Biophysical Analysis of Village Nodes in Electoral Area H: Dunsmuir, Qualicum Bay, and Bowser

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Regional District of Nanaimo

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BACKGROUND

The Regional District of Nanaimo Growth Management Plan identifies 13 village nodes within the Regional District (RDN). Future development will be directed to these compact community nodes in an effort to avoid urban sprawl and retain rural character and values within the area. This report includes a biophysical analysis of three village nodes: Dunsmuir, Qualicum Bay and Bowser (Figure 1). These areas will also eventually receive servicing to support anticipated future higher densities.

In order to facilitate development in these nodes in an environmentally sensitive manner, the RDN is gathering data and recommendations will be used to guide future village development. This study will serve as a technical background report for the Shaw Hill-Deep Bay Official Community Plan (OCP).

Village Nodes

- Dunsmuir Village: This 96-hectare node is located south of the Qualicum River and currently carries a population of 228. The RDN Shaw Hill-Deep Bay OCP, Bylaw No. 1007, 1996, provides for a mixed-use community that includes a mix of commercial, residential, and institutional uses, as well as the creation of public open space. There are 133 existing commercial or residential dwelling units. Estimates for the future build-out provide for a potential of 672 units.

- Qualicum Bay Village: This 120-hectare node is located adjacent to the north bank of the Qualicum River mouth and maintains a population of 84. The area consists of a tourist commercial centre with a community centre, parkland and seniors housing and in the future can expect to see an expansion in community amenities. There are 87 current commercial or residential dwelling units with future build-out projections of 684 units.

- Bowser Village: This 47-hectare node is located at the northern end of the Regional District and has a population of 81. It has a local commercial centre with strong tourist commercial and rural residential service linkages. There are 75 commercial or residential dwelling units with future build-out projections of 439 units.

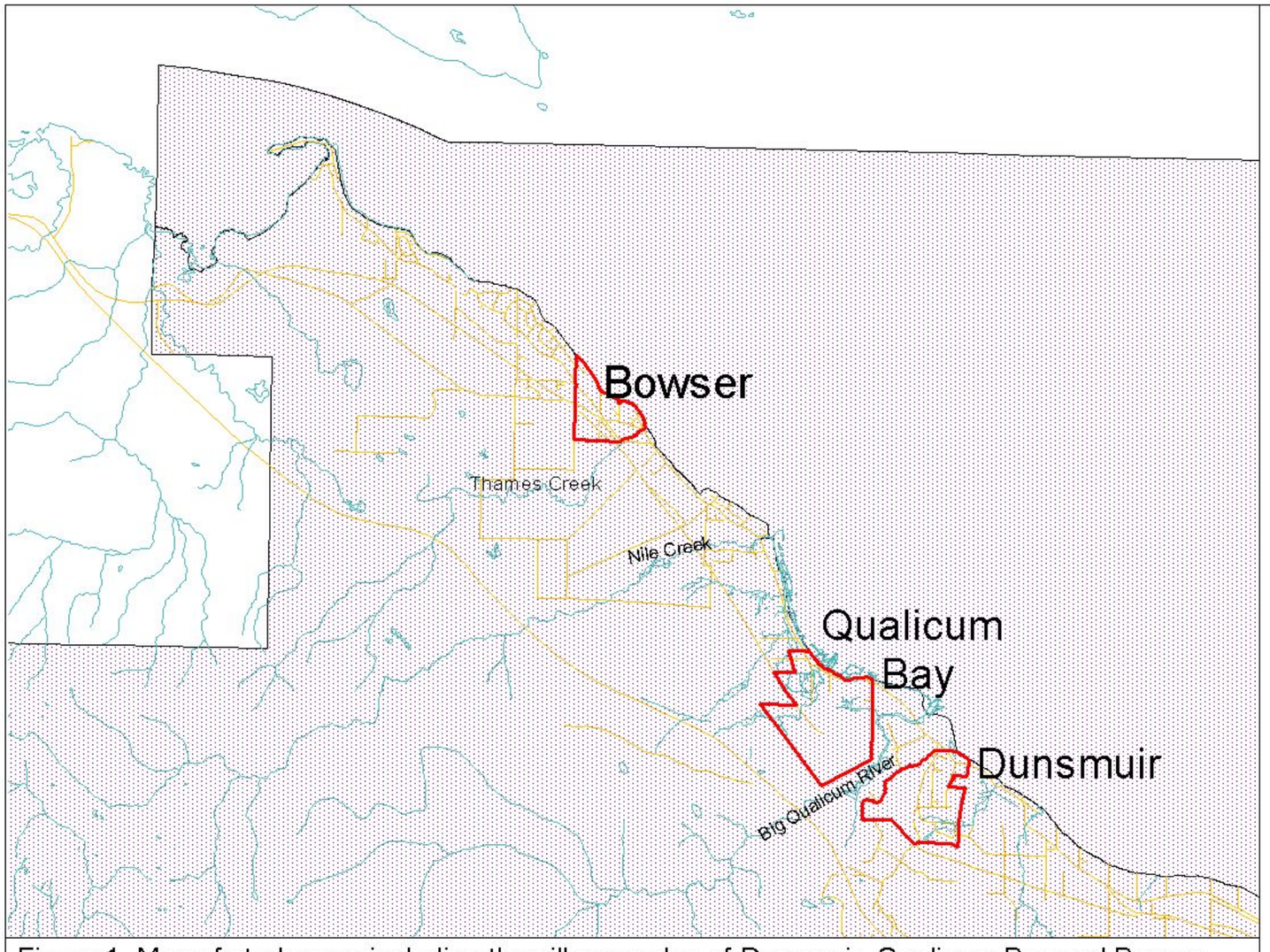

Figure 1. Map of study area including the village nodes of Dunsmuir, Qualicum Bay and Bowser.

