Denny Island

COMMUNITY WILDFIRE PROTECTION PLAN

August, 2006

Submitted to:

Central Coast Regional District
and residents of Denny Island

By:

Hans Granander, RPF

Wildfire Emergency Contacts

Organization	Phone #
Forest Fire Reporting – Ministry of Forests	1-800-663-5555
Coastal Fire Centre – Ministry of Forests, Parksville	1-250-951-4222
North Island Mid Coast Fire Zone – MOF, Campbell River	1-250-286-7645
NI MC Fire Zone – Protection Officer, Tom Rushton	1-250-286-6632
NI MC Fire Zone – Hagensborg field office	1-250-982-2000
Bella Bella RCMP	957-2388
Denny Island Emergency – Doug Sharkey	957-2759
PEP – Provincial Emergency Program	1-800-663-3456
Central Coast Regional District Emergency CCRD Emergency Coordinator – Stephen Waugh	1-250-799-5291 1-250-982-2424
Coast Guard	1-800-567-5111

Last update: May 1, 2006

Executive Summary

Denny Island is located on the outer central coast (Electoral Area – A) where the risk of wildfire is relatively low compared to other parts of the Province. A small community is situated on the north-west part of the island in the vicinity of the Shearwater Marine complex. There is growing concern within the community, and recent fire occurrences confirm, that wildfire is a threat to communities in this part of the Province.

Evaluation of the Interface Community Fire Hazard for Shearwater indicates a **moderate hazard**. This report documents the criteria that informed the evaluation and includes descriptions of the surrounding forest, the forest fuel types, community infrastructure, emergency response and special concerns that affect the rating.

As per the Ministry of Forests and Range analysis, Denny Island has a **low to moderate probability of wildfire** but if a wildfire was to get started it could burn very intensively making control and fire suppression difficult.

Even a small interface fire affecting one or two homes would have a big effect on the community given its small size. Much of the work to mitigate the risk falls on the shoulders of local residents to address the forest fuel hazard around their homes and properties.

Summary of Recommendations:

1. Develop public education and information distribution program regarding legal requirements for wildfire mitigation and precaution. Implement this as part of the broader emergency preparedness program.
2. Include interface fire management as one of the hazards that the local emergency response group considers and addresses.
3. Integrate notification of Coast Guard in event of interface fire for assistance with suppression and evacuation.
4. Develop education/information program to raise awareness of how to minimize risk of wildfire ignition and develop a system to inform the population about daily fire danger rating and the associated restrictions on ‘hot work’ activities and campfires.
5. Ensure refuse burning at the garbage dump is conducted in accordance with permits. Notify public that only designated personnel are permitted to conduct burning (signage).
6. Establish program to methodically remove wild growing scotch broom plants before problem gets too large.
7. Conduct S-100 Basic Forest Fire Fighting training for residents and workers on an annual basis.

8. Strengthen routine and ongoing communication between Denny Island emergency response personnel and MOFR Fire Protection Officer.
9. CCRD Emergency Committee should review feasibility of establishing a volunteer fire department on Denny Island and provide recommendation to CCRD Board.

Mitigation Treatments

- Conifer trees in the vicinity of homes should be pruned to a height of at least 2m. Branches overhanging houses or balconies should also be pruned back. Wild growing brush and other woody material should also be cleared from around houses.
- Work to improve access for fire truck to isolated shoreline residences.
- Establish program to monitor and remove any scotch broom plants that may invade the island.
- Given the susceptibility of slash fuels to fire, it is imperative that any mitigative treatments involve the removal of slash build up.

Foreword

This Community Wildfire Protection Plan was prepared on behalf of the Central Coast Regional District and the residents of Denny Island, with funding assistance from the Union of BC Municipalities. The plan provides an overview of the community, describes the surrounding forest fuel types, estimates the interface fire hazard and provides mitigating recommendations.

Acknowledgement

Many people assisted with the development of this plan. Acknowledgement and gratitude is due to Stephen Waugh, Emergency Coordinator and Donna Mikkelson of the Central Coast Regional District; Doug Sharkey, Denny Island Deputy Emergency Coordinator and Al Tite of Shearwater Marine.

Shearwater Marina with view towards the north.

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Denny Island Community Wildfire Protection Plan

Prepared by:

Hans Granander, RPF August 18, 2006

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1 Introduction

The Central Coast Regional District (CCRD) is working to help the communities of the Central Coast become more resilient to disasters. All of the communities of the Central Coast are surrounded by coniferous forests and the potential for forest fires to cause significant damage to homes, businesses and facilities is a real threat and of growing concern. Virtually all of the homes and businesses in the Central Coast are built amongst trees in close proximity to the forest and therefore are situated in the 'interface' fire zone, where risks are highest.

To address this safety concern, the CCRD is working to make Central Coast communities 'Firesmart' and with the support from the Union of British Columbia Municipalities (UBCM), has commissioned the preparation of Community Wildfire Protection Plans (CWPP) for each community. The purposes of these plans are to:

- Assess, document and map interface wildfire hazard
- Recommend fire prevention and mitigation strategy
- Recommend implementation activities regarding zoning, by-laws, development and landscaping
- Enhance emergency response plans
- Propose public communication strategies
- Recommend plan monitoring and updating mechanisms.

