

MOORECROFT CAMP

CONSERVATION VALUES AND RECOMMENDED LAND USE RESTRICTIONS UNDER A CONSERVATION COVENANT



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**PREPARED FOR BRITISH COLUMBIA CONFERENCE,
UNITED CHURCH OF CANADA
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Introduction

Moorecroft Camp is a 34 ha (85 acre) property comprised of coastal shoreline, wetland/riparian areas, and upland forest on the northeast coast of the Nanoose Peninsula (see Figure 1 and Figure 2). It is owned by the United Church of Canada (UCC), which operates the site as a retreat and educational camp. The Comox/Nanaimo Presbytery recently voted to sell the waterfront property. Key to that decision was a condition to create a conservation covenant that would protect the land and ecological values in perpetuity.

Following this decision, the Nature Conservancy of Canada was invited by the Presbytery to investigate the conservation values on Moorecroft Camp and provide suggested protection mechanisms for those values.

A report commissioned by the Nanaimo and Area Land Trust, called *Baseline Bio-Inventory and Conservation Assessment for the Moorecroft Camp Property, Nanoose* and written by Forrest and Materi (2007), provided significant key information to NCC undertaking the church project.

Ecological framework

Ecoregion: Eastern Vancouver Island

Ecosection: Nanaimo Lowland

Biogeoclimatic Zone: Coastal Douglas-fir moist maritime subzone (CDFmm)

Administrative framework

Ministry of Environment Region: Vancouver Island

Forest District: South Island

Regional District: Nanaimo



Figure 1. Location of Moorecroft Camp on Vancouver Island

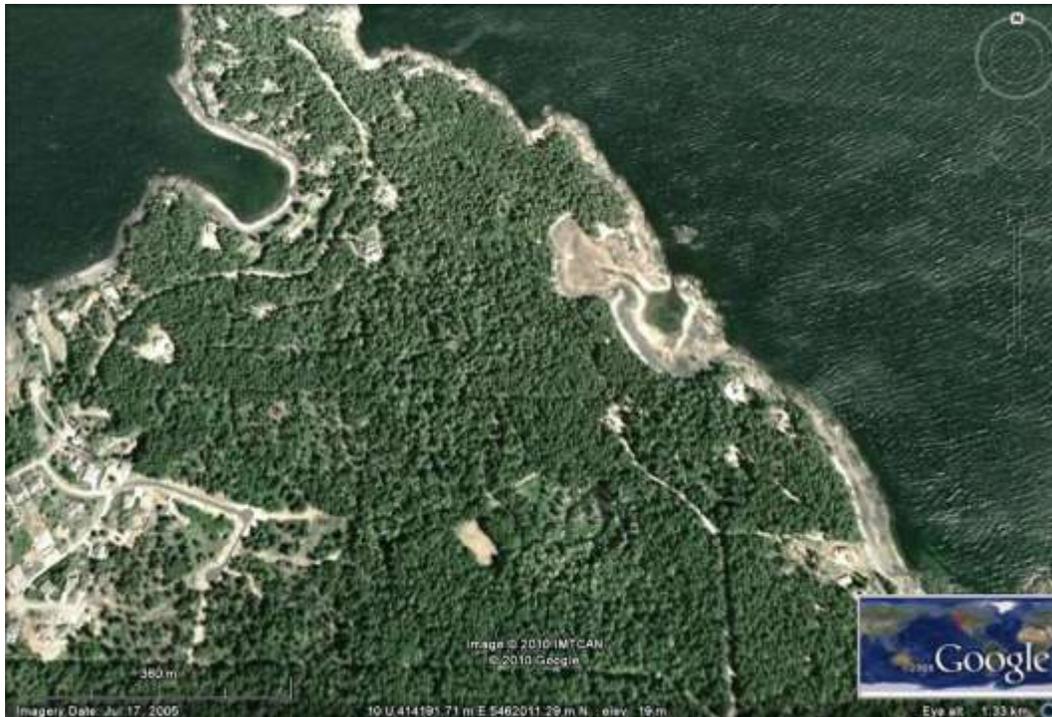


Figure 2. Aerial view of Moorecroft

Ecological context

The Coastal Douglas-fir biogeoclimatic zone (CDF zone) occupies a total of 2,593 km² in BC (see Figure 3). The CDF zone lies in the rainshadow of Vancouver Island and Olympic mountains, and includes eastern Vancouver Island from Saanich Peninsula in the south to Bowser in the north, portions of the Gulf Islands south of Cortes Island, and pockets along the south coast of mainland British Columbia on the Sunshine coast and the Fraser River delta. The CDF zone has warm dry summers and mild wet winters (Table 1).

