HAZARD ASSESSMENT

May 2008

Passage Island Wildfire Assessment

metro vancouver

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1. Introduction

This assessment was prepared pursuant to section 6(2) of the *Emergency Program Act* and section 2(1)(b) of the *Local Authority Emergency Management Regulation*. As part of the ongoing process of local emergency planning with respect to the preparation for, response to and recovery from emergencies and disasters within Electoral Area A, Metro Vancouver, Safety, Security & Emergency Management Division conducted a hazard assessment of the risk of wildfire in that part of Electoral Area A known as Passage Island. The intent was to assess the relative risk of occurrence and the potential impact on people and property of wildfire and identify any practical preventative or mitigative actions that could be undertaken by residents of the island, or by the Greater Vancouver Regional District ("Metro Vancouver"), which is the local authority for Electoral Area A.

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Local area services provided on Passage Island by Metro Vancouver include building inspections. From time to time, Metro Vancouver may conduct studies and work with residents to address concerns in their communities. Land use planning on the island is carried out by the Islands Trust.

2. Methodology

The assessment was conducted by the staff of Metro Vancouver using the template provided in the FireSmart manual as published by the British Columbia Office of the Fire Commissioner.

3. General Information

3.1 Location and description

Passage Island is located in Howe Sound, Queen Charlotte Channel between West Vancouver and Bowen Island at approximately 49° 20' 34" N / 123° 18' 17" W. The island covers a land area of approximately 13.52 Ha (33.4 Acres) and is subdivided into 61 legal lots of which 27 are occupied by residential buildings ranging from small seasonal cabins to larger year round residences.

3.2 Access and egress

The island is only accessible by small boat at one developed landing area useable at most tidal states; this is locally known as “the North Stairs”. There is currently no “dock” at which boats could be moored directly, which would make evacuation or emergency response more challenging. It is possible to land a small craft at two other public beach areas on the South and West sides of the island; however, these beaches are not suitable as year round access points due to their rocky nature and heavy driftwood loading.

Local weather conditions often cause a strong northerly outflow wind locally known as a “Squamish” which can generate moderate waves which can prevent access to the developed landing at North Stairs, effectively isolating the island from the mainland. The two other possible landing areas are also affected by significant wave action as they area largely exposed to waves generated in the Strait of Georgia by westerly and south-easterly winds which are prevalent.

North Stairs

South Beach Access

3.3 Fire Weather

The weather conditions experienced at Passage Island are generally more extreme than those in other areas of Metro Vancouver as the island is exposed on all sides and can most closely be compared to those at Lighthouse Park in West Vancouver. Environment Canada statistics indicate several times per year where the temperature and humidity could cause an extreme wildfire hazard rating to occur.

	Jun	Jul	Aug	Sep
# days above 18°C	4.2	14.5	13.7	3.6
Average Temperature (°C)	19	22	22	18
Average precipitation (mm)	112.1	99.5	83.8	137.8

Source: www.weatheroffice.gc.ca

3.4 Vegetation

The forest landscape is comprised of a mix of coniferous and deciduous trees, with conifers comprising the vast majority. Specific species identified were Douglas Fir, Red Cedar, Western Hemlock, Shore Pine, and Arbutus. Ground cover ranges from native and non-native grasses and lichens on cliff tops and open areas, to dense underbrush in central areas.

Ground Fuel Loading

Typical cliff top vegetation

4. Observations

Passage Island's lot layout and public access can be confusing to someone unfamiliar with the island. First responders arriving at the island would need to be directed by a resident to the incident area. There is no lot plan or island map available on site.