REGIONAL DISTRICT OF NANAIMO

Overview of Study Area: Bowser, Qualicum Bay and Dunsmuir

Urban Containment Boundary
RDN streams
RDN roads
RDN Electoral Area H

N

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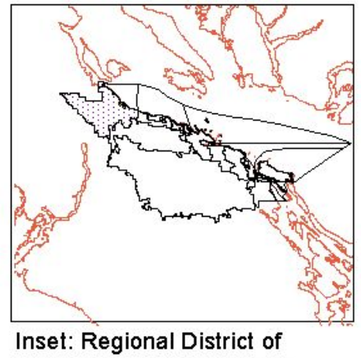

Inset: Regional District of Nanaimo, Electoral Area H

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Objectives

There are six objectives to complete the biophysical analysis of these three village nodes. These include:

1. A review of existing information on biological and physical features including Wildlife Trees, SEI sites and archaeological areas.
2. Field inventories of plant communities, wildlife habitat, species presence and particularly any rare or sensitive plant and animal species (CDC listed species).
3. Threats from adjacent land use.
4. Site stability, flood / drainage issues or other factors affecting lot layout.
5. Geographical positions of environmental features (include maps).
6. Recommendations for habitat enhancement or protection and land use.

Sensitive Ecosystem Inventory (SEI) and Environmentally Sensitive Areas (ESA's)

The Sensitive Ecosystem Inventory of East Vancouver Island and Gulf Islands was initiated in 1993 by provincial and federal government departments in response to an urgent need for inventory information on rare and fragile ecosystems to support sound land use planning decisions (Ward et. al. 1998, McPhee et. al. 2000). The project identified and mapped ecologically significant sensitive terrestrial ecosystems remaining in the area, specifically wetland, riparian ecosystems, older forests and woodlands, coastal bluffs, dunes, spits, cliffs and terrestrial herbaceous ecosystems. Inventory data was gathered through air photo interpretation and selective field checking. In general, only sites larger than 0.5 hectare were mapped. Many of the sites identified are at high risk of conversion to other land uses, degradation by development, and invasion by non-native species. Not all SEI sites have been goundtruthed by the SEI project due to limited time and field-crew availability. Details, identified by air photo interpretation, and in some cases groundtruthing, of each site have been recorded in a database at the BC Conservation Data Centre (CDC), Ministry Water, Land and Air Protection, WLAP, and are available upon request.

As part of the Official Community Plan (OCP) adopted in 1996, the RDN designated Environmentally Sensitive Areas (ESA's). ESA's, as defined by the RDN Shaw Hill-Deep Bay OCP are "areas of land and water that are sensitive to human interference. These may include: sub-tidal zones, estuaries, wetlands, lands adjacent to water bodes, groundwater aquifers, natural habitats and sites of historical, archaeological or scientific significance." These include SEI sites, watercourses and their associated aquatic habitats, mature and old growth

forests, Wildlife Trees, arbutus and Garry oak woodlands, and herbaceous communities. These areas are particularly sensitive to human activity and development, and thus require special consideration to protect their integrity.

In Electoral Area H, Bowser has two known sites identified by the SEI project, which would also be designated as ESA's by the RDN. One of these sites (N1528) is an older second growth forest and the other a riparian area along Thames Creek (N1590) on the south end of Bowser. One other riparian SEI (N1586), along the Qualicum River lies between the containment boundaries of Dunsmuir and Qualicum Bay, and could be affected by developments within these areas. Two of these SEI sites have been groundtruthed (N1528 and N1586) during the SEI project; however, the site along Thames Creek (N1590) was not groundtruthed.

One objective of this project was to visit these three sites to obtain more information and groundtruth where necessary. Another objective was to locate and record additional SEI/ESA sites that had been missed by the aerial SEI. Additional objectives were to record Wildlife Trees, veteran old-growth trees, and describe streams and additional wetlands located in the study areas.

Definitions:

Snag: Any standing dead tree that shows signs of wildlife use such as nest cavities for birds, racoons or bats and woodpecker foraging signs.

Veteran Tree: Any large, old growth tree with a diameter at breast height (dbh) of 1 meter or more. These trees were not cut during any period of logging over the last 100 years and stand well over the average canopy height. They often provide nesting cavities for birds, raccoons, bats and squirrels, as well as excellent perch or nest sites for Bald Eagles (*Haliaeetus leucocephalus*).

Wildlife Tree: Trees identified (and marked) by the MWLAP Wildlife Tree Program. These trees are usually veterans showing evidence of use by wildlife such as eagle nest sites and woodpeckers cavities.

METHODS

Information on rare habitats, sensitive ecosystems and wildlife concerns were obtained from the Conservation Data Centre of BC, BC Ministry of Water Land and Air Protection (WLAP), and the BC Ministry of Sustainable Resource Management (MSRM).

Researchers visited each of the three village nodes between August and September 2002. All Wildlife Trees and Bald Eagle nest sites were located from the WLAP Bald Eagle nest inventory reports 2000-2001. Geographical positions of active nests were recorded. Former nest sites where trees were removed were also noted. All SEI sites, wetland and riparian areas were described and evaluated using SEI groundtruthing forms (Appendix 1). Evidence of terrain instability and soil type was also noted. Observers recorded dominant plant species, invasive species, wildlife species and signs of occupation during field visits.

The geographical position of significant environmental features was detected using a Garmin etrex handheld geographic positioning system unit. The UTM coordinates (NAD 83) of features are listed in Appendix 2.

The Regional District of Nanaimo obtained archaeological data from the Provincial Heritage Register Archaeology and Recreation Inventory, Terrestrial Information Branch, MSRM. This data was summarised for each area.

RESULTS

Dunsmuir

This area is characterized as the Coastal Western Hemlock, very dry maritime (CWHxm) biogeoclimatic zone with site series 02 (lodgepole pine- cladina moss) (Green and Klinka 1994). Above the tracks on the west side, the dominant plant species also include grand fir (*Abies grandis*), salal (*Gaultheria shallon*), and ocean spray (*Holodiscus discolor*). The soil type is Sandy Loam, which is nutrient-poor and dry as described by Green and Klinka (1994).