Table 1. CDFmm climate normals 1969-90 for selected climate variables extracted from Spittlehouse (2008).

| Variable | Mean |
|---------------------------------------------|-------------|
| Mean annual precipitation | 1091 mm |
| Mean May to September precipitation | 201 mm |
| Precipitation as snow (mm water equivalent) | 61 mm |
| Mean annual temperature | 9.6 °C |
| Mean temperature of coldest month | 3.0 °C |
| Mean temperature of warmest month | 16.9 °C |
| Frost Free Period | 204 days |
| Degree days >5°C | 1965 |
| Summer heat:moisture index | 88 |



Figure 3. Coastal Douglas-fir Biogeoclimatic zone in British Columbia

The mesic or zonal¹ ecosystem is the Douglas-fir / dull Oregon-grape ecosystem. This ecosystem is a matrix forest ecosystem that occurs within the Georgia Basin of coastal southern British Columbia and the San Juan Islands of adjacent Washington, USA. It is found up to 390 m elevation on mostly gentle sites with mesic or slightly drier soil moisture regimes and medium to poor soil nutrient regimes, where sandy loamy soils are common. The overstory is typically dominated by Douglas-fir, with a well-developed shrub layer dominated by dull Oregon-grape and/or salal, a sparse herb layer, and a well-developed moss layer dominated by Oregon beaked moss. Western redcedar may co-dominate the overstory. This is a late succession climatic forest ecosystem originating from infrequent stand-replacing fires or occasionally windthrow.

Past disturbances, primarily fire and logging, has resulted in much of this ecosystem being in early structural stages², defined as less than 80 years old. Because of the early settlement of the area and the associated development, much of the loss of this ecosystem occurred more than 30 years ago. This is shown by the distribution of structural stage classes in this ecosystem across its full range (Figure 4), with a large proportion of the ecosystem now 40 to 80 years old and in the

¹ Zonal refers to the ecosystem that is on an average site and best reflects the climate of the vegetation zone; other ecosystems are either drier, wetter, poorer, or richer than the zonal ecosystem

² Structural stages: after disturbance by cutting or fire, a forest will proceed through a series of stages of development, each with a defined physical appearance, such as shrub-dominated, small young conifers, taller trees and eventually to a climax stage with multiple tree layers, downed logs, snags, etc.

young forest structural stage. Stand initiation for the young forests was most likely caused by forest harvesting, as forest fires have been much reduced since European settlement (McDadi and Hebda 2008). The condition of the Douglas-fir / dull Oregon-grape ecosystem has been degraded by the widespread fragmentation, development and harvesting that has occurred in the CDF zone. The dominance of younger age forests means that attributes of older forests are missing from the landscape. As stands get older, these attributes can be regained. These attributes include: complex canopy architecture, standing and fallen dead wood, species composition, epiphytic species³, soil invertebrates and nematodes, and insect and spider fauna (Trofymow *et al.* 2003). These are some of the characteristics that are desirable to protect at the Moorecroft camp.

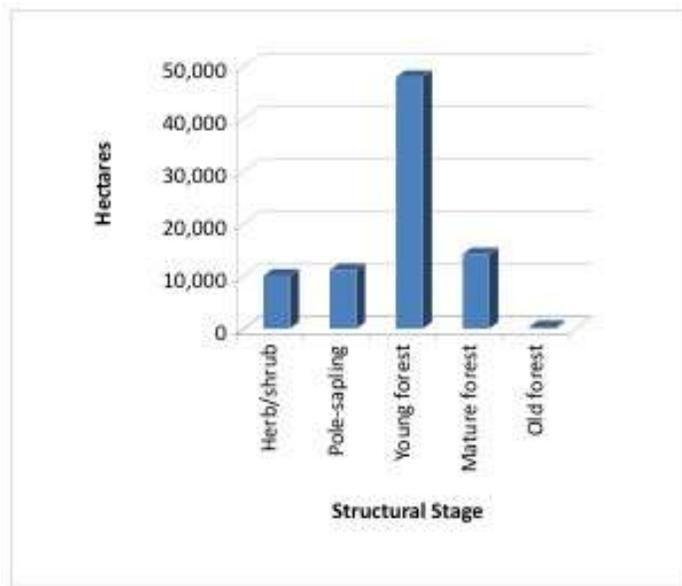


Figure 4. Distribution of structural stages for Douglas-fir/dull Oregon-grape ecosystem in British Columbia. Mature forest and old forest are relatively rare and desirable to protect and to “recruit” from young forests.

