

SECTION 2 - THE NATURAL ENVIRONMENT

2.1 FRESHWATER MANAGEMENT

The Shaw Hill - Deep Bay Plan Area contains many watercourses, wetlands, and aquifers. Each of these natural resources is worthy of protection through careful land use planning. It is recognized that there may be many significant areas of freshwater that have not yet been identified, and consequently, identification of these special features is an ongoing process.

The two major rivers located within the Plan Area are the Big Qualicum River and the Little Qualicum River. The Big Qualicum River, located entirely within the Plan Area, drains area mountains and the central area of the coastal lowland. The Big Qualicum River and its tributaries, which include Hunts Creek and Horne Lake, comprise the largest watershed in the Plan Area. Parts of the Little Qualicum River flow through the Plan Area. The Little Qualicum River, and its two major downstream tributaries, Whiskey Creek and Kincade Creek, drain the southeast portion of the Plan Area. Other permanent watercourses within the Plan Area include: Nile Creek, Thames Creek, Chef Creek and Fletcher Creek.

Spider and Illusion Lakes are part of an enclosed drainage system with no surface outflow streams. The enclosed nature of the drainage system makes both of these lakes susceptible to potential negative impacts caused by contaminated runoff and increased erosion. Runoff and erosion may cause an acceleration of the eutrophication process, and consequently a decline in the recreational appeal of these lakes.

Groundwater resources are particularly important to the Plan Area as residents rely on these resources for domestic water supplies and supply needs of the agricultural sector. The location of groundwater aquifers coincides with the spatial distribution of Quadra Sands. Quadra Sand, commonly known as glacial till, are distributed unevenly throughout the Plan Area. The Quadra Sands are located primarily in lowland areas near watercourses. Quadra Sands retain water underground. However, when the Quadra Sands are exposed, or disturbed, large quantities of water are discharged in the form of springs. These springs contribute to the flow of creeks and rivers. The subsurface material, which supports groundwater aquifers, is extremely sensitive to disturbance and erosion. Land development, which results in the exposure of the Quadra Sands may result in drainage problems and the eventual intrusion of erosion material into natural watercourses and wetlands. It is unknown at what point exposure of the glacial material would result in the degeneration of aquifers. Since a quality domestic water supply is essential, and damage to groundwater aquifers may compromise domestic water supply, land development must be planned in a manner that minimizes impact on existing aquifers and groundwater sources.

Surface water and ground water are interdependent. Groundwater flows are essential for recharging rivers and streams, and surface water recharges aquifers. Since fresh water sources are finite and susceptible to contamination, all surface water courses and

groundwater aquifers in the Plan Area are recognized as environmentally sensitive resources.

It is also important to realize that the long term availability of fresh water is threatened by competition amongst the different community water systems within the Plan Area for domestic water supplies from the same aquifer. Consequently, the potential impact of the increased demand placed on aquifers as a result of new development must be considered when making land use decisions for the Plan Area.

2.1.1 Objective FRESHWATER MANAGEMENT⁷

It is the objective of the Regional Board to:

- Identify and protect all watercourses to maintain their natural habitat, environmental quality, aesthetic appeal and recreational value;
- Conserve, protect and enhance freshwater sources for existing and future agricultural and domestic uses in cooperation with local and provincial water authorities and landowners;
- Encourage only appropriate development that respects the sensitive nature of the environment; and,
- Protect fish habitat in accordance with the **Fish Protection Act** and the **Riparian Areas Regulation**.

2.1.2 Policies FRESHWATER MANAGEMENT

1. All watercourses, lakes, swamps, and other wetlands in the Plan Area shall be identified as Environmentally Sensitive Areas on Map 1 attached to Schedule 'B' of this Plan. The Regional District shall oppose the establishment of land uses, which would have a long term negative impact on the quality, or quantity of ground, or surface water in these environmentally sensitive areas.
2. The Regional District shall request that the Approving Officer require subdivisions to be designed to maintain the hydraulic regime of streams while providing sufficient drainage in a manner which does not interfere with groundwater recharge or prevent the intrusion of erosion material into natural watercourses, lakes and wetlands.
3. Subdivision, construction, or alteration of land on any property designated Environmentally Sensitive on Map 1 shall adhere to protective setback regulations and guidelines along water courses and with the Development Permit Area provisions of this Plan where applicable. This will assure that development occurs under the guidance of BC Environment and the Federal Fisheries Department and in a manner, which minimizes the risk of bank erosion or the contamination of water by effluent or other runoff.
4. Prior to approving any rezoning to increase the density and intensity of land use on any property which may include environmentally sensitive groundwater resources,

⁷ Bylaw No. 1007.05 adopted January 23, 2007

- the Regional District shall require a hydrogeologic impact assessment on the water supplies of adjacent properties and on any nearby surface water resources. Assurance for the long term reliability of the water supply must be certified by a qualified professional engineer or geoscientist, with proven knowledge and experience in groundwater development and hydrogeological impact assessment.
5. The Regional District encourages the enhancement of existing community water systems. It is anticipated that the establishment of a regional water system, on Englishman River will, in the long term, relieve the competition for groundwater resources within the Little Qualicum watershed.
 6. The Regional District may consider approving land development proposals only if there is assurance that stormwater drainage from development does not increase the peak flow run off into agricultural areas.

2.2 PROTECTION OF NATIVE FLORA AND FAUNA

The Shaw Hill - Deep Bay Plan Area is rich in flora and fauna. The Plan Area is part of the Nanaimo Coastal Lowland and therefore contains the native flora and fauna characteristic of this zone. Some of the native flora and fauna in the Plan Area include: Douglas Fir, Western Hemlock, Western Red Cedar trees, deer, black bear, cougar, wolf and other small fur bearing animals.