During site visits observers noted presence of black bear (*Ursus americanus*) scat north of the tracks and near the Bald Eagle nest (E106-014) Wildlife Tree off Horne Lake Road (Figure 2). Bird species noted include the Red-breasted Nuthatch (*Sitta canadensis*), Golden-crowned Kinglets (*Regulus satrapa*), and Chestnut-backed Chickadees (*Parus rufescens*) in the forested areas and a Horned Grebe (*Podiceps auritus*), Belted Kingfisher (*Ceryle alcyon*), two American Widgeon (*Anas americana*) and a Greater Scaup (*Aythya marila*) at Shoreline Lake.

The photo-interpreted stream on the ESA map from the RDN (92F037-4-4) is actually a trail. However, the creek flowing into Shoreline Lake just to the north of the containment boundaries does not appear on any of the local maps showing watercourses. This is a fish-bearing creek, which shows evidence of recent restoration work.

Significant Environmental Features

In the Dunsmuir area, we described two new environmentally sensitive areas: # 1 is the riparian area along Westglade Brook and #2 is the wetland around Shoreline Lake. SEI groundtruthing forms were completed for these areas (Appendix 1). The SEI polygon N1586 is just northeast of Dunsmuir along the Big Qualicum River. Since drainage and development along that end of Dunsmuir could affect this major waterway, we have included it as an ESA that could be affected by development in Dunsmuir.

Table 1 shows the rare and endangered plant and animal species identified in the SEI and Conservation Data Centre records and Wildlife Trees identified by WLAP. Figure 2 shows the mapped locations of each feature with UTM coordinates in Appendix 2.

Table 1. Significant Environmental features in Dunsmuir.

Feature	Location	Description
Wildlife Tree	Horne Lake Rd / Hatchery Rd	Eagle nest (E106-014)-active. NB new GPS based location
Westglade Brook (new ESA #1)	Through centre of village.	Stream runs from wetland above tracks through town. Fish spp present. Wetland source on private land (Lot 1 plan 1280-R DL. 31 ALD*).
Shoreline Lake (new ESA #2)	By seashore	Excellent waterfowl habitat. Probable amphibian habitat. Approx. 1.14 hectares
Big Qualicum River-SEI N1586	Just outside north end of Dunmuir	Important fish bearing habitat.
Veteran trees (2)	Trail west of Hatchery Rd	2 Douglas fir. Approx. 1.2 m dbh. Good condition.
Veteran tree-snag	In gully by Eagle nest-Wildlife Tree	Old, >1 m dbh, well used by woodpecker spp. (Piliated Woodpecker + others). dbh=>1 m.

*ALD = Alberni Land District

Archaeological Sites:

There are two known archaeological sites within the Urban Containment Boundary of Dunsmuir according to the provincial Heritage Register Archaeology and Recreation (Figure 2). These are described as follows:

- DiSd-6: This site is Located just northwest of the junction of Kenmuir Road and Highway 19A. Few remnants are visible as white specks of shell; fire cracked rock, fragments of raw slate, and one piece of ground slate. Inspection of the subdivision between Kenmuir and Huson Roads concluded that no cultural material was threatened by these subdivisions. However, the disturbed midden deposits do continue to the north.

- DiSd-20: This site is located 300 metres south of Horne Lake Road and 8 metres west of highway 19A. Present condition of the site is unknown.

Recommendations

1. According to Wolf Bauer (1977) Shoreline Lake (new ESA#2) represents "a unique resource, a tiny freshwater oasis that attracted cormorants, swans, eagles, and a hawk within a half hour of observation". During our more recent visit we also noted a Belted Kingfisher, and a Horned Grebe. We recommend a buffer of 15 m be maintained around the lake. To enhance the surrounding habitat, removal of invasive species such as scotch broom (Cytisus scoparius) and Canada thistle (Cirsium arvense) would be beneficial. If possible, construction of a public path to the lake and down to the seashore would make this a unique bird watching site of interest to many local and visiting naturalists.

2. The creek flowing into the lake from the north end beside the lower end of Horne Lake Road should be groundtruthed.

3. Present condition of archaeological sites DiSd-6 and DiSd-20 need to be evaluated before further development in the surrounding area is undertaken.

4. The north end along the containment boundary is at a crest of a hill. Below this is unstable terrain descending towards the Big Qualicum River. Drainage will flow towards the riparian area surrounding the river. Development along this area should be restricted to protect the valuable fish habitat and sensitive ecosystem (N1586). Field surveys also revealed well test sites at the base of the

gully near the Wildlife Tree-Bald Eagle nest (E106-014). A buffer of at least 30 m from the edge of the gully should be maintained.

5. A natural buffer should be left around the eagle nest Wildlife Tree (E106-014) to protect the nesting habitat. The province recommends maintaining a minimum naturally vegetated 'no disturbance' buffer of 100 metres surrounding the nest tree (MELP 2001).

6. The two Douglas-fir veteran trees and the veteran snag near the eagle nest tree should not be disturbed by development. Trees of this age are rare in this area and are important for many cavity nesting birds, insectivorous birds, and as habitat for tree bats such as the Hoary bat (*Lasiurus cinereus*) (Nagorsen and Brigham, 1993).

7. The riparian area surrounding Westglade Brook (new ESA#1) should be maintained with a 30 m buffer. Herbicides should not be used to control weeds along the railway tracks at points where the brook crosses and follows the tracks.

8. The wetland feeding into Westglade Brook should also be protected (15 m buffer) and groundtruthed if possible. This wetland is on private land (Lot 1 plan 1280-R DL. 31 ALD) and is approximately 1500 square metres.