Ecosystem processes have also been altered in the CDFmm, with fire almost absent from the landscape, and the canopy-gap forest dynamics also greatly altered because of the predominance of young structural stages.

Threats

The most serious and on-going threats to this zone are clearing related to rural residential development and forest harvesting. Associated with these threats are road development, alien invasive plants and recreational use. The CDF zone has a long history of development and forest harvesting, as the area was one of the first areas settled in British Columbia by European immigrants. The zone covers less than one percent of the Province; it is rated as imperiled (Austin *et al.* 2008). B.C. contains 70-80% of the global range of this zone (Austin and Eriksson

³ Epiphytes are plants that grow on trees or downed logs, such as mosses and lichens

2009). Ninety-seven percent of described communities in the zone are of provincial conservation concern.

Ninety-three percent of the land in the CDF zone is privately owned and the CDF zone has the highest proportion of ecosystem converted to human uses in the province; 46% now being used for urban or agriculture uses, 44% subjected to forest harvesting, 7% non-forested and 3% old-growth forest. The remaining old-growth areas are small patches, including those in protected areas. Most of the old forest outside of protected areas is privately owned, and will continue to be lost to development and forest harvesting, as development of areas for residential and industrial uses is on-going. Invasive species that have been documented in this association include: spurge-laurel (*Daphne laureola*), English ivy (*Hedera helix*), holly (*Ilex aquifolium*), gorse (*Ulex europaeus*) and Scotch broom (*Cytisus scoparius*). Other threats include browsing by feral goats and sheep, agricultural development, and climate change.

Climate change has the potential to alter the disturbance regime, soils and vegetation as species and the ecosystem responds to shifts in temperature, moisture and weather patterns. Climate models indicate that for southern British Columbia, by 2050 summers might get warmer by 1.5 to 4 degrees and drier by as much as 35%. Also, winters might be warmer by 1.5 to 3.5 degrees and wetter by 0 to 20%.

There is moderate potential for restoration of the forested ecosystems. The attributes of old-growth structure, such as coarse woody debris; complex canopy structure, including large old trees; and standing dead trees, can recover through natural processes, but may require more than 100 years, depending on the biological and structural legacies remaining after disturbance. In the long-term there is potential to recruit additional stands into the mature and old structural stages if areas can be protected from development and harvesting. These stands will develop the attributes and biota of mature and old forests (Trofymow *et al.* 2003). However, it will be very difficult to reintroduce fire as an ecosystem process in such a heavily developed landscape. The elimination of exotic species, and the protection from reinvasion will also be very difficult. The attributes of old-growth structure, such as coarse woody debris; complex canopy structure, including large old trees; and standing dead trees, can recover through natural processes, but may require more than 100 years, depending on the biological and structural legacies remaining after disturbance.

Field Procedures and Ecological units of Moorecroft Camp

NCC's fieldwork involved visiting and documenting all the ecosystems on the Moorecroft Camp, relying on Forrest and Materi (2007) for an initial classification and verifying and ground-truthing the information in the report. Forested ecosystems were identified using *A Field Guide to Site Identification and Interpretation for the Vancouver Forest Region* (Green and Klinka 1994). Simpler names for the ecological units were assigned to the site series (i.e., formal ecological classes), such as mesic forest and oak woodlands. A more formal name would be "01 Douglas-fir – salal" for the mesic forest or "03 Douglas-fir – oniongrass" for the oak woodland. Each ecological type was sampled following NCC guidelines for baseline documentation, including photographs. Each ecological unit was mapped for the property (see Figure 5). All anthropogenic features (e.g., buildings, roads) were also mapped using GPS (see Figure 6).

