



Regional District of
Kitimat-Stikine



Terrace and Area Community Wildfire Protection Plan



Copperside Estate Fire 2005
Photo: courtesy of Ralph Ottens

Prepared for: Regional District of Kitimat-Stikine
City of Terrace

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- Garry Bell - Senior Environmental Protection Officer, Ministry of Environment

Endorsement

The following persons have reviewed and endorsed this report and the identified actions:

David Block - City Planner, City of Terrace

Barry Dobbin-District Manager, Kalum Forest District

Ted Pelligrino- Regional District Kitimat Stikine

Wes Patterson –Thornhill Volunteer Fire Department

Pete Weeber – Terrace Fire Department

Steve Westby- Terrace Fire Attack Base

Executive Summary

This Community Wildfire Protection Plan was completed by Northwest Timberlands Ltd for the City of Terrace and the Regional District of Kitimat Stikine. The intent of the report was to:

- Identify and map wildfire threat ratings for the wildland-urban interface;
- Discuss and identify with community stakeholders measures that should be taken to mitigate those risks; and
- Outline a plan of action to implement those measures.

The measures and actions identified in this plan can reduce the devastating effects of wildfire. Although the wildfire threat rating for the plan area has been determined to be moderate, there are critical conditions that do occur that will create high intensity, potentially devastating urban interface fires when properties and lives are at great risk. There are many examples throughout the province of large, intense fires that have occurred in the wildland-urban interface: the danger to lives and the damage caused have been significant

It is the responsibility of local governments, the province, and the home owner to review the potential hazards and make changes that will reduce the effects of wildfires within the interface. There are many actions summarized in this plan that can be done to fire-proof our communities. They all begin with a proactive prevention program, planning and preparing for a fire occurrence, and reducing hazards where they exist.

A few small steps by people and groups in positions of responsibility will allow a collective approach to safeguarding and minimizing the risk. These steps have been outlined throughout this report as “*ACTIONS*” and are summarized on the following pages.

ACTIONS related to Fire Smart for the Office of the Fire Commissioner (OFC)

- *Pursue changes to the eligibility of UBCM funding so that it can be applied against training of fire suppression forces in urban wildland interface fires, training of suppression forces in Fire Smart principles, and on the ground delivery and education of landowners by fire suppression forces in Fire Smart techniques*

ACTIONS related to Fire Smart for Local Governments and First Nation Villages:

- *Commit to applying the Fire Smart principles in issuing development permits or planned expansion. Ensure building codes are adhered to.*
- *Commit to continued and enhancing training and cross training of fire suppression agencies on wildland interface fires.*
- *Commit to training of land use planners and developers on Fire Smart principles.*
- *Commit to educating land owners in Fire Smart principles through media/ signage/site visits and demonstration pilot projects.*
- *Involve trained and experienced fire suppression personnel in delivery of Fire Smart principles to the local landowners*
- *Commit to developing or improving fire suppression resources in areas with little or no fire fighting capabilities.*
- *Pursue changes to the eligibility of UBCM funding so that it can be applied against training of fire suppression forces in urban wildland interface fires, training of suppression forces in Fire Smart principles, and on the ground delivery and education of landowners by fire suppression forces in Fire Smart techniques.*

ACTIONS related to Fire Smart for Land Owners

- *Commit to reducing the potential impact of wildland fires on your property*
- *Complete structure and hazard assessment of property*
- *Protect your “home”, your investment*

- *Maintain priority zones/ break the chain of fuel around your property*
- *Promote pine overstory removal when fire-smarting properties and structures. Encourage resistant understory species such as hemlock, cedar and deciduous species*
- *Remove ladder fuels and dead and down material in areas within 30 meters of any structures in and around the interface*
- *Ensure adequate emergency vehicle access*
- *Ensure adequate water supply*
- *Make your exterior Fire Smart*

ACTIONS related to Fire Smart for Provincial Government: MOFR Wildfire Management Branch

- *In concert with local fire departments, involve trained and experienced fire suppression personnel in delivery of Fire Smart principles to the local landowners*
- *Pursue changes to the eligibility of UBCM funding so that it can be applied against training of fire suppression forces in urban wildland interface fires, training of suppression forces in Fire Smart principles, and on the ground delivery and education of landowners by fire suppression forces in Fire Smart techniques.*

ACTIONS related to Bylaws

- *Regional District and the City to implement Fire Smart principles as a requirement of any planned development applications and include in by-laws or development checklist*

ACTIONS related to the OBSCR for the Ministry of Environment and MOFR (District Manager):

- *Maintain burning as a tool for cost effective fuel hazard reduction.*
- *Continue to require and enforce fuel hazard assessments and fuel hazard abatement on all forest harvesting operations located on Crown land. Request periodic updates from MOFR-District Manager on abatement status of hazards*
- *Continue to monitor and enforce abatement of fuel hazards on private land harvesting and clearing operations within 1 kilometer of a forest*
- *Provide RDKS with information regarding Wildfire Act roles and responsibilities and reference to hazard abatement requirements. Establish protocol with MOFR- District Manager Compliance & Enforcement and RDKS to ensure hazards created by landowners are abated.*
- *Ensure Open Burning Smoke Control Regulation compliance, and improve enforcement of burning reference numbers.*

ACTIONS related to Mutual Aid Agreements

- *Initiate service agreements between Kitsumkalum and the Terrace and Thornhill Fire departments to provide protection services while the Kitsumkalum Fire Department is undergoing re-organization.*
- *Develop a New Remo water reservoir to increase the protection services to “fully protected”*
- *Expand fire hydrant services to North Terrace area*

ACTIONS related to Cross Training/ Liaison

- *Enhance cross training of wildland and structural suppression forces in courses such as series 100 and series 215 (Fire operations in the Wildland/Urban Interface) and more advanced training as outlined in the Fire Smart Manual.*
- *Establish a more formal communication plan between the volunteer fire departments and the MOFR that will itemize actions and objectives as predicted fire starts and*

intensities increase. This may include table top scenarios on preparedness levels, describing plans for expanded attack and contingency plans.

- *Review and redraft current preparedness and response plans in consultation with local fire departments.*
- *Implement district command group meetings based on fire weather thresholds and include in the development of the communication plan*

ACTIONS related to MoFR Wildfire Management Branch

- *Pre-organize water sources and tanker re-load locations in areas that do not have municipal or regional district fire hydrant infrastructure.*

ACTIONS for modifying fuels in the Pine leading stands

- *Promote pine overstory removal in fire-smarting properties and structures. Encourage resistant understory species such as hemlock, cedar and deciduous species.*
- *Remove ladder fuels and dead and down material in areas within 30 meters of any structures in and around the interface.*

ACTIONS related to harvesting/development within the Wildland-Urban interface

- *Concentrate harvesting plans in the pine leading forests around the airport flats and the Rosswood area in advance of expected large mortality of these stands caused by the mountain Pine Beetle.*
- *Initiate clearing of forest types at risk to mountain pine beetle infestation through planned development projects.*
- *Develop fuel management plans that build on existing fuel modification treatments such as timber harvesting, land clearing and planned development that promote fuel “mosaics”*

ACTIONS related to Silviculture Stand Tending within the Wildland-Urban interface

- *MOFR to develop a tactical or **higher-level** silviculture treatment plan that addresses scheduling and hazard mitigation techniques that are to be included in Stand Management Plans for areas within the interface zones.*

ACTIONS related to the Airport Industrial Lands

- *City of Terrace to advance the development of the airport industrial land to provide a fuel break on this large contiguous fuel type and to reduce the amount land susceptible to attack from Mountain Pine Beetle. The project also presents the opportunity to Fire Smart the 30 meter planned buffers on the developed area.*
- *Create a road right of way that bisects the large contiguous pine forest on the Airport flats.*
- *Demonstrate fuel management activities on the airport industrial lands*

ACTIONS related to Utilities and Local Government Infrastructure

- *Utility companies, provincial emergency services, and local governments undertake a review of all their facilities for a Fire Smart hazard assessment and conduct the necessary actions to safeguard against wildland fires. Review facilities such as hydro and natural gas stations, and domestic water supply sources with particular attention to power sources*

ACTIONS related to a potential Pilot Project

- *Implement one or several pilot projects around community infrastructure that will showcase Fire Smart principles.*

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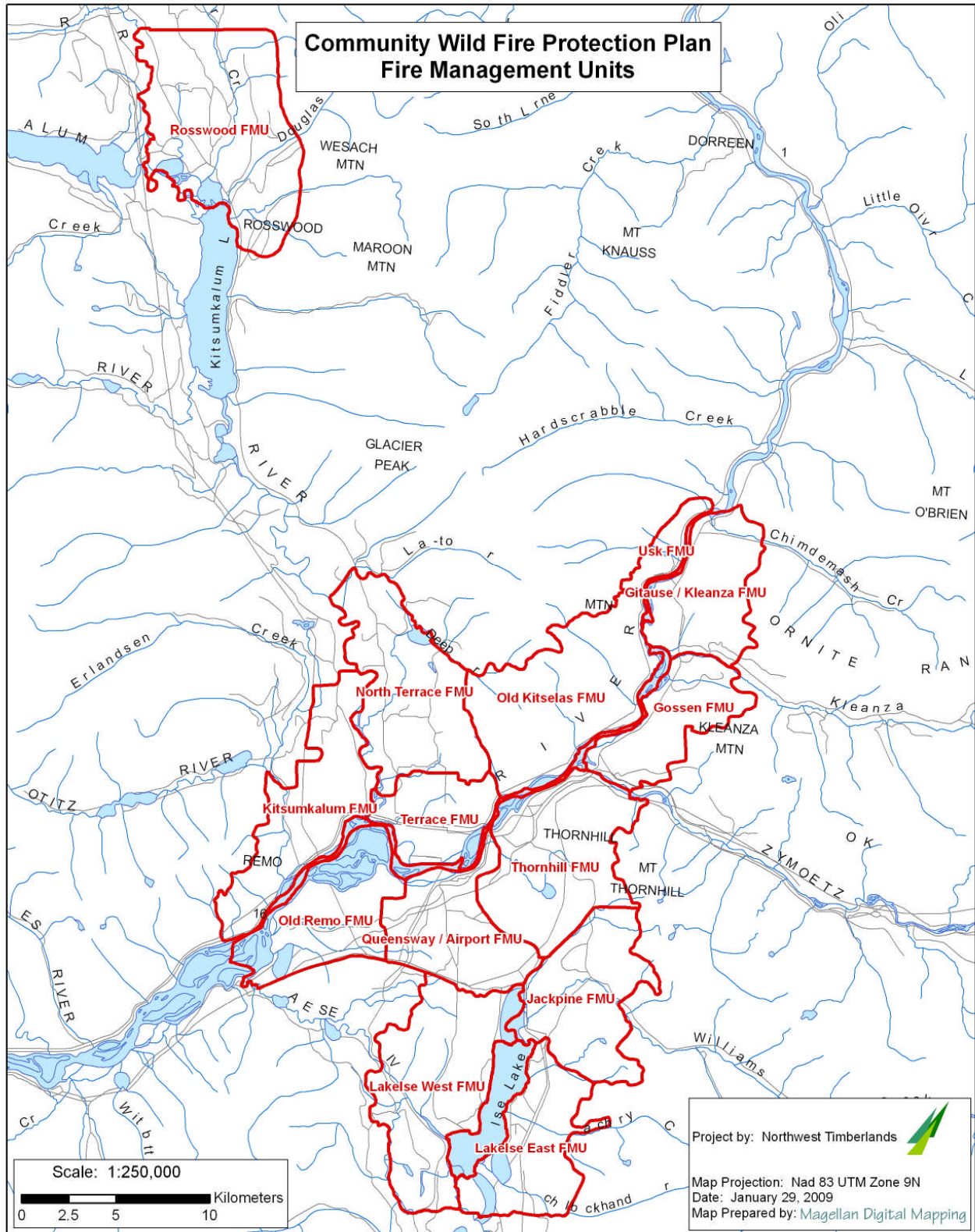
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Glossary of Terms