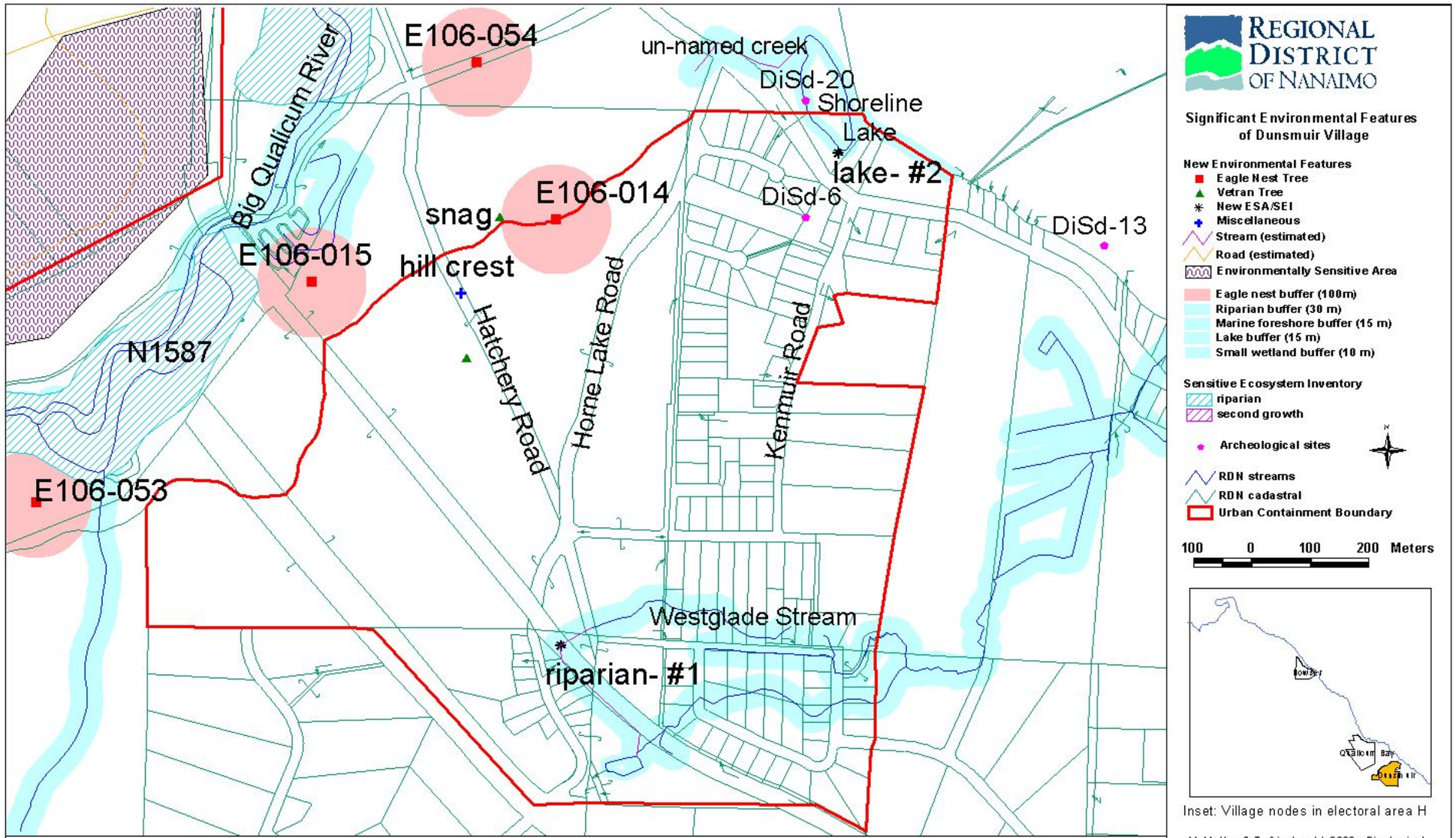


Figure 2. Map of Dunsmuir village showing significant environmental features and archeological sites.

Qualicum Bay

This area has a more diverse mixture of vegetation on rich and poor soil types in the Coastal Western Hemlock, very dry maritime subzone (CWHxm). The forested area north of the dirt road off Cochrane Rd (that leads to the Inland Island Highway) towards Black Brook has a richer soil types with site series 02 (lodgepole pine- Cladina moss) and 03 (Douglas-fir western hemlock-Salal). This area maintains excellent habitat for cavity nesters as researchers noted three species during a site visit including the Red-naped Sapsucker (Sphyrapicus nuchalis), Northern Flicker (Colaptes auratus) and Hairy Woodpecker (Picoides villosus) (CDC Blue-listed (vulnerable)) along the trail towards the brook.

The vegetation on the south side of the dirt road off Cochrane Road closer to the Big Qualicum River (RL 1 plan 35545, DL.254 Alberni Land District) is very dry with lodgepole pine (Pinus contorta) forest and very poor soil type (site series 11 lodgepole pine-Sphagnum moss) (Green and Klinka 1994). The terrain is unstable and drainage would flow down towards the river. This area (in the southern corner of the containment boundary) is also fragmented by narrow roads and all-terrain-vehicle (ATV) tracks, however it maintains significant natural habitat for wildlife. Wildlife signs were abundant, including black-tailed deer (Odocoileus hemionus) tracks, fresh bear scat, and a Bald Eagle feather. Birds species sighted included a Sharp-shinned Hawk (Accipiter striatus), Stellars Jay (Cyanocitta stelleri), Golden-crowned Kinglets and Chestnut-backed Chickadees. Two eagle nests were listed as in this area in 1995 (#1413, #1414). Since then, the nest trees were removed by the construction of the Inland Island Highway (pers. Comm Terri Martin).

Significant Environmental Features

In the Qualicum Bay area, we described two new environmentally sensitive areas: # 3 is the gully along Black Brook and #4 is the small wetland beside Highway 19A. SEI groundtruthing forms were completed for these areas (Appendix 1). The SEI polygon N1586 is just south of Qualicum Bay along the Big Qualicum River. Since drainage and development along that end of Qualicum Bay could affect this major waterway, we have included it as an ESA that could be affected by development in Qualicum Bay.