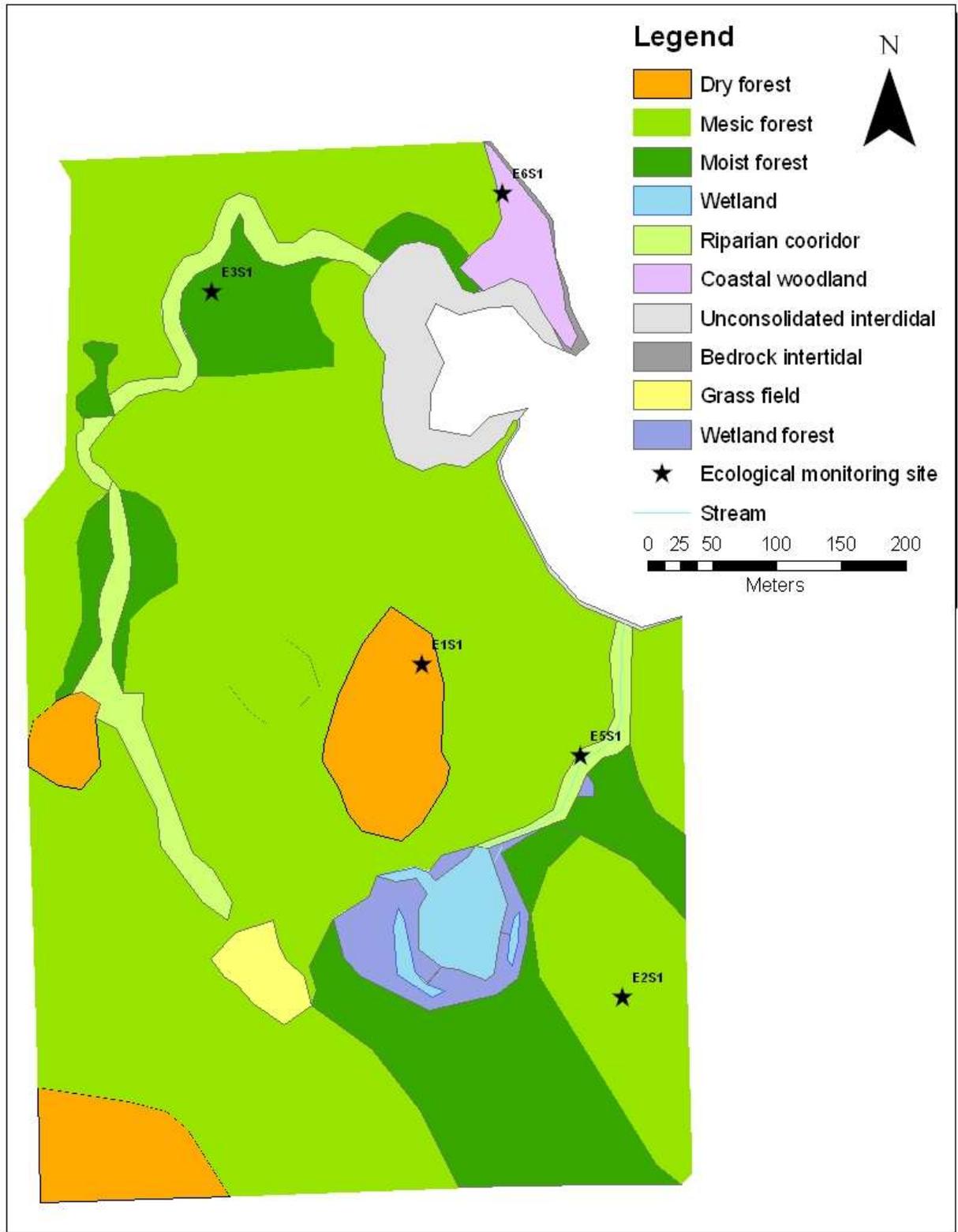


Figure 5. Ecological units of Moorecroft Camp

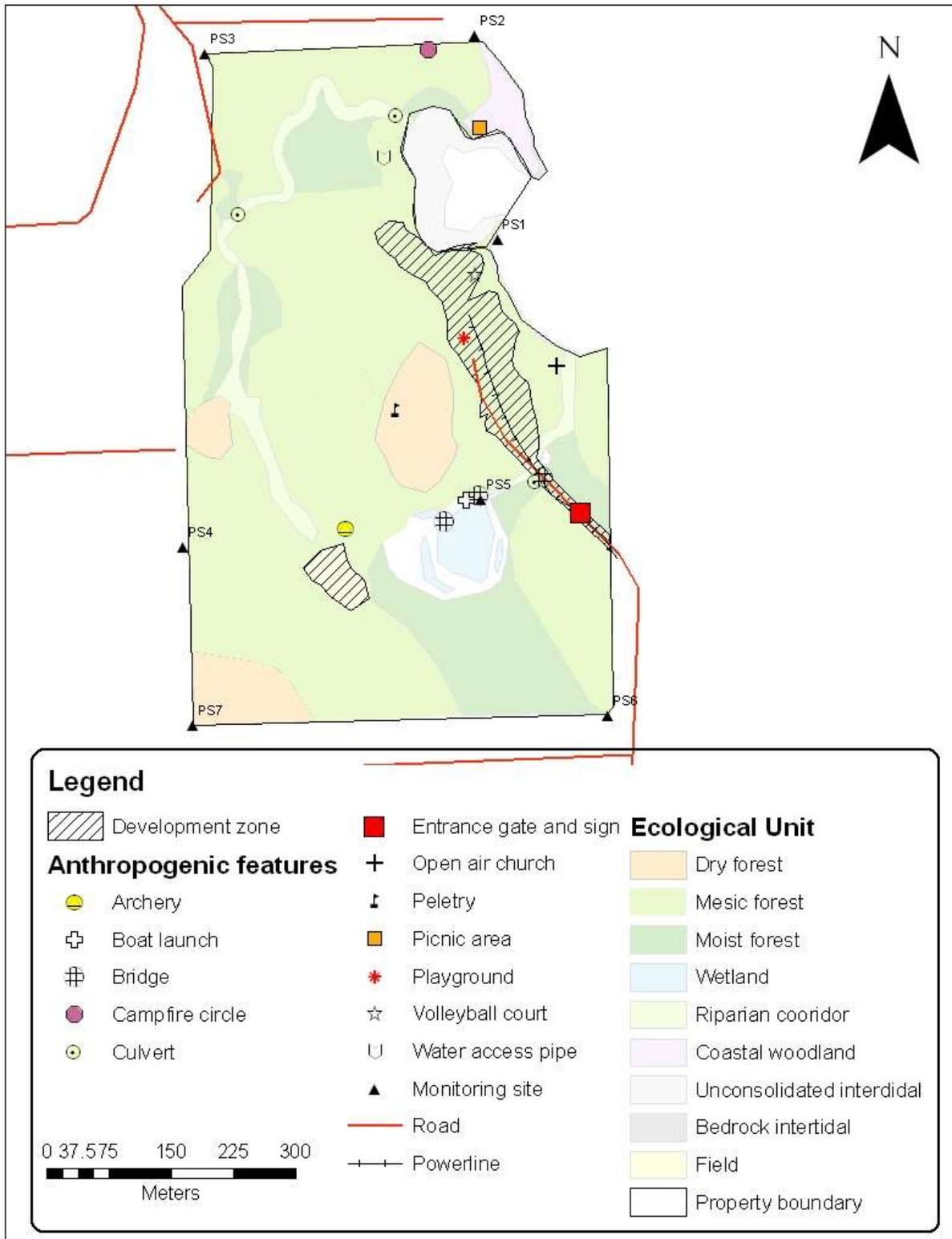


Figure 6. Anthropogenic features of Moorecroft Camp

Ecological Units

Seven ecological communities were defined for Moorecroft Camp, as well as one intertidal unit and one anthropogenic unit. These are briefly described below.

Mesic forest (Douglas-fir / dull Oregon-grape) (CDFmm01). Most of Moorecroft Camp is covered by a coniferous forest matrix; 54% of this is Mesic Forest (Douglas-fir/dull Oregon-grape ecosystem). This ecosystem is in a mature forest structural stage, as distinguished by a well-developed shrub layer of dull Oregon-grape, salal and young conifers. The herb layer is sparse, and in older forests there is a well-developed multi-layered tree structure (Figure 7). Self pruning of dead limbs from the bottom upwards is not yet advanced, nor is there much self-thinning with smaller trees struggling in the understory. Big arbutus has not yet been outcompeted. Mature bark is developing at the base of trees, not yet all the way up.



Figure 7. Mesic forest

Dry Forest (Douglas-fir-lodgepole pine / arbutus) (CDFmm/02) is drier, has more arbutus, and minor components of lodgepole pine. It generally has a greater diversity of herbaceous species, and occurs on upper slope to crest site positions (Figure 8).



Figure 8. Dry forest

Oak Woodland (Douglas-fir / oniongrass) (CDFmm03) is drier and richer than 02. The presence of Garry oak (*Quercus garryana*), hairy honeysuckle (*Lonicera hispidula*), and Pacific sanicle (*Sanicula crassicaulis*) are good indicators of this ecosystem (Figure 9).