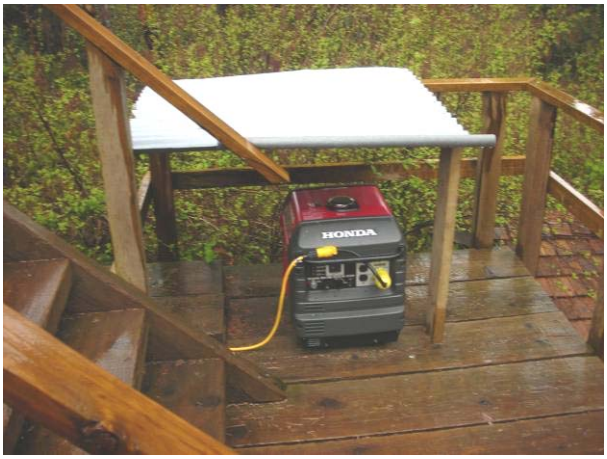
Many of the structures on the island are in very close proximity to the forest canopy which could result in a very rapid transition from a structure fire to a wildfire which could then spread very quickly and potentially encompass the entire island. Anecdotal evidence obtained from island residents indicates this has happened once before in about 1968, the ignition source was reported to be a campfire.

Most structures are of wood frame construction with wood siding, many are open foundation with spare combustibles stored under the structure. Some buildings have considerable clutter and debris around them that could assist in the rapid spread of a fire. Most structures have metal roofing, this is more a result of rainwater catchment effectiveness than fire prevention but it does significantly lower the potential for roof ignition from flying embers.

The one incident of injury from fire that occurred within the last 10 years was a result of a generator fire that escalated; the resident received burns over about 40% of his body and it required significant time before rescuers could evacuate him from the island. Generators are in common use and their storage and operation could result in further fire risk due to the presence of flammable fuels and potential for sparks from exhausts.

Many residences have solar/wind power systems which use banks of batteries. Lead acid type batteries generate flammable hydrogen gas when charging and were they to be located in an inadequately ventilated area could result in a build up of gases which could ignite from a loose connection or other spark. It is not known whether all installations are in accordance with industry standards as these are not generally covered by fire and building codes.

In the event of a significant fire during high season and the self-evacuation that would result, the current water taxi would be unable to evacuate all residents in a timely manner.



Good generator installation


Fire bucket

5. Fire Suppression

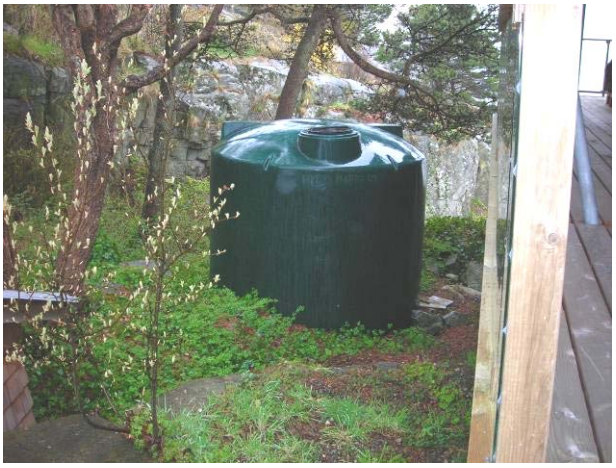
Like many remote areas of British Columbia, Passage Island has no formal structural fire suppression available. Wildland fire suppression is provided by the British Columbia Forest Service, and under a memorandum of agreement, by Metro Vancouver's Watershed Protection section. The official emergency plans for this area expect residents to prepare for, prevent, mitigate and respond to emergencies themselves.

No ground water availability has resulted in residences relying on rainwater cisterns ranging from 500 to several thousand gallon capacities as the only means of supplying domestic and initial fire attack water. Several residents have gasoline powered fire pumps and hoses, the general condition of which is unknown with sporadic, if any, maintenance and testing conducted.

These cisterns would likely be at a lowered level during the highest hazard period further limiting the available supply.

Communal fire buckets were noted on the island. However, the one inspected was found to be empty. Community owned hoses are available, however these have not been maintained and may not be reliable. They are not paired with pumps for community use and thus would have to be connected to privately owned pumps which may not have compatible connections.

