Lantzville, Nanoose Bay, and Nanoose First Nation

COMMUNITY WILDFIRE PROTECTION PLAN

Prepared by:
Strathcona Forestry Consulting

GIS mapping:
Madrone Environmental Services Ltd.

November 2010

Lantzville
Nanoose Bay
Nanoose First Nation

Community Wildfire Protection Plan

Prepared for:
Regional District of Nanaimo

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This Community Wildfire Protection Plan was developed in partnership with:

Ministry of Forests and Range	Union of British Columbia Municipalities
Regional District of Nanaimo	Nanoose First Nation 
Lantzville Fire Rescue 	District of Lantzville 
Nanoose Bay Fire Department	District of Nanoose Bay
CF Maritime Experimental and Test Ranges – Nanoose Range Fire Detachment	

Administration	
Preparation:	
RPF Name *(Printed)* RPF No: _____	RPF Signature Date: _____

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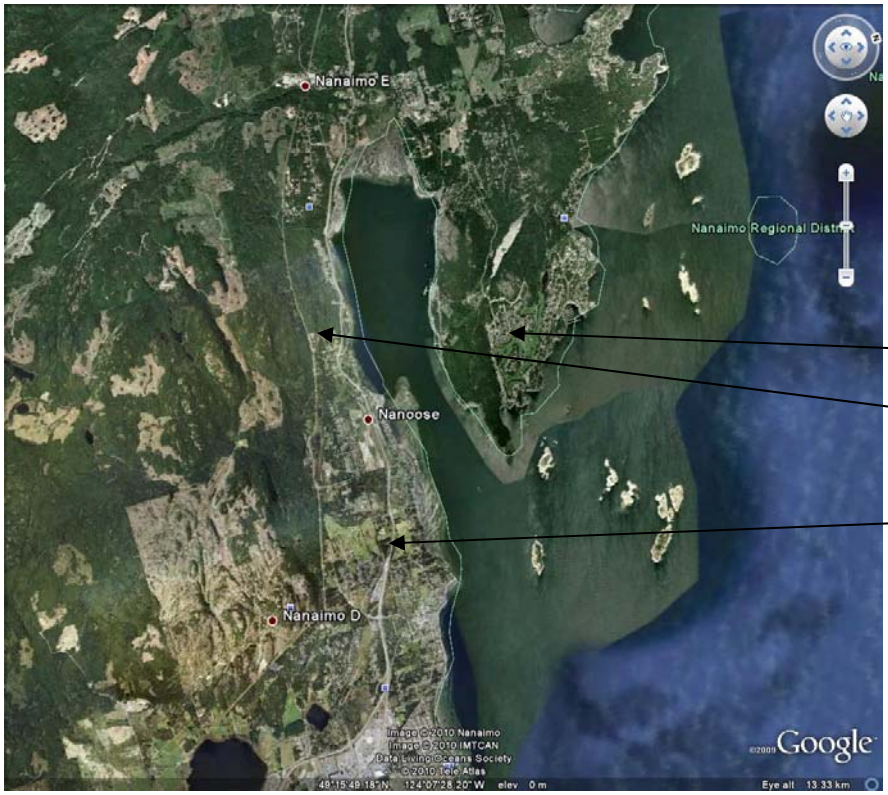
1.0 INTRODUCTION

1.1 Interface Communities

The neighbouring communities of Lantzville, Nanoose Bay, and Nanoose First Nation are located between the cities of Nanaimo and Parksville on southeast Vancouver Island. Bounded on the east by the coastline of the Strait of Georgia (part of the newly named Salish Sea), the districts of Lantzville and Nanoose Bay span a broad area of the Nanaimo Lowland, and extend as far west as the foothills of the Vancouver Island Mountain Ranges. Midway between Lantzville and Nanoose Bay, at Nanoose harbour, is the small Nanoose First Nation reserve. Lantzville, Nanoose Bay, and Nanoose First Nation are classified as "interface communities" with large areas at risk from interface fire that threatens properties and public safety.

Photos: Left: View south to Nanaimo from Fairwinds at Nanoose Bay; middle: Nanoose First Nation reserve sits between Nanoose Bay and Lantzville; right: Lantzville Fire Chief points to Lantzville (with Nanaimo city limits evident in upper right).



District of Nanoose Bay

Nanoose First Nation

District of Lantzville

Fig. 1 Overview map (above). Fig. 2. Google Earth image of Lantzville, Nanoose Bay, and Nanoose First Nation.

The Wildland-Urban Interface (WUI zone, or "interface") describes any area where combustible wildland fuels (i.e., trees, shrubs, grasslands) are located next to homes or other buildings. Fuels may occur at the interface, where development and wildland fuels (vegetation) meet at a well-defined boundary, or in the intermix, where development and wildland fuels intermingle with no clearly defined boundary (*FireSmart*, Partners in Protection, 2003). Fires that have the potential to involve both structures (and/or other manmade developments) and wildland fuels are known as interface fires. Interface communities are found across Canada.

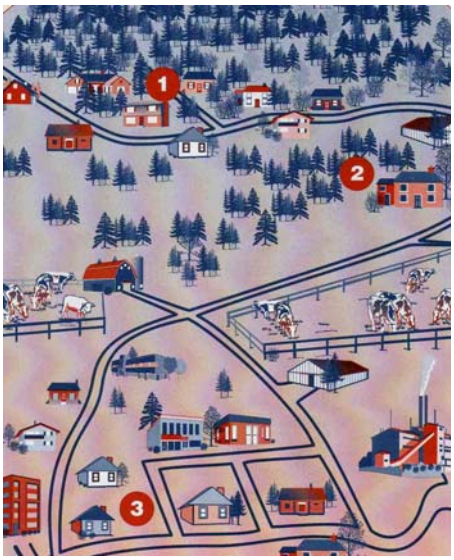


Figure 2. The interface area (1) is the first wave of buildings adjacent to dense wildland vegetation.

Intermix areas (2) are individual homes or pockets of buildings surrounded by wildland fuels (forest, brush, or grasslands). Intermix areas include "peri-urban" areas incorporating rural subdivisions and development.

In urban areas some distance from the interface (3), structures can be at risk from wildfire when strong winds carry burning embers. (FireSmart, 2003)

Wildfires have played a part of the natural ecological cycle of forests across North America for thousands of years. Wildfires recycle forest nutrients and reduce natural fuel loading (vegetative material available for combustion).

Photo. Wildfire. (USFS)

Human activities in and near wildland areas have resulted in aggressive fire suppression activities over the last fifty decades to protect life and property. As a result, the natural pattern of frequent low-intensity fires has been disrupted. Successful fire suppression has increased natural fuel loads, producing "semi-natural", or largely artificial forest structure.

The United Nations Intergovernmental Panel on Climate Change predicts global climate change will extend the duration of fire seasons and increase wildfire frequencies in fire-prone regions with mild climates (i.e., southeast Vancouver Island). On average, over 90% of the wildfires on southern Vancouver Island are caused by human carelessness (Ministry of Forests and Range, Coastal Fire Centre stats, 2010). One out of every eight fires in the Coastal Fire Zone in 2009 was classified as an interface fire. Fire fighting agencies confronting wildfire in the interface zone must contend with potential loss of life, property, infrastructure, and resources. Fire suppression in the interface zone is one of the most dangerous operations for fire fighters.

Photo. Water bomber suppresses human-caused wildfire near Cowichan Lake, on Vancouver Island.

Photo. Wildland fire fighter uses drip torch to create a back fire against a wild fire.

1.2 Community Wildfire Protection Plan Program

For several decades, British Columbia's Ministry of Forests and Range (MoFR) Wildfire Management Branch has advocated community-based interface planning. In the 1990's, after major interface fires at Penticton and Salmon Arm, the provincial Auditor General urged communities across the province to take action.

Public awareness of the danger of interface fires peaked in the hot dry summer of 2003, when unprecedented wildfires ravaged British Columbia's interior communities. "Firestorm 2003" destroyed 260,000 ha of forest, 334 homes and businesses, forced the evacuation of more than 45,000 people from their communities, caused $70 million in damages, and resulted in the loss of lives of three fire fighting airmen.

Photos. Firestorm 2003, Kelowna.

In the aftermath of Firestorm 2003, the province of BC commissioned The Honourable Gary Filmon to review the damage caused by the forest fires.

The Firestorm report recommended the province of BC take a leading role in the development of strategic interface management plans in cooperation with local governments. In 2005, the provincial government launched the Community Wildfire Protection Plan (CWPP) program. The Community Wildfire Protection Plan program is directed at medium- to high-risk interface communities. The program is administered by the Union of BC Municipalities (UBCM) and funded by the Ministry of Forests and Range (MoFR).

The purpose of the Community Wildfire Protection Plan is to identify areas at high risk and assign planning priorities in an effective and efficient manner.

The objective of the Community Wildfire Protection Plan is to establish a cooperative framework to improve community safety, reduce the risk of property damage, and protect natural resources.

Information contained in the CWPP is designed to guide development of fire awareness education, local planning tools, and management of forest lands adjacent to communities at risk. The wide-ranging scope of the CWPP:

- identifies high priority areas for fuel management activities
- familiarizes local government and elected officials and staff with wildfire protection and fire management issues
- influences community plans to acknowledge fire threat areas when considering development
- prompts building bylaws that acknowledge FireSmart
- allows communities to ensure limited dollars are allocated to highest priority areas when considering fuel management activities
- facilitates discussions with key stakeholders to encourage a cooperate approach to fuel management
- encourages public education around wildfire protection and the potential need for fuel management activities.

Community-based wildfire planning recognises the vital role of local and provincial fire fighting agencies in fire prevention and protection.

Photo. Ministry of Forests and Range fire fighting crew investigate a human-caused blaze at Thetis Lake Regional Park, on southern Vancouver Island. (photo: Times Colonist, 2008).

1.3 Lantzville, Nanoose Bay, Nanoose First Nation CWPP

In 2009, the Regional District of Nanaimo (RDN) initiated a coordinated effort to develop a joint Community Wildfire Protection Plan for the communities of Lantzville, Nanoose Bay, and Nanoose First Nation.

The scope of the project involved three phases:

- Phase 1 – Identification and mapping of wildfire risk areas (in consultation with representative fire departments and local stakeholders)
- Phase 2 – Description of community protection measures and responsibilities
- Phase 3 – Development of a community action plan with measures to mitigate the identified risk through implementation activities related to land use, landscaping, building construction, bylaws/procedures, subdivision development, and education

Photo. Human-caused wildfire at Nanaimo, a short distance south of Lantzville.

2.0 THE SETTING

2.1 Community Profiles

The Regional District of Nanaimo (RDN) on the eastern coast of Vancouver Island occupies a land area of 2,034.94 km^2 that includes the cities of Nanaimo and Parksville, the Town of Qualicum Beach, the District of Lantzville, and eight Electoral Areas containing a number of smaller, unincorporated communities (Fig. 3).

Community Wildfire Protection Plans have been completed for several communities in the RDN. This Community Wildfire Protection Plan prepared through the combined efforts of the District of Lantzville (incorporated), the unincorporated District of Nanoose Bay (in Electoral Area E), and the Nanoose First Nation (federal reserve land) covers three contiguous communities with a joint land base of approximately 70 km^2 extending between Nanaimo and Parksville.

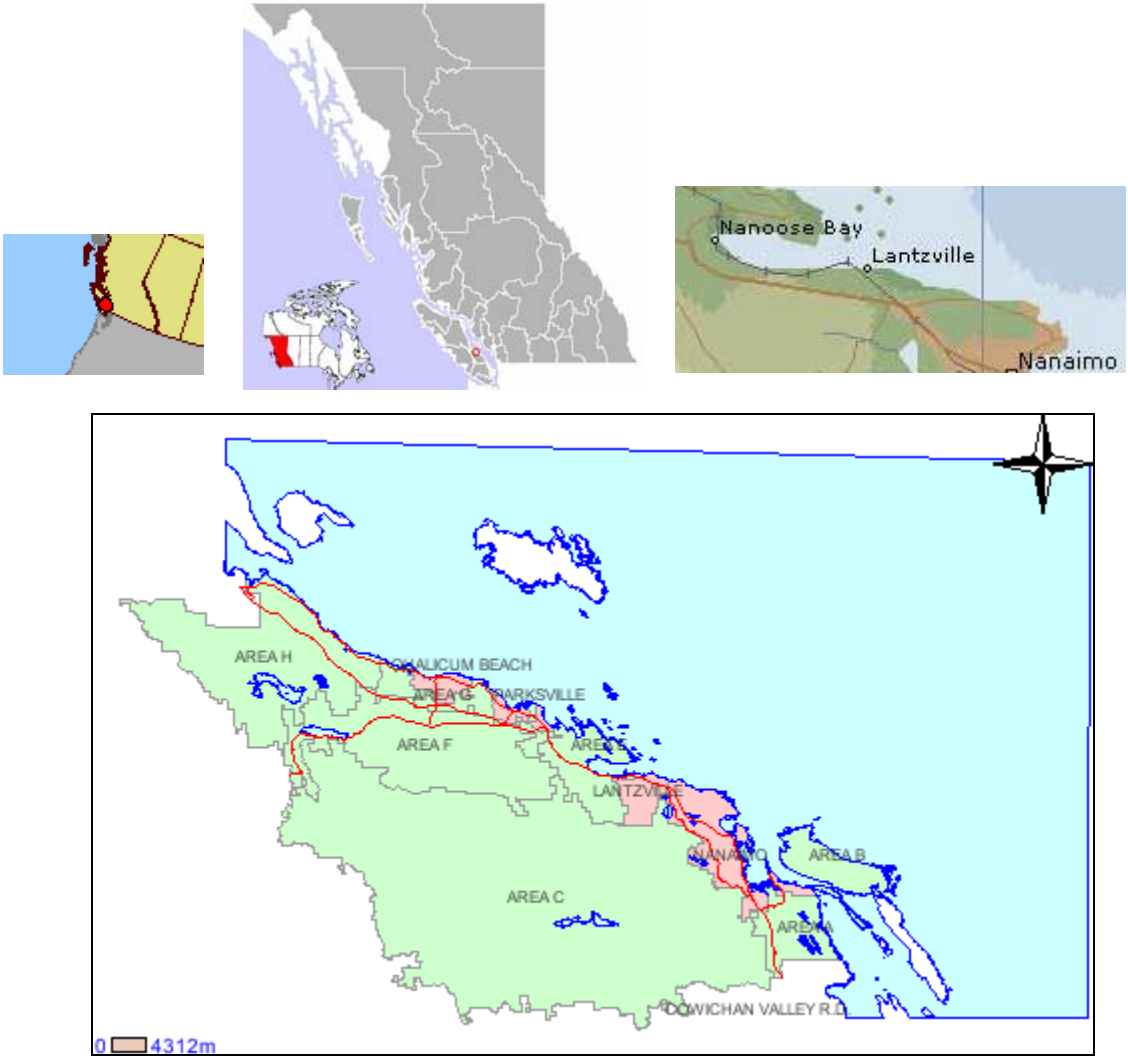


Figure 3. The incorporated District of Lantzville, the unincorporated District of Nanoose Bay (Area E), and the Nanoose First Nation are located within the Regional District of Nanaimo

2.2 Lantzville

Photo. Lantzville seascape.

The District of Lantzville, a coastal community on the east side of Vancouver Island, covers an area of 27.87km2 between the northern boundary of the City of Nanaimo and the southern portion of Nanoose Bay. The District of Lantzville had a population of 3,661 in 2006 (Stats Can Census). As noted on the community's website, Lantzville is British Columbia's first incorporation of the new millennium, and the 155th municipality in BC (www.lantzville.ca). The District of Lantzville incorporated on June 25, 2003. Lantzville was originally settled as a mining town in the 1800's, and is named after its American founder, Fraser Harry Lantz, who invested in a coal mine in nearby Nanoose.