Denny Island is situated in the outer, central coast (see map in Appendix A) where forest fire danger is low compared to many other areas of the province. The landscape on Denny Island is characterized by a complex of scrub forest and muskeg with occasional larger timber stands on elevated or sloped sites and along the shoreline. Settlement on Deny Island is situated near the Shearwater Marine complex and spreads along the northwest shoreline of the island where the forest type is denser and has larger trees than generally found on the rest of the island. With changing weather patterns, there is increasing local concern that the community is at risk from a damaging interface fire, even though it is one of the wetter places in the province.

In response to this identified concern, the CCRD has commissioned the preparation of the Denny Island Community Wildfire Protection Plan.

1.1 Planning Area

The plan covers the settled areas on Denny Island in the vicinity of the Shearwater Marine Complex and shoreline areas to the north.

1.2 Legal Framework

Interface fire is primarily addressed by the Provincial Wildfire Act (2005) and Regulations. This legislation spells out the authorities, obligations and responsibilities for the different layers of government, industry and individuals. The Provincial government has the authority to enter onto any land in the province to carry out fire control measures, including entering property, restricting access, order an evacuation and requisition persons and equipment. The government may also provide fire control assistance when requested by a local government.

Compared to previous versions of the fire legislation, greater responsibility is now placed on municipal governments to address use of fire and prevention of wildfire within their jurisdictions. With respect to the duties of a Regional District, unless they have established bylaws dealing with open fires or wildfire, then requirements still default to the Provincial standards under the direction of the Ministry of Forests and Range.

At this time there is no legal requirement for the Central Coast Regional District or communities in its jurisdiction to carry out Community Wildfire Planning; however, in the interest of making Central Coast communities 'disaster resilient', the CCRD is undertaking this proactive and preventative initiative.

Other legislation that pertains to fire in and around communities include:

- Forest and Range Practices Act
- Land and Parks Waste Management Act
- Open Burning Smoke Control Regulation

1.3 Local Fire Policies and Programs

The Central Coast Regional District is challenged financially with an extremely tight budget, limited due to its small tax assessment base. As such, the CCRD lacks administrative and other resources to take on a greater role in dealing with wildfire prevention and control. Therefore, the CCRD does not have any policies or regulations regarding wildland interface fire and, by default, rely on Provincial regulation, policies and support to control wildfire. Furthermore, there are no local bylaws or zoning requirements dealing with wildfire prevention or mitigation. Through this plan however, the CCRD recognizes the importance of determining the interface wildfire hazard and to inform residents so they can take voluntary action to reduce wildfire hazard in the vicinity of their homes and properties.

In the event of an actual interface wildfire, the CCRD's role and responsibility as local government authority becomes more pronounced. In

this kind of crisis situation, the CCRD may issue a **Local State of Emergency** to invoke powers necessary to address the emergency, including the issuance of an Evacuation Order (please refer to CCRD Emergency Plan for further information).

Denny Island does not have an official volunteer fire department. Local fire suppression capability is best described as 'neighbours helping neighbours' using private fire suppression equipment. The local fire fighting capacity is described in more detail in Section 5 - Emergency Operations. Fore shoreline fires the Coast Guard is expected to provide fire suppression assistance from the water using their on board fire pumps; however, these vessels may not be available on short notices. Overall, it is clear that there are inadequate resources to fight anything but the smallest interface fire and therefore quick assistance from outside agencies will be crucial.

1.4 Key Wildfire Regulation Requirements

Given the small size of Central Coast communities, almost all of the settled areas are in close proximity to the forest. Since the provincial wildfire legislation pertains to, not only forested areas, but areas within specified distances of a forest, the regulations apply to most areas in the communities. Key elements of the regulations that apply to industries, businesses and residences include hazard assessments, hazard mitigation, restrictions on industrial activities, fire preparedness and permissible fire requirements.

Note: The following is only a brief summary of the Wildfire Regulation. It is provided for basic information only. Those persons carrying out activities in the vicinity of a forest must refer to the current wildfire legislation for a complete understanding of the requirements. These regulations can be accessed at:

www.for.gov.bc.ca/protect/

Although the regulations apply to most activities, particular emphasis is placed on 'industrial activity' and 'high risk activity'. In general, **industrial activity** refers to land clearing and activities related to forestry, like logging, processing and silviculture, but it also includes activities like refuse disposal and road maintenance. **High risk** activities, again generally, refers to forestry work, but it also includes welding, grinding, right of way grass mowing and use of pyrotechnics. These types of activities are undertaken regularly within Central Coast communities and it is important that people are aware of their responsibilities in these regards.

Sufficient Fire Fighting Tools
Anyone carrying out an industrial activity that has potential to cause wildfire is required to keep sufficient fire fighting hand tools on site.

High Risk Activity Restriction
Anyone carrying out a high risk activity within 300 m of a forest during fire season must determine the Fire Danger Class and conduct operations in accordance with any applicable restrictions (fire watch, early shift, shutdown, etc), must have adequate hand tools and an adequate fire suppression system (fire pumps and water) on site.

Precautions to Prevent Escape of Fire
Anyone carrying out an industrial activity, including waste disposal, within 300 m of a forest must maintain sufficient fuel break to ensure fire does not escape.

Hazard Assessment
Anyone conducting industrial activity or operating a waste disposal site within 2 km of the boundary of the local government or a fire prevention district in a Regional District must conduct fire hazard assessment at 3 month intervals.

Hazard Abatement
For those areas where Hazard Assessments are required (within 2 km zone), fire hazard abatement is to be done within 6 months of the assessment.