<u>Term</u>	<u>Description</u>
BCTS	BC Timber Sales
C5 fuel type	Classification of fuels as described by the Canadian Forest Fire Prediction System (FBP). C5 is a type of forest fuel as described in the report.
FPB	Canadian Forest Fire Behavior Prediction System. A tool that helps fire suppression agencies in predicting fire behavior given current weather conditions and forest fuel types
Critical Fire weather	When weather conditions reach levels where predicted fire behavior will produce high intensity fires
Cross over days	When humidity levels are lower than air temperature. This condition can produce extreme fire behavior with high intensity fires
CWH	Coastal Western Hemlock Biogeo Climatic Ecosystem classification
CWPP	Community Wildfire Protection Plan
EBAP	Employment Bridging Assistance Program
FFMC	Fine Fuel Moisture codes
Fire Protection Zone	A geographic area that has fire protection services for structural fires. These areas are defined by distance and time to a designated fire hall
Fire Smart Manual	This interactive manual provides individuals with the necessary tools in planning and mitigating the risk of fire in interface areas
FMU	Fire Management Areas are designated to group smaller planning units into geographical areas that have similar terrain, development types, forest fuels, predicted fire behavior characteristics, fire protection services, and local government
Fuel Modification Projects	Projects designed to modify forest fuels in such a way as to effect, the chance of ignition starts , or the expected fire behavior in a given fuel type. Changes in expected fire behavior are designed to improve the success of control actions
High intensity fires	Fires that will exhibit very vigorous behavior and control actions are either indirect or can not be attempted until burning conditions ameliorate
MOFR	Ministry of Forests and Range
OBSCR	Open Burning Smoke Control Regulation
OFC	Office of the Fire Commissioner. The provincial body tasked with the Fire Smart Program
RDKS	Regional District of Kitimat Stikine

Series 100/215	Some of the fire suppression training courses as defined in the Fire Smart manual that are designed for cross training of suppression agencies in wildland and Urban interface fires
Stand Management Plan	A prescription/Plan for a parcel of land that sets management objectives and treatment options for the growing/tending and harvesting of trees
Thresholds	Bench mark conditions where changes in wild fire threat or fire behavior could be expected
UBCM	Union of BC Municipalities
Wildfire Act	Provincial Legislation pertinent to prevention, detection and suppression of wildfires
Wildland Urban Interface (WUI)	The area where structures and human development meet or intermingle with undeveloped wild land vegetation
Wildland Urban-Interface Wildlife Threat Rating	A numerical rating system that looks at four main components in assessing threats to structures and development from wildland fires. These components are forest fuels, terrain, structural placement and historic fire weather

1 Introduction

This report has been prepared in response to a call from community leaders to participate in the Community Wildfire Protection Planning (CWPP) process, and has been funded by the provincial government through the Union of BC Municipalities (UBCM). The basis of the report is to establish an assessment of local fuel types: i.e. to determine what fuel types exist and what hazard they contribute to the risk of wildland-urban interface fires.

The potential for devastating fires that destroy homes and properties is very much a real threat in the rural environment that dominates our communities. Fuel types combined with topography, fire weather and structural density will assist community planners in defining where risks occur and what can be done to reduce losses from fires and to improve the overall safety within the wildland-urban interface.

Areas in and around the City of Terrace and the community of Thornhill are surrounded by forest fuels that are intermixed with development, which requires interface stakeholders to prepare for the potential of a wildland fire within the interface zone. This preparation will normally require a combination of strategies such as implementing public education programs in risk and hazard reduction, implementation of fuel management techniques, and ensuring fire preparedness levels meet the potential of fires starting and expected fire intensities. This report provides background and describes the appropriate strategies to be applied in the planning area. Implementation of these strategies will require the participation and involvement of all stakeholders to work together to mitigate the risks and damages caused by fire.

1.1 Planning Area

This Community Wildfire Protection Plan covers the developed areas of the City of Terrace and the outlying settlements of Thornhill, Gossen Creek, Gitau, Usk, Kleanza Creek, Copper River Estates, Lakelse Lake, Matson Road, Kozier Road, Old and New Remo, Kitsumkalum, North Terrace, Findley Lake, Old Kitselas and Rosswood. The CWPP area is shown on the key map on the preceding pages. Appendix 1 includes more detailed maps that show fuel types and Fire Management Units.

The population base is estimated at approximately 18,500 using the 2006 and 1996 census and adjusted for recent decreases in population. The total land base of the planning area is 68,763 ha.

2 Methodology

The planning area was defined by the proponents to include the City of Terrace and outlying developed areas within the jurisdiction of the Regional District of Kitimat Stikine (RDKS). The RDKS area for this plan included all areas that were within a fire protection zone served by the Thornhill Fire Department, with the addition of West Lakelse Lake, Old Remo, and Findley Lake Road subdivision, Rosswood and the Kitsumkalum / Kitselas Indian Reserves.

The initial step was to produce a base map from the Ministry of Forests and Range inventory data that delineated the attributes associated with forest cover. The forest cover mapping was used as the basis for establishing fuel types that would exhibit similar fuel characteristics and fire behavior. The planning area was divided into fourteen geographic **fire management units** (FMUs) that correspond to descriptions that are similar in terrain/ aspect/ development densities/ protection services and topographic features. The base map contains

- Crown Land/Private Land
- Indian Reserves
- Roads/ Railways/Highways/Railroads
- Utilities/ Gas lines/Hydro lines

- Water bodies
- Forest cover
- Wildland Urban Interface (WUI) Threat Rating
- WUI assessment plot locations
- Fire protection boundaries
- Fire hall locations
- Fire hydrant and tanker re-load locations
- Municipality boundaries
- Historic fire start locations
- Planning boundaries
- Fire Management Units (FMU) - fourteen units

Six main fuel types were identified and assessed throughout the planning area and FMUs to identify not only differences in fuel type hazards but to rate the effects of topography and structural/development on wildland-interface hazards.

Plots were established in the field to measure the fire threat, and this, in conjunction with information on fuel, weather, topographical, and structural factors, was used to develop a Wildland Urban- Interface Wildfire Threat Rating. The plots were located in representative fuel types of various aspects, slopes, and urban development to determine the ranges of hazards that could be expected. The fuel types were first delineated using forest cover mapping. They were then coalesced to reduce the number and variation of types into fuel types that would exhibit similar hazard characteristics and fire behavior. The forest inventory types were further confirmed and refined using local knowledge satellite imagery and ortho photos.

Following completion of the Wildland Urban-Interface Wildfire Threat Rating, the assessment locations were transferred to the base map and the results were summarized. This summary and analysis was used in discussions with stakeholders.

A review of fire history and fire weather records was undertaken to assess the historic local conditions' relative risk and, through an analysis of the data, to determine when critical conditions occur. In addition, local by-laws, provincial statutes, relationships between agencies, and fire suppression preparedness levels were reviewed to confirm the ability within the planning area to prepare and respond to fires to evaluate any potential gaps. Actions/recommendations for improvement are included within these sections.

Discussions with stakeholders occurred throughout the process to provide a perspective on what opportunities existed to reduce the risk of wildfires through the introduction of effective fuel management techniques, landowner education and implementation of Fire Smart principles, existing bylaw reviews, and current fire preparedness levels and communications between suppression agencies. Discussions also occurred around the effects of the mountain pine beetle infestation and the predicted changes to fuel hazard in the pine leading forest that occur in the interface zone.

Based on stakeholder and threat rating information, options and recommendations for fuel management were developed. In conjunction with this process, a literature review was done of other completed Community Wild Fire Protection plans for communities such as Burns Lake, Revelstoke and Prince George. The outcomes of these reports were assessed for applicability to our area, and additional recommended treatments or actions were incorporated where appropriate.

Drafts of this CWPP were provided and discussed with key stakeholders to ensure buy-in of recommendations and clarity of responsibilities. This report includes the final outcomes of those discussions.

Actions are identified which relate to the information provided in this report or are based on information gathered, interviews with local and regional experts, and local knowledge

3 Description of Fire Management Units

The planning area has been divided into fourteen geographic fire management units (FMUs) that correspond to areas that are similar in terrain, aspect, development densities, protection services, and topographic features.

3.1 Terrace Airport – Queensway FMU

The Terrace Airport/Queensway fire management unit is defined as the area west of the highway 37 and North of Lakelse Lake. The unit includes the rural settlements of Queensway, the Matson Road area and the airport plateau.

The settlement along Queensway drive includes a range of development from high density to an intermix of less than 1 structure per hectare. Most of the high density is established along the Skeena River corridor with the upland subdivision of Churchill drive. The Matson/ Farkvam Road area and west contains primarily development in the less than one structure per hectare.

Fuel types include a significant band of low hazard deciduous along the Skeena River portion and the Queensway drive area which is bordered by the Skeena River to a more concentrated thrifty hemlock leading mixed stands in the Matson Road Area

The Airport Plateau contains the airport development lands and utility right of ways, including the Kitimat Spur extension of the Canadian National Railway. This area is comprised of predominantly lodgepole pine, hemlock forest of 90- 100 years of age with a hemlock understory representing all three height class layers.

The area has Fire protection services outside the airport core lands provided by Thornhill Fire Department and the Terrace Fire department provides services within the Airport Core lands.

Fire hydrant development extends down Queenway Drive and Churchill road subdivision. No hydrant services are located within the Matson Road Area.

3.2 Lakelse West FMU

This FMU is located along the west side of Lakelse Lake and is comprised of a narrow band of development directly adjacent to the lake shore. With the exception of a few dwellings along the Beam Station Road, the developments along the lakeshore range in seasonal cabins to year round residences.

Access is gained via the Beam Station Road or the west side forest access road

Fuel types are comprised of a significant amount of second growth hemlock-balsam harvested since the 1960's and a large tract of hemlock-balsam old growth in the Hai lake area as well as an old growth corridor along the Lakelse River. There are a few fragmented patches along the east aspect of Lakelse Lake as well as a few lodgepole pine leading types confined to steep rocky areas

This area is not within a fire protection Zone.

3.3 Old Remo FMU

This area contains the scattered development in the Kozier Road area and the settlement of Old Remo.

Old Remo is located within the Skeena flood plain and is surrounded by deciduous fuel types located to the north along the Skeena River and second growth hemlock-balsam with a brush component on the south side.

The developments are primarily located on cultivated agriculture land within an intermix of valley bottom forest fuels.

Kozier Road contains small acreages of various levels of cultivation with low development densities. The major fuel type surrounding this area is second growth hemlock-balsam with pockets of second growth hemlock greater than 100 years old.

This area is not within a fire protection zone and has no structural protection services.

3.4 Kitsumkalum FMU

The Kitsumkalum Fire Management Unit encompasses the developed areas of New Remo and Kitsumkalum Reserve

New Remo is located across from Old Remo and is on the Skeena River floodplain. The development is comprised of some higher density development along highway 16 west as well as low density development on cultivated agricultural land.