The District of Lantzville straddles the Island Coastal Highway (19). The E&N Railway between Victoria and Courtenay parallels a portion of the highway. The main access to the business area of Lantzville is Lantzville Road, which exits Highway 19 and loops through the community north of the Highway. A small village core on Lantzville Road containing the district's administration building, an elementary school, and light commercial buildings is surrounded by residential development. Scattered farms and small agricultural holdings are found throughout the district.

A light industrial area is located on the highway. In total, the District has about sixty businesses (District of Lantzville website).

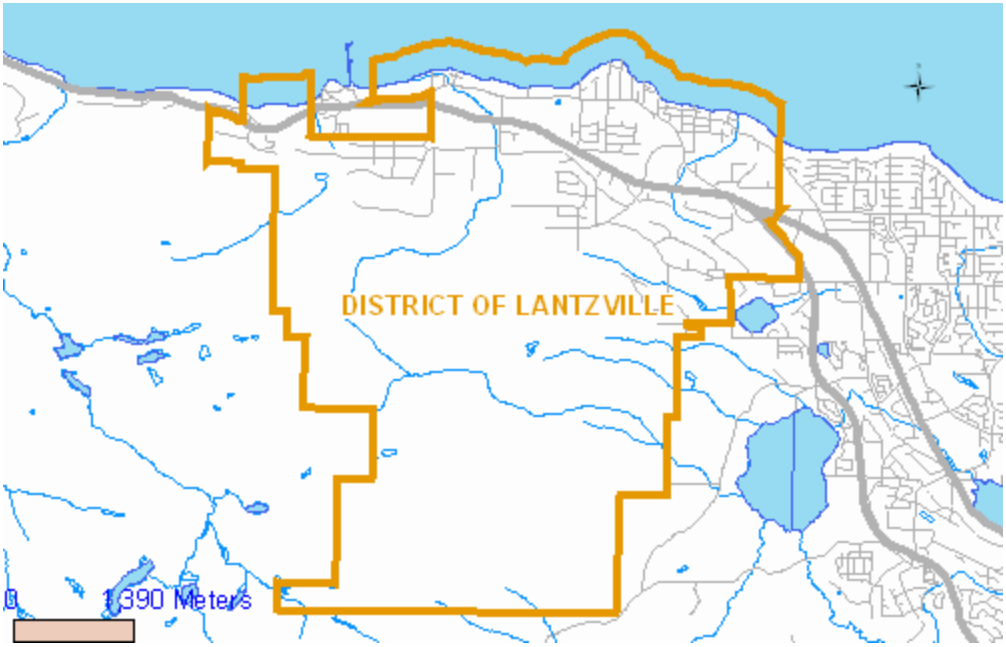


Figure 4. District of Lantzville. (www.lantzville.ca)

Most of the southern, upland portion of Lantzville is largely undeveloped, but has been significantly impacted over the last century by human activities, including logging, agriculture, mining, road and rail transportation, settlement, and recreational use (golf course). BC Hydro power transmission lines run east-west through the middle of the district. Private forest lands and several Crown Woodlots straddle the southern, upland portions of the district (Fig. 5).

A large holding of partially logged private land in the southern portion of the district has been under review for several years for a subdivision development. The Foothills project proposed a serviced development with 1,100 homes on the upland hills overlooking Lantzville. As of October 2010, development is stalled.

Figure 5. South Island Woodlots (MoFR, SIForest District).
Several current and proposed Woodlots surround Lantzville and Nanoose Bay.








Photos. Views of Lantzville. Clockwise from top left: Lantzville Road and business centre; Seaview Elementary School; residential neighbourhood with "sea views"; established residential area along Lantzville Road; BC Hydro RoW; upland Woodlot; waterfront properties; Highway industrial site.

2.3 Nanoose Bay

The District of Nanoose Bay follows the coastline from Nanoose Harbour to Craig Bay between Lantzville and the City of Parksville (Fig. 2). The district spreads southwest to lands along the lower Englishman River, southeast to include the lands along Nanoose Creek and Bonnell Creek, and inland as far west as the lower slopes of the Vancouver Island Mountain Ranges, encompassing a significant area of private industrial forest lands. The district covers an area of 36.33 km2, and had a population of 5,246 in 2006 (Stats Can census). Nanoose Bay is named after a First Nations band, and refers to the shape of Nanoose Bay.

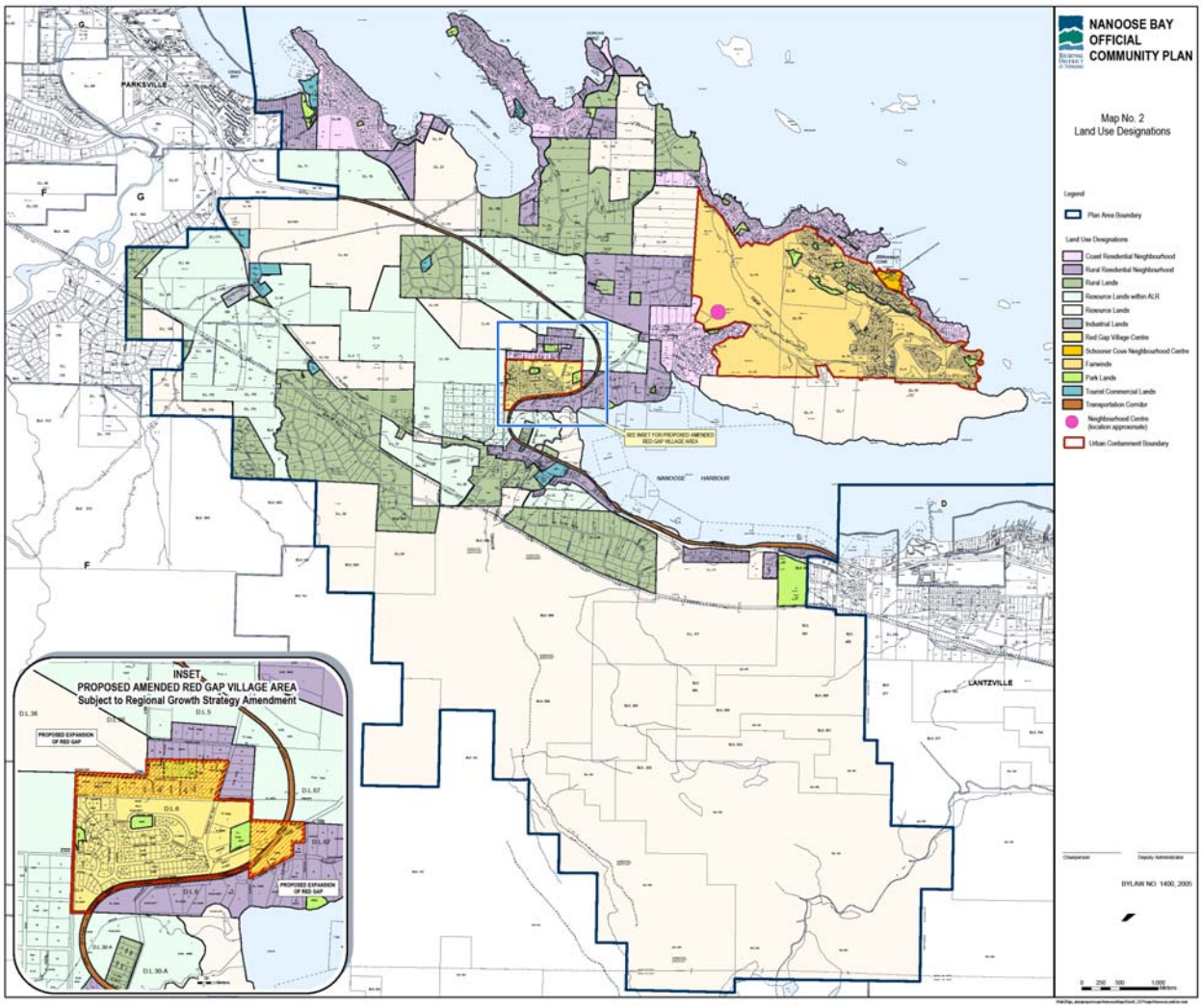


Fig. 6. Land Use at the District of Nanoose Bay (RDN: Nanoose Bay OCP).

Rural residential neighbourhoods are dispersed throughout the northern portion of the district. Residential development includes older, established neighbourhoods, mobile home parks, residential estate properties at Dorcas Point and Cottam Point, and upscale resort development at Fairwinds and Schooner Cover. Residential and

commercial development at the Fairwinds lands and Schooner Cove areas of the Nanoose peninsula are designated within Urban Containment Boundaries (UCBs) (www.rdn.bc.ca). The majority of community facilities, including a community hall, a library, and a firehall, are currently concentrated in the Red Gap area, within the UCB. A small shopping plaza is also located at the Red Gap.

Rural residential development south of Highway 19 straddles upland topography along the BC Hydro transmission lines between the Englishman River and Nanoose Bay.

The Canadian Forces Maritime Experimental and Test Ranges (CFMETR) base occupies the southern portion of Nanoose peninsula, overlooking Nanoose Harbour. Access to the base is secured with a fence along the northern and western boundaries. A gated security checkpoint at the main access road is staffed 24/7. The base contains a small, waterfront 30-site campground used by military personnel and their families.

Photo. Canadian Forces Marine Experimental and Test Ranges base, Nanoose Bay.

The district contains two popular seaside church camps (Moorecroft United Church camp at Dorcas Point, and a Pentecostal camp at Nanoose Harbour). Agricultural holdings, including several horse ranches, are scattered throughout the district. Community parks are located throughout the area, from the coast to the upland hills.

The main road access routes within Nanoose Bay consist of the Island Highway (19), and Northwest Bay Road, which loops through the Nanoose peninsula. Remaining roads in the district are relatively narrow, except at Fairwinds, where roads and pedestrian facilities follow urban design.

Photos. Views of Nanoose Bay. Clockwise from top left: Fairwinds Estates; mobile home park; Pacific Shores; horse ranch, Northwest Bay Road area; upland hills west of Highway 19; view of western portion of district from Red Gap area; agricultural holding; coastline residential development.

2.4 Nanoose First Nation

The Nanoose First Nation (Snaw-naw-AS First Nation), a member band of the Te'mexw Treaty Association, is located at Nanoose Bay. Approximately 226 band members live at the 53.4 ha reserve, which overlooks Nanoose Harbour. Highway 19 runs through the reserve, separating the northern portion of the reserve, on the waterfront, from the southern, upland portion. The band administrative office, preschool, and several homes are clustered at the lower portion of the reserve, at Nanoose Harbour. The lower portion of the reserve is accessed from Lantzville Road, and from Highway 19 (via Mallard Way). The upper portion of the reserve is also accessible from the highway, and from Lantzville's Northwind Drive.

The band operates a commercial campground on the waterfront at the lower portion of the reserve. The upland portion of the reserve contains a mix of older and newly constructed homes, and a native health facility.

Fig. 7. Nanoose First Nation, a member of the Te'mexw Treaty Association, is located at Nanoose Harbour.







Photos. Views of Nanoose First Nation: clockwise from top left: Band Administration office; band official at waterfront; campground; rehabilitated coastline; new residences at upper portion of reserve; lower portion of reserve; coastal zone rehabilitation; campground

3.0 BIOPHYSICAL DESCRIPTION

3.1 Climate

The Districts of Lantzville and Nanoose Bay, and the Nanoose First Nation are classified in the moist maritime Coastal Douglas-fir biogeoclimatic subzone (CDFmm). Located in the rainshadow of the Vancouver Island mountains, the CDFmm biogeoclimatic subzone is generally restricted to low elevations along southeast Vancouver Island, and the southern Gulf Islands. The CDFmm has warm, dry summers, and mild, wet winters. Growing seasons are very long, and feature pronounced water deficits on zonal (average) and drier sites. Long periods of droughts are not uncommon during the fire season (April to October). The CDFmm represents the mildest climate in Canada.

Photo. Extreme fire hazard: fire hazard sign at Nanoose Bay.

Prevailing weather systems in summer can vary from moderately moist to windy and excessively dry patterns. Prevailing summer winds are northwesterly. Net radiation values are generally high.

Over the last decade, fire weather data from the Ministry of Forests and Range indicate an average of over 15% of total days in Fire Class Hazard 3 (moderate danger class).

3.2 Physiographic Features

Landforms influence fire behaviour by affecting ignition potential and the rate of fire spread.

The land base covered in this CWPP is located in the Eastern Vancouver Island Ecoregion of the Georgia Depression Ecoprovince (Fig.8). The Eastern Vancouver Island Ecoregion, an area of reduced rainfall leeward of the Vancouver Island Ranges, is divided into two Ecosections corresponding to physiographic differences. The Nanaimo Lowland Ecosection is a coastal plain along the southeastern margin of Vancouver Island. It has a mild climate with low snow depths. The Nanaimo Lowland Ecosection developed in prehistoric times when ancient rivers and seas deposited marine, fluvial, and fluvioglacial deposits on the landscape. The Leeward Island Mountains Ecosection is a mountainous area which extends from the crest of the Vancouver Island Ranges to the Nanaimo Lowlands.

Fig. 8. The land base covered in this CWPP is located in the Eastern Vancouver Island Ecoregion of the Georgia Depression Ecoprovince (dark green shading).

First Nations peoples and European explorers utilised and inhabited the Nanaimo Lowland Ecosection due to its gentle topography and proximity to the coast. Most of the development on southeast Vancouver Island, including Lantzville and Nanoose, is concentrated on the Nanaimo Lowland Ecosection. (The Nanoose First Nation is wholly contained within the Nanaimo Lowland Ecosection.)

Photo. View of Lantzville, looking east to the coast from the Foothills area. Most of the existing development on southeastern Vancouver Island is found on the gently sloping Nanaimo Lowland Ecosection fringing the coast.

Upland areas in the southern portions of the Districts of Lantzville and Nanoose Bay are located in the Leeward Island Mountains Ecosection. This hilly, inland ecosection contains the proposed Foothills subdivision at Lantzville, and a significant area of private forest industrial lands at Nanoose Bay.

Photo. View from Red Gap Village at Nanoose Bay, looking towards rural residential lands and private forestry tenure at upland terrain west of Highway 19.

Elevational limits of the Nanaimo Lowland Ecosection range from sea level to approximately 200 m. Slopes are generally gently to moderately sloping, with notable exceptions (i.e., steep upper slopes of Notch Hill at Nanoose Bay). Soils at the Nanaimo Lowlands Ecosection developed from various parent materials: colluvium, fluvial and/or glaciofluvial deposits, marine deposits, and morainal deposits. Marine parent materials occur along much of the Lantzville coastline, and extend from Nanoose Harbour east to Northwest Bay and Craig Bay. Fluvial parent materials occur at the lower reaches of Nanoose Creek and the Englishman River. Large areas of the Nanoose peninsula, including the Canadian Forces base and much of the Fairwinds lands are located on hilly, colluvial lands. Morainal deposits are found throughout the subject area. The Aulds Road neighbourhood at Lantzville is located on old glacial moraine.

Southern portions of Lantzville and Nanoose Bay within the Leeward Islands Mountain Ecosection are located between 200 m and approximately 500 m asl. Slopes vary between 5 and 100%. Soils in these upland areas developed in colluvial and morainal materials.

Soil depths, drainage, and texture vary considerably throughout the subject area. A wide range of humus forms is found.

3.3 Vegetation

The Nanaimo Lowland Ecosection is an ecologically unique area, containing a diversity of flora and fauna in a wide array of ecosystems ranging from forests, floodplains, and wetlands to coastal bluffs, woodlands, and grasslands. Human activities – logging, agriculture, and urbanization – over the last century have significantly altered the area.

Photos. Vegetation variability on a range of terrain at Lantzville-Nanoose Bay-Nanoose First Nation. Clockwise from top left: Garry oak-arbutus woodlands at Nanoose Bay; coastal bluffs at Nanoose Bay; restored coastline at Nanoose First Nation; second growth forest at Lantzville; terrestrial herbaceous ecosystem at Lantzville

The current landscape of the Nanaimo Lowland Ecosection contains fragments of ecosystems in a relatively natural state.