Permissible Open Fires
There are four categories of permissible fires, three of which generally applies to communities:

- **Category 1 –** small fire (<1m height & diameter), including campfires.
- **Category 2 –** one or two moderately small fires (< 2m height & 3 m diameter), or grass fire <0.2 ha.
- **Category 3 –** 3 or more fires not exceeding 2 m in height or 3 m in diameter; or less than three fires and greater than 2 m in height or 3 m in diameter; or grass fires > 0.2 ha.

These categories require increasing levels of safeguards and the regulations should be referenced for the most up to date requirements. Most Central Coast communities burn their garbage in fires that fit the Category 3 designation and, as such, are required to:

- obey any burning restrictions
- do so in a safe manner

- obtain a burn registration number
- take all necessary precautions
- establish fuel break around fire
- ensure an adequate fire suppression system is available
- maintain a fire watch
- ensure fire does not exceed capacity to prevent escape.

Given the recent changes to the Wildfire Legislation, it is likely that many people are not aware of their responsibilities in regard to their industrial activities and use of fire.

Recommendation
Develop public education and information distribution program regarding legal requirements for wildfire mitigation and precaution. Implement this as part of the broader emergency preparedness program.

1.5 Fire Planning Process

A preliminary estimate of the 'Hazard, Risk and Vulnerability Analysis' (HRVA) was conducted in preparation for the Central Coast Outer Coast Emergency Plan (Draft, 2006). This analysis ranked interface wildfire as a hazard of concern for Denny Island. To address this concern, the CCRD commissioned the development of a Community Wildfire Protection Plan.

The development of the Denny Island Plan was initiated at a meeting with key Denny Island emergency personnel and the CCRD Emergency Coordinator on November 7 & 8, 2005. The following steps and tasks were taken to complete the Plan:

- Available forest inventory maps and data were assimilated.
- Strategic Threat Analysis maps and data were acquired.
- Background information on forest fire ecology, weather data and topography was summarized.
- Information on the community in terms of population, infrastructure, developments, activities and fire control resources was summarized.
- MOFR Fire Protection personnel were consulted.
- Field reconnaissance was conducted to determine forest fuel conditions.
- Interface Fire Planning Units (IFPU's) were identified.
- Hazard evaluation was conducted.
- A draft CWPP with hazard map was circulated for review and comment.

- Final CWPP completed.

1.5.1 Denny Island Emergency Management & Response

The Denny Island community is very small with only about 85 permanent residents, so there are limited resources for emergency management and response. As a matter of necessity, people in isolated communities help each other in times of emergency, and Denny Island is no different in this regard. Like any community of this size, people wear many 'hats of responsibility' and there are no 'departments' to focus on any one particular task. Denny Island has a local Deputy Emergency Coordinator volunteering as an extension of the CCRD Emergency Management Program. Emergency issues are addressed through a local ad hoc committee organized by the Coordinator. Mitigation of interface fire hazard therefore needs to be incorporated into regular considerations of this local emergency management committee.

Recommendation: Include interface fire management as one of the hazards that the local emergency response group considers and addresses.

2 Community Profile

Denny Island is situated along the Inside Passage, half way between Prince Rupert and Port Hardy on the outer, central coast of British Columbia. The site was chosen by the Royal Canadian Air Force as an important antisubmarine bomber reconnaissance unit in 1941, but disbanded in 1944. After the war, a former Air Force officer purchased the base and began developing the Shearwater Marine complex which is the hub of the Denny Island community. There are approximately 85 residents but during the active fishing season the marina is full with boats and the transitory population can rise to several hundreds. Economic activity is primarily marine based as Shearwater is a popular full-service marina and fishing resort. Besides an old Pacific Canadian fish plant, there are a couple of bed-and-breakfast lodgings, fishing-charter operators, moorage for pleasure boaters, a small store and post office, pub restaurant and regular water taxi service to Bella Bella. A dry land log sort is operated sporadically.

Figure 1 Shearwater Resort and Marina complex

2.1 Geography

Denny Island is a relatively flat, low lying island with some rolling hills rising to 700 m elevation although the hills near the settled areas only reach 250 m. Most of the island is inaccessible by road except for settled areas in the vicinity of Shearwater and the airstrip.

2.2 Population and Community Description

The population on Denny Island is approximately 85 people and, understandably, the community is limited in resources and services. There are a handful of children on the island, some of which attend the small local

school while the rest attend the larger school in Bella Bella. Building density varies from 'developed' (100-1000 buildings/sq km) in the immediate vicinity of the Shearwater Marine complex and 'isolated' (1-10 buildings/sq km) to the northwest, where primarily ocean front residences are strung out along the shoreline. Many of these shoreline residences (approximately 50%) are only accessible from the ocean or by small foot/ATV trails, thereby limiting access for fire trucks. For some, Denny Island is their only residence while others live part of the year in more urban settings. During the hectic spring/summer fishing season, hundreds of visitors, either staying at the Shearwater resort or on their own boats at the marina, increase the population significantly.

2.3 Socio-economic Condition

The socio-economic status of the residents varies from those existing on meagre incomes to those that are comfortably well off. Very few people have fire insurance, so outside financial assistance will likely be required to help people recover from a damaging interface fire.

2.4 Investments and Infrastructure

Investments are primarily individual residences, government agency housing and commercial infrastructure:

- Shearwater marine complex – shop, warehouse, stores, restaurant, lodge.
- School
- Public dock and harbour.
- Marine fuelling installation and tank farm
- Ferry terminal
- Paved airstrip
- Some of heavy machinery
- Small grocery store
- Firehall
- Barge ramp.
- Roads
- Diesel generating plant (back up system).
- Telephone & hydro lines
- Water lines.