Table 2 shows the rare and endangered plant and animal species identified by the SEI and Conservation Data Centre and Wildlife Trees identified by WLAP. Figure 3 shows the mapped locations of each feature with UTM coordinates in Appendix 2.

Table 2. Significant Environmental features in Qualicum Bay

Feature	Location	Description
Vancouver Island Watershrew	Black Brook	Red-listed by CDC. Pitfall trapped in brook in 1997
Black Brook (new ESA # 3)	Through centre of village	Rich riparian area and gully.
Wildlife Tree	West end of Lions Way.	Former Eagle nest (E106--016) location before top broke off in 2001. Still good perch site. Good quality snag
Wildlife Tree	Near Tracks / Grove Business Centre	Active Eagle nest (E106-057). Same pair that nested at above site.
Wildlife Tree	By Crown and Anchor Pub	Eagle nest (E106-055). Not active this year but was in 2001.
Nest tree / Snag	By pub parking lot	Large nest in dead conifer, it is not known what species used this nest or when
Wetland (new ESA #4)	By hwy 19A. PT.A plan 9003 DL.20 NLD*.	Approx. 3 m x 30 m. Fish present. Flows through culvert to sea.
Big Qualicum River. SEI N1586.	Just outside south end of village	Ecologically significant fish habitat.

*NDL=Newcastle Land District

Archaeological Sites:

There is one known archaeological site within the Qualicum Bay Urban Containment Boundary.

- DiSd-19 is located on both sides of Island Highway from a point 180 m north of the Casa del Mar Resort to approximately 75 m south of the entrance to McCabes Trailer Park. It consists of a shell midden where historic findings of burials were excavated in the 1940's. Some ground slate and stone artefacts also may exist.

Recommendations

1. Qualicum Bay has a relatively large amount of developed shoreline compared to Dunsmuir and Bowser. Structures including riprap, lock block armouring and retaining walls have been used along much of the developed shoreline. Unfortunately, these structures offer only short-term, localized solutions to shoreline changes or erosion and can accelerate erosion of adjacent areas. Fisheries and Oceans Canada recommends maintaining and enhancing natural vegetation to stabilize eroding areas and provide important habitat to aquatic and terrestrial wildlife. Also, homes or other developments should be set back at least 15 to 30 m (depending on site specific conditions like soil type and bank steepness) from the top of the bank or high-high tide mark. Note that erosion problems can also be caused by upland drainage therefore a qualified professional (e.g. geotechnical engineer) should be consulted to design and install mitigating structures. Hard surfaced, engineered shoreline modifications are expensive and should be avoided because they prevent the deposition of sediments that are required to regenerate the shoreline. It is preferable to use loose materials such as large blast rock that will not break down.

2. Development of the lodgepole pine forested area in the southern part of Qualicum Bay should be restricted. A thin layer of moss covers the sandy soil, which is very sensitive to disturbance as seen by the ATV tracks. The sandy soil is also unstable for development and any run-off from this area will drain toward the Big Qualicum River. Removal of vegetation could lead to significant erosion. Any development should be subject to a development permit application including storm water and erosion management options. The less disturbed southwest corner (in RL 1 plan 35545, DL.254 Alberni Land District) could be designated as parkland without access to ATV's.

3. The three Wildlife Trees in Qualicum Bay should be preserved with a buffer of 100 m natural vegetation where possible. The Wildlife Tree at the end of Lions Way that broke off in 2001 should continue to be protected as it could be used for perching or habitat for cavity nesters.

4. The new nest that was found in a snag by the pub parking lot should be observed to determine what species was nesting and if it is still active.

5. The undeveloped part of Black Brook is a rich site with at least one very rare species, the Vancouver Island Watershrew (*Sorex palustrius brooksi*). Any new roads or clearing near the brook should be avoided. If a road does go through this area, careful consideration should be made to protect the riparian area and allow for an unrestricted water flow. A minimum natural vegetation buffer of

30 m from each side of the brook should be maintained. Where the gully is well defined in DL.32 (NLD) the buffer should be measured from the top of the gully.

6. Welch Creek and Root Spring are channelized right from their source. Since these streams drain into the Big Qualicum River, it is recommended that habitat restoration occur where possible. A buffer of 30 m should be maintained along the waterway, with limits to surface runoff and pollutants. We recommend consultation with local StreamKeepers for possible restoration work and options.