Second-growth stands dominate forested areas of Lantzville, Nanoose Bay, and Nanoose First Nation. Forests at well-drained sites throughout the Nanaimo Lowland Ecosection and the Leeward Islands Mountain Ecosection are dominated by Douglas-fir, with lesser amounts of western redcedar and grand fir. Drier sites are characterised by the presence of Garry oak (i.e., Nanoose peninsula) and arbutus (ubiquitous on rocky headlands and uplands throughout Lantzville and Nanoose Bay). Mixed coniferous/deciduous or pure deciduous stands of red alder and/or bigleaf maple are common in moist sites (i.e., riparian areas: Nanoose Creek, Bonnell Creek, Englishman River) and poorly drained areas (Nanoose Bay estuarine floodplains).

Photo. Douglas-fir/western red cedar forest with oceanspray/salal shrub layer at Nanoose Bay.

The forest understorey is commonly comprised of salal, dull Oregon-grape, ocean-spray, and Oregon beaked moss (*Kindbergia oregana*). Less prominent species include baldhip rose, snowberry, western trumpet honeysuckle, vanilla-leaf, electrified cat's tail moss (*Rhytidiadelphus triquetrus*), and various members of the lily family.

The federal/provincial Sensitive Ecosystem Inventory (SEI) has identified and mapped remnant sensitive ecosystems (less commonly represented and/or rarer ecosystems) on eastern Vancouver Island. A broad representation of sensitive ecosystems occurs in the area covered by the Lantzville-Nanoose Bay-Nanoose First Nation CWPP. These less common and/or rare ecosystems include coastal bluffs, sparsely vegetated ecosystems, terrestrial herbaceous ecosystems, wetlands, riparian ecosystems, woodlands, older forest, older second-growth forest, and seasonally flooded agricultural lands. Management of interface areas should include strategies to protect sensitive ecosystems.

3.4 Natural Disturbance History

Prior to settlement by European immigrants in the late 1800's, the natural disturbance regime of many forest ecosystems on southeast Vancouver Island consisted of infrequent stand-initiating events. Forest ecosystems were generally even-aged; delayed post-fire regeneration periods resulted in some stands with uneven-aged characteristics. Wildfires were often of moderate size (20 to 1000 ha), with unburned areas resulting from sheltering terrain features or higher site moisture. Many larger fires occurred after periods of extended drought. The landscape was dominated by extensive areas of mature forest surrounding patches of younger forest. The mean return interval for these disturbances was about 200 years for the CDF (Table 1) (FPC Biodiversity Guidebook. 1995. MoFR).

Lightning sparked the majority of historical fires. First Nations peoples used prescribed burns to cultivate plants for food, medicine, and other uses.

Table 1. Mean forest fire return interval and fire size

Biogeoclimatic Unit	Mean Historical Wildfire Fire Return Interval (Years)			Fire Size (ha)		
	Minimum	Average	Maximum	Minimum	Average	Maximum
CDFmm	50-100	100-300	300-400	0.1-5	5-50	150-550

(BC Ministry of Forests and Range)

Photo. Fire-scarred stump and surrounding second-growth forest.

The forest landscape of Vancouver Island prior to the 20th century was a varied mosaic of forest stands and habitats. Infrequent fires reduced natural fuel loading and recycled nutrients.

Over the last century, the demise of traditional aboriginal cultural land management practices, and the advance of modern fire suppression have increased fuel loading (available combustible vegetation).

3.5 Recent Fire History

The Ministry of Forests and Range Protection Branch maintains a database of wildfires that have occurred in the last fifty years (Ministry of Forests and Range, Coastal Fire Centre, 2009). Human-caused and lightening-caused fires are recorded. Across British Columbia there is generally an equal split between lightening-caused and human-caused fires. On the south coast, on average of more than 90% of wildland fires are human-caused; lightening typically accounts for very few wildfires on southeastern Vancouver Island. In 2009, almost 98% of the wildland fires on southeast Vancouver Island were human-caused. One out of every eight reported wildfires in the mid island in 2009 was an interface fire (MoFR Coastal Fire Centre, 2009).

Local fire departments respond to bush fires. The annual call volume for Lantzville Fire Rescue typically involves a number of bush fires. In the 2009 fire season, Lantzville Fire Rescue responded to several human-caused bush fires, the majority of which occurred within close proximity to populated areas of the district. During the same fire season at Nanoose Bay, the Nanoose Volunteer Fire Department responded to a rash of human-caused bush fires along Northwest Bay Road. In 2009, the CFMETR fire base reported no fires. In recent years the military base fire department has responded to an escape fire at the campground, and a bush fire accidentally started by base employees.

Photo. Beach fires are banned at Lantzville when fire hazard ratings are high.

4.0 INFRASTRUCTURE

Located within the Regional District of Nanaimo, the communities of Lantzville, Nanoose Bay, and Nanoose First Nation are subject to various types and levels of governance. The District of Lantzville is incorporated, with a mayor and council. Nanoose Bay, in Electoral Area E, is an unincorporated Improvement District. The Nanoose First Nation lies on federal lands. A local band council carries out administrative duties. The Nanoose First Nation is a member band of the Te'mexw Treaty Association.

In Regional Districts in British Columbia, residents pay only for those services provided to the Electoral Area or Municipality in which they reside. The RDN provides services directly to Electoral Area E (Nanoose Bay). These services include administration, building inspection, emergency planning, bylaw enforcement, water utilities, and fire protection. Services at Lantzville are provided directly from the local tax base. The Nanoose First Nation receives services through Indian and Northern Affairs Canada (INAC).

The Nanoose CFMETR is maintained and operated by the Naval Undersea Warfare Centre Division Keyport (NUWCDIVKPT). The joint United States-Canada facility has been open since 1965 as a testing site for torpedoes, sonar, sonorbuoys, and other maritime warfare equipment. The range tests between 300 and 400 torpedoes annually. An average of two submarines and six surface ships visit the range each year (www.globalsecurity.org/military/facility/nanoose).

Communications towers in the area are operated by various leasees.

4.1 Tools Available to Local Governments

While only a small fraction of wildfires intrudes into areas of human settlement, the impact of wildfire is generally devastating to life and property. Governments can use a variety of tools to manage interface fire hazards. Key actions from local government, working in concert with local and provincial fire fighting agencies, can play a lead role in wildfire risk reduction in the interface zone.

Tools available to local government to manage the interface include:

- public education and involvement
- preventative measures at time of rezoning and subdivision, including planning, building, and servicing
- fire protection and emergency preparedness

4.2 Public Education and Involvement

The approach local governments take to conduct a public education program should be based on the severity of the interface fire risk, the nature of the community, and the

availability of resources. Involving and informing the public of the interface fire risk is critical to garnering public support for any measures that government may choose to enact as well as assisting in empowering individuals to undertake their own measures to protect their homes (City of Langford, 2001. *Addressing the Interface Fire Hazard*).

4.3 Planning Tools

A range of planning tools is available to local government to manage development in the interface zone. Most of the planning tools are applicable only to new development. The planning tools include:

- **Development Permits and Development Permit Areas**. A Development Permit Area (DPA) is a set of development regulations pertaining to a specific area as specified by the Official Community Plan. Any proposed building and subdivision within a DPA requires the issuance of a development permit. The authority for local governments to establish DPAs is set out in the Local Government Act, Sections 919.1 and 920.

  The purpose of a Development permit area (DPA) may be to:

  - protect development from hazardous conditions
  - protect the natural environment, its ecosystems and biological diversity
  - revitalise an area in which a commercial use is permitted
  - establish objectives for the form and character of intensive residential development, and/or to establish objectives for the form and character of commercial, industrial, or multi-family residential development
  - establish objectives to promote energy conservation, water conservation, and reduce greenhouse gases

  The flexibility of DPA guidelines allow local government to fairly exercise its discretion in granting or refusing a permit on a case by case basis, while providing objective principles to guide conditions for approving or refusing a DP application.

  A limited number of communities in British Columbia has applied local interface mapping to OCP guidelines to create Development Permit Areas for wildfire.

  Development Permit Areas only address new development.

- **Covenants**. Section 219 of the Land Title Act permit local governments, including regional districts, to request Section 219 covenants to manage how land is subdivided and built upon. Local governments usually make these covenants a condition of a development permit, subdivision approval, and/or building permit. The covenants can be used to address interface fire protection measures, such

as vegetation setbacks around residential structures, types of building materials, and construction design and criteria.

Existing lots and structures are generally not subject to covenants. Covenants are difficult to enforce over time.

- **Rural Land Use Bylaws**. Rural Land Use Bylaws (RLUB) are a planning tool only available to regional district governments. RULBs, which cannot contain DP areas, allow for the combining of zoning, subdivision control, and servicing standards in one bylaw. Items covered under RULBs generally have little relevance to wildfire.

- **Recreation Planning**. Local governments can use park planning and trail planning to minimise the risk of interface fires. Trails can be designed to accommodate fire response vehicles and fire department response.

- **Engineering Tools**. Infrastructure planning tools include Subdivision and Servicing bylaws to regulate by bylaw the provision of works and services to lands that are being subdivided; and local Building Bylaws to regulate the construction of buildings.

- **Burning Regulations.**
  Nanoose Bay. Burning regulations are administered as per MoFR. Permits are not required for backyard burning; however, only burning of garden waste is permitted. Backyard burn piles should be no larger than 6' high by 9' across. No backyard burning is permitted if Ministry of Forests has a ban in place. Venting index should be checked before burning.
  Large fires such as land clearing and agricultural fires require a reference number which can be obtained by calling the Ministry of Forests 1-888-797-1717.

  Lantzville. In 2010, a new burning bylaw was introduced in Lantzville (*District of Lantzville Fire Protection Services Bylaw* No. 86, 2010):
  -No open burning May 15-Oct. 15
  -Incinerators permitted year-round with permits
  -Beach fires permitted. No fires permitted under fire ban or closures. No beach fires after 11 pm.

  Nanoose First Nation. Regional government burning bylaws do not apply to federal reserve lands.

4.4 Fire Protection

Fire protection in the Regional District of Nanaimo is provided by fifteen fire departments that operate out of twenty-three fire halls. Nine of these fire departments, including Lantzville Fire Rescue, are administered and financed by municipalities and improvement districts, and operate independently of the RDN. Other volunteer fire departments in the RDN (including Electoral Area E – Nanoose Bay) work under Fire Protection societies. The RDN collects property taxes for these fire departments, and provides financing for their operations and capital expenses. The volunteer fire department societies are responsible for day-to-day management of their fire departments, and operational guidance to their volunteers. They also advise the RDN of their capital improvement requirements. (www.rdn.bc.ca)

Lantzville Fire Rescue provides fire protection services to Nanoose First Nation on a yearly contract basis.

The CFEMTR Nanoose Bay base is served by a four-man fire department Monday to Friday between 0900 and 1700. The base falls within the fire protection area of the Nanoose Volunteer Fire Department.

Lantzville Fire Rescue and Nanoose Volunteer Fire Department respond to medical emergencies, motor vehicle accidents, structure fires, chimney fires, grass and bush fires, vehicle heavy equipment and boat fires, flammable and combustible fuel leaks, compressed gas leaks, and dangerous goods spills.

Local fire departments are responsible for all fires within their respective fire protection areas. Lantzville Fire Rescue and Nanoose Volunteer Fire Department will respond to a MoFR fire if requested, and will also respond to other mutual aid requests. Additional assistance may be requested from the Ministry of Forests and Range (MoFR) Wildland Fire Service when fires occur in wildland or interface areas.

4.5 Lantzville Fire Rescue

Lantzville Fire Rescue is a paid on-call department that provides fire rescue, medical aid, and fire safety education services to the residents of Lantzville. The department also provides fire protection services to the Nanoose First Nation on a yearly contract basis. The department was established in 1955. The department operates out of one station at 7580 Superior Road.

Photo. Lantzville Fire Rescue Firehall, Superior Road, Lantzvile. (photo LFR)

Lantzville Fire Rescue includes one Fire Chief, one Deputy Chief, two Captains, and two Lieutenants. The department can accommodate about twenty nine members. Membership in the department has been characterised by relative stability over the years. According to LRF sources, "recruitment is good; retention is a challenge". Some members move on to career firefighting at other areas. With the recent opening of Nanaimo's newest Firehall #3 on Hammond Bay Road, LFR is projecting a small loss of trained members to Nanaimo. Results from a recent recruitment by LFR, however, indicate the department will readily be restored to its full compliment of firefighters.

Annual call volume for LFR varies between 150 and 170 calls. Medical calls (including Motor Vehicle Accidents = MVAs) account for approximately half the annual call volume. Approximately 10% of the call volume involves bush fires. Structure fires are uncommon. Decreasing call volume over recent years corresponds with fewer medical calls due to changes in protocols for first responders. Calls involving the duty officer, however, have increased in response to growing numbers of burning complaints and reports of smoke.

Response time to most areas of the district ranges averages about 10 minutes (including 4 minutes to hall). As with any volunteer department, LFR acknowledges, "in reality, you never know who you're getting, and when they're going to show up."

The department utilizes five pieces of equipment: 2003 Superior-Freightliner Pumper, 1993 Superior-Freightliner Rescue, 1986 Hub-Mack Pumper/Tender, 2007 GMC C.A.F. Mini Pumper, and a 1981 Hub-Ford Pumper/Tender. (www.lantzvillefire.ca)

LFR provides a comprehensive training program to ensure a competent and compliant level of skills for firefighters. Forest firefighting is an integral component of the training.

Photo. Fire fighter training. (Photo LFR)

Like volunteer fire departments across the province, Lantzville Fire Rescue has a high level of commitment to the local community. Throughout the year, Lantzville Fire Rescue is involved in many community activities, including Fire Prevention Week, a Halloween Bonfire, and Mine Town Days. An annual garage sale at the Firehall in April is a popular fundraiser for emergency fire equipment. Sales of calendars include a home safety check list and tips for emergency preparedness. During Emergency Preparedness Week in May, the department teams up with RDN Protective Services and hosts public meetings to promote safety in the interface zone.

Photos. Left: Muscular Dystrophy charity boot drive; middle: Hallowe'en bonfire.

High priority is placed on fire safety/prevention education. The department regularly conducts fire prevention sessions for school children at the local elementary school, and at Nanoose First Nation. The department provides an instructional fire safety session for local Boy Scout and Girl Guide companies.

Lantzville Fire Rescue recognises the ongoing need to provide fire safety education is a driving factor that motivates the department of volunteers. The LFR Fire Chief explained that the department would like to expand fire safety education programs, but "there is never enough time to do all the public fire education that is needed".

4.6 Nanoose Volunteer Fire Department

The Nanoose Volunteer Fire Department is a volunteer department that responds to emergencies in Nanoose Bay (Electoral Area E) and the Englishman River subdivision in Electoral Area G. The department has an annual call volume of approximately 300 calls, over half of which are medical. The department operates out of one fire hall at 2741 Nanoose Road. The hall has capacity to hold up to eight vehicles.

Photo. Nanoose Volunteer Fire Department Firehall, 2741 Nanoose Road. (photo: NVFD)

Photo. Nanoose Volunteer Fire Department emergency vehicle. (photo: NVFD)

The Nanoose Volunteer Fire Department currently includes a full compliment of about thirty male and female firefighters. The Nanoose Bay Fire Protection society requires members to have lived, or owned property in the district, for at least one year. Some members are self-employed. The department recruits new members throughout the year, and receives about eight to ten new applications each year. Currently there are ten probationary members.

Response time to more accessible areas of the district is about ten minutes (4 minute turnaround time, plus 5-8 minutes from hall). Fire department officials note that they "used to have the first truck out the door three minutes after the first page". The department that response time is "only as fast as the last guy out the door."

Training provided by Nanoose Volunteer Fire Department includes forestry firefighting.

Nanoose Volunteer Fire Department is a community-based organization that participates in a variety of local activities. As an example, since 1987, the NVFD has hosted firefighters and community leaders throughout the region at the annual John Enos Lectures to learn about new and improved methods of firefighting.