Anecdotal evidence from residents indicates that all residences have portable first aid extinguishers available of at least 5 lb size. This could not be confirmed and it is likely that many would be expired and/or inoperative. The skill and training level of residents in effective use of extinguishers was not assessed.



Small Cistern

Fire Pump at a residence

The ocean waters surrounding the island are the most reliable source of fire suppression water. However, the pumps currently available on the island may not have sufficient lift capability to access this water source. Further, it is expected that adequate pressure for fire fighting could not be maintained with the current network of hoses. Use of pumps and hoses with sea water also necessitates increased maintenance immediately after use to prevent corrosion of metal fittings and degradation of hose linings.

6. Assessment results

The assessment checklist and calculation of relative risk rating was created based on a generalized knowledge of structures and sites on the island and is not representative of specific structures or lots. Completion of the assessments resulted in the following two broad categories:

Structure and Site Hazards assessed as **“Extreme”**
Area Hazards assessed as **“High”**

The detailed assessment results are included as an appendix to this report.

7. Recommendations

The following recommendations are general in nature and do not reflect a commitment by Metro Vancouver to providing the services, supplies or equipment except where expressly identified. As identified in the Metro Vancouver Emergency Plan, residents of Electoral Area A are expected to mitigate, prepare, respond and recover from disasters and emergencies on their own volition.

Primary Recommendations

1. A weatherproof map and lot plan should be created and posted at the North Stairs, West Beach, South Beach and "City Hall" (community open space) locations (see map attached). This map should show the lot (address) numbers, as well as the locations of all evacuation points, communal fire equipment and emergency contact information.

2. A wildfire hazard rating sign should be installed at the North Stairs, a smaller sign or poster should be placed onboard the water taxi or at the Eagle Harbour water taxi landing (once a permanent site is located). These signs should be updated frequently during fire season using the hazard rating posted for Lighthouse Park.

3. A system of restrictions such as open burning bans should be developed and linked to the hazard rating. Suggested restrictions can be based on the provincial wildfire regulations.

4. Residents should consider, as far as practical, carrying out the mitigative measures around their residences as recommended in the FireSmart Homeowner Manual, available in hard copy from Metro Vancouver, local fire departments or by visiting www.pssg.gov.bc.ca/firecom/pdf/homeowner-firesmart.pdf These measures should include pruning, removal of hazard trees, brush reduction and home maintenance.

5. Generators should be inspected and maintained in accordance with manufacturer's instructions annually to ensure fitted spark arrestors are effective.

6. Residents should consider organizing an annual clean-up of common areas to reduce the ground fuel load.

7. At least one additional developed evacuation point should be identified and maintained on the island. The primary location should be the North Stairs with a secondary point at "South Beach". In conjunction with the Ministry of Transportation, the existing wooden stairs at "South Beach" should be repaired and driftwood debris should be removed periodically to allow easy access for responders. Abandoned boats on both beaches should be removed to further ease access for emergency responders. A sign stating "Emergency Access" in large letters, clearly visible from a vessel offshore, should be placed in a prominent location at the beach.

8. All residents are encouraged to take personal preparedness training and information in basic household fire suppression similar to that offered by the City of Vancouver Neighbourhood Emergency Preparedness Program Workshop #4 available at minimal

cost from the City. Contact 604-871-NEPP (6377) or send an email to nepp@vancouver.ca for more information.

9. The informal alerting system of an air horn should be expanded and formalized, spare air horns, replaced annually, should be placed in the common area. Information should be supplied to each residence identifying the procedures to be followed upon hearing the horn sound.

Secondary Recommendations

1. An alternate evacuation point should be created at West Beach in collaboration with the Ministry of Transportation, with developed access stairs, signage and an annual maintenance program; this is in addition to the secondary evacuation point recommended for “South Beach”.