Figure 9. Oak woodland understory

Moist Forest (Grand fir / dull Oregon-grape) (CDFmm/04) has a richer nutrient regime, and generally has plentiful sword fern and dense shrubs. The presence of three-leaved

foamflower (*Tiareella trifoliata*) and palm tree moss (*Leucolepis menziesii*) are good indicators for this ecosystem (Figure 10).



Figure 10. Moist forest

Riparian Forest (Grand fir / three-leaved foamflower) (CDFmm/06) is associated with lower slopes near ephemeral streams. The presence of three-leaved foamflower and a sparse shrub layer are good indicators for this ecosystem (Figure 11).



Figure 11. Riparian forest, with ephemeral stream

Wetland Forest (Western red cedar / skunk cabbage) (CDFmm/11) has the richest nutrient regime. The presence of skunk cabbage (*Lysichitum americanum*) and salmonberry (*Rubus spectabilis*) are good indicators of this ecosystem.

Marsh (CDFmm/Wm05) is a previously altered wetland that is recovering towards a marsh with cattails (*Typha latifolia*) around the perimeter (Figure 12).



Figure 12. Marsh

The intertidal zone, although not within the legal land title area of Moorecroft, was also mapped. NCC combined the bedrock-dominated shoreline with the unconsolidated shoreline portion within this zone. Both parts were found to be in good condition, with a diverse seaweed and animal community.

Table 2. Relative amounts of ecosystems on Moorecroft Camp

| Ecological Unit | Hectares | % of property |
|------------------|----------|---------------|
| Mesic forest | 18.42 | 54 |
| Dry forest | 1.81 | 5 |
| Moist Forest | 8.80 | 26 |
| Riparian forest | 0.91 | 2.6 |
| Oak woodland | 0.49 | 1.3 |
| Wetland forest | 0.93 | 2.6 |
| Marsh | 0.53 | 1.5 |
| Development Zone | 2.38 | 7 |

Each mapped ecological unit was equated to an ecological community described by Green and Klinka (1994) and ranked by the B.C. Conservation Data Centre. This resulted in the units being classified as being Red-, Blue-, or Yellow-listed. Red-list indicates endangered or threatened status within B.C., blue-list is vulnerable, sensitive and/or of special concern within B.C., and yellow-list is considered reasonably secure and not at risk in B.C. Except for the developed portions of the property (too degraded to clearly identify the ecosystem), all non-intertidal

ecological communities on the property are ranked as Red- or Blue-listed (see Table 3 and Figure 13). A G1S1 ecosystem is “as endangered as a community can become before extinction” (see footnote below).

Table 3. Status of ecosystems on Moorecroft Camp (Conservation Data Centre 2010).

| Ecological Unit | Ecosystem (ecological community) | Global rank⁴ | Provincial rank⁵ | List status |
|------------------------|-----------------------------------------|--------------------------------|------------------------------------|--------------------|
| Mesic forest | Douglas-fir / dull Oregon-grape | G2 | S2 | Red |
| Dry forest | Douglas-fir-lodgepole pine / arbutus | Not ranked | S2 | Red |
| Moist Forest | grand fir / dull Oregon-grape | G1 | S1 | Red |
| Riparian forest | grand fir / three-leaved foamflower | G1 | S1 | Red |
| Oak woodland | Douglas-fir / oniongrass | G1 | S1 | Red |
| Wetland forest | western red cedar / skunk cabbage | Not ranked | S2S3 | Blue |
| Marsh | Cattail | Not ranked | S3 | Blue |

⁴ Global ranks (G) are assigned based on the global distribution of the ecosystem. The ecosystems are assessed on a 1 to 5 scale, with 1 being the rarest and 5 secure.

⁵ Provincial (subnational) (S) ranks are assigned to the ecosystem within B.C. only. The ecosystems are assessed on a 1 to 5 scale, with 1 being the rarest and 5 secure.



Figure 13. Map of red and blue-listed ecosystems on Moorecroft Camp

Protecting additional CDF habitats from development should be a top priority in BC, particularly where CDF occurs in later seral condition, or where it can buffer other important habitat areas such as rich marine or freshwater ecosystems, and/or protect known habitat for species-at-risk. All three of these things are true of the Moorecroft camp property, making the undeveloped portions of the property priority areas for conservation attention.