4.7 Nanoose CFMETR Base

The CFEMTR Nanoose Bay base is served by a four-man fire department Monday to Friday between 0900 and 1700. The base falls within the fire protection area of the Nanoose Volunteer Fire Department. When called to respond to the base, NVFD vehicles travel to the base via Powder Point/Fairwinds Road. Recently a B-train tanker carrying jet fuel for the base jack-knifed on a winding corner on the access road, blocking traffic for several hours.

Photos. Above: security gate and firehall at CFMETR Nanoose; middle: base campground; bottom: base communications.

As part of its regular patrols during fire season, the base fire department performs routine checks several times a day at the base's waterfront campground. A storage tank contains 1,000 L of water for initial attack. The base's pumper truck is used to fill up the water tank. A cache of emergency fire fighting equipment is stored onsite. An emergency phone connects with the base gate. Response time for the base fire department to the campground is approximately 15 minutes. Set-up time for a second truck would entail an additional 10 minutes.

Photos. Fire department personnel from Nanoose Bay Volunteer Fire Department and Nanoose military base inspect a cache of emergency fire fighting equipment at the base campground.

The Raven First Nation program conducts an annual, week-long cultural camp at the base during which First Nations youth from across Canada cut and clear deadfall from the campsite area. Firewood from the project is used at a supervised ceremonial sweat lodge fire.

Photo. The base fire department conducts routine patrols during the fire season.

5.0 Preparation of the Community Wildfire Protection Plan

Preparation of the Community Wildfire Protection Plan for Lantzville, Nanoose Bay, and Nanoose First Nation followed criteria found in FireSmart (*FireSmart: Protecting Your Community from Wildfire*, Partners in Protection, 2003).

STEP ONE: Plan Overview – Objectives and Goals

Objectives and goals of the Community Wildfire Protection Plan were reviewed with the Union of BC Municipalities, Regional District of Nanaimo, District of Lantzville, District of Nanoose Bay, Nanoose First Nation, Lantzville Fire Rescue, Nanoose Volunteer Fire Department, and the Ministry of Forests and Range Wildland Fire Services.

STEP TWO: Data Acquisition and Information Sharing

Identification and acquisition of resource and community information is necessary in order to share perspectives, priorities, and objectives relevant to the planning process.

Emergency planning guides and community resources consulted included:

- FireSmart – Protecting Your Community from Wildfire (2nd Edition, Partners in Protection, 2003) www.partnersinprotection.ab./ca
- Firestorm 2003 Provincial Review (The Hon. G. Filmon, 2004) www.2003.firestorm.gov.bc.ca
- Addressing the Interface Fire Hazard – A Case Study of the District of Langford (District of Langford, 2001)
- Water Supply for Public Fire Protection (Fire Underwriters Survey, 1999)
- S-100 (BC) Basic Fire Suppression and Safety (MoFR, 2004)
- National Fire Protection Association (NFPA) Standards (NFPA, Massachusetts, USA)
- District of Lantzville www.lantzville.ca
- Ministry of Aboriginal Relations and Reconciliation www.gov.bc.ca/arr/firstnation/temexw
- Lantzville Fire Rescue www.lantzvillefire.ca
- Nanoose Volunteer Fire Department www.nanoosevfd.com
- Regional District of Nanaimo *www.rdn.bc.ca*
- Ministry of Forests and Range Wildfire Management Branch *www.for.gov.bc.ca/Protect*

STEP THREE: Hazard - Risk Assessment

Hazard-risk models used in this project included:

- Canadian Forest Fire Danger Rating System
- Community Interface Fire Hazard Assessment (FireSmart)
- Hazard-Impact-Risk-Vulnerability Assessment

(Strategic Threat Analysis [STA] mapping, a recent introduction to BC fire prediction modeling, was not used due to its limited applicability to Vancouver Island.)

STEP FOUR: Hazard Mapping

Interface hazard mapping was developed to:

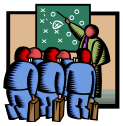
- identify areas at potential risk from wildland fire
- designate the community's wildland-urban interface zone

The Regional District of Nanaimo provided base mapping (topographic, cadastral, and ortho) for field work. Global information system (GIS) based mapping and modeling were used to spatially identify the severity of a wildfire hazard. Pre-mapping was refined with ground truthing. ArcGIS 9.2 software was used to convert field mapping to digital format (shape files) compatible with the provincial government's GIS system.

STEP FIVE: Community Hazard Reduction Priorities

Once the community assessment and base map were completed, local protection and hazard mitigation needs were analysed in consultation with local fire departments, stakeholders, and local governments.

STEP SIX: Action Plan



Mitigation measures were identified to address community interface fire protection requirements.

STEP SEVEN: Education and Awareness

The process of developing a Community Wildfire Protection Plan can lead community members through valuable discussions regarding management options and implications. Effective public education and awareness will help motivate people to create FireSmart communities.

STEP EIGHT: Implementation

Community planning officials must mutually agree on fuel management priorities, equipment needs, requirements for additional local planning tools, and other necessary actions. Local governments should establish an assessment strategy for the Community Wildfire Protection Plan to ensure the plan maintains its relevance and effectiveness over the long term.

6.0 Hazard Assessment

Hazard assessment methodology was based on standard fire danger and hazard assessment models:

1) Canadian Forest Fire Danger Rating System
2) Interface Community Fire Hazard Analysis
3) Hazard, Impact, Risk and Vulnerability (HIRV) Process

6.1 Canadian Forest Fire Danger Rating System

The Canadian Forest Fire Danger Rating System (CFFDRS), developed by Forest Canada, is a standard national system of rating fire danger. The computer-based CFFDRS is the primary fire management decision aid in Canada. During the fire season, the BC Ministry of Forests and Range, Wildfire Management Branch operates approximately 260 hourly weather stations. Fire managers assess hourly weather observations, together with supplementary data from other agency stations, to determine fire danger on forestlands. Fire weather information is used to make fire prevention, preparedness and suppression decisions, and other general fire management decisions.

Photo. Fire weather station.

A general knowledge of the CFFDRS and its components is useful to understand fire danger and potential fire behaviour.

The CFFDRS has two sub-systems:

1. **The Fire Weather Index (FWI) System**
2. **The Fire Behaviour Prediction (FBP) System**

The **Fire Weather Index (FWI) System** uses four weather readings (taken each day at 1300 PDT). These inputs are:

- Temperature (wet and dry bulb)
- Relative Humidity
- Wind speed and direction
- Rainfall (cumulative – past 24 hours)

Weather readings are entered into standard tables which provide fire fighters with three Fuel Moisture Codes and three Fire Behaviour Indices.

Fuel Moisture Codes. Fuel Moisture Codes are numerical ratings that express daily changes in moisture content of three classes or layers of forest fuel (each class has a different drying rate). Fuel Moisture Code values increase with lower fuel moistures.

Table 2. Fuel Moisture Codes

Fuel Moisture Code	Represents	Time Lag*	Amount of 24 hr rainfall required to lower value	Interpretation
FFMC Fine Fuel Moisture Code represents the moisture content in litter (needles, twigs) and other surface fuels	Surface Litter	2/3 day	0.6 mm	FFMC <77 – generally a fire will not start without concentrated effort 77-86 – app. 86% of ignition sources will start fires >86 – easy ignition of fuels >94 – almost 100% of ignition sources will ignite forest fuels
DMC Duff Moisture Code represents moisture content of duff layers 5-10 cm deep	5-10 cm duff	12 days	1.5 mm	DMC <35 – generally this layer will not be involved in fire activity >35 – this layer is involved as fire intensity increases
DC Drought Code represents the moisture content of deep duff layers 10-20 cm deep. The DC expresses seasonal drought effects on forest fuels and the amount of smouldering that will occur in deep duff layers and large logs	10-20 cm duff	52 days	2.9 mm	DC 0-300 – very little involvement of this fuel in most areas 300-450 – increased involvement with fires becoming more intense and mop-up problems increasing 500+ - extensive involvement of the fuel layer. Fires are intense with difficult mop-up problems, due to the depth of the fires

*Time lag = time required for fuel to lose 2/3 of its moisture under standard drying conditions, i.e., 21^0 C and 45% RH

Fire Behaviour Indices. The FWI Fuel Moisture Codes plus wind are linked to form three Fire Behaviour Indices (Fig. 9):

Initial Spread Index (ISI) – represents the relative fire spread expected immediately after ignition

Build Up Index (BUI) – represents the total amount of fuel available for consumption – useful in determining mop-up requirements – used in calculating rate of spread

Fire Weather Index (FWI) – represents the potential fire intensity

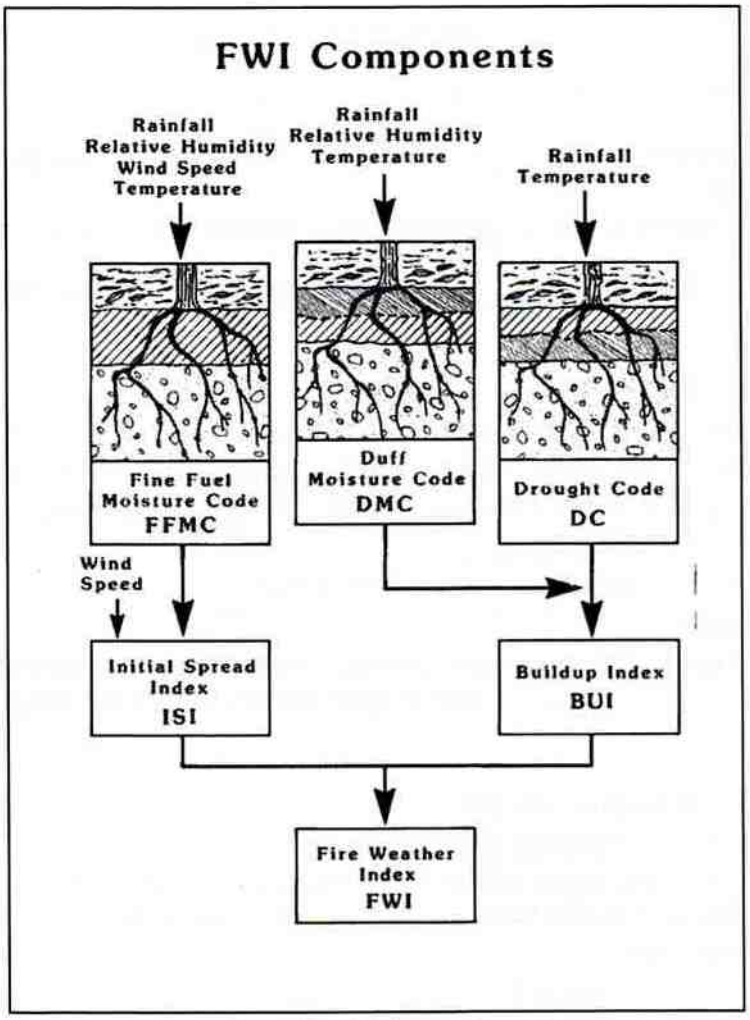


Fig. 9 FWI Components

Fire Danger Class Ratings (DGR), calculated based on fire weather indices from a network of automated weather stations, are used to determine the need for open fire bans and public travel restrictions or road closures in forested areas. Industrial activities use the fire danger classes to determine restrictions on industrial operations, such as the need for early shutdown, "fire-watch" following early shutdown, or complete shutdown of industrial activity.

Table 3. Calculation of Fire Danger Classes

Build-up Index (BUI)	**Fire Weather Index (FWI)**				
	0	*1-7*	*8-16*	*17-30*	*31+*
0-19	I	II	II	III	III
20-42	II	II	III	III	IV
43-69	II	III	III	IV	IV
70-118	II	III	IV	IV	V
119+	III	III	IV	V	V

FWI = Fire Weather Index; BUI = Buildup Index

Fire Danger Class 1 Very Low

Fire Danger Class 2 Low

Fire Danger Class 3 Moderate

Fire Danger Class 4 High

Fire Danger Class 5 Extreme

Table 4. Fire Danger Class Descriptions

Fire Danger Class Rating	**Description**
Class 1	Forest fire is not likely to start. (**VERY LOW**)
Class 2	Forest fire danger is **LOW.** It is possible for fires to start in light flashy fuels, but they will have a slow rate of spread.
Class 3	Fire danger is **MODERATE**. Fine fuels in open areas and sunny slopes may spread rapidly. Use caution during any forest activities.
Class 4	Fire danger is **HIGH**. Fires will start easily from all causes, and will spread rapidly, and increase in intensity - they will be hard to extinguish. Spot fires may occur and will burn deep. Extreme caution must be used in any forest activities. Burning permits and industrial activities may be restricted.
Class 5	Forest fire danger is **EXTREME**. Small fires will spread very rapidly - they will be hard to extinguish. Severe spotting may occur. Mop-up will require a great deal of effort. General forest activities may be restricted, including burning permits, industrial permits, and campfires.

Fire behaviour predicts how forest fuels will burn under different conditions. Forest fuels are typically classified according to the layer of the forest in which they are burning: ground, surface, or crown:

- Ground fires creep through the duff (organic soil) and decaying woody material beneath the forest floor.
  Ground fires often smolder for a long time, and are persistent, slow burning, and difficult to detect.

Photo. Ground fire (spreading to surface fuels).

- Surface fires burn needles, cones, twigs, branches, logs, stumps, and leaves on the forest floor, in addition to lower branches of standing timber.

  Surface fuels include "ladder fuels" (aerial fuels) – i.e., branches, leaves, and bark on tall bushes; the lower branches of trees; or young understorey trees – which help ground and surface fires spread upward through the forest canopy into the tree crowns. Surface fires spread more rapidly by wind.

Photo. Surface fuels.

- Crown fires burn in the upper foliage and branches, and also consume surface and ground fuels. Crown fires occur when high-intensity surface fire spreads ("ladders") through the lower foliage into the canopy above. Crown fires spread from tree to tree.

  Crown fires travel quickly, are difficult to control, and are the most destructive fires.

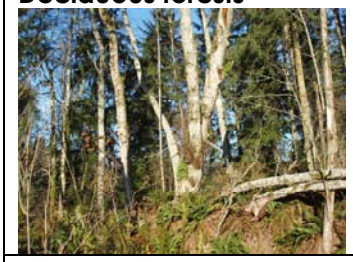
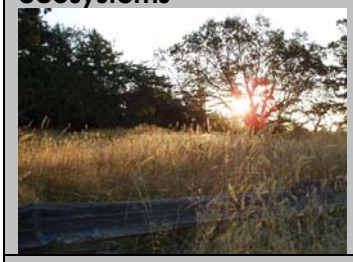
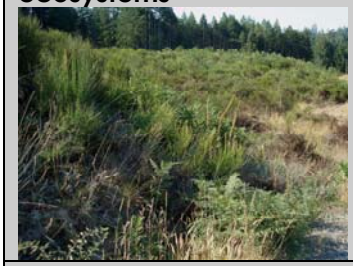
Photo. Crown fire.

The Fire Behaviour System incorporates five generic fuel type classes, subdivided into sixteen benchmark fuel types, to forecast how a wildfire will react. A vegetative fuel type is defined as an identifiable association of fuel elements of distinctive species, form, size, arrangement, and continuity that will exhibit characteristic fire behaviour under defined burning conditions. Classification of fuel types incorporates stand structure and composition, surface and ladder fuels, and the forest floor cover and organic (duff) layer. Major fuel type classes are: Coniferous stands, Deciduous stands, Mixedwood stands, slash, and open (grass).

The following table summarises major fuel types found in the area covered by the Lantzville-Nanoose Bay-Nanoose First Nation CWPP, based on the Canadian Forest Fire Behaviour Prediction (FBP) System. (Fuel types are generic; they represent a type of behaviour pattern, rather than the specific type of stand found in an area. Fuel types are described qualitatively, rather than quantitatively, according to characteristics of forest stands.)