There are a few scattered fishing lodges west of the Zymachord that are located within hemlock balsam second growth fuel types. This development, being on the flood plain, is surrounded primarily by deciduous leading forest types on flat ground. Bounded by the Skeena River to the south and the Zymachord river to the west, there is a significant portion of cultivated land and deciduous leading fuel types to the north.

Higher hazard fuel types in second growth and old growth hemlock-balsam are located upslope and away from the developed areas.

This area is within the fire protection zone.

Kitsumkalum is located along and upslope of the Kitsumkalum River flood plain. The development is medium to high density bounded by the Skeena River on the south and the Kitsumkalum River to the east. The dominant forest cover fuel type is second growth hemlock-balsam harvested since the 1960's, located up-slope of the developed area.

This area has fire protection services provided by the Kitsumkalum volunteer Fire Department that is not fully functional due to obsolete equipment and recurrency training requirements of its members.

3.5 Lakelse East FMU

The Lakelse East Fire Management Unit encompasses the development along the shores of Lakelse Lake. Development here contains some high density structures along First Avenue to an intermix of low density, sparsely developed areas within forested areas. The unit extends from Furlong Creek in the north to the southern end of Lakelese Lake below the Onion Lake plateau.

Development is primarily along the shores of the lake, and is intermixed into a variety of fuel types from deciduous leading fuel types to valley floor hemlock-balsam old growth forests. The second growth and pine leading forests are primarily located on the east side of highway 37 south upslope of all but a few developments. Above these fuel types are upslope old growth hemlock-balsam stands

This area is within a fire protection zone provided by the Lakelse Lake satellite station of the Thornhill Volunteer fire department.

3.6 Jackpine Flats FMU

The Jackpine Flats FMU encompasses the rural development of intermixed structures on small acreages. This area has as part of its history a large fire that occurred around 100 years ago. There is a homogenous pine leading fuel type that surrounds and extends into this developed area.

This FMU is bounded to the south by a natural deciduous type fuel break associated with the Sockeye and Williams Creeks, and by the very steep mountainsides from which Williams Creek flows. To the north is the base of the airport-Thornhill plateau. There is an intermix of some second growth, deciduous leading, and hemlock old growth that surrounds the main developed area. Upslope and to the east of the developed area is the steep and rocky Thornhill mountain that contains old growth hemlock-balsam.

This FMU is within a fire protection zone with services provided by Thornhill volunteer fire department.

3.7 Thornhill FMU

The community of Thornhill lies directly east and across the Skeena River from Terrace. The unit is bounded by Highway 37 to the west, the Skeena and Copper Rivers to the north and Thornhill Mountain to the east. Jackpine Flats delineates the south boundary.

Development in this FMU ranges from high density residential/commercial to scattered rural with some parcels of land developed for agricultural purposes.

There is an intermix of forest types within the developed areas throughout the unit

The Thornhill lower bench contains residential development as well as the main commercial area and is bounded in the west by the Skeena River with primarily deciduous leading fuel types. Within the developed area are pine dominated fuel types that are approximately 100 years old. These type separate higher density developments and form fairly large contiguous fuels. Deciduous fuel types separate the river from the developed areas.

The upper Thornhill bench is similar to the lower bench but with less commercial development. Again, the fuel types that are intermixed within the developed areas are primarily pine leading forests with areas of deciduous types bordering the perimeters. A large contiguous swamp system separates the pine leading forests along the southern boundary of the development on the plateau above Jackpine Flats.

Recent harvesting and future plans by BC Timber sales are converting the pine leading fuel types of the plateau to second growth plantations. These activities have modified and will continue to modify the structure of the surrounding forest fuels. The portion of Thornhill on Mountain the east side of the FMU and north of the Thornhill Mountain Trail Road is very steep and rocky, and the base of the mountain along this section has deciduous dominated fuel stands with upslope hemlock-balsam old growth above.

To the south of Thornhill Mountain Trail Road to Sockeye Creek and the north end of Jackpine FMU, the base of Thornhill Mountain is comprised primarily of pine dominated and thrifty hemlock forests less than 100 years old. These types reach near alpine with a band of old growth hemlock directly above.

This Fire Management Unit is within a fire protection zone with services provided by the Thornhill Fire Department

3.8 Gossen FMU

This Fire Management Unit is east of Thornhill from the Copper River to the west side of Kleanza creek containing the residential development of Copperside Estates and Gossen Creek subdivision. With the exception of a few parcels of land, the area is high to medium density with some larger rural acreage around Copperside estates.

Copperside Estates is situated on the valley floor, within the Skeena and Copper River flood plains. Bordered by two rivers and the associated deciduous leading fuel types, there are two significant patches of pine leading and thrifty hemlock fuel types.

Copperside Estates was the location of two wildfires, one each in 2005 and again 2006 that resulted in an evacuation of some nearby residents. As these fires (the result of lightning strikes) were located on the steep hill slope above the development, the risk and the reason for the limited evacuation was for safety reasons from rolling debris.

The fire has had a significant impact on the amount and type of forest fuels found in this area.

Gossen Creek is a residential development area to the east of Copperside, and is a small acreage development located on a Skeena River high bench flood plain. Bounded on three sides by the Skeena River, and a small band of thrifty hemlock fuel type of less than 100 years old, this community is comprised of 2 acre parcels of land with an intermix of thrifty hemlock brush separating properties.

The east side of the developed area is bordered by Highway 16 and then a small bench to the base of a large steep mountain that eventually changes to hemlock-balsam old growth. Within this old growth type there has been harvesting activities in the past and some currently occurring. Future harvesting and fuel modification will continue to occur on this hillside over the rotational age of the forest.

Both Copperside Estates and Gossen Creek subdivision are within a fire protection zone with services provided by Thornhill Volunteer Fire Department.

3.9 Gitau-Kleanza FMU

This Fire Management Unit extends north from Kleanza Creek to the east side of Chimdemash Creek. Highway 16 transects this unit from north to south. The west side is bordered by the Skeena River and the east side by large forested mountains.

The development in this area ranges from high density residential in Gitau subdivision to small acreage residential at Kleanza Creek subdivision and the settlement Usk on the Highway side.

Gitau subdivision is a high density development that sits on a small plateau above Kitselas Canyon on the Skeena. The main fuel type located around this fuel type is dense stands of predominately thrifty hemlock less than 100 years old with some small pockets of pine leading fuel types. There are significant brush and deciduous leading fuels to the north along the Skeena River and adjacent to Kleanza Creek in the south. The development is bordered on the east by Highway 16.

Kleanza Creek Subdivision is bordered by Highway 16 on the west and thrifty hemlock or pine leading fuel types surrounding or intermixed in these small acreages. The subdivision is located at the base of a large mountain which is forested in similar fuel types.

A few larger more dispersed developments are situated adjacent to the subdivision up Kleanza Creek Forest Road on larger parcels of cleared land. These properties are intermixed and surrounded by the same fuel types of thrifty hemlock or pine leading forests.

Usk is an old community of medium density structures concentrated around the ferry crossing on the highway side of the Skeena River. Bordered by the Skeena River on the north and west flank, the main fuel type is deciduous leading. Across the highway where there are a few developments as far as Chimdemash Creek they are sparsely located, directly adjacent to the highway, and are surrounded by thrifty hemlock, second growth hemlock-balsam and some isolated patches of old growth hemlock.

There is an extensive history of harvesting activity upslope on Singlehurst Mountain that has created a second growth hemlock-balsam fuel type. Intermixed and further above the harvested area is old growth hemlock-balsam.

Kleanza Creek, Gitaus and Chimdemash Creek are within a fire protection zone. Services are provided by the Gitaus and the Thornhill Volunteer Fire Departments.

3.10 Usk FMU

This Fire Management Unit is defined by the slide tracks in the south that separate this unit from the old Kitselas FMU to Shannon Creek in the North and Skeena River to the east. The mountain above Usk is extremely steep and rises quickly to the alpine forest cover.

The development is o primarily medium density, situated along the river bottom flood plain. The north axis of the development is intermixed and surrounded by a large predominately pine leading fuel type. This type is upslope of the development. To the west is a series of slide tracks and deciduous types intermixed with fingers of old growth hemlock-balsam. The southern and eastern edge is bordered by the Skeena River and is directly across from Highway 16.

This area is not within a fire protection zone.

3.11 Terrace FMU

This Fire Management Unit encompasses the City of Terrace and Brauns Island. The community is comprised of a large area of high density residential, commercial and industrial lands and large tracks of residential /agricultural located adjacent to the Skeena River with some smaller dispersed acreages on the upper bench.

Surrounded by the Skeena River on the entire southern flank and the Kitsumkalum River on the west, the fuel types within these areas are primarily deciduous leading.

The northern and eastern edges have small bands of deciduous leading fuel types next to developed areas that give way to thrifty hemlock or predominately pine fuel types. Most of the development is located on flat river benches with some development such as north Sparks Street and Deep Creek subdivision upslope of forest fuels

The City of Terrace and Brauns Island have fire protection services provided by the Terrace and Thornhill Fire department.

3.12 North Terrace FMU

The North Terrace FMU is located north of Terrace and extends to Lean-to Creek in the north, just beyond the Findley Lake Road development and is bordered on the west by the Kitsumkalum River and Deep Creek in the east. The height of land above the Old Kitselas FMU separates the two FMUs.

The development within this unit is medium density small rural acreages. The exception would be the agricultural development area of Dutch Valley. The developments are widely spaced and range from higher developed areas such as Woodland Park Drive and Orde Road to more clustered development such as Findley Lake Road west, and Merkley Road.

The area has a wide mix of fuel types representing all the various fuel types listed in this report: pine leading, deciduous leading, second and old growth hemlock-balsam, and thrifty hemlock.

The area north of the City of Terrace municipal boundary to the Deep Creek subdivision has fire protection services provided by the Thornhill Fire Department. The area north of Deep Creek subdivision to Lean-to Creek is outside the fire protection zone.

3.13 Old Kitselas FMU

The Old Kitselas Fire Management Unit is bordered by the height of land between the North Terrace FMU, the Skeena River on the south and east flank and the alpine on the north boundary. The development in this FMU is low density rural acreages that are primarily located along the river and railway tracks with some scattered development up slope near the end of the old Kitselas Road.

The river plain development and the site of old Kitselas is primarily located in deciduous leading fuel types with the upslope properties intermixed with pine leading or second growth fuel types.

This area is not within a fire protection zone.

4 Wildland and Urban Interface Wildfire Threat

Plots were established in the field to measure fire threat. This information, in conjunction with information on fuel, weather, topographical, and structural factors, was used to develop a Wildland Urban-Interface Wildfire Threat Rating. There were thirty-three fuel management plots located through out the planning area. The plots were established and recorded following the procedures of the *Wildland Urban Interface User Guide*. Summaries of wildfire threat hazard ratings are provided in Appendix 2.

The result was the map in Appendix 1 that not only illustrates the various wildland urban interface wildfire threat ratings, but is also correlated to the wildfire intensity rank that could be expected in those fuel types.

The entire planning area represented by the thirty three fuel assessment plots indicate that the highest wildfire threat rating that occurs in the planning area is **'Moderate'**.

4.1 Rating Factors

The fuel types found in the planning area exhibit a wide range of attributes that describe the potential wildfire urban interface hazard as assessed using the required assessment procedures. The rating system assesses four main components:

- Fuels
- Weather
- Topography
- Structural

4.2 Fuel Factors

Fuel as a factor is related to the type of forest that exists in a given area. The five fuel types identified in the FMUs are such that they range from a low to a moderate wildfire threat rating. As fuel and development are the only two factors in the assessment equation that

can be modified, it indicates that fuels alone do not exhibit a significant fire hazard to development.