Management Zones

NCC is proposing two management zones for the property: a conservation zone (protected by covenant) and a development zone (no restrictions). These two zones are shown in Figure 14. The primary criteria used for the delineation of the proposed conservation zone was the status of the ecosystem, as per the BC Conservation Data Centre rankings (high conservation value = Red -or Blue-listed ecosystems) and lack of intensive disturbance (other than trails). The main access road would be part of the development zone, as would the rectangular field in the southwest (see Figure 15). For the most northwesterly cabins, it was determined that the forest ecosystem was in good condition around the buildings and should be part of the conservation zone (see Figure 16). The entire intertidal area out to the water lease boundary was also included within this conservation zone, although it could not be included in the covenant because it is not legally part of the fee simple title against which a covenant can be registered in the Land Title Office.

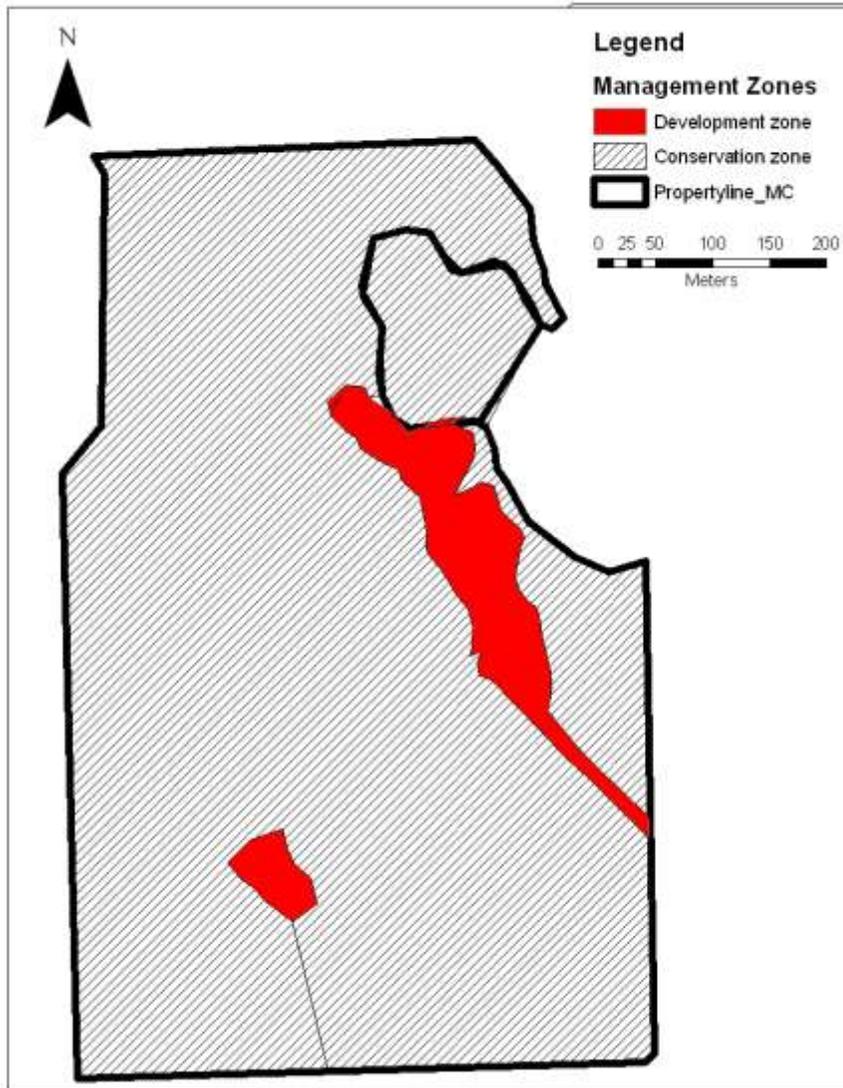


Figure 14. Map showing proposed management (conservation and development) zones on Moorecroft



Figure 15. Well-disturbed core development area, with widespread ground disturbance.



Figure 16. Relatively undisturbed forest around some cabins included in Conservation zone

Proposed Conservation Covenant Terms

The restrictions below represent the kind of restrictions NCC recommends for covenant terms that would protect the ecological values documented in this report in the conservation zone. These types of restrictions are accepted as standard terms for a covenant that would protect the

types of ecosystems found in the CDF (i.e. the ecosystem mapped and documented at Moorecroft Camp). Once agreed to by the parties, a finalized list restrictions will be included in a Section 219 Conservation Covenant. Where “Amenities” are referred to below, they will be defined in the covenant as the ecosystems described above. Amenities are the ecological values of the property.