2. Residents should consider obtaining a Mark 3 fire pump (or equivalent) for pumping seawater or drawing from cisterns without a fitted fire pump and 2000ft of 1½” hose which should be stored in a central location and be transportable by no more than two people to the majority of areas of the island. Residents should receive training in its operation and conduct annual testing of this equipment and implement a preventative maintenance program.

3. An amendment to the Greater Vancouver Regional District Electoral Area A Building Administration Bylaw. No. 1043, 2006 should be considered to require limited sprinklers be installed in all new construction, along with an adequate water supply to ensure at least five minutes of continuous operation of at least two sprinkler heads. This would reduce the risk of a small household fire becoming unmanageable.

4. A modification to the Greater Vancouver Regional District Electoral Area A Building Administration Bylaw. No. 1043, 2006 should be considered that provides minimum standards for the location, installation and maintenance of “off grid” power system components. This should emphasize adequate ventilation for lead acid batteries while charging, fire resistant generator enclosures and safe flammable liquid storage.

8. Resources

The following island residents provided essential background information vital to the production of this report and should be acknowledged:

Roger Gale
Diana Krimmer
Skip Jolly

The following Metro Vancouver staff provided technical assistance:

Rod Tulett	Security & Emergency Coordinator
Roland Totzauer	Watershed Protection Officer
Mike Neale	Watershed Protection Assistant
Shawn Davidson	Building Inspector
Tina Atva	Electoral Area Planner and Administrator

The following references were consulted during the production of this assessment:

Preparing a Community Wildfire Protection Plan
Society of American Foresters
Bethesda, Maryland
http://www.safnet.org/policyandpress/cwpphandbook.pdf

The Homeowners FireSmart Manual - BC Edition
BC Forest Service - Protection Program
Victoria, BC
http://www.pssg.gov.bc.ca/firecom/pdf/homeowner-firesmart.pdf

FireSmart: protecting your community from wildfire - Second Edition
Partners in Protection
Edmonton, Alberta
http://www.partnersinprotection.ab.ca/downloads/

Community Wildfire Protection Plan
Cariboo Regional District
Williams Lake, BC
http://www.cariboord.bc.ca/Services/Emergency/ProtectiveServices/tabid/114/Default.aspx