There is no municipal water system on Denny Island. The majority of residences either, collect and store rain water or pump from a stream or pond or both. Shearwater Marine and Coast Ready Enterprises (formerly Pacific Canadian Fish) have water rights and a dam/pipeline system from Croil Lake. This system services these two companies plus the school and

hydro and some private residences. There are 4 fire hydrants connected to this pipeline system. These hydrants only serve the nearby area surrounding the Shearwater Marine complex.

2.5 Key Community Interface Fire Issues

The following issues were identified by local people:

- Emergency Evacuation: There are few emergency evacuation options for people on Denny Island. Since roads do not extend very far from the community, people would have to be evacuated by boat to Bella Bella on the neighbouring Campbell Island in an emergency. The Coast Guard may be called upon to assist with this evacuation.
- Shearwater Marine is the single most important economic driver within the community and any long term disruption to this facility can have large impact on the viability of the community.
- Economic disruption from forest fire along power line: Hydro power is transmitted from Ocean Falls to Denny Island via transmission lines supported by wooden poles. A forest fire along the powerline can cause significant economic disruption by burning up the poles. There is a backup power system and enough fuel is stored to provide backup power for approximately four weeks.
- Fire truck access: Many residences are only accessible by boat or by small foot/ATV trails and thereby limiting the ability of the fire truck to provide suppression support. Coast Guard has pumping capacity and it may be necessary for Coast Guard to assist with suppression around the water front properties.
- Fuel management in vicinity of homes: Many people that live in this area have a preference for homes built in and amongst the evergreen forest and, as a consequence, forest fuels are in close proximity to the homes thereby raising the interface fire hazard.
- The garbage dump is a main potential fire source. Fortunately, summer winds during summer hot spells usually blow from the west/north west, away from the settled areas. However, at times summer winds do blow from the south, placing the community partially downwind from this risk.
- Community could greatly benefit from more support and training from MOFR regarding interface fire suppression.

3 Interface Fire Planning Units

Community wildfire plans are broken down into Interface Fire Planning Units (IFPU) in order to facilitate differences in terms of fire hazard, values at risk, logistics and operational challenges. Due to the small size of the community, only one IFPU is identified for Denny Island.

3.1 Denny Island IFPU

The main characteristics of the Denny Island IFPU are:

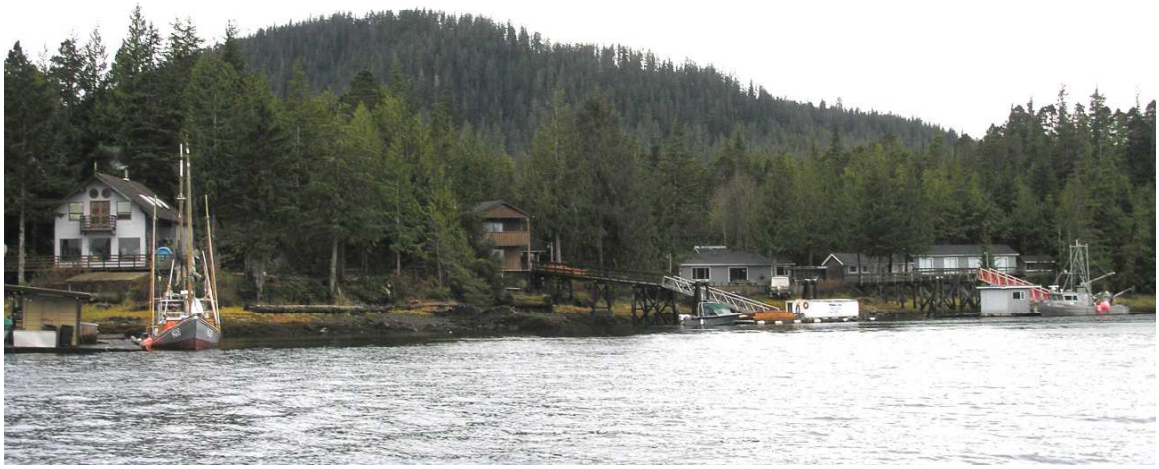
- Interface fire zone extends throughout the majority of this small and spread out community.
- Buildings generally have metal or asphalt tile roofing.
- The garbage dump is located southeast of the community well away from infrastructure.
- Small unofficial fire hall with fire truck.
- There is partial fire hydrant coverage.
- Good road access is only available to approximately 50% of the homes outside the central hub of the Shearwater Marine complex.

Figure 2. Central hub of Shearwater Marine complex, hydro generating plant, school and some residences.

Figure 3 Shoreline homes. Note lack of road access and close fuel proximity.

Figure 4. Foot trail access to shoreline home.

Figure 5 Shoreline homes nestled amongst forest.



4 Wildfire Hazard Assessment

Wildfire hazard is a function of the risk of occurrence in combination with the severity of impact. To determine the hazard, a review of local fire ecology, fire history, likely sources of ignition, forest fuel characteristics and density of developments in the interface is necessary. To objectively quantify the hazard, the Interface Community Fire Hazard Form (ICFH Form) was followed. Appendix C contains the hazard evaluation for each Interface Planning Unit.

In 2005, the Ministry of Forests and Range evaluated interface fire threats and the mapped results of this Strategic Threat Analysis (STA) has been incorporated into the evaluation of the hazard on Denny Island. Information from the STA include: fire probability classification, building density analysis, probability of human and lightning caused ignition, head fire intensity and spotting potential.

The background information used to complete the hazard evaluation is explained in this section.