Table 5. Fuel Types* – Lantzville-Nanoose Bay-Nanoose First Nation

	General Fuel Characteristics			
Layer: / Fuel Type Complex:	**Forest Floor and Organic Layer**	**Surface and Ladder Fuels**	**Stand Structure and Composition**	**Comments – Distribution Mitigation**
Coniferous stands 	Shallow to moderately shallow organic layer (duff), consisting of needle litter, small twigs, cones, and feather moss	-discontinuous to moderately continuous understorey -proportion of ladder fuels varies between younger immature stands and older mature stands	-immature to mature stands -stand density ranges from open to moderately well-stocked to dense	Extensive coniferous stands throughout area. Coniferous stands surround land base
Effect on fire behaviour:	Thick duff layers increase chance of ignition and spread	Ladder fuels increase potential for surface fire climbing into crowns	Dense stands with high fuel loading pose greatest risk. Crown fires spread quickly, and are difficult to control	Extreme fire weather exacerbates risk of ignition and spread of wildfire
Pine stands/(often with Douglas-fir) 	-continuous layer of needle litter, small twigs, cones, and feather moss	-high proportion of ladder fuels (lower live and dead branches, shrub layer, downed stems) tend to be found in younger stands	Generally comprised of younger, immature stands -often densely stocked -low height to live crown	Small pure stands common along coast and at well-drained inland locations
Effect on fire behaviour:	High capability of carrying surface fire	High capability of carrying surface fire into crowns	Crown fires more common in dense pine-dominated stands	Extremely combustible (due to natural resins)
Mixed wood stands (coniferous/deciduous) 	-discontinuous to continuous leaf and needle litter -organic layers are generally uncompacted and friable	-sparse to continuous herb layer -moderate to continuous shrub layer -ladder fuels often extend to ground	Moderately well-stocked mixed stands of Douglas-fir with western redcedar, big leaf maple (and/or red alder)	Throughout area. Common in moist seepage sites
Effect on fire behaviour:	Low to mod. capability of carrying surface fire	Risk of ignition and fire spread increases during extreme fire weather in stands with high surface fuel loading	Local stands contain sufficient proportion of combustible coniferous trees to sustain and spread a wildfire, especially during extreme fire weather	Fuel types differentiated by season and % of coniferous &deciduous cover

Layer: / Fuel Type Complex:	Forest Floor and Organic Layer	Surface and Ladder Fuels	Stand Structure and Composition	Comments – Distribution/ Fire Behaviour
Deciduous forests 	-continuous leaf litter; shallow, uncompacted organic layer	-moderate medium to tall shrubs and herb layers -moderate dead, down woody fuels	-moderately well-stocked stocks	Generally found as small stands at riparian areas and seepage sites throughout land base
Effect on fire behaviour:	Low risk of ignition and spread during extreme fire weather	Surface fuels are generally shaded and moist, with a low capacity for "drying out"	Shaded understorey layers and moist conditions usually limit potential fire spread	Low combustibility
Grass-dominated ecosystems 	-continuous live and dead (may be cured depending on weather) grass litter -shallow, moderately compacted organic layer	-discontinuous to continuous with scattered shrubs; -in early summer: grass is generally green -in late summer, brown cured grasses pose fire hazard	Clumps of brush species (i.e., broom) and scattered trees may increase potential for fire spread	Not widespread, but found at several locations: -Notch Hill -coastal bluffs
Effect on fire behaviour:	Low to high risk of ignition & spread (depending on season)	Low humidity and high winds will increase potential for ignition and fire spread	An understorey of dry grass and leaf litter in a forest stand contributes to surface fuel loading.	Wind will spread fire rapidly in dried, cured grass
Slash and Downed Woody Debris 	-moderately deep to deep uncompacted to compacted organic layer, often with continuous needle litter and accumulations of feather moss	-moderate to high foliage retention (especially if there is a high content of western redcedar)	-individual trees and clumps of standing trees located near slash piles increase risk of fire climbing into crowns	Logging and land clearing.
Effect on fire behaviour:	High risk of ignition and spread during extreme fire weather	Elevated surface fuels have a greater capacity for "drying out"	Dead standing trees act to spread a ground fire into crowns of adjacent stands	Highly combustible in certain seasons
Shrub-dominated ecosystems 	-shallow, compacted organic layer (disturbed areas) to moderately deep, uncompacted organic layers (relatively undisturbed areas)	-sparse to dense, invasive and/or native shrub cover	Areas dominated by invasive broom increase potential for ignition and fire spread	Present throughout area, especially on disturbed sites
Effect on fire behaviour:	Risk of ignition varies with vegetation type/season	Low humidity/ high winds increase ignition potential/ fire spread	Accumulations of brush layers contribute to dangerous fuel loads	Variable combustibility

Fire behaviour also describes the way in which fuel ignites, flame develops, and fire spreads. A wildfire behaves according the environment in which it is burning. Fire behaviour is affected by three elements of the fire environment – fuel, weather, and topography.

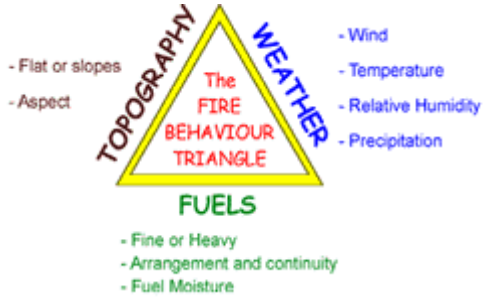


Figure 10. Fire Behaviour Triangle

A change in any of the components of the fire environment will cause a change in the behavior of the fire – the change can be very abrupt and rapid. Of the elements affecting fire behaviour, only fuel can be managed (Table 6).

Table 6. Fire Behavior Triangle Components

Weather	Wind Temperature Relative Humidity Precipitation	Wind can push a fire forward; fires also create their own wind currents. Heat results naturally (lightning strike) or is introduced by people. Low relative humidity can dry out fuels, causing them to ignite more easily. Precipitation can put out a fire; conversely, a lack of precipitation dries fuels, increasing the fire threat.
Topography	Flat or Slopes Aspect	A fire moves more rapidly up hills. A fire is more likely on drier southern and western aspects.
Fuels	Light or Heavy Arrangement Fuel Moisture	The drier and lighter the fuels, the more easily they will ignite. A continuous layer of fuels on the forest floor aids the spread of a fire. Low fuel moisture can promote chance of ignition and increase fire spread.

Adapted from U. S. Dept. of Agriculture – Forest Service

Fire weather, fuel types and topography are combined to predict three output fire behaviour factors:

1. Fire Intensity – a measure of the rate of heat energy released – based on the rate of spread and predicted fuel consumption.

2. Rate of Spread – measure of the speed at which a fire extends horizontally – based on the hourly Initial Spread Index (ISI) value, and adjusted for steepness of slope.

3. Crown Fraction Burned – measure of the proportion of tree crown involved in a fire – based on the rate of spread, crown base height, and foliar moisture content.

TABLE. 7.
FIRE BEHAVIOR CHARACTERISTICS AND FIRE BEHAVIOUR OUTPUTS FOR GENERIC FUEL TYPES AT LANTZVILLE-NANOOSE BAY-NANOOSE FIRST NATION
BASED ON WEATHER CONDITION PREDICTIONS FOR 90TH PERCENTILE FW INDICES:

OUTPUT FACTORS→ FUEL TYPES↓	FIRE INTENSITY (BASED ON RATE OF SPREAD AND PREDICTED FUEL CONSUMPTION)	RATE OF SPREAD (SPEED OF FIRE – ADJUSTED FOR STEEPNESS OF SLOPE AND WIND)	CROWN FRACTION BURNED (PROPORTION OF TREE CROWNS INVOLVED IN FIRE)
CONIFEROUS STANDS	MODERATE TO HIGH	MODERATE TO RAPID	HIGH
PINE STANDS	HIGH	RAPID	VERY HIGH
MIXED WOOD STANDS	LOW TO MODERATE	MODERATE	LOW TO MODERATE
DECIDUOUS STANDS	LOW	LOW	LOW
SLASH AND DOWNED WOODY DEBRIS	MODERATE TO HIGH	MODERATE TO RAPID	N/A
GRASS-DOMINATED ECOSYSTEMS	MODERATE TO HIGH	MODERATE TO RAPID	N/A
SHRUB-DOMINATED ECOSYSTEMS	LOW TO HIGH	LOW TO HIGH	N/A

Based on fire behaviour, severity of wildfire hazard is measured using:

a. Risk of ignition
b. Structures at risk
c. Suppression constraints

Risk of Ignition. The risk of ignition on southeast Vancouver Island is primarily from human activity. Common human-caused ignition sources include: discarded cigarettes and matches from smoking, campfires, motorised machinery, motorised recreational vehicles (i.e., dirt bikes), and fires started at homes, businesses, and yards adjacent to woodland areas.

Table 8. Risk of ignition

Location	Probability of Ignition
Areas within 20 m of any roads and trails	Moderate to High
Areas within 20 m of power lines	High
Areas within 100 m of housing/ resorts/ commercial	High
Areas frequented by party goers	High

Structures at Risk. Structures at risk include all human-made structures (buildings and facilities) that have the potential to be destroyed or damaged by wildfire.

Many structure types are found at Lantzville-Nanoose Bay-Nanoose First Nations, ranging between old and new construction: single family homes and multiplex residential, businesses - commercial and light industrial, institutions (i.e., public and private schools, community centres), and resort accommodations.

Table 9. Structures at Risk

Unnatural Fuel Types- Structures at Risk (human structures and facilities)	-Construction materials of local structures in high-risk interface areas vary from highly combustible (i.e., cedar shake roofing; wood siding) to fire-retardant (metal roofs, cementitious siding materials). -Chimneys often do not have spark arrestors. -Many structures in high-risk interface areas are surrounded by combustible vegetation.	In interface areas, safety of buildings should be a high priority.
Affect on fire behaviour:	-Difficult-to-access structures with inadequate fireflow have highest risk. -Remote structures constructed with combustible materials (combustible roof-covering assemblies and non fire-resistant siding), surrounded by forest coniferous cover present very high risk. -Extreme fire weather, combined with poor access, will challenge suppression efforts.	Residents and communities will be more likely to take action to reduce the hazard posed by wildfire if they are aware of the conditions of their own buildings, site, and area.

Suppression Constraints. Suppression constraints are based on the availability of:

- suppression resources
- access restrictions
- topographical features

A wide variation in suppression response is found in British Columbia. Suppression response to flat, well-roaded peri-urban neighbourhoods with hydrants within close proximity to a fire hall (i.e., Lantzville Road area) will be relatively fast, compared to poorly accessed, rugged perimeter areas with no water supply for fireflow (i.e., undeveloped Foothills area of Lantzville). Access to water sources (fire hydrants) is vital for fire suppression. Areas further than 300 m from a fire hydrant pose a higher risk (and are usually subject to higher insurance premiums). Areas further than 8 km from a fire hall are generally outside fire protection boundaries. Exceptions to this include the Englishman River community area, which was added to the Nanoose Bay Fire Protection Area.

Local fire resources can be overwhelmed by large/long or multiple calls.

Table 10. Suppression Constraints

Factor	Specifics	Rating
Distance from roads	0-50 m from a road	Low
	50-100 m from a road	Moderate
	>100 m from a road	High
	>300 m from a road	Extreme
Gradient of roads	All-weather road surface (i.e., paved):	
	<20%	Low
	≥20%	Moderate - High
	Gravel	
	<15%	Low - Moderate
	≥15%	High - Extreme
Availability of water sources	Areas < 300 m from a fire hydrant	Low
	Areas > 300 m from a fire hydrant	High
Distance from fire hall	Areas < 8 km from a fire station	Low
	Areas > 8 km from a fire station	High - Extreme

Photo. Interface fire (FireSmart, 2003).

Fire Intensity Ranking

The Fire Intensity Rank System summarises fire behaviour (MoFR, Wildland Fire Branch).

Rank 1 - smouldering ground or creeping surface fire.

A Rank 1 fire is a smouldering ground fire or a fire that burns in the ground fuel layer. These fires have no open flame and produce white smoke.

Firebrands and going fires tend to be virtually self-extinguishing unless high Drought Code and/or Build up Index values prevail, in which case extensive mop-up is generally required.

Rank 2 - low vigour surface fire.

A Rank 2 fire has a rate of spread of less than 1.5m/min.

A Rank 2 fire is a surface fire or a fire that burns in the surface fuel layer, excluding the crowns of trees. Rank 2 fires produce visible open flame; have little or no spread, which is the speed at which the fire extends; and have an unorganized flame front or a flame front that does not exhibit all the same characteristics.

Suppression is achieved through direct manual attack at the fire's head or flanks by fire fighters with hand tools and water. A constructed fire guard should hold.

Rank 3 - moderately vigorous surface fire.

Rate of spread: 1.5 - 3.0 m/min.

A Rank 3 fire is a vigorous surface fire with a moderate rate of spread. A Rank 3 fire has an organized front and may display "candling" (tree's fuels ignite and flare up along the perimeter and/or within the fire).

Hand-constructed fire guards are likely to be challenged. Successful control of Rank 3 fires generally involves heavy equipment (bulldozers, pumpers, retardant aircraft, skimmers, helicopter w/bucket).

Rank 4 - highly vigorous surface fire, torching (or passive crown fire).

Rate of spread: 3.0 - 6.0 m/min.

A Rank 4 fire produces grey to black smoke, has an organized surface flame front, and has a moderate to fast rate of spread along the ground. Short aerial bursts and short range spotting will occur with these fires.

Control efforts at fire's head may fail.

Photo. Rank 4 fire.

Rank 5 - Extremely vigorous surface fire or active crown fire.

Rate of spread: 6.0 - 18.0 m/min.)

A Rank 5 fire produces black to copper smoke, has an organized crown fire front, moderate to long-range spotting and independent spot fire growth.

Very difficult to control. Suppression action must be restricted to fire's flanks. Indirect attack with aerial ignition (i.e., helitorch and/or aid dispenser) may be effective.

Rank 6 – Blow-up or conflagration, extreme fire behaviour.

Rate of spread in excess of 18.0 m/min.

Violent fire behaviour occurs with a Rank 6 fire. An organized crown fire front, moderate to long-range spotting and independent spot fire growth are characteristic of this fire type. There may be the presence of fireballs and whirls.

Violent physical behaviour is probable. Suppression actions should not be attempted until burning conditions ameliorate.

Photo. Rank 6 fire.

6.2 Interface Community Fire Hazard Analysis

The Ministry of Forests and Range Protection Branch "Interface Community Fire Hazard" analysis provides a quantitative procedure for assessing the interface fire hazard. Based on FireSmart, the analysis ranks over 23 factors (including an assessment of fuel type characteristics, response time, accessibility, etc.) and assigns points – the greater the hazard, the greater the number of points – to each hazard-risk factor. An interface area, site, or structure is not considered to be "fire safe" unless it obtains a low or moderate assessment score.

Over the last decade, local fire weather data from the Ministry of Forests and Range Mid Island Fire Centre indicate long periods of days in Fire Class Hazard 3 (moderate danger class) or higher.

Photo. Fire hazard sign at Lantzville Fire Rescue.

6.3 Hazard, Impact, Risk and Vulnerability (HIRV) Process

Risk assessments allow communities to anticipate and reduce the impacts of natural and manmade hazards by analyzing current and historical data and information resources. The HIRV model is a useful planning tool for local governments.

The HIRV process consists of:

- Hazard Identification
- Risk Analysis
- Vulnerability Assessment
- Impact Analysis
- Risk Management

Hazard can be loosely thought of as the product of risk, vulnerability, exposure, and the capacity of humans to respond to extreme conditions. For the purposes of this report, hazard refers to an unplanned or unwanted natural or human-caused fire, or a prescribed fire that threatens to escape.

Risk is a measure of the probability of occurrence of an event and the expected severity, and an analysis of potential factors (human or natural) which can contribute to the potential for fire occurrence.

Risk should not be confused with risk of ignition. For the purposes of this report, the probability of ignition can be accounted for by assigning a higher hazard rating to areas where fires are most likely to be started.

Vulnerability defines the ability of people, property, industry, resources, and areas of environmental and historic concern to weather, resist, or recover from the impacts of a hazard in the long term as well as the short term.

Impact is assessed through an analysis of social, environmental, economic, and political factors. Impact analysis provides the necessary links between vulnerabilities and hazards.