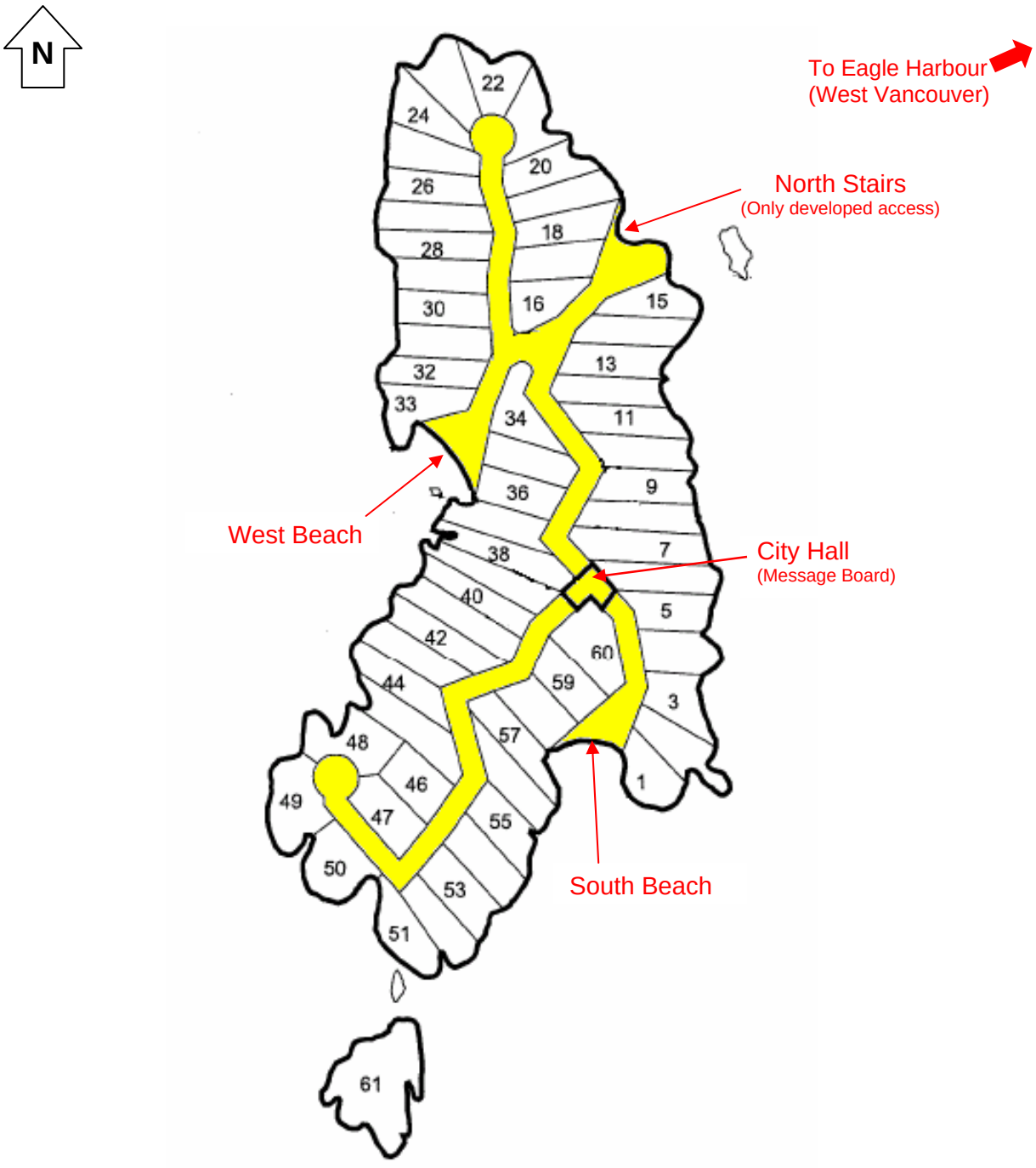
Woodland Community Wildfire Assessment
Kentucky Division of Forestry
Frankfort, Kentucky
http://www.forestry.ky.gov/NR/rdonlyres/9CDEBDB5-71B2-43D9-924D-564502BB8A00/0/KDFCommunityWildfireHazardAssessment.doc

Neighbourhood Emergency Preparedness Program
City of Vancouver
http://www.city.vancouver.bc.ca/corpsvcs/emerg/NEPP/NEPPworkshops.htm

Island Map

(annotations by Metro Vancouver)

PASSAGE ISLAND



STRUCTURE AND SITE HAZARD ASSESSMENT FORM

(Page references refer to FireSmart Manual)

Factor	Page Reference	Characteristics and point ratings				Score
1 Roofing Materials	2-5	Metal, tile, asphalt, ULC rated sakes or non-combustible material		Unrated Wood Shakes		
		0		30		0
2 Roof cleanliness	2-6	No combustible material	Scattered combustible material, <1 cm in depth	Clogged gutter, combustible material >1 cm in depth		
		0	2	3		0
3 Building exterior	2-7	Non combustible stucco or metal siding	Log, heavy timbers	Wood or Vinyl siding or wood shake		
		0	1	6		6
4 Eaves, vents and openings	2-8	Closed eaves, vents screened with 3mm mesh and accessible	Closed eaves, vents not screened with 3 mm mesh	Open eaves, vents not screened, debris accumulation		
		0	1	6		1
5 Balcony, deck or porch	2-9	None, or fire resistant material sheathed in	Combustible material, sheathed in	Combustible material, not sheathed in		
		0	1	6		6
6 Window and door glazing	2-10	Tempered	Double Pane		Single Pane		
			Small/medium	Large	Small/medium	Large	
		0	1	2	2	4	2
7 Location of nearby combustibles	2-11	None or >10 metres from structures		<10 metres from structures		
		0		6		6
8 Setback from edge of slope	2-12	Adequate		Inadequate		
		0		6		6
9 Forest Vegetation <10 metres	2-14	Deciduous	Mixed	Coniferous		
				Separate	Continuous	
		0	30	30	30	
10-30 metres		0	10	10	30	30
10 Surface vegetation <10 metres	2-16	Lawn or non combustible material	Wild grass or shrubs	Dead and down woody material		
				Scattered	Abundant	
		0	30	30	30	
10-30 metres		0	5	5	30	3
11 Ladder fuels	2-17	Absent	Scattered	Abundant		
		0	5	10		5
					Total Score for Factors 1-11	65
					Structure and Site Hazard Level	Ext