4.1 Forest Ecology

Denny Island is located in the central very wet hyper-maritime variant of the Coastal Western Hemlock (CWH vh2) biogeoclimatic zone and as such is characterized as coastal rainforest. The climate in this variant is typically wet and humid with cool summers and mild winters. In terms of the provincial danger rating, the community is located in Danger Class 1.

The CWH vh2 zone is classed as Natural Disturbance Type 1 (MoF, 1995) where stand initiating disturbances are 'rare' with a mean return interval of 250-350 years. Most of these types of major disturbances that occur at this frequency in the outer coast area are primarily caused by wind but may also be due to landslides or, more rarely, fire. The wet climate makes for very low natural fire occurrence; however, when fires are able to get started, it is during unusually dry conditions when the combination of high volumes of dry wood fuel makes for catastrophic fire situations (Beck, et al 2005). These intense fires 'terminate' forest stands but also 'initiate' new long lived plants. Initial re-vegetation is rapid but full recovery may take hundreds of years.

4.2 Fire Weather

Historical weather data was provided by the Ministry of Forests and Range. There are five weather stations that apply to the Mid Coast Forest District. They are located in Hagensborg, McInnes Island, Machmell drainage, Port

Hardy and Talchacko valley. The weather station that provides the most pertinent information for Denny Island is McInnes Island which is located approximately 40 km northwest of the village. Table 1 summarizes the fire season weather conditions from 2001 to 2005 along with the Canadian Fire Weather Indices and Danger Class records.

Table 1. McInnis Island weather records and fire weather indices records.

Factor	April	May	June	July	August	Sept	Oct
Weather Data:							
Mean Temp C	7.8	9.6	12.5	13.9	14.4	12.3	9.1
Relative Humidity	84.8	83.7	85.1	87.8	91.4	90.0	85.5
Wind Speed (km/hr)	20.7	18.6	16.7	17.2	15.7	20.5	22.3
Wind Direction	149	156	179	162	155	138	141
Precipitation (mm)	164.1	155.8	121.2	134.6	163.5	280.9	1889.0
Fuel Indices:	Gaps in data, particularly for later summer months.						
FFMC	43.4	46.8	49.2	53.6	34.1	18.9	No data
DMC	2.2	3.8	3.4	3.1	1.6	0.2	No data
DC	11.5	32.3	33.9	75.3	80.4	9.3	No data
ISI	1.1	1.6	1.4	1.2	0.3	0.0	No data
BUI	2.9	5.5	4.9	5.5	3.0	0.4	No data
FW	0.8	1.4	1.2	0.9	0.1	0.0	No data
Danger Class (days/mnth)	Data gaps, but rarely reaches moderate danger class.						
Extreme	0.0	0.0	0.0	0.0	0.0	0.0	No data
High	0.0	0.0	0.0	0.0	0.0	0.0	No data
Moderate	0.2	0.8	0.3	0.0	0.0	0.0	No data
Low	3.8	5.0	10.0	8.3	3.5	0.0	No data
Very Low	17.0	17.8	9.3	21.7	27.5	28.0	No data

Unfortunately the availability of Fuel Indices data was inconsistent for different months, particularly late summer months for some years and so the record is incomplete. However, a review of the limited available data shows that the Danger Class (DC) was very rarely above Low (class 2) and the amount of days where the DC was moderate or higher ($DC \geq 3$) accounted for only 1% of the days during the fire season. This is consistent with the weather data which shows that there is usually regular precipitation throughout the fire season, temperatures are not extreme and relative humidity remains high.

The McInnis Island weather data indicates that summer winds usually blow from the south/southeast direction and are characterized as gentle to moderate breeze (Canadian Forest Fire Danger Rating System, CFFDRS). However, locals also observe that during summer hot spells, the wind usually comes from the north/northwest direction.

4.3 Fire History

Historically, there have been few fires in the immediate vicinity of Denny Island. Locals report one house fire in last five years and there have also been a few minor brush fires around the garbage dump.

Taking a broader view, in the last few years there have been a number of small fires in the maritime area of the Mid Coast. Small lightning fires occurred near Kwatna inlet in 2003 and 2004. Two human caused fires that were less than 2 ha in size occurred in 2004. Most significantly, in 2005, a fire that grew to 39 ha in size occurred in Johnston Channel (approximately 14 km NW of Denny Island community) along the power line connecting Ocean Falls to Denny Island. Fuel loading was high due to routine vegetation control along the power line. Deemed to be human caused, this fire is significant not just in its size but also because it occurred in April when fuels are usually still wet from winter and spring rains. In recent years there have also been a number of small brush fires within the neighbouring community of Bella Bella that the local fire department responded to. The residents see these recent incidents as warning signs of increasing fire danger due to changing climatic conditions.

4.4 Risk of Wildfire Occurrence

Risk of occurrence is primarily affected by sources of ignition, the availability of fuel and its condition. Fire history indicates that natural forest fires are rare in the outer coast area and in recent years, human caused ignition is shown to be the main source. Ministry of Forest and Range's Strategic Threat Analysis shows that there is a **low to moderate fire probability** in the vicinity of Shearwater (Appendix D).

With human caused fires being the main threat, it is more likely that a fire may spread from the community to the forest interface rather than from the forest to the interface. Regardless of the cause though, once the interface is burning, nearby properties are under serious threat. The main potential sources of ignition on Denny Island are untimely burning of debris, back yard camp fires and escapes from the garbage dump. Other accidental sources include children playing with matches or dropped cigarettes. Given that the most likely ignition source is by humans, there is opportunity to reduce the fire risk through education and due care.