The following table summarizes the areas of the five fuel types found and the Wildland-urban interface threat rating. These fuel types total 68,763 hectares within the planning area. Total fuel modification within the interface zone through timber harvesting is expected to be 1723 hectares over the next five years, and will be distributed across these fuel types.

Figure 1: Fuel type / Hazard Summary for Planning Area

Fuel Type	Cultivated/ cleared	Fuel Type 1 WUI HAZ D1	Fuel Type 2 WUI HAZ C5	Fuel Type 3 WUI HAZ C3	Fuel Type 4 WUI HAZ C6	Fuel Type 5 WUI HAZ C6	Total Ha
WUI Hazard	Low	Very low- Moderate	Low- Moderate	Moderate	Moderate	Moderate	
Area (ha)	7705	10006	14262	8160	14103	4527	68763

All of the WUI wildfire threat data collection indicated some trends in the forest fuels within the planning area. It is apparent, given our climate, that there is very little forest floor debris that contributes to an increased threat rating. The small and large debris quickly rots in our coastal influenced climate and does not create a build up of these fuels that will contribute to fire intensity.

Due to our fuel types, crown closure, and ecosystems, we also experience a low amount of flammable surface vegetation available as fuel. We consistently have a low rating in this category as the majority of the ground cover is moss or herbs.

The other value that is consistently low is the amount of standing dead and down coniferous forest with or without foliage. This factor may change in time if the mountain pine beetle infestation is successful in reaching epidemic levels (see section 4.2.7 below).

Some of the fuel factors that have an impact on moderating our wildland urban interface wildfire threat rating are:

- Consistently average duff depths rating
- Consistently lower than average vegetation fuel
- Consistently lower than average fine and large woody debris continuity rating
- Consistently lower than average coniferous crown base height rating
- Consistently lower than average ranking for coniferous forest health rating

The fuel types were also roughly categorized to reflect the fuels as described in the Canadian Forest Fire Behavior Prediction System (FBP). The fuels described in the FBP system can aid in assessing the following factors

- What critical fire weather conditions need to exist for high intensity fires in a particular fuel type
- How often do those critical conditions exist for each fuel type
- When do those conditions exist
- What is the historical wildland forest fire starts and cause
- When do those fire starts occur
- Compare historical fire starts during critical fire weather conditions

Through this analysis a correlation can be made to the risk of a fire start during critical conditions, as well as an assessment of current suppression preparedness levels when those conditions exist. The following sections describe the five main fuel types found in the planning area.

4.2.1 *Deciduous leading forest fuels*

Deciduous leading forest fuels are found along the active flood plain in valley bottoms, rivers and creeks and in some areas that had been heavily disturbed from fire or an increase in the water table. They provide natural fuel breaks and differing fire behavior characteristics than the other four main fuel types. The deciduous leading fuel type provides the lowest overall WUI threat rating on the wildfire urban interface hazard rating. This fuel type is characterized by fire behavior within the D-1 fuel type as defined in the Canadian Forest Fire Behavior Prediction System

Deciduous leading - D-1 Fuel Type (Plot 5)
photo: T. Jobb



4.2.2 *Second growth hemlock-balsam fuels*

Second growth hemlock-balsam - D6 fuel type (Plot 28)
photo: T. Jobb



Second growth hemlock-balsam fuels are primarily the result of over 80 years of harvesting activity of which the last 50 years could be considered heavy activity. Located predominately on the valley floor and mid-slope elevations, some activity has reached just below the alpine type fuels. They are mostly made up of hemlock-balsam regeneration and range in age from recent harvesting to 80 years plus. This fuel type

differs in that they are commonly a shorter crown height, more susceptible to temperature fluctuations, precipitation, humidity changes and the effects of wind. Fire behavior in this fuel type would exhibit higher intensities and rate of spreads than in the old growth hemlock-balsam fuel types. Use of this fuel for strategic fire control could aid in suppression actions (e.g. by taking advantage of differing crown heights from adjacent fuels). This fuel type is characterized by fire behavior within the **C6** fuel type as defined in the Canadian Forest Fire Behavior Prediction System.

4.2.3 Old growth hemlock-balsam fuels

Old growth hemlock-balsam fuels are found primarily off the valley floor on the mid to upper slope elevations. There are small areas intermixed within the developed areas along the valley bottom but are not a large area of contiguous fuel. This fuel requires above-average fire weather conditions to create high intensity fires that can affect the difficulty of control for suppression forces. This fuel can act as a good fuel break from other fuels as there can be higher humidity levels and lower temperatures within the associated canopy. Other than deciduous leading fuels, this fuel type will exhibit a much lower fire intensity with different spread rates than adjacent valley floor fuels. Use of this fuel for strategic fire control could aid in suppression actions. This fuel type is characterized by fire behavior within the **C5** fuel type as defined in the Canadian Forest Fire Behavior Prediction System



*Old growth hemlock-balsam - C5 Type Fuel (plot 20)
photo: T. Jobb*

4.2.4 Pine leading fuels



*Pine leading - C3 Type Fuel (plot 14)
photo: T. Jobb*

Pine leading fuels are located primarily on the benches in the valley bottom and on steep, rocky mountains or knolls. Burned in the 1920s, the area that the pine leading fuels occupy is diminishing due to a significant amount of development on the sites they occur.

These fuels are primarily a pine leading type with an emerging or well established understory of western hemlock. Given high or extreme weather indices, this fuel type and its proximity to development could pose the greatest control difficulties of all the local fuel types. The current mountain pine beetle infestation may have an impact on the future hazard of this type by modifying the fuels (see section 4.2.7). Other fuel types, fuel breaks such as right-ways, rivers and topography breaks would anchor control lines for this fuel type. This fuel type is characterized by fire behavior within the **C3** fuel type as defined in the Canadian Forest Fire Behavior Prediction System

4.2.5 Thrifty hemlock-balsam fuels

Thrifty hemlock-balsam fuels are found on sites that either have a fire history or sites from some of the first logging over 80 years ago. These types are usually a very dense canopy with very little underbrush or herbaceous layer. There is commonly a 5-10 percent birch/aspen deciduous component. Found primarily on the valley floor, it extends up slope in a few places such as Kleanza Creek and Copperville Estates. The expected fire intensity would be somewhat less than that found in the pine leading stands primarily due to being found on moister sites and containing a deciduous component. This fuel type is characterized by fire behavior within the **C5** fuel type as defined in the Canadian Forest Fire Behavior Prediction System

*Thrifty hemlock-balsam - C5 Type
Fuel (plot 32)
photo: T. Jobb*



4.2.6 Developed agriculture and swamps

This type includes urban and agricultural development as well as some of the larger swamp systems. As these polygons are essentially the fuels that we wish to protect (i.e. developments), they also represent a fuel type that forms a control point due to changing forest cover, intermixed fuel breaks and different fire behavior. The swamp systems delineated also form areas for control points and the opportunity to take

advantage of varying fire behavior. These types range in size from very large (City of Terrace) to small scattered development throughout the planning area. Large swamps are located between the developments of Jackpine and Thornhill as well as between Jackpine and Lakelse Lake.

4.2.7 Mountain Pine Beetle influences

4.2.7.1 Changes to fuels

Although mountain pine beetle (MPB) has long been found in the local forests in endemic populations, the area has not seen a significant outbreak since the early 1980s. At least, that was the situation until 2006 when the beetle has been found in increasingly greater numbers. This increase was the result of a weather system from the east that carried in large amounts of mountain pine beetle at precisely the time of their flight¹.

The mountain pine beetle affects the pine forests which happen to be one of the predominant fuel types located in or around the wildland urban interface. The largest tracts of pine forest are on the airport industrial lands, JackPine flats, Thornhill , Terrace bench , Terrace Mountain, Rosswood, old Kitselas, Gitaus and Kleanza / Usk areas. This fuel type comprises 8160 ha within the planning area, but more importantly is a significant feature of the forest fuels found close to developed areas.

The approach by staff in the Ministry of Forests and Range is to monitor through aerial surveys the spread of the infestation. The exception to this is direct ground assessments and control strategies (fall/burn/harvesting) in and around the Rosswood area. This strategy is an attempt due to limited dollars to stop the northern advance of the mountain pine beetle into the Nass valley.

Any measures to apply beetle control actions such as the fall and burn in 2007/2008 around the Terrace area are now generally considered ineffective. However, the City of Terrace has implemented a program to locate and remove beetle infested trees that may pose a fire or safety hazard within and directly adjacent to parks, green spaces and trails in the municipality.

It is interesting to note that the beetle infestation has not exploded and that the pine leading stands remain infested but not as severe as predicted. The thought is that our moist climate could actually inhibit the life cycle and reproduction of the mountain pine beetle. Differences in the species of pine found here compared to the interior, as well as our stand compositions could also be contributing factors

The next few years should provide a clearer picture on the severity of this outbreak and the damage caused.

4.2.7.2 MPB effects on Wildland-Urban Interface Fire Hazard

Depending on the severity of the MPB outbreak, a complete attack such as that experienced in the interior of British Columbia will change the hazard of this fuel type. The type will go from green foliage to standing red. These changes in foliage will immediately increase the flammability of the fuel type and the expected fire intensities. Fires under certain weather conditions that would have normally produced moderate fire intensities with somewhat predictable behavior would react with extreme behavior and high intensities. These are the fires that

¹ Aaron Benterud, Ministry of Forests and Range. Personal conversation, November 13, 2008

are extremely difficult to action with suppression forces, other than very limited and strategic defense.

The red and dead phase of the mountain pine beetle infestation will change to a grey phase in two years, where the hazard would previously have been predicted to drop due to the loss of needles. The experience of fire specialists within the MOFR on fires in the interior pine forests grey phase indicates that this is not the case. Grey phase fuel types in the interior have produced crowning fires of very high intensities due to the amount of dry/dead fuel available. There is thought that as pine goes grey and falls down, there could be a significantly higher hazard than the current “green” stage². If this occurs, the need to remove or modify these fuel types will be all the more important.

4.3 Weather Factors

Weather as a factor can not be altered. Weather is expressed as a numerical rating of the surrounding local fire weather and historical fire starts. The Terrace area is situated in a moist, coastal influence zone, and therefore has a very low rating in this category

Low historical fire weather and fire start history consistently results in the Terrace area having the lowest threat rating attainable. This is discussed further in the section on fire weather.

4.4 Topography Factors

Topography is another factor that can not be changed. Extreme wildfire threat ratings are related to south aspects with steep slopes and gullies. The primary development within the CWPP planning area is located on flat benches or gentle slopes indicating a low to moderate influence on wildfire threat rating. An overview of the local development shows that most occurs on the valley bottom floor on river terraces or benches with some on gentle rising slopes such as the upper portion of Kleanza subdivision.

Developed areas that are situated on flat ground consistently have a lower wildfire threat rating. Increased fire behavior would be expected if a developed area is located on a west or south aspect on steeper slopes, with gullied terrain. In some cases the topographic ratings were increased to a high rating in fuel types found on steeper south aspects with gullied terrain. This rating accounted for 25% of the WUI wildfire threat rating plots established (see Appendix 2).

Topographic fire breaks such as ridges, drainages, and mountains, combined with a mosaic of fuel types provides natural defence lines in which to action wildland fires spreading into the interface. The general topography of the area works in favour of control efforts to contain fires to one FMU.