Hazard Level Low <21 points Moderate 21-29 points High 30-35 points Extreme >35 points

AREA HAZARD ASSESSMENT FORM

(Page references refer to FireSmart Manual)

Factor	Page Reference	Characteristics and point ratings				Score
12 Forest vegetation (overstory)	2-18	Deciduous	Mixed	Coniferous		
				Separated	Continuous	
		0	15	15	30	15
13 Surface Vegetation	2-18	Lawn or non combustible material	Wild grass or shrubs	Dead and down woody material		
				Scattered	Abundant	
		0	5	5	15	5
14 Ladder fuels	2-18	Absent	Scattered	Continuous		
		0	5	10		5
15 Slope	2-19	0-10%	10-25%		>25%	
			Even	Gullied	Even	Gullied
		0	4	5	8	10	5
16 Position on slope	2-20	Valley Bottom or lower slope	Mid slope	Upper slope		
		0	3	5		3
					Total Score for Factors 12-16	33
					Area Hazard Level	High

Hazard Level Low <21 points Moderate 21-29 points High 30-35 points Extreme >35 points

Remarks

- Risk ratings are average for all structures on island.

- Fuel loading (factors 12 & 13) was generally considered high, made up mostly of Douglas fir, Red cedar, Western hemlock, Shore Pine, and Arbutus.

- There were sporadic areas of ladder fuels and dense underbrush.

- Closed canopy was not continuous. Houses were generally in close proximity to these fuels.

- Summertime winds were said to be generally from the south east and speeds of 35kph are not uncommon. This is not surprising given the open exposure of this small island. With accelerated drying due to this exposure this area is prone to dry out faster than the surrounding mainland and fire codes and behaviour will generally be higher.

AREA HAZARD ASSESSMENT FORM

Factor	Page Reference	Yes	No
Ignition Potential (area)			
Frequent Lightning Fires	2-21	☐	☒
Frequent or potential for human caused fires	2-21	☒	☐
Aspect – South or West	2-22	☒	☐
Ignition potential (structure and site)			
Chimney – unscreened	2-22	☐	☒
Chimney – overhanging branches	2-22	☐	☒
Chimney – inadequate clearance	2-22	☐	☒
Burning barrel / fire pit – inadequate	2-23	☐	☒
Overhead power lines near vegetation	2-24	☐	☒
Propane tanks near vegetation / structure	2-24	☒	☐
Questions answered with “yes” indicate conditions that contribute to hazard. Questions answered with “no” are items favourable to lower hazard.			

FIRE SUPPRESSION CHECKLIST

Factor	Page Reference	Yes	No
Fire Service			
Response time longer than 10 minutes	2-25	☒	☐
Access to area for emergency vehicles – inadequate	2-25	☒	☐
Access to structure – inadequate	2-25	☒	☐
Water Supply			
Municipal – not available	2-27	☒	☐
On site – not available	2-27	☐	☒
Suppression equipment on site – not available	2-28	☐	☒
Questions answered with “yes” indicate conditions that contribute to hazard. Questions answered with “no” are items favourable to lower hazard.			