Recommendations: Develop education/information program to raise awareness of means to minimize risk of wildfire ignition and develop a system to inform the population about daily fire danger rating and the associated restrictions on 'hot work' activities and campfires.

Ensure refuse burning at the garbage dump is conducted in accordance with permits. Notify public that only designated personnel are permitted to conduct burning (signage).

4.5 Forest Fuels

The forests on Denny Island are generally described as 'scrub forest' in comparison to typically more productive coastal forests. However, the 'scrub' is actually a mosaic of partially treed bogs on subdued terrain and productive forests on steeper or elevated, better drained slopes. Tree species are primarily western hemlock and red and yellow cedar. Sitka spruce grows along the island shoreline along with lodgepole pine which also grows along bog edges. Patches of red alder can be found on sites where mineral soil has been exposed from disturbance.

In coastal ecosystems, the most volatile fuels are generally associated with slash build up from logging or land clearing. Except for the eastern areas of the district, most of the larger fires in the Mid Coast have occurred in slash fuel types, thereby demonstrating the need to manage fuel loading associated with timber harvesting or forest clearing in the vicinity of the interface. Mature coastal forests generally do not burn easily, except in extreme cases and forested buffer strips have been a key 'fire break' strategy between large areas of slash loading. Often, slash fires will only burn into surrounding forest perimeter to the 'shadow line' (area of direct sunlight permeation from forest edge into the timber). Fuels exposed to open sunlight are often more volatile than those under the shadow of the forest canopy. It should be cautioned though that during extreme weather conditions (prolonged period of dry weather, hot temperatures and wind), then coastal forests will burn and due to the large amount of biomass, fires can be very intense and difficult to suppress.

Ministry of Forest and Range vegetation inventory data was relied on to provide forest cover information. Some minor modification of this information was made based on air photo review and field reconnaissance. Appendix E contains a map depicting the various land/forest cover types in the area and a satellite imagery map (compliments of Western Forest Products Ltd) is provided in Appendix B.

Scotch broom is a particularly, fire volatile, invasive plant specie that is present in small amounts in neighbouring Bella Bella. This introduced plant can spread quickly and Denny Island residents are wise to be vigilant and remove any spread of this plant before it becomes a problem.

Recommendation:
Monitor for signs of establishment of Scotch broom and remove wild growing plants before problem gets too large.

4.5.1 Forest Fuel Classification

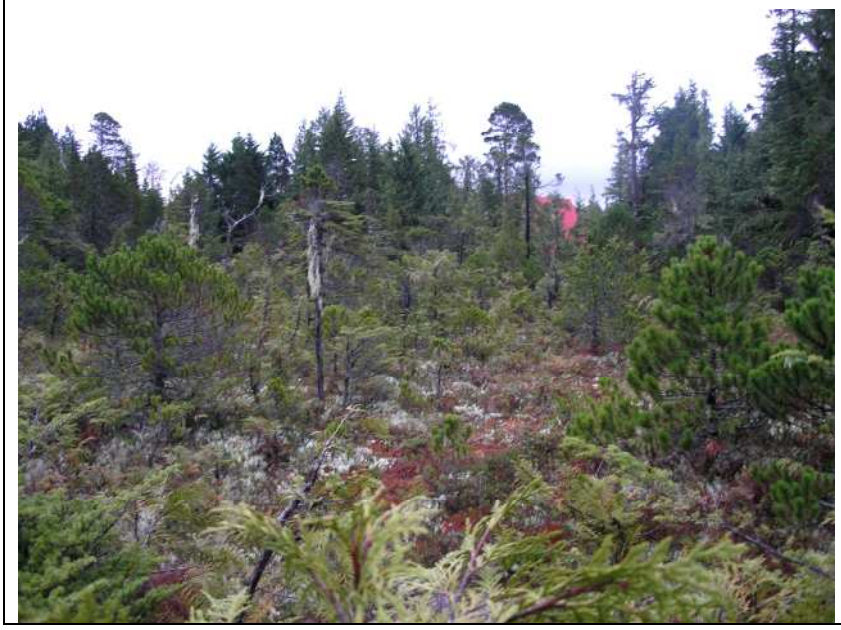
The Canadian Forest Fire Danger Rating System (CFFDRS), developed by the Canadian Forest Service, classifies forest fuels into 16 major types. Most of these classifications were developed in eastern and northern forests and they do not fit very well in terms of describing coastal forest fuels. However, in order to provide some consistency, attempts have been made to best approximate the local fuels in terms of the CFFDR System. There are primarily two types of forest fuel classes in the vicinity of settled areas on Denny Island:

- **Bog woodland**, estimated to correspond to CFFDRS C1 Fuel Type. This type occupies much of Denny Island and is found west and south of the settlement.
- **Productive Coniferous**, estimated to correspond to CFFDRS C2 Fuel Type. This type is found along the shoreline and nearby hills and it envelopes the Denny Island settlement.

Burning Difficulty: In the description of the various fuel types, a subjective assessment is made regarding how easily the fuels will burn. In this context, a Burning Difficulty rating of 'low' means that fuels will usually not burn readily. A 'high' rating means the fuels can easily burn.