4.5 Structural Factors

Structural factors relate to the proximity of structures to fuel areas, and the types of structures/ development. This category had the greatest variation in ratings which ranged from low to high-moderate, which is a normal characteristic of semi rural development, where structures are often located next to forest fuels or within interface areas.

Modification of this factor can be achieved when planning for new development or replacing existing structures.

² Brad Martin, Ministry of Forests and Range. Personal conversation, December 16, 2008

5 Fire Weather and Fire History

5.1 Fire Weather

Terrace and area is situated within the Coastal Western Hemlock (CWH) biogeoclimatic zone. Summer and winter climates are moderated by Pacific Ocean weather patterns, where extreme temperatures, when they occur, are short lived.

The weather patterns and historical fire weather place this planning area as one of the lowest weather rating areas in the province, using the wildland urban interface wildfire threat worksheet.

A summary of historical fire weather and fire starts has been collected from the Ministry of Forests and Range protection division data base. The methodology was to set parameter thresholds of conditions that would cause high intensity fires in excess of 4000 kW/m. This threshold is widely understood as the condition when a fire will become extremely difficult to control. This is when control tactics such as direct attack are not feasible, and large landscape characteristics are used in control through back burning.

For each fuel type encountered in the planning area, fire intensities will reach this critical point at different thresholds. The following table summarizes these thresholds from the historical fire weather data for three different fuel types .There have been no adjustments for factors such as wind, slope, aspect or time of day to the weather indices used.

Although it is possible to refine the prediction of fire behavior based on the above variables, it would be difficult to predict or plan for the multitude of variations experienced through out the planning area. Therefore the threshold levels will most likely occur more often than illustrated due to increases in Fine Fuel Moisture codes because of time of day, allowances for slope or aspect and changes to wind speeds. The three types that have been compared are the C5 fuel type, most often used to reflect our mature hemlock balsam stands , the C3 fuel types(Pine leading) and C6 fuel type, coniferous plantation of crown base heights over 2 meters. The data illustrates that there is an average of 12 critical days per year where high intensity fires could occur in coniferous fuel types. The critical days for a pine leading type fuel (C3) is lower at around 8 days per year and less than 2 days per year in mature hemlock balsam forests (see figure 2).

Critical Fire weather occurs sporadically and must be considered when promoting or planning large scale fuel management programs and the associated costs.

Elevated risk conditions can also occur during the breakdown of a significant high pressure system and the associated critical fire weather thresholds, when extreme in flow winds from the Pacific occur. Although this change usually brings moist and cooler air, there is a critical period when the winds can create conditions favorable to extreme fire behavior.

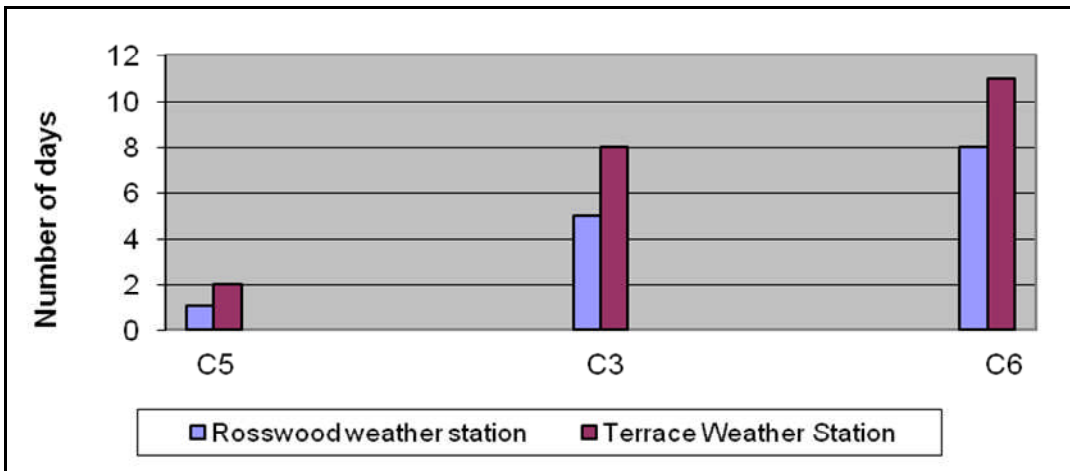
History has shown that these fires will make the biggest gains during the first burning period, where as once the front is established, the winds will decrease, the humidity's will rise and temperatures lower. Fire intensity will respond accordingly.

Another high risk condition exists in our fuel types prior to green up in the early spring of each year. This is when there is more surface vegetation available for easy ignition and a relatively fast rate of spread. The significant advantage for suppression efforts on this type of fire is that control is easier compared to late spring and summer conditions. Although a fire may ignite easily and may spread fast in fine fuel types, it does not burn as intensely at this early time of year due to the amount of time that large and medium size fuels have had to dry.

This “spring “ hazard would be found in lighter fuels with ground cover such as plantations, cultivated fields and forested areas with a surface vegetation or forest floor fuels such as woody debris or dry leaves.

Late spring, specifically the month of June, is a time when we can expect an increase in fires starts, and elevated fire weather conditions could support large intense fires. June is also the month when most cross over days occur, as a result of the longer days leading up to summer (cross-over days are when humidity levels are lower than air temperature).

Figure 2: Graph of number of average annual days when fire weather thresholds exist for high intensity fires (greater than 4000kw/m) by fuel types described by the FBP system.

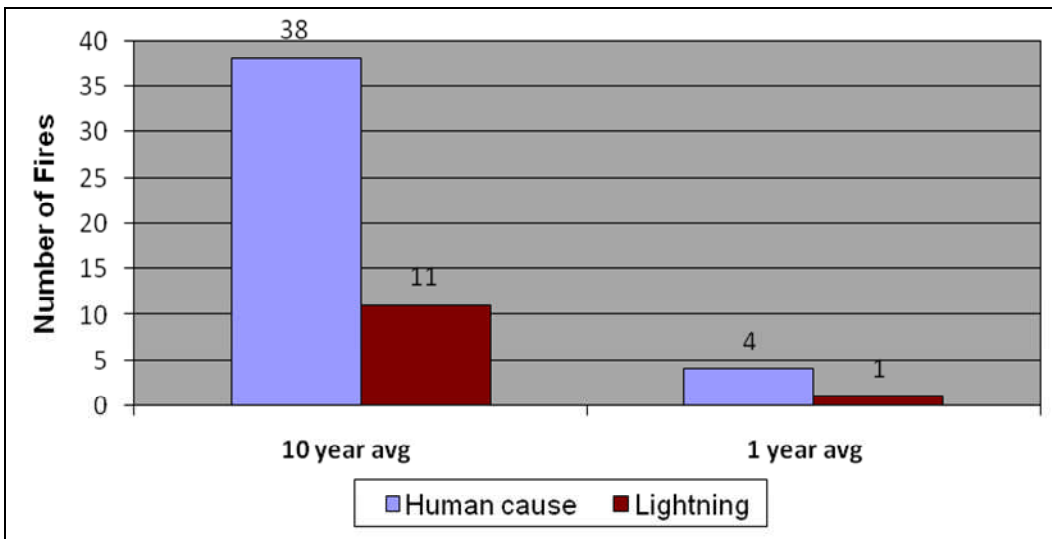


(Source: Ministry of Forest and Range.)

5.2 Fire History

Terrace and the surrounding area have experienced significant climatic changes over the past two decades. As global warming effects become more apparent, changes in weather patterns will have a significant impact on wildland fires and their behavior.

Figure 3: Graph of Number of Wildland-Urban Interface Fires



(Source: Ministry of Forest and Range.)

The annual average number of fires that start in the Kalum Forest District is twenty fires per year. Approximately five of these fires start within the Wildland Urban Interface. Of these five wildland interface fires per year, approximately four are human caused and one lightning (Figure 3). In addition to the wildland fires, the Thornhill Fire Department responds to approximately 14 fires per year that are not accounted for in the Ministry of Forests and Range statistics. The Thornhill Fire Department fires are usually associated with back yard fires and grass fires.

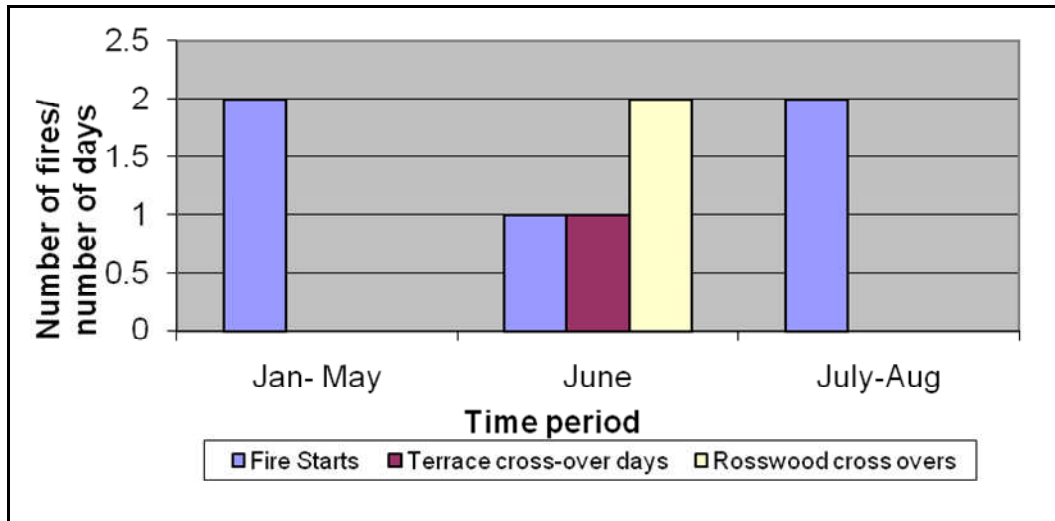
The fires that occurred in the Kalum Forest District were plotted to determine the occurrence of both lightning and man caused fires in or adjacent to the planning area. It is important to quantify not only the fire intensity one could expect in our fuel types, but also the risk and history of actual fire starts.

The majority of the fire causes are abandoned camp fires, children/juveniles or lightning strikes.

For a breakdown of historic fire starts and specific causes refer to Appendix 3. This data was also used to correlate fire starts that occur during critical fire weather conditions such as “cross over days” when humidity levels are lower than air temperature. Graph 3 illustrates that cross over days and fire starts occur mostly in the spring, specifically June. Fewer fire starts and cross over days occur after June 30th when more intense fires could be expected due to long term drying trends.

- Cross over days are when extreme fire behaviour and intensity can result due to the air temperature being higher than the air humidity
- 85% of Cross Over days Occur before June 30th (Spring Hazard)
- Fire starts occur on average of five times per year
- Three of the average annual fire starts occur prior to the end of June

Figure 4: Graph of Historic annual fire starts compared to historic annual cross over days



(Source: Ministry of Forest and Range.)

6 Fire Preparedness and Prevention

6.1 Fire Smart Program – Fire Smart Manual

The Fire Smart Manual is available on line at the Office of the Fire Commissioners website at www.pssg.gov.bc.ca.

This manual provides details in discussions on

- hazard assessments for your property
- solutions and mitigation actions
- emergency measures
- wildland urban interface training
- communications and public education
- land use planning

The low density development that occurs in the interface zone (a large component of our area), puts these areas at particular risk to wildfire and the risk of structural fires entering on to the wildlands. Our communities are at risk from a wildland fire.