Hazard-Impact-Risk-Vulnerability (HIRV) modeling was developed to assess the potential impact of interface fire at various locations throughout the area covered by the Lantzville-Nanoose Bay-Nanoose First Nation CWPP. The following four examples highlight the range of conditions found between very high hazard areas at the Foothills Properties in Lantzville, and Notch Hill at Nanoose Bay, and moderate hazard areas at the lower, accessible portion of Nanoose First Nation, and at a well-established neighbourhood near the coast in Lantzville.

HIRV Tables

Table 11. Hazard Impact Risk and Vulnerability Model. Wildfire Hazard – Midsummer

Hazard	Risk Rating	Certainty	Vulnerability Rating	Certainty	Impact Analysis*	Certainty	Risk and Vulnerability Analysis
Wildfire Hazard – Foothills Property	Extreme	Data is well established	Extreme	Data is well establish'd	Env=3 Soc=2 Econ=2 Pol=2	Data is well established	Risk= Extreme Vulnerability= Extreme

* Env=Environmental Soc=Social Econ=Economic Pol=Political Ratings: 1=Low, 2=Moderate, 3=High, 4=Extreme

Table 12. Hazard Impact Risk and Vulnerability Model. Wildfire Hazard – Midsummer

Hazard	Risk Rating	Certainty	Vulnerability Rating	Certainty	Impact Analysis*	Certainty	Risk and Vulnerability Analysis
Wildfire Hazard – Notch Hill CFMETR	High	Data is well established	High-Extreme	Data is well establish'd	Env=3 Soc=3 Econ=3 Pol=3	Data is well established	Risk=High Vulnerability= High-Extreme

* Env=Environmental Soc=Social Econ=Economic Pol=Political Ratings: 1=Low, 2=Moderate, 3=High, 4=Extreme

Table 13. Hazard Impact Risk and Vulnerability Model. Wildfire Hazard – Midsummer

Hazard	Risk Rating	Certainty	Vulnerability Rating	Certainty	Impact Analysis*	Certainty	Risk and Vulnerability Analysis
Wildfire Hazard – Older established, lower portion of NFN	Mod-High	Data is well established	Mod-High	Data is well establish'd	Env=2 Soc=3 Econ=1 Pol=2	Data is well established	Risk=Mod-High Vulnerability= Mod-High

* Env=Environmental Soc=Social Econ=Economic Pol=Political Ratings: 1=Low, 2=Moderate, 3=High, 4=Extreme

Table 14. Hazard Impact Risk and Vulnerability Model. Wildfire Hazard – Midsummer

Hazard	Risk Rating	Certainty	Vulnerability Rating	Certainty	Impact Analysis*	Certainty	Risk and Vulnerability Analysis
Wildfire Hazard – Well-established neighbourhood NE Lantzville	Low-Mod	Data is well established	Mod	Data is well establish'd	Env=2 Soc=2-3 Econ=1-2 Pol=2	Data is well established	Risk=Low-Mod Vulnerability= Mod

* Env=Environmental Soc=Social Econ=Economic Pol=Political Ratings: 1=Low, 2=Moderate, 3=High, 4=Extreme

Table15. HIVR Interpretation		
Impact	**Examples**	**Rating**
Social	-possible injuries -possible deaths -loss of housing -disruption of family life -critical facilities lost	**Low -** Minor disruption of society **Medium** - Possible injuries and small-scale disruption of family life **High -** Serious injuries; large-scale community disruption **Extreme -** Multiple fatalities; major disruption of community life and loss of critical facilities
Political	-coerced risks -catastrophic risks -unresponsive process -memorable events -industrial risks	**Low** - Minor opposition **Moderate** - low level of political backlash – intervention may be required **High** - significant event embroils government - major actions required **Extreme** - Significant intervention required from all levels of government In the event of a major catastrophe government declares "Disaster Area"
Environ-mental	-quality of life -water quality -destruction of natural resources	**Low** - Minimal environmental impact at area of effect **Moderate** - Regional environmental damage **High** - Long-term recovery. Requires significant after action **Extreme** - Severe long-term effects on biodiversity
Econ-omic	-structural; non-struc-tural damage -loss of services; jobs -loss of revenue	**Low** - Economic impact minimal **Moderate** - Loss of business **High** - Regional long term loss **Extreme** - Chronic long-term economic downturn

HIRV modeling indicates risk management (mitigation) is required in areas with a High to Extreme interface fire hazard rating.

7.0 Interface Fire Hazard Ratings

Wildland-Urban Interface mapping was conducted in liaison with Lantzville Fire Rescue, the Nanoose Volunteer Fire Department, and the CFMETR Nanoose base fire department using four standard Ministry of Forests and Range wildland urban interface hazard mapping classes: Low, Moderate, High, and Extreme. Approximately 88% of the land base covered by the Lantzville-Nanoose Bay-Nanoose First Nation was assessed with a high to extreme hazard interface fire hazard rating.

TABLE 16. WILDLAND URBAN INTERFACE FIRE HAZARD RATING CLASSES

Low – urban, suburban, and farm areas with modified forest fuels; generally flat terrain; no readily combustible vegetation; superior fire protection with fast response times; minimal history interface fires; low risk to adjacent development

Moderate – partially modified forest fuels; scattered mixed forest in suburban areas; moderate to good water availability; good fire protection coverage with adequate response times; periodic fire starts; gentle to sloping topography; homes and structures may be threatened

High – areas with little or no fuel modification; continuous ground fuels; sloping terrain with/without gullies present; moderate to low availability of water; delayed fire protection coverage, or no fire protection; some areas hard to access; direct threat to homes/structures/values

Extreme – areas with little or no fuel modification; continuous ground fuels; rolling and gullied terrain; rock outcrops may be present; low water availability; often outside fire protection boundaries; some inaccessible terrain; may or may not have heavy use (recreation/resource industry); often has history of frequent fire starts; direct threat to homes/structures/values

Adapted from MoFR

Photo (Firestorm 2003)

7.1 Low Interface Fire Hazard

Areas with a **Low** interface fire hazard typically consist of "built-up", serviced, development (i.e., residential, commercial structures) with a superior transportation network and good fireflow. Areas with a low interface fire hazard rating also include well-maintained peri-urban parklands, irrigated golf courses and maintained agricultural lands, moist riparian corridors and natural wetlands. Approximately 1% of the land base covered by the Lantzville-Nanoose Bay-Nanoose First Nation is rated with a low interface fire hazard.

Local Examples: A small fraction of the land base in the Lantzville-Nanoose Bay-Nanoose First Nations CWPP was rated with a low interface fire hazard. Areas rated low consisted predominately of wetlands, lakes, and managed agricultural lands.

Table 17. General Characteristics of Areas with Low Interface Fire Hazard.

Fire Behaviour	Low Fire Intensity - low Rate of Spread – slow (flat to gentle slopes) Crown Fraction Burned - low
Risk of Ignition	Low – limited ignition sources.
Structures at Risk	Low – developed areas have high degree of modified natural fuels.
Suppression Constraints	Low – good access and fireflow; close to fire station.
Comments	Low concern - "built-up" areas; modified fuels; good detection.

Photo. Riparian areas, such as this estuarine meadow area at Nanoose Bay, typically have a low interface fire hazard rating.

7.2 Moderate Interface Fire Hazard

Areas with a **MODERATE** interface fire hazard rating in the Lantzville-Nanoose Bay-Nanoose First Nations CWPP include established residential neighbourhoods and commercial properties with reasonable to good fire suppression capabilities within close proximity to a firehall. Some areas rated with a Moderate interface fire hazard rating are buffered by, or consist of natural or manmade fuel breaks (i.e., golf courses, cleared agricultural lands with low to moderate fuel loading). Approximately 11% of the land base covered by the Lantzville-Nanoose Bay-Nanoose First Nation CWPP is rated with a high interface fire hazard.

Examples: developed neighbourhoods of Lantzville/Nanoose Bay/Nanoose First Nation with community water; golf course; maintained farmland

Table 18. General Characteristics of Areas with Moderate WUI Fire Hazard.

Fire Behaviour	Moderate Fire Intensity - low Rate of Spread – slow (flat to gentle slopes) Crown Fraction Burned - low
Risk of Ignition	Moderate – forested/bush areas near structures pose ignition risk.
Structures at Risk	Moderate – moderately fire-resistant construction with varying degrees of natural fuel loading. Modified natural fuels.
Suppression Constraints	Low to Moderate – fireflow adequate (hydrants) to inadequate (limited and/or no hydrants). Good to fair access.
Comments	Surrounding vegetation is often continuous

Photos. Moderate interface fire hazard areas; clockwise from top left: Nanoose First Nation (lower portion of reserve); maintained garden at Pacific Shores, Nanoose Bay; older residential, serviced area of Lantzville.

7.3 High Interface Fire Hazard

Areas with a **HIGH** interface fire hazard rating at Lantzville-Nanoose Bay-Nanoose First Nation comprise a significant portion of the land base. These areas generally consist of extensive brush and/or forest vegetation located near or adjacent to structures and facilities. Approximately 25% of the land base covered by the Lantzville-Nanoose Bay-Nanoose First Nation CWPP is rated with a high interface fire hazard.

Examples: rural neighbourhoods in forested settings with delayed response times. These areas encompass both "intermix" and "interface" areas.

Table 19. General Characteristics of Areas with High WUI Hazard.

Fire Behaviour	High Fire Intensity - high Rate of Spread – rapid (if fanned by wind) Crown Fraction Burned – moderate to high
Risk of Ignition	High - close proximity to continuous wildland fuels
Structures at Risk	High – established and proposed development located within or adjacent to areas with high fuel loading.
Suppression Constraints	Low to High – range of fire suppression resources (from good access and fireflow to poor fireflow or fireflow lacking; some areas have difficult access)
Comments	Early detection and rapid response key to successful suppression.

Photos. Above right: Lantzville Fire Rescue Fire Chief points to forested, rural portion of Lantzville with high interface fire hazard. Below left: Andover Road at Nanoose Bay backs onto CFMETR. Rural properties in the midst of combustible vegetation may have inferior potential for suppression, resulting in a high interface fire hazard rating.

7.4 Extreme Interface Fire Hazard

Areas with an **EXTREME** interface fire hazard rating encompass brush and forested lands with a wide range of suppression constraints. Approximately 63% of the land base covered by the Lantzville-Nanoose Bay-Nanoose First Nation CWPP is rated with an extreme interface fire hazard.

Examples: Extensive forest land tenures with variable terrain and limited accessibility; forested acreages with delayed response times; undeveloped land with rugged terrain and high fuel loading (i.e., proposed Foothills subdivision); Notch Hill (sensitive ecosystems/hilly terrain/key infrastructure).

Table 20. General Characteristics of Areas with Extreme WUI Fire Hazard.

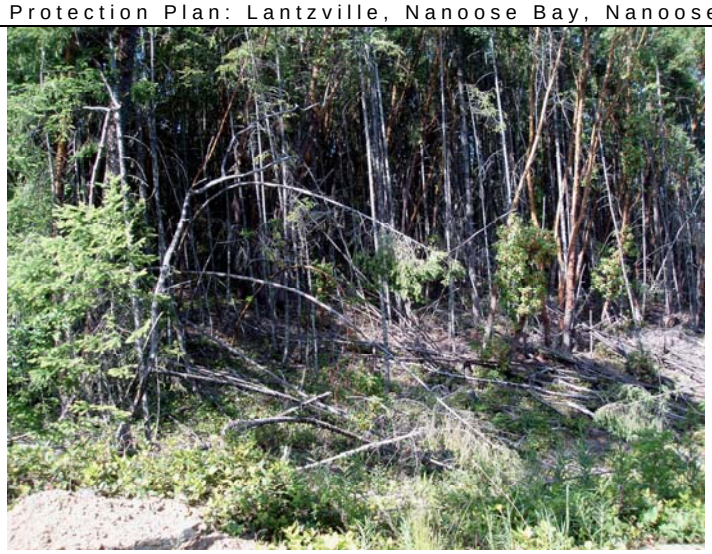
Fire Behaviour	Extreme Fire Intensity – high to extreme Rate of Spread – very rapid (wind and slopes will increase rate of spread) Crown Fraction Burned – high to extreme
Risk of Ignition	Extreme - influx of summer visitors increases risk of ignition in areas with forest and brush (i.e., cigarettes, campfires) - logging, land clearing, and recreational activities contribute to risk of ignition
Structures at Risk	High to Extreme – rural, combustible structures surrounded by flammable vegetation present the highest risk
Suppression Constraints	Very Low to High – characterised by poor fire suppression resources (poor fireflow or fireflow lacking; some areas have difficult access)
Comments	Hard-to-access interior/peripheral areas with high fuel loading and delayed response times are a cause for concern

Photos. Extreme fire hazard areas include rugged terrain with continuous fuels and limited access. Upper left: Notch Hill, CFMETR, Nanoose Bay; top right: Foothills area, Lantzville; lower right: upland forested areas of Nanoose Bay.

Table 21. Specific Characteristics of Sampled Areas Ranked with Extreme WUI Fire Hazard.

Location	Fire Behaviour/ Potential Fire Intensity Rank	Risk of Ignition	Structures at Risk	Suppression Constraints	Fuel Type(s)/ Fuel Loading
Notch Hill, CFMETR, Nanoose Bay (SW aspect;, midslope) **N49° 16 36.1" W124 09' 28.7"**	**Fire intensity:** high to extreme **Rate of spread:** very rapid **Crown fraction burned:** high to extreme **Fire Intensity Rank: 4**	Moderate	High (peripheral structures: residences, military infrastructure at CFMETR, Fairwinds, and ???)	Moderate to High (limited accessibility; limited fireflow)	C, M, O Moderate to High Fuel Loading (variable) Surface Fuel Loading: 3-9 kg/m2
Proposed Foothills subdivision, Lantzville **(variable aspects; midslope)** **N49 ◦ 13' 25.3" W124 05' 28.5"**	**Fire intensity:** high to extreme **Rate of spread:** very rapid **Crown fraction burned:** high to extreme **Fire Intensity Rank: 4-5 (6)**	High to extreme	Currently Moderate (structures downslope). At build-out, risk may increase, depending on type of development.	High (no fireflow, difficult access)	C, M, O, S High to Extreme Fuel Loading Surface Fuel Loading: 8 kg/m2

Photos. Notch Hill, CFMETR, Nanoose Bay.



Photos. Foothills area of Lantzville.

7.5 Interface hazard ratings at Lantzville-Nanoose Bay-Nanoose First Nation.

Table 22. Sampling of interface fire hazard ratings: Lantzville-Nanoose Bay-Nanoose First Nation.

Location	Fire Behaviour	Risk of Ignition	Structures at Risk	Suppression Constraints	Fuel Type(s)	Overall Wildfire Hazard
Dickinson Road residential area, Lantzville	M	L	H	L	fragmented C,D,M,0	M
Andover Road residential area, Fairwinds, Nanoose Bay	M-H	M-H	H	M	C,0	H
Nanoose First Nation campground	M	M	M	M	M,C,0	M
Lisa Lane area, Nanoose Bay	M-H	H	M-H	H	C	H
Englishman River community subdivision, Nanoose Bay	M-H	M-H	M-H	H	C,M,0	H
Notch Hill, CFMETR, Nanoose Bay	H-E	M-H	H	H	C,M,0	E
Proposed Foothills subdivision, Lantzville	H-E	H-E	M	H-E	C,0,S	E

L=Low, M=Moderate, H=High, E=Extreme

Fuel Types: C=Coniferous, D=Deciduous, M=Mixed Forest, 0=Shrub-dominated, S=Slash

Photos. Wildfire.

8.0 DISCUSSION

Prior to settlement by non Europeans, the natural disturbance regime of forest ecosystems on southeast Vancouver Island consisted of infrequent stand-initiating events involving periodic wildfires that reduced underbrush and combustible vegetation. Aboriginal peoples, including the ancestors of the Nanoose First Nation, used fire as a tool in resource management and community sustainability. Fire was utilised to manage food and medicinal plants, to enhance habitat for wildlife, and to reduce the risk of fuel loading around communities.