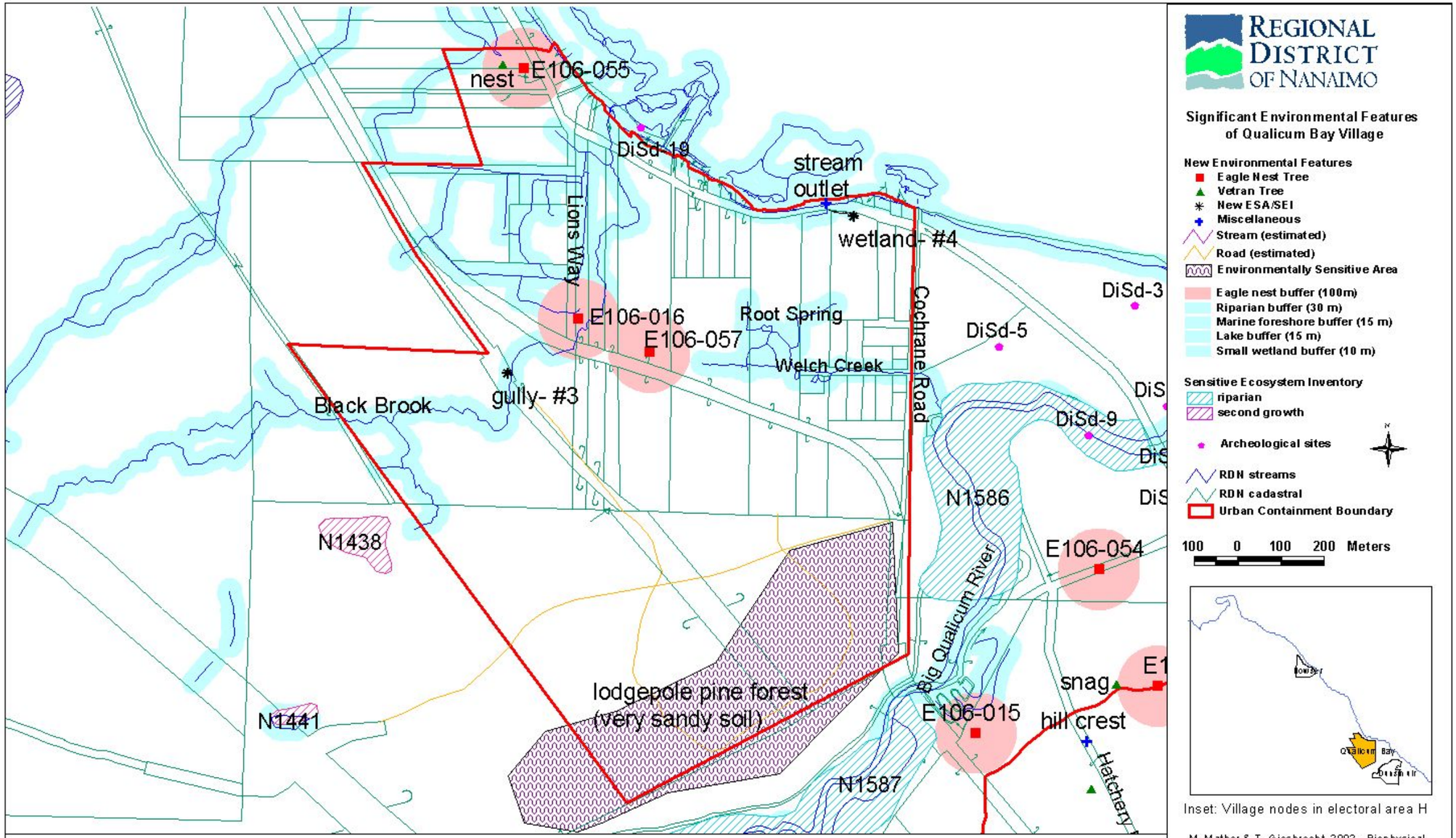


Figure 3. Map of Qualicum Bay village showing significant environmental features and archeological sites.

Bowser

The older second growth SEI (N1528) in the southern part of Bowser is classified by the SEI inventory as Coastal Western Hemlock very dry sub zone (CWHxm) with site series 4 (Douglas-fir sword fern). Researchers noted that this area is dominated by Douglas-fir, grand fir, western redcedar and sword fern. There is some hemlock, big leaf maple, bracken, salal and dull Oregon grape. This indicates that it may be site series 7 (western redcedar- foamflower), which is drier than site series 4. In either case, this area has rich soils, but the soil moisture may vary throughout the site. Researchers noted six large Douglas-fir and grand fir trees (over 1 m dbh) and one western redcedar that was about 1.5 m dbh.

Thirkill (undated) reported a barrier to fish migration on Thames Creek (SEI-N1590) at the outlet of the culvert under Highway 19A. Since then significant restoration along the creek has removed this obstacle. WLAP, Fisheries and Oceans Canada and local landowners have helped in the construction of a new bridge over (rather than in) the creek to access a beachfront house. They have also helped with the stabilization of the creek banks, replanting of native vegetation and construction of a tunnel under the beach rock out past the low tide to allow for fish access to the sea.

The waterfront of Bowser is less developed than Qualicum Bay or Dunsmuir. Researchers also noted rare dune habitat in the less developed parts of the shore. Several bird species were observed including 15 Harlequin Ducks, 4 Great Blue Herons, and 1 Common Loon.

Significant Environmental Features

In the Bowser area, we described two new ESA's: #5 is the dunes along the waterfront by lots off Kelsey Road and the lot west of Coburn Road and #6 is the ephemeral stream and gully through the lot on the west side of Coburn Road. The two SEI polygons in the area are the older second growth forest on the southwest side of the containment boundary (N1528) and the riparian area along Thames Creek (N1590). SEI groundtruthing forms for these four areas are included in Appendix 1.

Table 3 shows the rare and endangered plant and animal species identified by the SEI and Conservation Data Centre and Wildlife Trees identified by WLAP. Figure 4 shows the mapped locations of each feature with UTM coordinates in Appendix 2.

Table 3. Significant Environmental features in Bowser

Feature	Location	Description
SEI-N1528 Older second growth forest	Southwest end of containment. Lot PT 1&2 PL.2076 and PT 2 plan 1820 in DL36 NLD	Rich second growth forest with numerous veteran Douglas-fir and western redcedars.
Grand fir- dull Oregon grape	In SEI N1528	CDC red-listed plant community. Not identified by CDC, but present.
SEI-N1590. Thames Creek	South end of village	Riparian stream with fish: Coho Salmon, Cutthroat Trout, Cutthroat Trout (anadromous) and Steelhead
Wildlife Tree	Coburn Rd., first driveway	Eagle nesting tree (E106-063) active in 2002.
Dunes (new ESA#5)	Seashore (Lot 5 plan 2076, Lots 1&2 of plan 44044, Lot 1 of plan 37170 in DL36 NLD)	Rare ecosystem type, in small patches (approx. 5 m x 30 m and some smaller areas)
Riparian gully-ephemeral (new ESA #6)	In Lot 5 plan 2076 DL36 NLD on west side of Coburn Rd.	Dry gully in late summer, but seasonally very wet. 3 m wide all through forested lot. Outlet on beach.

Archaeological Sites:

There is one known archaeological site within the Urban Containment Boundary of Bowser.

- DiSd-16. This site is located at the end of Bowser Road close to the water. In 1993 archaeologists noted that this site has likely been destroyed by development over the years. They also found evidence that suggests that this mound was likely a natural topographic feature.