The potential damage caused by wildland-interface fires to homes and property can be reduced by employing the basic components of a Fire Smart program.

It is for these reasons that “**Fire Smart**” principles should be promoted to the land owners and that local governments require that these principles be considered for new development or planned expansion of existing developments.

Fire suppression agencies, local governments and landowners all have a role to play in protecting our community. The implementation of Fire Smart programs will provide the most cost effective impact on reducing losses and damage from wildfires.

UBCM Operational Fuel Management Treatments should include Fire Smart education and delivery as an eligible project. Delivery of this material and buy in from landowners has the potential to result in more effective fuel management treatments directly adjacent to structures and development, providing defensible positions for suppression forces.

This approach has been discussed with representatives of the Office of the Fire Commission (OFC), the provincial authority on the Fire Smart program. Under the current OFC budget, the primary delivery mechanism for Fire Smart is through the production of educational material (pamphlets). The OFC are pursuing funding for the training of suppression forces in WUI fires, but at time of writing this report, have no avenue for the training of suppression agency personnel or the delivery of material to landowners.³

ACTIONS related to Fire Smart for the Office of the Fire Commissioner (OFC):

- *Pursue changes to the eligibility of UBCM funding so that it can be applied against training of fire suppression forces in urban wildland interface fires, training of suppression forces in Fire Smart principles, and on the ground delivery and education of landowners by fire suppression forces in Fire Smart techniques*

ACTIONS related to Fire Smart for Local Governments and First Nation Villages:

- *Commit to applying the Fire Smart principles in issuing development permits or planned expansion. Ensure building codes are adhered to.*
- *Commit to training of land use planners and developers on Fire Smart principles.*

Fire Suppression agencies, local governments and land owners all have a role to play in protecting our communities.

The implementation of the Fire Smart Program will provide the most cost effective impact on reducing losses and damages from wildfires.

³ Dave Ferguson, Office of the Fire Commissioner, personal conversation, February 26, 2009

- *Commit to educating land owners in Fire Smart principles through media/ signage/site visits and demonstration pilot projects.*
- *Involve trained and experienced fire suppression personnel in delivery of Fire Smart principles to the local landowners*
- *Commit to developing or improving fire suppression resources in areas with little or no fire fighting capabilities.*
- *Pursue changes to the eligibility of UBCM funding so that it can be applied against training of fire suppression forces in urban wildland interface fires, training of suppression forces in Fire Smart principles, and on the ground delivery and education of landowners by fire suppression forces in Fire Smart techniques.*

ACTIONS related to Fire Smart for Land Owners:

- *Commit to reducing the potential impact of wildland fires on your property*
- *Complete structure and hazard assessment of property*
- *Protect your "home", your investment*
- *Maintain priority zones/ break the chain of fuel around your property*
- *Promote pine overstory removal when fire-smarting properties and structures. Encourage resistant understory species such as hemlock, cedar and deciduous species*
- *Remove ladder fuels and dead and down material in areas within 30 meters of any structures in and around the interface*
- *Ensure adequate emergency vehicle access*
- *Ensure adequate water supply*
- *Make your exterior Fire Smart*

ACTIONS related to Fire Smart for Provincial Government: MOFR Wildfire Management Branch:

- *In concert with local fire departments, involve trained and experienced fire suppression personnel in delivery of Fire Smart principles to the local landowners*
- *Pursue changes to the eligibility of UBCM funding so that it can be applied against training of fire suppression forces in urban wildland interface fires, training of suppression forces in Fire Smart principles, and on the ground delivery and education of landowners by fire suppression forces in Fire Smart techniques.*

6.2 Bylaws

A review of existing building regulations and bylaws for the City of Terrace and the RDKS pertaining to development indicates that no specific checklists or requirements are included to ensure that wildland fire threats are considered; nor are any mitigating actions required as part of the permitting process.

As noted above, all new areas proposed for development within the Regional District or the City of Terrace should comply with Fire Smart principles. Houses should be sited on lots to provide defensible positions; access roads and driveways need to be able to accommodate emergency vehicles; and location and spacing of fire hydrants or water sources need to be considered in community planning and development. The Fire Smart manual includes a checklist that can be used as part of the development process to include Fire Smart items.

ACTIONS related to Bylaws:

- *Regional District and the City to implement Fire Smart principles as a requirement of any planned development applications and include in by-laws or development checklist*

6.3 Wildfire Act/ Open Burning Smoke Control Regulation

Burning permit issuance and enforcement within the City of Terrace is administered through the fire department, and within the RDKS is administered by the Ministry of Forests and Range.

All burning is governed by the *Wildfire Act* and the *Open Burning Smoke Control Regulation* (OBSCR⁴). Beyond industrial burns, the wildland interface homeowner will be faced with the decision to abate the hazard through chipping, hauling to a licensed landfill, burying debris or by burning. Category 1 open fires are restricted to camp fires, the burning of leaves, and vegetative yard debris. This category is restricted to one pile less than 1 meter high by 1 meter wide. Category 2 open fires are a maximum of 2 piles not exceeding 2m by 3m in size each.

All piles larger in size than 2m by 3m will require the landowner to obtain a burning reference number from the MOFR and again comply with the OBSCR. Burning must be conducted when favorable venting conditions exist, so that smoke will rise and dissipate away from populated areas so as not to adversely affect the air quality. The decision to burn will be governed by the *Wildfire Act* and the OBSCR and will require a burning reference number for all category three or larger open fires.

There can be no burning of any prohibited material of any size or type under the smoke control regulations. (Refer to link to OBSCR for a list of prohibited material.)

*The home owner must comply with the OBSCR smoke control regulation on all open burning other than the burning of leaves, grass stubble, weeds and campfires. In the **Regional District**, burning over 2 piles greater than 2m x 3m will also require a burning reference number from the Ministry of Forests and Range. In the City of Terrace all burning other than campfires for cooking requires approval of the **City of Terrace**. There can be no burning of prohibited material.*

There are changes to the OBSCR being proposed that may further restrict the use of open burning and the conditions under which burning can occur. The intent of these changes is to further manage burning and its effects on air quality. These regulations are expected to be developed and implemented within the next two years. See the MOE website (http://www.env.gov.bc.ca/epd/codes/open_burning/index.htm) for information on these proposed changes.

The planning area for this CWPP is located in either a high sensitivity zone (centered around Terrace) or a moderate sensitivity zone⁵. The proposed changes to the regulations will eventually eliminate all category 2 and 3 burns in high sensitivity areas over a 2 year phase in period and further restrict under what conditions burning can occur in a moderate sensitivity zone.

There are discussions occurring around exempting burns from the proposed changes that are for the purpose of hazard abatement or fuel management

within the wildland interface zones: this would be to allow owners to continue to safeguard their property and structures. It is expected that there will remain certain conditions that will

Changes to the OBSCR may eventually eliminate or restrict the use of fire in high to moderate smoke sensitivity areas.

⁴ Link to the OBSCR: http://www.bclaws.ca/Recon/document/freeside/--%20e%20--/environmental%20management%20act%20%20sbc%202003%20%20c.%2053/05_regulations/31_145_93.xml

⁵ Smoke Sensitivity zone map: http://www.env.gov.bc.ca/epd/codes/open_burning/pdf/OBSCR_map.pdf

still be assigned to these burns that will prevent fires from escape and to ensure the control of smoke. Input into the proposed changes is ongoing at the time of writing this report.

It is important to the land owner as well as the land manager that **burning continues to be a viable (cost effective) option for hazard reduction treatments**. Maintaining this option will require that burning be conducted under conditions that will minimize the impact of smoke affecting populated areas. This will require the person conducting the hazard reduction treatment to engage professionals to assist in the preparation and timing of treatments.

The *Wildfire Act* also requires the assessment and abatement of hazards on crown as well as private land. Most crown land hazards occur on areas where harvesting activities have occurred and are the responsibility of the forest licensee. Private land clearing or development can create hazards directly adjacent or within the interface as this is where private land is concentrated. It is also the responsibility of the landowner to assess and abate any hazard within one kilometer of a forest and is the responsibility of the MOFR to ensure compliance with this act. There are some examples within the interface where this is not being done or enforced.



Example of private land clearing with no hazard abatement. This parcel of land is surrounded by low density development with some houses located directly uphill of this site

photo: T. Jobb

ACTIONS related to the OBSCR for the Ministry of Environment and MOFR (District Manager):

- *Maintain burning as a tool for cost effective fuel hazard reduction.*
- *Continue to require and enforce fuel hazard assessments and fuel hazard abatement on all forest harvesting operations located on Crown land. Request periodic updates from MOFR-District Manager on abatement status of hazards*
- *Continue to monitor and enforce abatement of fuel hazards on private land harvesting and clearing operations within 1 kilometer of a forest*
- *Provide RDKS with information regarding Wildfire Act roles and responsibilities and reference to hazard abatement requirements. Establish protocol with MOFR- District*

Manager Compliance & Enforcement and RDKS to ensure hazards created by landowners are abated.

- *Ensure Open Burning Smoke Control Regulation compliance, and improve enforcement of burning reference numbers.*

6.3 Local Fire Suppression Agency Organisation and Interaction

6.3.1 Fire Protection Areas

The fire protection areas defined in this plan are served by various Fire departments and the Ministry of Forests and Range Wildfire Mangement Division.

Some FMUs or portions are outside fire protection areas and solely rely on the MOFR for wildland fire protection.

In the case of wildfire, the MOFR will endeavor to protect dwellings and structures where operationally feasible, but provide no structural protection.

Currently Rosswood, Old Remo, West Lakelse Lake and Findley Lake Road are not within a fire protection area serviced by any organized fire department.

Fire Protection services within specific FMUs are provided by

- City of Terrace Fire Department
- Thornhill Volunteer Fire Department
- Gitau satellite station of Thornhill VFD
- Lakelse Lake satellite station of Thornhill VFD
- Kitsumkalum Volunteer Fire Department- currently undergoing re-organization
- Ministry of Forests and Range - Northwest Fire Center
- Ministry of Forests and Range - Terrace Attack Base

6.3.2 Mutual Aid/Protection Agreements

There are mutual aid/protection agreements between Thornhill and Terrace fire departments as well as with the Ministry of Forests and Range Northwest Fire Zone. These agreements are intended to provide additional support to the respective responsible department and to identify first responders in the case of an advantage in geographic location that one department may have over another.

In the case of all wildland fires in or adjacent to the wildland urban interface, the Ministry of Forests and Range's Northwest Fire Center responds with the available resources at their disposal.