Proposed Land Use Restrictions for Management Zone A

Restrictions on land use for the conservation area are proposed as follows:

1. Except as expressly permitted in this Agreement, the Owner shall not do anything, omit to do anything, allow anything to be done, or allow the omission of anything, that does or could reasonably be expected to destroy, impair, diminish, negatively affect, or alter the Conservation Area or the Amenities from the condition described in the Report.
2. Without restricting the generality of section 1, the Owner shall not, except with the prior written approval of the Covenant Holder, in the sole discretion of the Covenant Holder, use or permit the use of the Land for any of the following activities:
 - (a) alter or interfere with the hydrology of the Conservation Area, including diversion of natural drainage and flow of water in or around the Conservation Area which may impact the Amenities;
 - (b) subdivide the Conservation Area by any means;
 - (d) allow any buildings, structures, fixtures or improvements to be built, affixed, or placed on the Conservation Area except as expressly permitted in this Agreement (this restriction will be subject to a reserved right to maintain buildings (cabins) and structures existing within the Conservation Area at the date of the Agreement);
 - (e) allow any road, driveway, path, trail, lane or other way, whether for vehicular or other passage, to be laid out or constructed outside the Development Area, other than the driveway and paths existing on the reference date of this Agreement as documented in the Baseline Report⁶;
 - (f) allow any flora or fauna, living or dead, which is native to the Conservation Area, to be removed, harvested, cut or destroyed in any way within the Conservation Area;
 - (g) allow any noxious, exotic flora or fauna to be planted or introduced; defined by the *BC Weed Act*;

⁶ These will be mapped later for the covenant

- (h) cause or allow fill, rubbish, ash, garbage, waste or other material foreign to the Conservation Area to be deposited in, on or under the Conservation Area;
- (i) cause or allow any component of the Conservation Area, including soil, rock or gravel, to be disturbed, explored for, moved, removed from or deposited in or on the Conservation Area;
- (j) allow any motorized equipment to be used except on roads and driveways or where the Owner is acting within reserved rights expressly laid out in this Agreement;
- (k) lease or otherwise transfer control of the Land unless the lease refers to this Agreement and contains a provision which permits the Owner to terminate the lease in the event that the tenant violates the lease.

Proposed Landowner's Reserved Rights for Management Zone A

The land use restrictions set out in the covenant will be off-set by the Landowner's Reserved Rights. The landowner's rights are proposed as follows:

Owner's Reserved Rights

1. The Owner reserves all of its rights as owner of the Land, including the right to use, occupy and maintain the Land in any way that is not expressly restricted or prohibited by this Agreement, so long as the use, occupation or maintenance are consistent with the intent of this Agreement.
2. Without limiting the generality of section 1, the following rights are expressly reserved to the Owner:
 - a. To maintain trails and roadways existing as of the date of this Agreement, as described in the Baseline Documentation Report;
 - b. To maintain cabins and improvements in the Conservation Area in their current footprint, as described in the Baseline Documentation Report;
3. Nothing in this Agreement restricts or affects the right of the Owner or any other party to do anything reasonably necessary under emergency conditions to:
 - a. prevent, abate or mitigate any damage or loss to any real or personal property;
or
 - b. prevent potential injury or death to any individual.
4. The Owner shall notify the Covenant Holder of the circumstances of such action within 30 days, including the actual or likely effect on the Land or the Amenities.

5. If the Owner or any other party intends to do anything described in section 3 under non-emergency conditions, the Owner shall give at least 30 days' prior written notice to the Covenant Holder, describing in reasonable detail the intended action, the reason for it, and its likely effect on the Land or the Amenities. The Owner shall permit the Covenant Holder to enter upon and inspect the Land if any action is proposed under this section. The Covenant Holder may comment on the proposed action and the Owner and any other party shall take those comments into consideration before doing anything under that section. If the proposed action includes felling, trimming, pruning, topping or defoliating a tree on the Land, whether living or dead, under non-emergency conditions, the Owner shall obtain the prior written consent of the Covenant Holder.

Acknowledgements

This report was written by Andrew Harcombe (NCC Terrestrial Ecologist) and Katie Blake (NCC Coordinator of Conservation Projects), both with the British Columbia Region. Fieldwork was carried out by Andrew Harcombe, Leah Ballin, and Allison Archibald. Review of the report was done by Tim Ennis, Director of Stewardship for B.C.

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