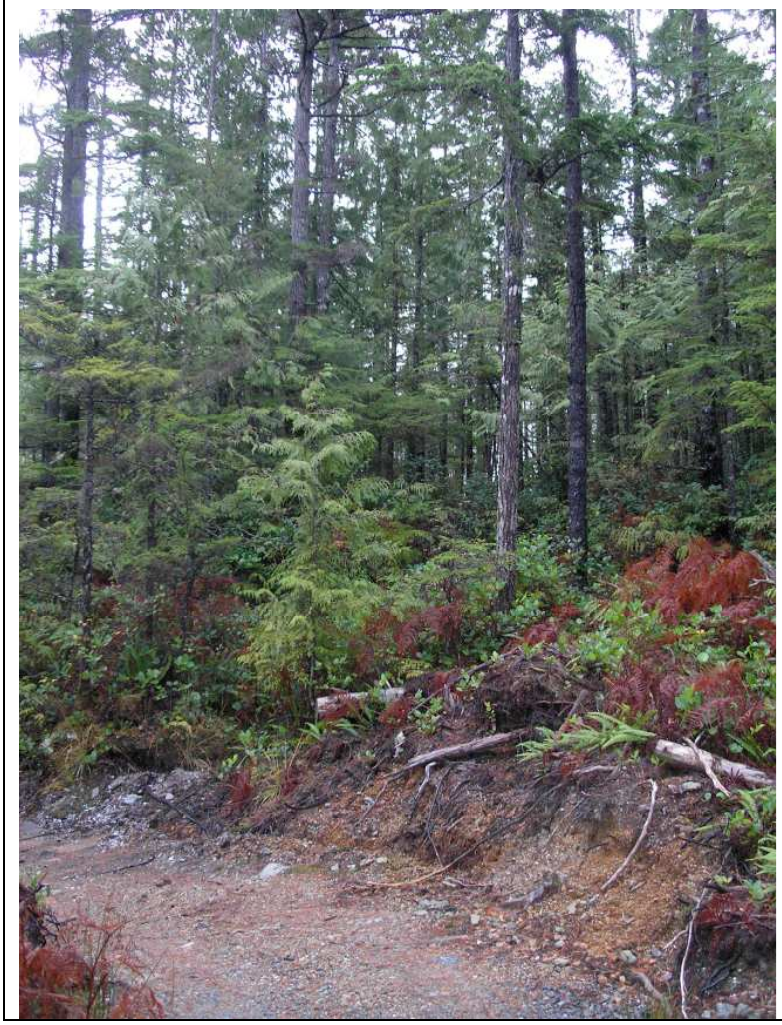
Crowning Potential: Subjective assessments of the various fuel type's potential for crown fire is also made. This assessment incorporated the fuel type, density and presence of ladder fuels. Wind also has a strong influence on crowning potential.

Forest Fuel types in vicinity of settled areas on Denny Island.



Bog Woodland C1

- Coniferous bog complex
- Open park like, clumps of cedar, hemlock and pine trees amongst heather shrub groundcover.
- NP, YC(PH)820
- 3-17 m height
- Live crown 80%
- Crown closure 10%
- Duff > 25 cm.
- Burning difficulty is low with high hazard of intermittent crown torching.
- Large tracts of this type is situated west and south of the settled areas on Denny Island.



Productive Forest C2

- Productive coniferous forest
- CH(S) 831
- Variable canopy structure
- 20-25 m tall
- Crown closure 20-40%
- Moderate understory vegetation.
- 15-20 cm duff.
- Burning difficulty is low with high crowning potential, particularly in windy conditions.
- There is a band of this type of forest enveloping the settled areas on the island.

The distribution of these fuel types is shown on the Fuel Types map in Appendix F.

The MOFR has also generated an estimation of the anticipated fire intensity based on the types of forest in the vicinity. Termed Head Fire Intensity (HFI), it is the predicted energy output of the fire at the front or head of the fire. It has become one of the standard gauges by which fire managers estimate the difficulty of controlling a fire and select appropriate suppression methods. It is measured in kilowatts per meter of fire front and is based on the Rate of Spread and the Total Fuel Consumption. This analysis indicates that the most of the forest types surrounding settled areas would burn with a moderate to high intensity. This rating is lower than that of typical coastal forests due to the lower density of wood biomass in these outer coast forests. The Head Fire Intensity map is provided in Appendix G.

4.6 Density of Developments

In terms of the hazard assessment, Denny Island is classified as 'rural' and surrounded by 'continuous forest'. In terms of values to protect, the Denny Island IFPU is categorized as 'incomplete development' whereby the distribution of structures and facilities is scattered amongst a forested landscape so that interface fire is a threat throughout the settlement.

Building density varies from 'developed' (100-1000 buildings/sq km) in the immediate vicinity of the Shearwater Marine complex and 'isolated' (1-10 buildings/sq km) to the northwest, where primarily ocean front residences are strung out along the shoreline.

4.7 Hazard Rating

Using the Wildland Urban Interface Fire Hazard Assessment methodology, Denny Island is determined to have a **moderate** interface fire hazard (see Appendix C for details). Under this hazard ranking, homes and structures are considered to be threatened by interface fire.

The main factors that influence this rating are:

- The low Fire Weather Potential due to coastal climate
- Small rural community with interface fire potential throughout.
- Fuel characteristics - thick duff layers and coniferous forest
- Unofficial volunteer fire department with moderate response time
- Partial fire hydrant coverage
- Low historical incidence of fire.
- No significant extenuating factors
- Local concerns and observations of changing conditions.

5 Emergency Operations

Please refer to the Central Coast Emergency Plan for up-to-date contact information.