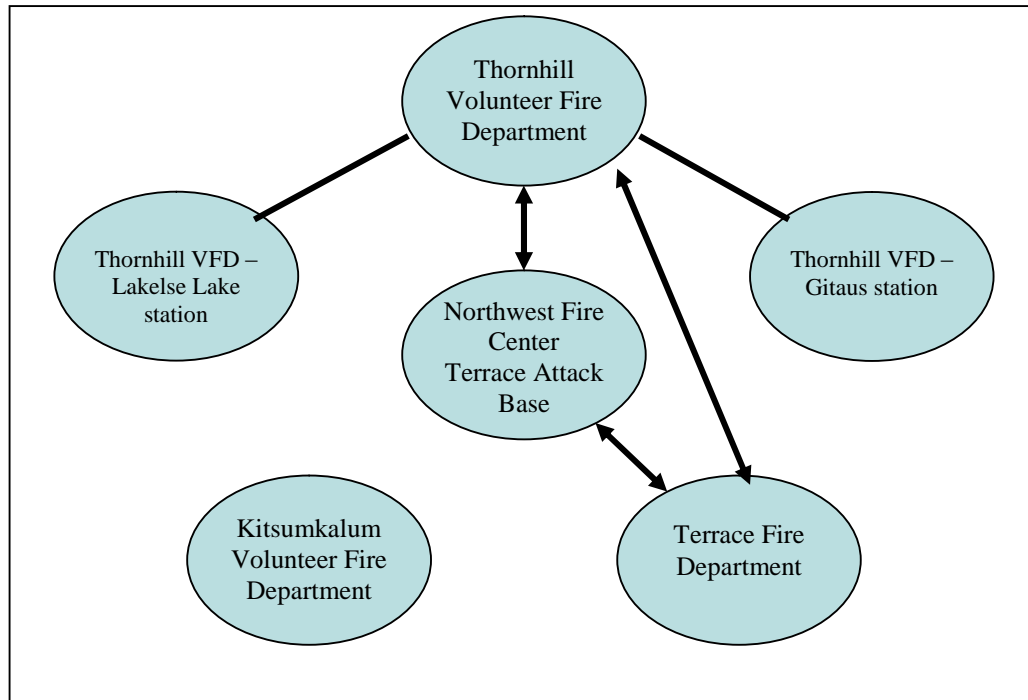
Kitsumkalum Fire Department is undergoing a re-organization of its resources. Currently there is no formal agreement for fire protection services with the Terrace or Thornhill volunteer fire department.

Figure 5 provides a visual representation of the the mutual aid/ protection agreements within the CWPP area.

ACTIONS related to Mutual Aid Agreements

- *Initiate service agreements between Kitsumkalum and the Terrace and Thornhill Fire departments to provide protection services while the Kitsumkalum Fire Department is undergoing re-organization.*
- *Develop a New Remo water reservoir to increase the protection services to "fully protected"*
- *Expand fire hydrant services to North Terrace area*

Figure 5: Mutual Aid/Protection Agreements for Terrace and Area Fire Suppression Agencies



6.3.3 Joint Response Agreements

The City of Terrace and Regional District of Kitimat Stikine have a joint response agreement that covers off initial response. Although this five year agreement has expired, both parties continue to operate under the original agreement while working towards a replacement.

This joint response agreement is intended to combine resources and provide mutual assistance. The agreement covers dispatching services; provides for fire response in the North Terrace, Brauns Island, and New Remo areas by the Terrace Fire Department, and response to commercial fire calls in the City of Terrace by the Thornhill Volunteer Fire Department.

6.3.4 Cross Training/ Liaison

All fire suppression agencies, whether for structural or wildland fires, will be called upon to work very close together during fires that occur in the interface zone. These fires, when they occur, can be very demanding as they involve both structural fires and forest fuels. Under extreme fire weather conditions, these fires are the most dangerous and explosive that fire suppression agencies will experience.

The fundamental suppression techniques between structural and wildland fires require focused ongoing cross training between the agencies. As in all fire suppression, training is paramount for the safe and effective co-ordination of resources. The Fire Smart Manual identifies a training matrix for fire suppression agencies that should be used to develop expertise and coordinated efforts on interface fires.

Particularly since the Coppersive Estates fires, there has been an expanded effort for fire control agencies to cross train and communicate during conditions of increased

wildland fire behavior and intensities. Communications are initiated by the Terrace Fire Attack Base based on predicted fire starts and predicted fire intensities. The threshold levels are defined in the Terrace Attack Base Preparation Response Manual. These threshold levels, although they require liaison between MOFR personnel and Volunteer Fire Departments, should have a more formal communications plan prepared. This may include ‘table top’ scenarios on preparedness levels describing expanded attack and contingency plans as well as district command group meetings that include other stakeholders and resource suppliers as conditions “heat “up.

In addition, the continued training of fire suppression agencies’ key personnel in Wildland Urban Interface training as detailed in the Fire Smart Manual chapter 5 training matrix would be a worthwhile commitment from all governments. This would allow the agencies to support their suppression forces with the necessary tools to work in an effective and unified command environment.

ACTIONS related to Cross Training/ Liaison

- *Enhance cross training of wildland and structural suppression forces in courses such as series 100 and series 215 (Fire operations in the Wildland/Urban Interface) and more advanced training as outlined in the Fire Smart Manual.*
- *Establish a more formal communication plan between the volunteer fire departments and the MOFR that will itemize actions and objectives as predicted fire starts and intensities increase. This may include table top scenarios on preparedness levels, describing plans for expanded attack and contingency plans.*
- *Review and redraft current preparedness and response plans in consultation with local fire departments.*
- *Implement district command group meetings based on fire weather thresholds and include in the development of the communication plan*

6.3.5 Ministry of Forests and Range Wildfire Management Branch

The MOFR has a permanent attack base located at the Terrace Airport. This base is the deployment center for a twenty person unit crew, two initial attack crews and operational personnel. The base also has the capability to be a reload station for air tankers. The resources stationed at the Terrace Attack Base are a provincial resource and are deployed around the province where fire conditions or fire weather demand. In some cases the resources are sent out of province to assist other jurisdictions

The Terrace Attack Base conducts annual reviews and pre-organization of additional resources in the event of a need to back-fill provincial resources that have been deployed out of the area or for expanded attack on active fires. Part of this pre-organization is the protection agreements between the MOFR and the local fire departments. One item identified that would be a benefit to focus on would be the pre-organization of water sources where tankers can reload for interface fires. Pre-planning these locations and securing advance agreements with landowners to use their land for access to water supplies in the event of a wildfire occurrence would improve suppression activities.

Areas that presently have no identified locations for water supply are the community of Rosswood, the west side of Lakelse Lake, Old Remo, and Findley Lake subdivision. For areas not serviced by fire hydrants but have regional district reservoirs, locations should also be identified for extended or expanded fire action.

ACTIONS related to MoFR Wildfire Management Branch

- *Pre-organize water sources and tanker re-load locations in areas that do not have municipal or regional district fire hydrant infrastructure.*

7 Fuel Management Options

Terrace and the surrounding areas have seen considerable change to the forest cover and forest fuels over the last 80 years. Approximately 30 percent of the area has been modified through development or harvesting activities. There was a significant amount of fuel modification treatments completed by the Employment Bridging Assistance Program (EBAP) of the early 1980s. The treatments ranged from ladder fuel reduction on airport lands, District Lot 373 in Thornhill and around the landfill site at Rosswood. There was a standard prescription on all silviculture stand tending treatments to remove and burn all roadside slash within five meters of a right-of way. This practice has been replaced by maintaining an untreated slash free buffer on all main roads.



Ladder fuel removal conducted in pine leading forests of District Lot 373 in Thornhill during the early 1980's

photo: T. Jobb

Pruning of the lower branches was first introduced into the area under EBAP as a means of increasing wood quality. This treatment can also effectively increase a stand's average crown height thereby reducing wildfire threat ratings

The treatments conducted were primarily for job creation purposes, but also has provided land managers an insight into the long term effects of the treatments,

The mosaic of fuel types and the natural geographic barriers of the planning area provide a good basis to build on for fuel management treatment options that will promote protection measures for the community. Many of these options occur or will occur during regular development activities, such as agricultural land clearing, proposed timber harvesting in and around the urban wild land interface, industrial development, and home site development.

To provide an example of fuel management activities that will promote infrastructure protection, works can be planned at the airport industrial park to build a road from highway 16 to the Beam Station that will act as a fuel break, and to clear approximately 55 hectares of pine forest that is at risk to MPB infestation.

ACTIONS for modifying fuels in the Pine leading stands

- *Promote pine overstory removal in fire-smarting properties and structures. Encourage resistant understory species such as hemlock, cedar and deciduous species.*
- *Remove ladder fuels and dead and down material in areas within 30 meters of any structures in and around the interface.*

7.1 Proposed timber harvesting within the Wildland-Urban interface

Proposed timber harvesting within the wildland-urban interface in this CWPP is projected at 1778 hectares over the next five years. This amounts to approximately a 2% conversion of fuel types from mature stage to plantations. This conversion aids in maintaining the general fuel mosaic of the area, breaking up large contiguous fuel types. As well, this development will provide road access and additional fuel breaks within the fuel types.

The forests on the airport plateau lands should be prioritized for stand conversion provided log markets exist that support an economic case. On these lands, the City of Terrace's industrial park project and timber sales planned by BC Timber Sales (BCTS) will result in access to and break-up of contiguous fuel types.

ACTIONS related to harvesting/development within the Wildland-Urban interface

- *Concentrate harvesting plans in the pine leading forests around the airport flats and the Rosswood area in advance of expected large mortality of these stands caused by the mountain Pine Beetle.*
- *Initiate clearing of forest types at risk to mountain pine beetle infestation through planned development projects.*
- *Develop fuel management plans that build on existing fuel modification treatments such as timber harvesting, land clearing and planned development that promote fuel "mosaics"*

7.2 Silviculture Stand Tending Activities

Silviculture or stand tending activities on previously harvested areas create short term spikes in fuel hazards. These fuel types are generally confined to second growth stands which are located adjacent to most developments within all FMUs, and represent a fuel that, in comparison to the other fuel types in the area, will produce higher intensity fires under lower weather thresholds. The land manager can alter this fuel type through stand tending or spacing projects, which can create higher levels of dead and dry elevated forest fuels. This fuel type represents 20 percent of the land base and there are currently no criteria for assessing and planning around hazard reduction or fuel management for these treatment areas. Currently the standard prescription for fuel management on stand tending projects is to retain a five meter untreated buffer along all major road right-of ways and minimizing the depth of slash. Review of fuel management objectives for mitigating hazards should also be included in Stand Management Plans for areas on which silviculture activities will be occurring. In addition to this approach, an overview of planned silviculture treatment areas within the interface zone should be prepared and kept up to date. This overview would indicate scheduling and hazard mitigation techniques and should be developed by the Ministry of Forests and Range.

Another stand tending treatment that occurs is pruning of the lower branches of second growth forests. Pruning effectively raises the crown height of the stand and can have a positive effect on reducing the wildfire threat rating, as long as the pruned branches are dealt with proactively so that they do not create increased forest fuels.

ACTIONS related to Silviculture Stand Tending activities within the Wildland-Urban interface

- *MOFR to develop a tactical, or **higher-level** silviculture treatment plan that addresses scheduling and hazard mitigation techniques that are to be included in Stand Management Plans for areas within the interface zones.*

7.3 Proposed Airport Industrial lands

The proposed Airport Industrial Lands are located south of the Terrace Kitimat Airport within a large contiguous pine leading fuel type. This fuel type is classed as a moderate wildland urban interface hazard. The effects of the mountain pine beetle infestation could result in an elevated hazard due to dead and dying trees becoming a major component of this type

The City of Terrace plans on advancing their development of this project. Phase one of this project will entail the construction of a highway access junction and the clearing and grubbing of a road right-of-way that will bisect this large contiguous fuel type. There are also plans to do the initial clearing of the first 55 hectares adjacent to Highway 37.

This development will provided a reduction in the amount of forested area within this type and an additional fire break and control point across the large plateau. The design of the development will also require a 30 meter forested area between the roads and the initial clearing. This area would provide a good opportunity to showcase the removal of the overstory pine in favor of the hemlock understory. Intertree spacing could also be done to further fire-smart the buffer strip.

By advancing the development of the airport industrial lands, the City of Terrace will provide a fuel break on a large contiguous fuel type and reduce the amount land susceptible to attack from the Mountain Pine Beetle.