Recommendations

1. SEI N1528 (older second growth forest) should be protected within the containment boundary, as this area will provide habitat for wildlife species and in time will develop characteristics of true old growth forests. Future road extensions including road R/W 3210, Sundy, Pitt and Eastdowne

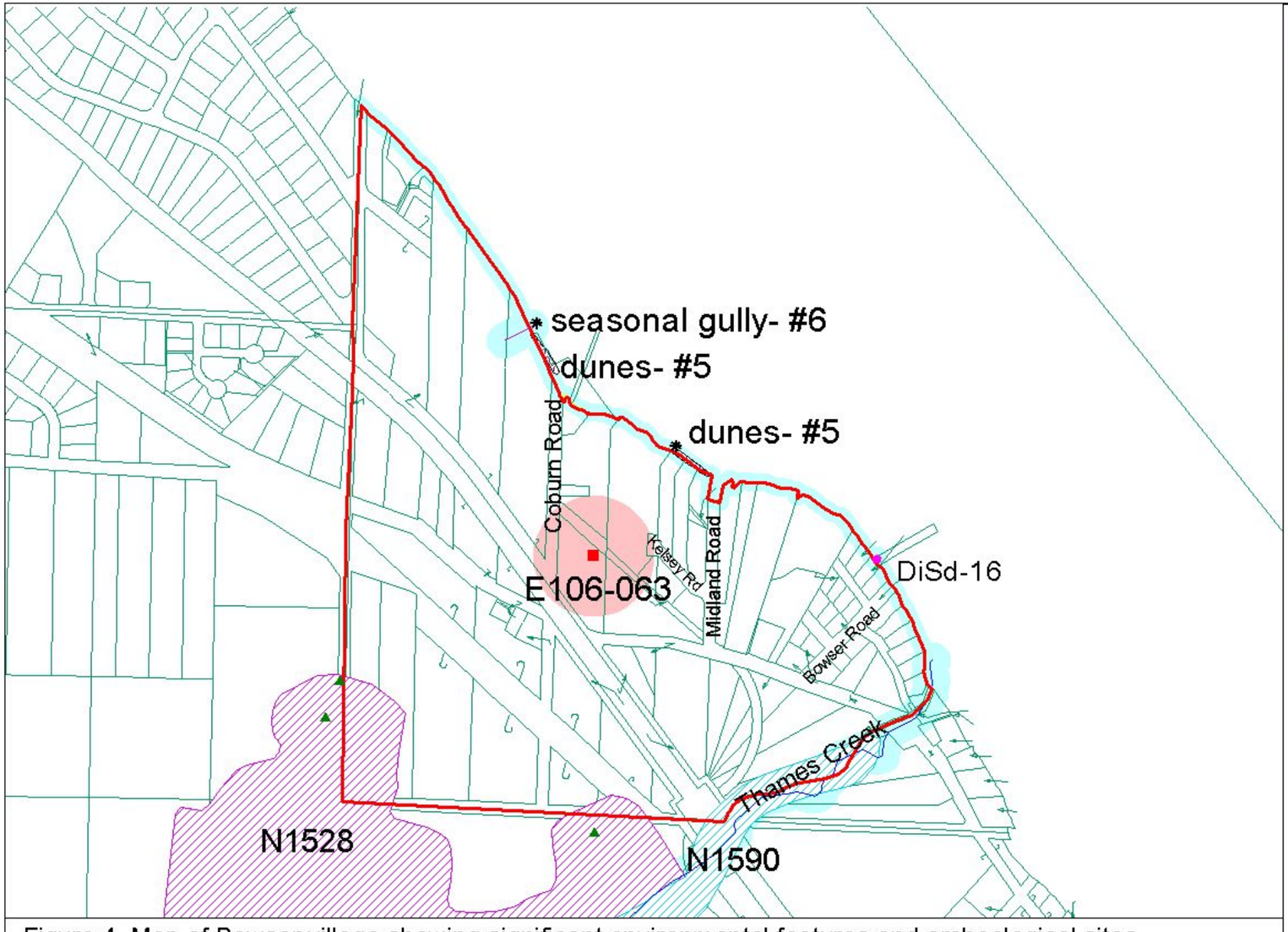
Roads should be re-assessed to avoid the destruction of the few remaining veteran trees and the rare Grand fir-dull Oregon grape plant community.

2. The dune area along the shore of Bowser should be maintained because it is a very rare ecosystem. Also, dunes are a natural (and attractive) barrier from high water and eliminate the need for retaining walls. In order to maintain dunes, development should be discouraged in or adjacent to dunes, and access should be restricted. Wherever possible, vegetated buffers should be maintained around each dune area to isolate the ecosystem from outside disturbance, maintain microclimates, and minimize edge effects. A site assessment can determine the appropriate width of the buffers (e.g. 15 m), which should be measured from the top of the dune area, not the high tide line. Dunes, which are fragile ecosystems are easily damaged and should also be protected from recreational activities, livestock, pets, and introduced plant species. Trails should be well marked and fenced when adjacent to critical areas. Use signs to inform people of the fragile nature of the dune ecosystem.

3. Continue with stream upkeep and restoration along Thames Creek (SEI N1590). Future developments along this fish-bearing creek should not be within 30 m of the stream bank on either side.

4. Development around the ephemeral creek (new ESA #6) should be discouraged as it is likely unstable. There is evidence that this creek may be very full at times as noted by the cobbles and the large, dry streambed. Outflow into the ocean could also affect marine habitats. The stability and length of this creek should be further groundtruthed and evaluated before determining an effective buffer along the surrounding steep gradient down to the beach.

5. The Wildlife Tree (with eagle nest E106-063) should have a buffer of 60 m (where possible) of natural undisturbed vegetation and a ‘no disturbance’ buffer of 100 m during the nesting season (MELP 2001).