Denny Island does not have an official volunteer fire department. Official help is limited to Coast Guard suppression support to shoreline infrastructure. Locals deal with fire suppression by 'neighbours helping neighbours' using privately owned equipment. The community does not have resources required to set up an official volunteer fire department.

Although the distances are short, response time to a fire call can range from 15-30 minutes due to volunteer mobilization, gravel road condition and difficult access to some residences.

There are 3 fire hydrants on the Shearwater Marine property and one at the school. These are on the private water system and they provide protection for most residences immediately surrounding the Shearwater Marine complex. Fire protection for other residences is by pumping from the ocean or ponds.

First response to an interface fire will likely be up to the local residents and it is advisable that key residents at Shearwater receive basic forest fire suppression training. Furthermore, it is a WCB requirement that those partaking in suppression of forest fires receive S-100 training, annually. So it is incumbent on employers conducting high risk or industrial activity (as per Wildfire Regulation definition) that employees are properly trained to fight forest fires as necessary.

Recommendation:
Conduct S-100 Basic Forest Fire Fighting training annually for volunteer firemen.

For anything but the smallest interface fire, the Ministry of Forests and Range are relied upon to provide forest fire suppression support. During times of fire danger, the MOFR positions a 'rapattack' crew in Bella Coola that can quickly attack wildfires by helicopter while they are still relatively small. If initial attack efforts are insufficient, then additional fire fighting capabilities and resources can be quickly deployed from the Coast Fire Center in Campbell River.

Currently there is no mutual aid agreement in place between MOFR and the local fire department. It is recommended that the routine communication between the Shearwater emergency response group and the MOFR Fire Protection Officer responsible for the Mid Coast be enhanced in order to coordinate efforts efficiently.

Recommendation: Strengthen routine and ongoing communication between Denny Island emergency response personnel and MOFR Fire Protection Officer.

5.1 Available Fire Fighting Resources

There is no fire department on Denny Island and residents have to rely on private suppression equipment and resources. Shearwater Marine has the most fire suppression resources in its fire hall and this equipment has been acquired by donation and fundraising and includes the following:

Shearwater Fire Equipment

- 1969 La France Fire Truck, utilizing either a 6" or 2.5" input line and having eight 1.5" discharge lines, 300 gallon capacity.
- 2 Gas powered portable fire pumps (*1.5" Honda, 2.5" Hale*)
- 200 feet 2.5" fire line with standard fire thread couplings
- 1000 feet 1.5" Forestry fire line with Forestry couplings
- adapters for 2.5" and 1.5"

Other

- Heavy equipment – a number of excavators, dump trucks, back hoes, front end loaders, fork lifts and cranes are available on the island.

Recommendation: CCRD Emergency Committee should review feasibility of establishing a volunteer fire department on Denny Island and provide recommendation to CCRD Board.

Accommodation

- Subject to occupancy, accommodation for a large fire fighting crew is available at Shearwater Lodge.
- A number of bed and breakfast units are also present on the island.

6 Mitigation and Recommendation Summary

The main realistic opportunities to reduce interface wildfire in the vicinity of settled areas is through public education to reduce risk of human caused ignitions and to conduct fuel hazard reduction treatments in the vicinity of homes and structures. Much information can be accessed via the internet on how people can 'Firesmart' their homes and properties. The following government website is a good source:

www.for.gov.bc.ca/protect/

6.1 Mitigation Treatments

- People are encouraged to ensure that conifer trees in the vicinity of their homes are pruned to a height of at least 2m. Branches overhanging houses or balconies should also be pruned back. Wild growing brush and other woody material should also be cleared from around houses.
- Work to improve access for fire truck to isolated shoreline residences.
- Establish program to monitor and remove any scotch broom plants that may invade the island.
- Given the susceptibility of slash fuels to fire, it is imperative that any mitigative treatments involve the removal of slash build up.

6.2 Recommendations Summary

The recommendations for follow up are re-iterated:

1. Develop public education and information distribution program regarding legal requirements for wildfire mitigation and precaution. Implement this as part of the broader emergency preparedness program.
2. Include interface fire management as one of the hazards that the local emergency response group considers and addresses.
3. Integrate notification of Coast Guard in event of interface fire for assistance with suppression and evacuation.
4. Develop education/information program to raise awareness of how to minimize risk of wildfire ignition and develop a system to inform the population about daily fire danger rating and the associated restrictions on 'hot work' activities and campfires.
5. Ensure refuse burning at the garbage dump is conducted in accordance with permits. Notify public that only designated personnel are permitted to conduct burning (signage).
6. Establish program to methodically remove wild growing scotch broom plants before problem gets too large.
7. Conduct S-100 Basic Forest Fire Fighting training for residents and workers on an annual basis.
8. Strengthen routine and ongoing communication between Denny Island emergency response personnel and MOFR Fire Protection Officer.
9. CCRD Emergency Committee should review feasibility of establishing a volunteer fire department on Denny Island and provide recommendation to CCRD Board.

7 Monitoring and Evaluation

Forest fuel conditions and communities change over time and so this plan should be reviewed on an annual basis by the local emergency management committee and updated as required. If major developments or changes occur, such as forestry activity significantly changing the fuel loading of the surrounding forest, then the plan may require rewrite.

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Appendices

Appendix A – Bella Bella Overview and IFPU Hazard Map

Appendix B – Satellite Image Map

Appendix C – Community Wildfire Hazard Assessment Form

Appendix D – Fire Probability Map

Appendix E – Land and Forest Cover Map

Appendix F – Forest Fuel Type Map

Appendix G – Head Fire Intensity Map