ACTIONS related to the Airport Industrial Lands

- *City of Terrace to advance the development of the airport industrial land to provide a fuel break on this large contiguous fuel type and to reduce the amount land susceptible to attack from Mountain Pine Beetle. The project also presents the opportunity to Fire Smart the 30 meter planned buffers on the developed area.*
- *Create a road right of way that bisects the large contiguous pine forest on the Airport flats.*

7.4 Utilities/Infrastructure

In the case of wildland interface fires the risk of infrastructure to damage or loss will become a priority of suppression agencies. Without hydro power, the operation of pumps to deliver water to fire hydrants and the loss of telephone communications are real risks that can directly impact fire suppression efforts. By applying Fire Smart techniques to infrastructure installations the risk of damage can be reduced and the infrastructure will be safeguarded against capital losses. Infrastructure that should be reviewed for fire proofing includes utility companies such as PNG, BC Hydro, and Telus; water delivery systems; power transformer stations; and emergency services facilities.

ACTIONS related to Utilities and Local Government Infrastructure

- *Utility companies, provincial emergency services, and local governments undertake a review of all their facilities for a Fire Smart hazard assessment and conduct the necessary actions to safeguard against wildand fires. Review facilities such as hydro and natural gas stations, and domestic water supply sources with particular attention to power sources*

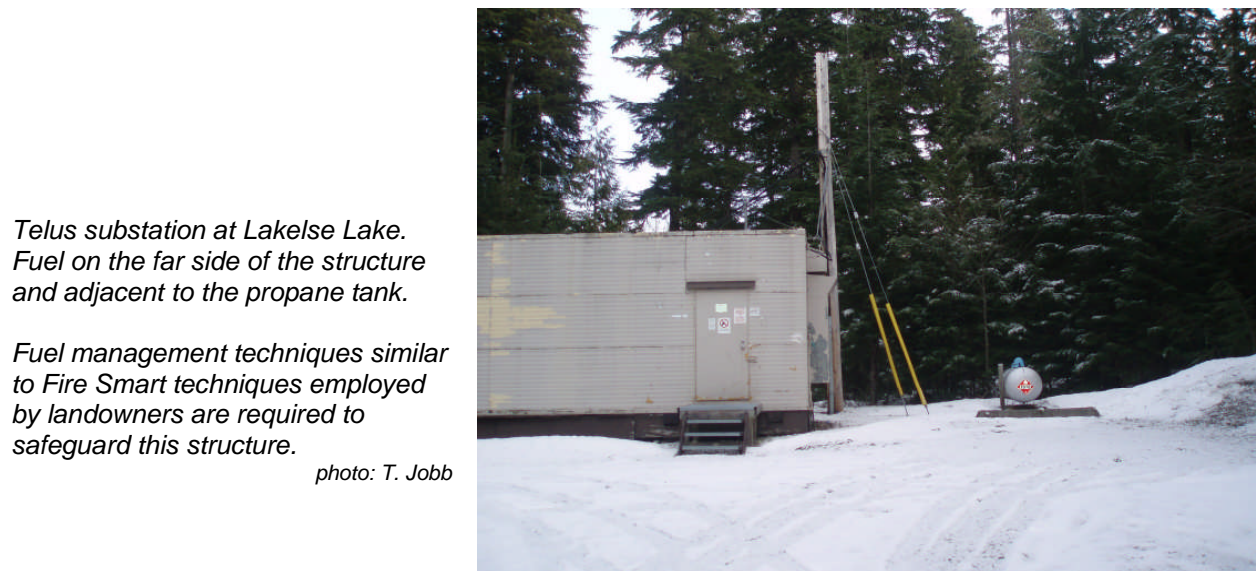
The following photos provide some examples of infrastructure sites to be addressed.



Hydro Line that provides power to City of Terrace water reservoir at the east end of Halliwell Avenue.

Fuel management treatment should be employed to safeguard the power source

photo: T. Jobb



Telus substation at Lakelse Lake. Fuel on the far side of the structure and adjacent to the propane tank.

Fuel management techniques similar to Fire Smart techniques employed by landowners are required to safeguard this structure.

photo: T. Jobb

Pacific Northern Gas pumping station directly adjacent to flammable C3 fuel types and residential areas near Copperside Estates. Warning signs are posted on fence enclosure of the danger from open flame to this facility.

photo: T. Jobb



Fire Hydrant Located across from residential areas directly adjacent to forest fuels.

Fire smart techniques would greatly improve the opportunity to access this hydrant for fire suppression action in the event of a wildland fire.

photo: T. Jobb



Forest fuels directly adjacent to BC Hydro sub station at 4- way intersection in Thornhill. Substation is constructed of large dry timbers.

Reducing fuel from within 10 meters of the structure and modifying fuels within another 30 meters would be a good step in fire-smarting this facility.

photo: T. Jobb

7.5 Pilot Project/ Fuel Management Projects

Demonstration of fuel management and Fire Smart techniques would help raise awareness of the risks that wildfires currently present to public and private property. By implementing a pilot project around a community structure to showcase Fire Smart principles, the project can be used to educate property owners on how they could improve the aesthetics of their property as well as reduce the potential damage that a wildfire may cause by establishing a defensible position. Treatment options in the pine leading forests, may include implementation of an overstory removal with the spacing of understory trees and the pruning of lower limbs. Educational signage about the Fire Smart techniques would also be beneficial.

Possible pilot projects would include

1. Removal of ground fuels and ladder fuels around the hospital property
2. Removal of ground fuels and thinning out canopy around Thornhill Volunteer Fire Department
3. Treatment of ground fuels and pruning of ladder fuels around city of Terrace green space adjacent to the MUKS-KUM-OL housing development on Pear Street .
4. Treatment of fuels around community bus shelters where required
5. Treatment of fuels around regional and municipal fire hydrants where required
6. Removal of dead/ down material along Terrace Mountain Trail and removal of ladder fuels
7. Treatment of ground fuels and pruning of ladder fuels around Regional District green space areas in Thornhill that are adjacent to residential areas

ACTIONS related to a potential Pilot Project

- *Implement one or several pilot projects around community infrastructure that will showcase Fire Smart principles.*

8 Conclusions

The planning area for this CWPP represents some unique circumstances in terms of wildland urban interface wildfire threats. With the CWPP area located in the Skeena and Kalum Valleys, the wildfire threat ranking system rates most of our fuel types at a moderate or lower threat rating. These ratings are primarily due to our climate which affects the forest fuels and fire weather.

Within the CWPP area, ground fuel decays readily, deciduous species thrive along valley bottoms, and intense fire weather occurs sporadically and are usually of short duration.

This rating does not take into account the consequence of a devastating wildland fire. Risk is the combination of hazard *and* consequence, and we have communities where a wildland fire will have high consequence. Combining this high consequence with areas of moderate hazard indicates that the planning area is potentially at a high risk.

Unfortunately the conditions for high intensity fires **do occur** and that is when properties and potentially lives are at great risk. It would be irresponsible of local governments, the province and the landowners not to review the potential hazards and make changes that will positively reduce the effects of wildfires within the interface. There are many things that can be done to fire-proof our communities. They all begin with a pro-active prevention program, planning and preparing for a fire occurrence, and reducing hazards where they exist.

A few small steps by people and groups in positions of responsibility will allow a collective approach to safeguarding and minimizing the risk of devastating wildfires in our communities. These steps have been outlined throughout this report as "**ACTIONS**".

Taking steps to reduce the potential damages and losses caused by interface wildfires is a community responsibility. Understanding the risks and having an awareness of the significant danger and possible consequences is the first step to taking positive action.

Awareness training of people involved in local governments, fire suppression agencies, and land owners is the first phase in promoting Fire Smart communities. With awareness comes buy-in to the need for proactive actions that will set the example and bring the rest of the communities into the Fire Smart world.

There are many examples throughout the province of large intense fires that have occurred in the wildland-urban interface: the danger to lives and the damage caused have been significant.



Although it is different fuel type and different weather patterns, the awareness of devastating fires that recently occurred in Australia are a stark reminder of the need to act proactively in reducing the risk of fire. By using some of the tools that currently exist and the resources available, a positive effect on reducing the threat is possible. This will take buy-in by all of the stakeholders and will require the leadership and resources of local and provincial governments. This leadership needs to educate, encourage, and support the land owner if tangible results are to be achieved. As with any plan, the challenge will be in implementing the Actions included in this report.



Australian Bush Fires – Victoria Province - 2009



Australian Bush Fires – Victoria Province - 2009

Appendix 1- Detailed maps showing Fuel Types, Wildfire Threats and Fuel Management Units.

Shown in a separate attachment titled Community Wild Fire Protection Plan Wildfire threat Rating Map.

Appendix 2- Summaries of Wildfire Threat hazard Ratings

Shown in a separate attachment titled Wildfire Threat Rating and Data Summaries

Appendix 3- Historic Fire Starts and Specific Causes

Shown in speperate attachment titled Historic Fire Starts and Specific Causes

Appendix 4 – Sources of Information

Information Source	Publisher	Date of publication
<i>Historic Wildfire starts for the Kalum Forest District</i>	MoFR	2008
<i>Wildfire Act and Regulations current to February 2009</i>	MoFR	2005
<i>Open Bruning and Smoke Control Regulations- current to February 2009</i>	MoE	2006
<i>Guide to Open Burning Smoke Control Regulation-currewnt publciation</i>	MoE	Current Version
<i>OBSCR –Policy Intentions Paper for Consultation</i>	MoE	May 2008
<i>Union Of BC Municipalities –Fuel Management- Curent to February 2009</i>	UBCM	Current Version
<i>Forest Inventory Data- for Kalum Forest District TSA</i>	MoFR	Current Version
<i>Wes Paterson- Fire Chief-Thornhill Volunteer Fire Department</i>	Interview	Sept 29/ 08
<i>Pete Weeber- Fire Chief-Terrace Fire Department</i>	Interview	Nov 18/08
<i>David Block-City of Terrace Planner</i>	Interview	Nov/12/08
<i>Ted Pellegrino- Regional District of Kitimat Stikine-Planner</i>	Interview	Nov 24/08
<i>Brian Grunnewald- Regional Fuel Management Specialist- multiple meetings</i>	Interview	Oct 15/08
<i>Steve Westby- Terrace Fire Attack Base- Base Manager-MoFR</i>	Interview	Nov 13/08
<i>Kazmir Kopec-Terrace Fire Attack Base-Forest Protection Tech-MoFR</i>	Interview	Nov 13/08
<i>Tony Falcao- Northwest Fire Zone-Fuel Management Specialist</i>	Interview	Nov 24/08
<i>Mike Pritchard- Forest Protection Technician</i>	Interview	Nov 24/08
<i>Brad Martin-Senior Protection Officer-MoFR-Operations</i>	Interview	Dec 16/08
<i>Gail Cambell-BCTS-Planner- Skeena Buiisness Unit</i>	Interview	Nov 25/08
<i>Jeremy Lafontaine-Aaron Benterude-MoFR-Kalum Forest District-MPB</i>	Interview	Nov 13/08
<i>Wilfred Mckenzie- General Manager- Kltselas Forest Products</i>	Interview	Dec 18//09
<i>Gary Bell-MOE Senior Environmental Protection Officer</i>	Interview	Jan 21/09
<i>Steve Roberts- -Kitsumkalum First Nation Band Administrator</i>	Interview	Nov 10/08
<i>Brian Wilman-Service Manger - Telus</i>	Interview	Feb 25/09