From the present standpoint of community fire protection, fires have the potential to develop into catastrophic wildfires of a scale and intensity beyond the range of historical variability (Agee, Fire Ecology of the Pacific Northwest. 1993). Global climate change is predicted to extend the duration of fire seasons in fire-prone environments, and to produce greater fluctuations in weather patterns (United Nations Intergovernmental Panel on Climate Change, 2003).

Residents of Lantzville/Nanoose Bay/Nanoose First Nation enjoy an extensive peri-urban setting of forests and coastline situated between the cities of Nanaimo and Parksville. Recreational pursuits, industrial activities, and expanding development in forested areas have increased the risk of fire in the interface zone of these communities. Almost ninety percent of the land base covered by Lantzville/Nanoose Bay/Nanoose First Nations is classified as a high and/or extreme hazard area for interface fire.

Fire Departments and Emergency Services at the communities of Lantzville, Nanoose Bay, and Nanoose First Nation cite various cooperative ventures with multiple levels of government to prevent fires in the interface zone. These small communities have made significant strides to manage the interface zone, including:

- reviews of new development applications by the local Fire Departments to ensure adequate servicing and other wildfire risk mitigation measures
- compliance with MoFR campfire bans
- scheduled patrols during extreme fire weather (depending on availability of personnel)
- ecosystem restoration and vegetation rehabilitation at the Nanoose First Nation campground to remove invasive, combustible brush species
- public workshops to promote interface awareness
- tight surveillance of people entering campgrounds (i.e., T, DND campground)
- cooperation with MoFR Wildland Fire Service in fire prevention tactics and follow-up

Local fire department officials cite a wide range of issues and problems affecting management of the interface zone, including:

- **Human-caused fires (fires deliberately set at garbage piles, woody debris, and stolen vehicles in brush/forested areas close to residences and other structures).** The annual incidence of human-caused fires (Photos 87, 88) continues to

increase in some areas despite the best efforts of fire department officials to promote fire safety and prevention.


- **Spot fires and fire potential along the rail corridor**.
  ×Spot fires are not uncommon on the railway tracks during mid summer.
  ×A recent fire on the railway tracks necessitated an inspection by foot along a long section of the track by the local fire departments. "We had a good long walk along the tracks" (NVFD).

- **Delayed response times**
  ×Residents of areas with delayed response times need to be vigilant. In rural areas, response times greater than 8-10 minutes are considered delayed.
  The Nanoose Volunteer Fire Department notes the following response times:
  - Morello Road area – 20 minutes (no community piped water)
  - Schooner Cove – 20 minutes.
  - Summerset Rd/Seablush Dr – 10 - 15 minutes
  - Hillview - > 20 minutes (NVFD: "nasty slope; older houses; no water; not good access; long run back for water")
  - Skyview Road – 18-22 minutes
  - Kinghorne / Kaye Road (Rivers Edge) – 20-25 minutes (longest run for NVFD: "by the time the fire department arrives, the houses will be fully engulfed by flames")

- **Contact information for stakeholders is difficult to access, especially during emergencies.**
  ×Lantzville Fire Rescue recently spent several hours trying to contact Southern Rail when rail travel was impeded by a blockage on the tracks.
  ×With the downturn in the forest industry, and concomitant changes in forest land tenures, fire department officials at many communities on Vancouver Island state that emergency contacts, access information, and gate keys are hard to obtain for forest lands in/adjacent to Fire Protection Areas.
  ×Local fire departments note that private land forestry gates "stop us, but not the partygoers".

- **Island Highway is a "bottleneck".**
  ×The Island Highway is the main traffic artery through Lantzville/Nanoose Bay/Nanoose First Nation. In the summer, as many as 700 vehicles/hour travel each direction through Lantzville and Nanoose Bay (NVFD stats, 2009).
  Motor vehicle incidents (MVIs) and other traffic obstructions can obstruct traffic flow and/or result in long delays.
  At some sections of the highway, there is no detour route for emergencies.
  ×At some sections of the highway, multiple jurisdictions may be involved: DND, Crown Land, First Nations, local jurisdictions, Ministry of Transportation and Highways, Island Railway corridor.
  ×In the event of fire, Lantzville Fire Rescue has the ability to control the traffic lights at the Superior Road/Island Highway to permit fire emergency vehicles to cross the intersection. The process benefits response time.

- **Transportation of hazardous materials via road/rail through the communities.**
  ×The types and amounts of hazardous materials transported through Lantzville and Nanoose Bay via highway/rail are not required to be specified to the local fire departments.
  -As many as 215 tanker cars/day of hazardous materials and flammable liquids (including sulfuric acid and propane) travel by rail through the area (NVFD).


- **Existing residential driveway accesses in many areas of Lantzville/Nanoose Bay are unsuitable for emergency vehicle access.**
  ×Steep, narrow driveways and long driveways may hinder access by emergency vehicles. Steep, winding driveways at Nanoose are compared to "luge runs".


- **Development with limited access and/or hazardous terrain**
  ×Subdivisions without looped access roads hinder emergency response (i.e., Rivers Edge at Englishman River in Nanoose Bay Fire Protection Area)
  -At Lisa Lane, the fire department doubts whether Hydro lines would provide sufficient clearance for emergency fire vehicles.


- **Impeded access - resort areas.**
  ×At the height of the summer tourist season, when the fire risk is highest, and driveway spaces are fully occupied with visitors' vehicles, congested accesses at Pacific Shores limit turning radii for fire department emergency vehicles.
  ×(Pacific Shores is occupied year-round. Each month the NVFD responds to 3-4 medical calls at the resort.)

- **Current mapping for First Nation reserves is not readily available.**
  ×Fire departments responsible for First Nation reserves often do have up-to-date cadastral mapping. Mapping information for reserves is difficult to obtain.

- **"Pre-org" mapping shows hydrant locations, but does not indicate pressures.**
  ×RDN maps for fire departments could be supplemented with pressures of individual fire hydrants.

- **Fireflow at Nanoose Bay mobile home park.**
  ×One low-pressure hydrant is installed at the Nanoose Trailer Park. Installation of an additional hydrant would improve fire suppression capabilities.
  -The NVFD has responded to several mobile home fires at the Nanoose Bay mobile home park, including the manager's mobile home, which burnt to the ground.

- **Blackjack subdivision at Lantzville does not have hydrants.**
  ×Connecting Clark Road East and Clark Road West would improve response time by 3-4 minutes to the Blackjack subdivision area.

- **Fireflow requirements at First Nation reserves are often not reliable.**
  ×Fire departments responsible for First Nation reserves note that fireflow/hydrants on reserves are generally not maintained to FUS requirements.

- **Reduction of suppression capabilities as a result of inadequate building standards.**
  ×A new 4-storey condominium was recently added to the Pacific Shores resort at Nanoose Bay. During the development review process, the NVFD recommended the new structure have a maximum of 3 storeys above ground level.
  Comment from NVFD: "How do you get a ladder up to the 4th-storey?"

- **Fireflow specifications.**
  ×A swimming pool at Pacific Shores Resort was installed with a dry hydrant for fireflow. The NVFD responded to a fire call to find the pool empty.

- **District of Lantzville does not have a community police office.**
  ×A community police office with resources would provide support for various interface management issues, including teen parties at night at beach accesses, and activities on forestry roads near rural neighbourhoods.


Photo. District of Lantzville offices.

- **Recruitment and retention of volunteer firefighters is an increasing challenge.**
  ×Volunteer fire departments throughout British Columbia are finding it increasingly difficult to recruit, and maintain, new firefighters. Soaring real estate values, a changing job market, and increasing requirements for training are some of the reasons cited.
  ×Lantzville Fire Rescue and Nanoose Volunteer Fire Department are fortunate to have relatively stable crews, but LFR may still see manpower losses to career fire departments.


Photo. Lantzville Fire Rescue.

- **Volunteerism often ebbs at "high-end" subdivisions and housing estates for retireees.**
  ×Currently only one member of the Nanoose Volunteer Fire Department resides at Fairwinds.


Photo. Fairwinds.

- **Extreme interface fire hazard at Foothills subdivision lands.**
  ×Development of the Foothills subdivision is stalled due to prevailing economic conditions. The property is currently gated and under guard.
  According to the local fire department, the "fire risks are appalling".
  N.B. A UBCM-funded Fuel Management Prescription is being conducted for the Lantzville-Foothills area (Crown and public lands permitted only). Completion is anticipated Fall 2010.


Photo. Foothills, Lantzille.

- **Fuel management at community parks.**
  ×Copley Park and Sebastion Park at Lantzville, and Beachcomber Park at Nanoose Bay are small community parks bordering residential areas. Fuel reduction at the parks would reduce the interface fire hazard.

Photos. Beachcomber Park (left); Copley Park (middle); Sebastion Park (right).

- **Fuel management at CFEMTR.**
  ×The base's fire department recommends rehabilitating old access roads, and creating a 4WD access trail along the property's fenceline in order to improve fire emergency access.


Photos. CFEMTR.

- **Parklands and trails with inadequate emergency access.**
  ×Enos Lake at Nanoose Bay is a popular hiking area. The NVFD says designated trails needed are needed for 4WD fire emergencies, and at present, "it is too far to haul high-volume hose". The fire department has had several calls to the area, and notes that, in the event of a medical emergency of fire, the area is "not terribly accessible for us".
  ×Walking trails connecting Crown lands with recreational features at Nanoose are "not well organized" (NVFD).

Photo. Hiking trail, Fairwinds.

- **Bylaw enforcement.**
  ×Local parks are posted with signs stating "No Fires".
  -No bylaw enforcement occurs.


Photo. Beachcomber Park.

- **Ongoing parties and loitering problems at private, undeveloped parcels.**
  ×Vagrants and teen parties at undeveloped land parcels straddling highway in northeast Lantzville result in garbage and fire threats.


Photo. "Vacant land" between Lantzville and Nanaimo.

- **Landscaping features may present a fire risk.**
  ×Many residential properties use cedar (and pine) hedges as property borders, and bark mulch for landscaping.
  Coniferous hedges and bark mulch can be highly combustible, particularly during extended periods of summer drought. Structure fires could readily spread to cedar hedging.
  ×During the Firestorm interface fires in 2003 in BC's interior, cedar hedging and wooden fencing around homes often acted as conduits for fire spread from the forest to structures. Dry bark mulch increased the rate of spread of fire.


Photo. Cedar hedges at Lantzville.

- **Building code inspections and compliance**
  ×Building inspections of commercial buildings are conducted at Lantzville and Nanoose Bay.
  Older, multi-story residential structures may not meet code (i.e., Schooner Cove at Nanoose Bay), potentially endangering fire fighters.
  Structures at the Nanoose First Nation do not fall under the BC Building Code.


Photo. Nanoose First Nation.

- **Sightlines for fire emergency vehicles responding from LFR.**
  ×Roadside brush beside the highway southeast of the Ware Road/Highway intersection restricts motorists' views of LFR emergency vehicles at the intersection.
  Cooperate with Ministry of Transportation and Highways to trim roadside right-of-way brush around the Ware Road/Highway 19 intersection.


Photo. Improvements in motorists' sightlines would enhance safety.

- **Fire department liaison at the regional level.**
  ×Unlike some other regional districts, RDN does not have a staff position specifically designated as the liaison with fire departments.

9.0 SUMMARY OF RECOMMENDATIONS – ACTION PLAN

Mitigative action to reduce the threat of fire in wildland urban interface areas is primarily a community responsibility. Local governments, in concert with local and provincial fire officials, can take the lead in development and implementation of risk reduction strategies and policies to:

- Raise public awareness and preparedness
- Oversee risk assessment and mitigation techniques
- Establish guidelines for land use and development
- Establish and maintain an integrated emergency response and management system

Effective public education and community involvement can encourage home and property owners to take their own preventative measures in interface fire risk areas.

Recommendations to reduce the risk of interface fire at the communities of Lantzville, Nanoose Bay, and Nanoose First Nation include:

Education and Community Involvement

- **Support efforts by the local fire departments to educate homeowners and the public about interface issues through effective public awareness programs.**

- **Continue to promote interface awareness on the District of Lantzville website.**

- **Adopt the FireSmart (Partners in Protection, 2003) standard for community protection, both for public and private property.**

- **Cooperate with the Ministry of Forests and Range and Regional District of Nanaimo to create a condensed version (i.e., informative pamphlet) of the FireSmart Manual.**

- **Cooperate with the RCMP to establish a community policing office at Lantzville. A community policing presence could deter deliberately caused fires.**

- **Continue to promote FireSmart guidelines for interface safety at schools, community events and venues: (i.e. Fire Department talks at schools during Fire Prevention Week; Lantzville's Community Garage Sale and Mine Days; Nanoose Bay's Enos Lectures; Nanoose First Nations campsite).**

- **Continue to ensure local campgrounds, resorts, and summer camps are familiarised with pertinent sections of BC's Wildfire Act (SBC 2004) – including forest fire protection and campfire restrictions.**

- **Ensure any regulatory action taken to educate residents about interface actions is done in consultation with the Ministry of Forests and Range Protection Branch.**

- **Cooperate with the Ministry of Forests and Range to ensure standardised implementation of Coastal fire bans throughout the Region.**

Vegetation Management

Fuel Modified Zones –

- **Conduct neighbourhood "tailgate" sessions to encourage home and property owners to establish and maintain Fuel Modification Zones around residences and other structures, especially in High and Extreme hazard areas.**

UBCM Fuel Management Programs –

- **Make application to UBCM for funding to conduct operational fuel treatment at public lands interfacing development.**
  Prioritise fuel management projects based on values-at-risk.
  Fuel reduction is recommended at the following public lands:
  -Copley Park, Lantzville (reduce/remove surface/ladder fuels in forested portion of park abutting homes)
  -Sebastion Park, Lantzville (light understorey thin; reduce/remove surface/ladder fuels in this small, forested park abutting residences on Sebastion/Lantzville Road. Fuel treatment at this park would profile fuel management to the community, and might serve to reduce the beach fires and parties at Sebastion Road beach access.
  -Beachcomber Park, Nanoose Bay (light understorey thin; reduce/remove surface fuel in this ocean-side park flanking residences. Fuel treatment at this park might serve to reduce illegal fires in the area.
  -Woodlot 1314, Lantzville (reduce fuels in a 10-m buffer along trails and contiguous boundaries to improve sightlines and discourage human-caused fires in the woodlot). Residential acreages border the eastern portion of this woodlot.