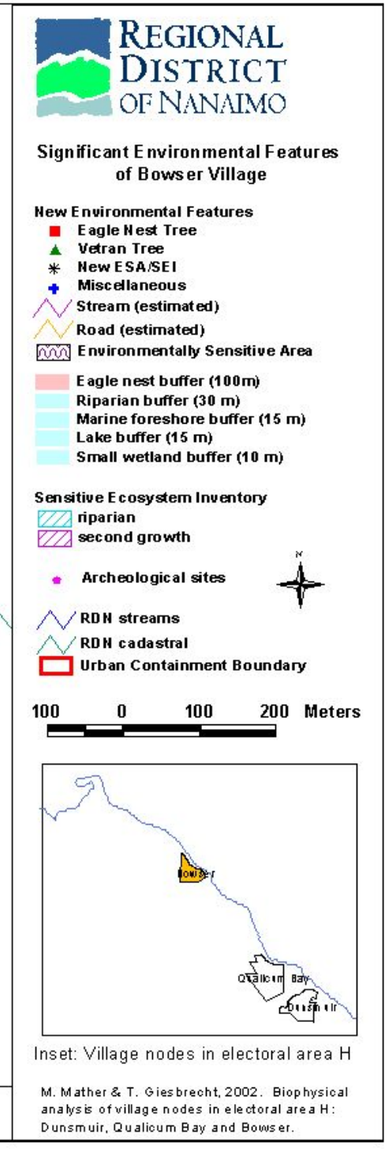


Figure 4. Map of Bowser village showing significant environmental features and archeological sites.

SUMMARY

A biophysical analysis of the village nodes in Dunsmuir, Qualicum Bay and Bowser was completed so that development of these areas could be done in an environmentally sensitive manner. Six new ESA's were identified and all SEI's within the containment boundaries were located and groundtruthed where necessary. In addition, Wildlife Trees were located and their status was confirmed. We recommend that ESA's and significant environmental features be designated as development permit areas and that specific recommendations as described for each area should be taken into consideration before development occurs.

In order to minimise degradation and encroachment of non-native species into ESA's, we recommend that a buffer of natural vegetation should be maintained around riparian areas (30 m), foreshore areas (15 m) and lakes / small wetlands (10-15 m). Wildlife Trees should have a buffer of 60 m of natural undisturbed vegetation and a 'no disturbance' buffer of 100 m during the nesting season (MELP 2001).

Specific to the foreshore, natural vegetation should be maintained and enhanced to stabilise eroding areas and provide important habitat to aquatic and terrestrial wildlife. Protection of the foreshore habitat is especially important in Bowser where rare dune ecosystems are present. If mitigating structures are required, a qualified professional geotechnical engineer should be consulted to design and install the structures to limit shoreline erosion. In addition, waterfront landowners should work together to develop a complementary and cohesive management plan for shoreline stewardship. If one owner installs a seawall the problem of shoreline erosion will shift to one of his down-current neighbours.

All updates to the SEI and descriptions of the newly identified ESA's will be forwarded to the CDC. Updated Wildlife Tree information will be forwarded to both WALP and to the CDC. Recommendations based on this biophysical analysis will be used as a guide for future development within these areas.

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Appendix 1

SEI Groundtruthing Forms for wetlands and uplands.
(Hard copies only)

Appendix 2

GPS points and descriptions (UTM Zone 10, NAD83).

UTM ZONE	EASTING	NORTHING	TAG	VILLAGE	DESCRIPTION
10	382919	5472107	1	Dunsmuir	Trail crossing Hatchery Road (photo-interpreted stream was incorrect); 9m accuracy
10	382887	5472082	2	Dunsmuir	Veteran tree along trail between Hatchery Road and railway (7m accuracy)
10	382877	5472200	3	Dunsmuir	Crest of hill on Hatchery Road (8m accuracy)
10	383119	5471588	4	Dunsmuir	Culvert: for Westglade Brook; saw fish; water still flowing thru culvert New ESA #1.
10	383562	5472453		Dunsmuir	Shoreline Lake. New ESA #2
10	383425	5472617		Dunsmuir	Un-named creek flowing into Shoreline Lake (12 m accuracy)
10	383059	5471561	5	Dunsmuir	Westglade Brook culvert under railway connects to culvert by Marshall Road (ESA #1) (10 m accuracy)
10	381533	5473023	7	Qualicum Bay	Road turns into trail before crosses Black Brook; saw RNSA; HAWO; NOFL; (8m accuracy)
10	381464	5473096	8	Qualicum Bay	Stream crosses trail (8m accuracy) new ESA # 3
10	378805	5476715	9	Bowser	Veteran tree in 2nd growth
10	382947	5472337	11	Dunsmuir	Snag along road off hatchery Road (10m ac)
10	383051	5472335	12	Dunsmuir	Ridge top by eagle nest (8m ac)
10	382308	5473480	13	Qualicum Bay	Wetland by highway (8m ac) New ESA # 4
10	382242	5473512	14	Qualicum Bay	Culvert under highway (7m ac)
10	381453	5473848	15	Qualicum Bay	Nest in snag near Crown and Anchor Pub (11m ac)
10	378547	5477087	16	Qualicum Bay	Culvert by gift shop (7m ac)
10	378425	5477023	17	Bowser	Vegetation description near SEI (11m ac)
10	378385	5476966	18	Bowser	2 veteran snags (10m ac)
10	378361	5476906	19	Bowser	Veteran Douglas -fir (12m ac)
10	378941	5477354	21	Bowser	End of 1st dune area (5m ac). New ESA #5
10	378711	5477557	22	Bowser	Stream outlet (8m ac.) New ESA #6
10	381809	5473148	E106-057	Qualicum Bay	Wildlife Tree by railway
10	383049	5472334	E106-014	Dunsmuir	Wildlife by hatchery (9m ac)
10	378804	5477172	E106-063	Bowser	Wildlife Tree on Coburn Road (Garmin)
10	381502	5473839	E106-055	Qualicum Bay	Wildlife Tree at Crown and Anchor Pub
10	381637	5473229	E106—016	Qualicum Bay	Wildlife Tree at end of Lions Way