/>

Preparing Your Farm and Ranch for the Potential of Wildfire and the Impact of the Mountain Pine Beetle Brochure, April, 2004, Sponsored by Alcan, Lakeland Mills, West Fraser Mills, Stuart Nechako Woodlot Association, L & M Lumber, Canadian Forest Products Ltd. Plateau Division, BC Timber Sales, Nechako Valley Regional Cattlemen's Association, Ministry of Forests

Probabilities of Sustained Ignition in Lodgepole Pine, Interior Douglas-fir, and White Spruce-Subalpine Fir Forest Types. B.D. Lawson and G.N. Dalrymple. Canadian Forest Service Natural Resources Canada, Victoria, BC. October 1996. Supplement 1 to: Field Guide to the Canadian Forest Fire Behaviour Prediction (FBP) System, FRDA Handbook 012

Relative Humidity Tables for 3 Elevation Classes. BC Ministry of Forests Protection Branch. Tables adapted from: Canadian Forestry Service 1984. Tables for the Canadian Forest Fire Weather Index System. Environ. Can., Can. For Serv., Tech Rep 25 (4th ed.)

The Home Owners FireSmart Manual, BC Edition, Pamphlet, BC Forest Service

Saskatchewan Environment Website: <http://www.se.gov.sk.ca/fire/risk.asp>

Urban/Wildland Fire Protection/Prevention Plan, 2002, District of Logan Lake, BC

List of Appendices

- Appendix 1** Valemount Fire Risk Analysis and Protection Planning Area Overview Map
- Appendix 2** Emergency Contact List
Procedure for Reporting a Wildfire
- Appendix 3** Map of Valemount and District Fire Protection Local Services Area and Legal Description as per Bylaw No. 1163, December 12, 1990
- Appendix 4** BC Meteorological Information from 1951 to 1980
- Appendix 5** Map of Robson Valley Historical Wildfires 1950 to 1999
Map of Valemount – Tete Jaune Cache Wildfires 1950 to 1999
- Appendix 6** Wildfire Risk Hazard Rating Maps
Table 1 - Summary of Canadian Fire Behaviour Prediction System Fuel Codes and Descriptions
- Appendix 7** Summary of Organizations and Individuals Consulted
Public Consultation Minutes and Newspaper Articles covering the public meeting December 7, 2004
Public Consultation Meeting Minutes Regarding Draft Recommendations February 21, 2005
Newspaper Articles covering the Public Review of Draft Recommendations February 21, 2005
- Appendix 8** Village of Valemount Bylaw 560, 2004
- Appendix 9** Page 29A of Schedule ‘A’ of Bylaw 842 outlining the Canoe Mountain Development Permit Area (Regional District of Fraser Fort George)
Ministry of Forests Operational Guidelines for Wildfire Suppression with Local Governments
Prince George Fire Centre Standard Operating Guideline – Compensation for Non-Tax Based Fire Response Agencies
City of Langford Development Permit Area Guidelines for Interface Fire Hazard Zones (Bylaw No. 635)
Example Development Permit for New Subdivision
Example Development Permit for Single-Family Dwelling
FireSmart Landscaping on South-eastern Vancouver Island
City of Kamloops Bylaw 5-1-2121

City of Kamloops Council Policy No. EDS-15

Appendix 10 Jasper Interface Steering Team Terms of Reference
Hot Topic Information Pamphlet Produced by Jasper
Interface Steering Committee