Fuel Management on "Vacant" Lands –

- **Pursue opportunities with owners of vacant, undeveloped lands bordering development to reduce fuel loading along boundaries abutting existing development:**
  -Foothills
  -brush/grass parcels north of Woodgrove Mall, on the border of Lantzville and Nanaimo

Slash Abatement –

- **Cooperate with local governments to ensure private land owners abate hazardous fuels in a safe and environmentally friendly manner.**

Roadside Fuels –

- **Continue to cooperate with BC Hydro to ensure regularly scheduled vegetation maintenance work along road rights-of-way.**

Fire-resistive Landscaping –

- **Encourage residents to landscape with fire-resistive vegetation.**
  ***See FireSmart Landscaping on Southeastern Vancouver Island*,**
  Strathcona Forestry Consulting, 2004
  http://www.cityoflangford.bc.ca/document/brochures/FireSmartLandscaping.pdf

Fuel Disposal –

- **Encourage homeowners to compost deciduous litter and grass clippings.**

- **Investigate with the Regional District of Nanaimo a community-wide program of managing yard wastes by collecting or composting, or converting such wastes into renewable energy.**

Building Construction and Design

- **Require all new construction/retrofits to follow RDN building permit process.**

- **Use fire-retardant roof covering assembly rated Class A, B, or C (i.e., metal, tile, ULC- rated asphalt).**

- **Use non-combustible siding material (i.e., stucco, metal siding, brick, cement shingles or cementitious materials, poured concrete, or ULC-rated wood siding).**

- **Investigate the feasibility of mandating spark arrestors on chimneys/stovepipes on new construction.**

- **Follow FireSmart guidelines for design, construction and maintenance of chimneys, window and door glazing, eaves and vents, and decking.**
  http://www.partnersinprotection.ab.ca

Infrastructure

Strategic Planning –

- **Cooperate with RDN on bylaw enforcement issues (i.e., "No Fires" at local parks).**

- **For areas that are designated for future development in the OCP (that is, not already zoned for development), ensure that the secondary plans or bylaw amendment applications contain development permit areas for interface fire risk mitigation. Request to the local government that development permit areas be applied to existing developed/subdivided areas in high or extreme interface hazard areas.**

- **Liaise with Ministry of National Defense to improve emergency access at strategic areas of CFEMTR Nanoose Bay by rehabilitating old access roads and creating a 4WD access trail along the property's fenceline.**

- **Consider creation of RDN staff position to act as liaison with regional fire departments.**

- **Work with local government in rezoning applications of undeveloped lands within the District to ensure adequate servicing requirements for fire protection are met.**

- **Encourage local government to issue FireSmart pamphlets to development applicants.**

Parks and Wildlands –

- **Encourage residents to institute informal "Forest Watch" neighbourhood patrols during fire season. Continue to encourage "Eyes on the Foothills".**

- **Incorporate well-marked, mapped trails, roaded emergency access to Enos Lake, and signage with emergency contact numbers at strategic trail accesses at the Fairwinds development at Nanoose Bay.**

Access –

- **Strive to ensure property accesses (i.e., width, length, turning radii) are integrated as part of the RDN Building Inspection Services mandate, along with properly installed and visible address signs.**

- **Liaise with local governments and the Ministry of Transportation and Highways on improving emergency access by completing/looping existing one-way road systems at areas identified by the local fire departments as having slower or possibly hazard delayed response times (i.e., Clark Road East and Clark Road West at Lantzville; Lisa Lane – between Lantzville and Nanoose Bay; Rivers Edge subdivision, Nanoose Bay).**

- **Request Ministry of Transportation and Highways cuts brush on southeast side of Ware Rd/Highway 19 intersection, to make it better for west-bound vehicles to see LFR vehicles at the intersection.**

- **Continue to refer any development applications for review to the local fire departments to ensure that access requirements and building features of any proposed development are sufficient to allow fire trucks and other emergency vehicles access to the properties and structures.**

- **Contact rail/road transportation carriers to ensure local fire departments are notified of the types and amounts of hazardous materials regularly transported through the subject area. Ensure the carriers supply local fire departments with appropriate Material Safety Data Sheets.**

- **Ensure up-to-date cadastral mapping for Nanoose First Nation is made available to Lantzville Fire Rescue for pre-org. mapping purposes.**

- **Incorporate hydrant pressure data into pre-org (fire preparedness) mapping.**

Fire Protection

Fireflow –

- **Pursue the feasibility of installing additional hydrant at the Nanoose Bay Trailer Park to improve fire suppression capabilities.**

Compliance –

- **Cooperate with Indian and Northern Affairs Canada to ensure that hydrants at Nanoose First Nation are regularly maintained to comply with FUS standards.**

Firefighters –

- **Strive to increase the stability of local volunteer fire departments by providing more innovative benefits to firefighters (i.e., paid training, benefits, support, local tax deductions).**

Pre-fire Planning –

- **Develop and document pre-fire plans (operating guidelines) for specific fire/emergency sites (rail/highway corridors/military base)**

Firefighting at the Grassroots Level –

- **Encourage homeowners bordering areas of extensive forest to equip their homes with personnel fire fighting equipment, including: rooftop access ladder, pump (non-electric power source), shovel, rake, large water barrel, and 10-L pail. Regular practices are recommended to ensure familiarity with the use of fire fighting equipment.**

- **During extreme fire weather, encourage residents to use sprinkler systems powered by gas pumps drawing from cisterns to "wet down" PZ 1 zone around structures.**

10.0 IMPLEMENTATION

No plan is complete until it is implemented.

Local governments must take the responsibility for implementation.

The Community Wildfire Protection Plan for the communities of Lantzville, Nanoose Bay, and Nanoose First Nation should be distributed to local governments within three months of the plan's submission. Recommendations in the plan should be reviewed in consideration of official adoption of the plan. An opportunity to review the plan should be provided to local stakeholders (i.e., Woodlot owners, BC Parks, Ministry of Forests and Range, private forestry companies, and other special interest groups), and nearby jurisdictions in the Regional District of Nanaimo. A public review process should be scheduled within six months of the plan's submission.

Maintenance of the Community Wildfire Protection Plan should include an annual schedule for monitoring and evaluating the programmatic outcomes established in the Plan.

Regular evaluations of the Community Wildfire Protection Plan should 1) assess the effectiveness of programs, and 2) identify any changes in hazard-risk assessments.

Coordinating agencies responsible for various implementation processes should report on the status of their projects, the success of various implementation processes, difficulties encountered, success of coordination efforts, and which strategies should be revised or removed. Organizations participating in the Plan evaluation should be clearly identified in the evaluation.

Fire protection and prevention in the interface are ongoing processes.

Photo. Wildfire.

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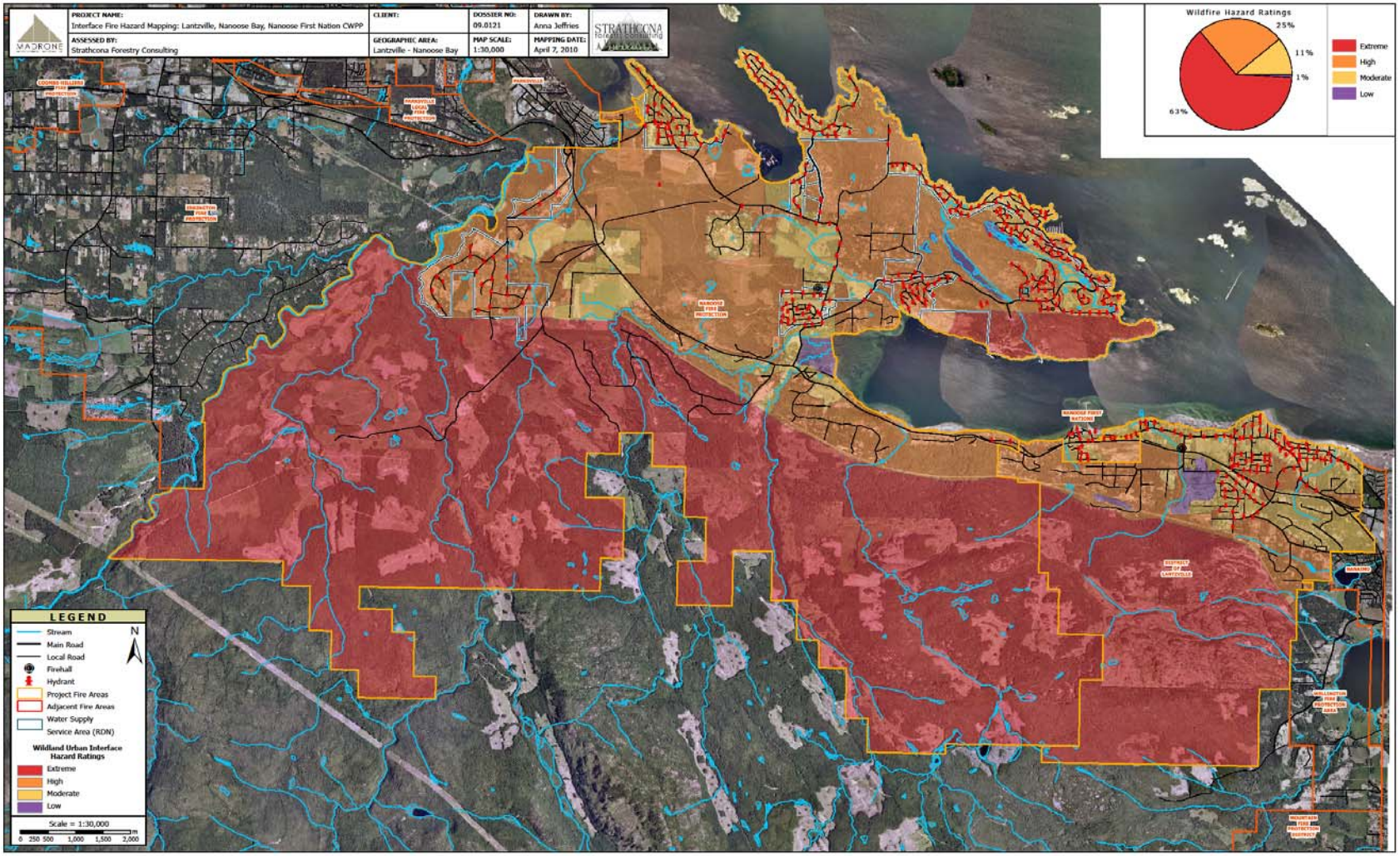

APPENDIX 1. CWPP INTERFACE MAPPING

APPENDIX 2. GLOSSARY OF TERMS

Biogeoclimatic units: geographic areas influenced by similar regional climates

Biogeoclimatic Ecosystem Classification (BEC): a system that groups similar segments of the landscape into categories of a hierarchical classification system that combines three major classifications: climate, vegetation, and site

Brunisol Soil: Soil Great Group with weak soil development; common on southeastern Vancouver Island

Buildup Index: (used in CFFDRS - combines Duff Moisture Code and Drought Code) – a numeric rating of the total amount of fuel available for combustion

CDFmm: moist maritime Coastal Douglas-fir Biogeoclimatic Subzone

CFMETR: Canadian Forces Maritime Experimental Test Range (Nanoose)

CFFDRS: Canadian Forest Fire Danger Rating System – a model developed by Forestry Canada for evaluating forest fire danger

CWPP: Community Wildfire Protection Plan

CWHxm: very dry maritime Coastal Western Hemlock Subzone

Crown Fires: burn foliage and branches in the upper canopy, and also consume surface and ground fuels

DC: Drought Code – a numerical rating of the average moisture content of deep, compact organic layers

DGR: Fire Danger Class Ratings (1 to 5) calculated based on fire weather indices

DMC: Duff Moisture Code – a numerical rating of the average moisture content of loosely compacted organic layers of moderate depth

Development Permits / Development Permit Areas: authorised under the Government Act, these local planning tools, which are outlined in the Official Community Plan, address specific conditions, including protection of development from hazardous conditions (i.e., wildfire)

Ecosystem: for purposes of the BEC, an ecosystem is defined as a particular plant community and its associated topography, soil, and climate

FBP: Fire Behaviour Prediction system – modeling that predicts the rate of spread, fuel consumption, and intensity of wildfires

Field mapping: mapping of physical features and key resources

Fire Behaviour: the manner in which fuel ignites, flame develops, and fire spreads

Fire Behaviour Triangle: three elements of the fire environment – fuel, weather, and topography – affect fire behaviour

Fire Behaviour Output Factors: fire intensity, rate of spread, crown fraction burned
Fire Danger: a description of the combination of both constant and variable factors that affect the initiation, spread, and difficulty to control a wildfire on an area

Fireflow: water supply for firefighting

Fire Protection Improvement District: autonomous local government body that is administered by an elected board of trustees, and is responsible for providing one or more local services (i.e., fire protection) for the benefit of the residents of the community

Fire Season: officially April 1 to October 31

Fire Service Area: area served by the local Fire Department

Fuel: any substance which will ignite and burn

FireSmart Fuel Modified Zones: (distances vary according to location, lot size, aspect, slope, etc.):
Priority Zone 1 (fuel removal 0-10 m around structure);
Priority Zone 2 (fuel reduction or conversion 10-30 m around structure);
Priority Zone 3 (fuel reduction 30-100 m around structure)

Fuel loading: total amount of vegetative fuel available for potential combustion

Fuel treatment: manipulation of vegetative (and structural) fuels by harvesting, chipping, burning, composting, or other means

Fuel treatment priorities: management of vegetative (and structural) fuels prioritised according to hazard, risk, safety, funding, etc.

FWI: Fire Weather Index – accounts for the effects of fuel moisture and wind on ignition potential and probable fire behaviour

GIS: Geographic Information System – GIS is a computer technology that uses a geographic information system as an analytic framework for managing and integrating data, solving a problem, or understanding a past, present, or future situation

Ground fires: burn in the duff layer (organic soil) and decaying woody material beneath the forest floor

Hazard: the product of risk, vulnerability, exposure, and the capacity of humans to respond to extreme conditions

HIRV: Hazard, Impact, Risk and Vulnerability – an analysis model – designed as a community based-approach to sustainable hazard mitigation

Impact: assessed through the use of social, environmental, economic, and political factors

Improvement Districts: autonomous local government bodies responsible for providing one or more local services for the benefit of the residents in a community. Improvement Districts vary considerably in size, from small subdivisions, to urban communities. Improvement Districts are usually located in rural areas of the province where there was no alternative form of local governance available, suitable, or desirable for the community. Improvement Districts are similar

in structure to a municipality but are more informal and only provide direct services such as waterworks and fire protection.

Interface fires: fires that have the potential to simultaneously involve both structures (and/or other manmade developments) and wildland fuels

ISI: Initial Spread Index – a numerical rating of the expected rate of spread of a fire

Ladder Fuels: aerial fuels that act as a conduit to help spread a fire upward into the tree canopy

Leeward Island Mountains Ecosection: upper, hilly counterpart of Nanaimo Lowland Ecosection

LFN: Lantzville First Nations

LFR: Lantzville Fire Rescue

MoFR: BC Ministry of Forests and Range

NFPA: National Fire Protection Association

Nanaimo Lowland Ecosection: coastal plain on the south-eastern margin of Vancouver Island. The Ecoregion is the product of a relatively dry, mild climate in the rain shadow of the Vancouver Island Mountain Range. It is one of the most ecologically diverse areas in North America.

NVFD: Nanoose Volunteer Fire Department

OCP: Official Community Plan

Ortho photos: 3-dimensional mapping developed from satellite imagery and digital elevation models

PEP: Provincial Emergency Program

Podzol: Soil Great Group characterised by podzolic B horizon

Priority Zones: See FireSmart Fuel Modified Zones

Probability of ignition: for the purposes of this report, the probability of ignition can be accounted for by assigning a higher hazard rating to areas where fires are most likely to be started

Risk: the measure of probability of occurrence of an event and the expected severity, and an analysis of potential factors (human or natural) which can contribute to the potential for fire occurrence

RDN: Regional District of Nanaimo

STS: Superior Tanker Shuttle

Slash loading: branches, limbs, and coarse woody debris left on the forest floor after logging

Suppression constraints: obstacles to extinguishing a fire (i.e., little or no water, difficult access, limited manpower, challenging weather conditions, etc.)

Surface fires: start on the forest floor, where they consume needles, twigs, logs, and branches; if left unchecked, will burn elevated fuels (lower branches of trees; partially downed trees; tall shrubs) above the forest floor

TCH: TransCanada Highway

UBCM: Union of British Columbia Municipalities

Vulnerability: the ability of people, property, industry, resources, and areas of environmental and historic concern to weather, resist, or recover from the impacts of a hazard in the long term as well as the short term

Wildfire Severity: measured through analysis of: fuel types, risk of ignition, structures at risk, and suppression constraints

Wildland-Urban Interface (WUI): the zone where structures, businesses, and other human activities and pursuits are situated among trees and other combustible vegetation

Wildland-Urban Interface (WUI) fire hazard rating classes:
Low – urban, suburban, and farm areas with modified forest fuels, generally flat terrain; no readily combustible vegetation; low risk to adjacent development
Moderate – partially modified forest fuels; scattered mixed forest in suburban areas; moderate to good water availability; homes and structures may be threatened
High – areas with little or no fuel modification; continuous ground fuels; sloping terrain with/without gullies present; moderate to low availability of water; some areas hard to access
Extreme – areas with little or no fuel modification, continuous ground fuels; rolling and gullied terrain; rock outcrops may be present; low water availability; some inaccessible terrain; may or may not be heavy use areas; direct threat to homes/structures/values.