Protection of the native flora and fauna species in the Shaw Hill - Deep Bay Plan Area is important. Plants perform an important ecological function, producing all the oxygen in the earth's atmosphere, providing food through photosynthesis, providing the habitat that supports all living creatures. Moreover, plants function to improve urban climate and air quality, encourage wildlife diversity, and provide diversity of place and amenity values.

Animals and plants are linked to one another by the sum of relationships between the eater and the eaten, known as the food web. Every species has particular requirements for its habitat, without which it cannot survive. By protecting and carefully managing significant areas of native flora and fauna, the ecological integrity of the Plan Area may be preserved.

Many areas of significant native flora and fauna are located on Crown Lands, and as such are more easily protected through government initiative. These include: the Provincial Parks at Horne Lake and Spider Lake, Federal Fisheries land holdings along the shore of the Big Qualicum River and the Little Qualicum River, the Marshall Stevenson Wildlife Management Reserve at the Little Qualicum Estuary and, to a lesser extent, numerous small community parks that are oriented towards greenbelt or nature protection.

Provincial initiative includes the Protected Areas Strategy, where prospective areas to be protected in the future have been identified within the Plan Area, these include: the Horne Lake Caves Provincial Park at the end of Horne Lake and an area of old growth forest remnants west of Deep Bay, adjacent to the Gainsburg Swamp.

In addition, there are other sites of ecological importance that are worthy of protection in the Plan Area including Illusion Lake and Annies Woods. Illusion Lake could be protected by expanding Spider Lake Provincial Park. Annies Woods, located on a parcel

of Crown Land south of the Old Island Highway, may be a suitable site to establish an ecological reserve as it includes old growth forest. More details on flora and fauna can be obtained through the Ministry of Environment, Lands and Parks.

2.2.1	Objectives	PROTECTION OF FLORA AND FAUNA
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- Support *the establishment of wildlife and waterfowl reserves.*
- Conserve *and protect wildlife and waterfowl habitat sensitive to human disturbance.*
- Support *the identification and designation of significant native flora and fauna areas.*

2.2.2	Policies	PROTECTION OF FLORA AND FAUNA
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1. The Regional District shall support the identification and designation of areas for the protection of native flora and fauna in perpetuity. In particular, the RDN shall support initiatives associated with the following areas: provincial protected areas, provincial parks, ecological reserves, fisheries reserves and hatcheries, wildlife refuge, waterfowl habitat or Regional District park land.
2. The Regional District supports the designation of the following priority areas for the protection of flora and fauna within the Plan Area:
 - Proposed Protected Area over Crown Land west of Deep Bay including Gainsburg Swamp;
 - Proposed Protected Area expansion of Horne Lake Caves Park located at the west end of Horne Lake at the mouth of the Qualicum River tributary;
 - Ecological Reserve or park designation at Fletcher Creek over Crown Land described as Lot 36, District Lot 81, Newcastle Land District Plan 1937.
 - Expansion of Spider Lake Provincial Park to include Illusion Lake.
3. The habitat protection initiatives of BC Environment and the Federal Department of Fisheries, along rivers, streams and wetland areas shall be strongly supported and complemented with Regional District park land and greenway protection initiatives.
4. The Regional District shall support and encourage the restoration and enhancement of streams and their riparian corridors wherever possible by community groups, corporate bodies or by land developers.

2.3 ENVIRONMENTALLY SENSITIVE AREAS

Environmentally sensitive areas are areas of land and water that are sensitive to human interference. These may include: sub-tidal zones, estuaries, wetlands, lands adjacent to water bodies, groundwater aquifers, natural habitats and sites of historical, archaeological or scientific significance. Environmentally sensitive areas within the Plan Area include the Big Qualicum Fish Hatchery and river corridor, the Little Qualicum Fish Hatchery and river spawning channels, and the Marshall-Stevenson Wildlife conservancy.

2.3.1 Objectives ENVIRONMENTALLY SENSITIVE AREAS

- Identify *environmentally sensitive areas*.
- Preserve *and protect environmentally sensitive areas*.
- Conserve *and protect ground and surface water resources*.
- Encourage *development that is compatible with environmentally sensitive areas*

2.3.2 Policies ENVIRONMENTALLY SENSITIVE AREAS

1. Land or water, which is sensitive to human presence, or is of historic, archaeological or scientific significance is deemed to be an environmentally sensitive area. These areas are identified on Map No. 1 attached to this plan.
2. Environmentally sensitive areas as shown on Map No. 1 are not limited to the boundaries indicated. Changes to boundaries may be undertaken to reflect changing on-site conditions or more comprehensive environmental assessments.
3. Development proposals shall be reviewed in relation to existing and potential archaeological sites, and where sites are apparent, the development proposal shall be referred to the Heritage Conservation Branch of the Ministry of Municipal Affairs for comment.
4. The Regional District shall only support development on land within an environmentally sensitive area provided the applicant or appropriate authority presents acceptable evidence that the proposed development will not adversely affect the environmentally sensitive area. In reviewing development plans the Regional District shall give due consideration to:
 - soil stability;
 - natural vegetation or ground cover;
 - wildlife and fish habitat;
 - quality and quantity of surface drainage and groundwater; and
 - adjacent land uses.
5. The Regional District shall request the application of *Land Development Guidelines for the Protection of Aquatic Habitat* including the protection of buffering riparian corridors which are deemed to be environmentally sensitive through this Plan and in particular shall encourage the Approving Officer to require protective covenants or the designation of Return to Crown Land along the bed of, and buffering riparian corridor of watercourses, creeks, lakes and wetlands wherever development on adjacent land is proposed.
6. Environmentally Sensitive Area provisions and associated Development Permit requirements of this Plan may be applicable in the future to any watercourse identified in an Environmentally Sensitive Area Aquatic Habitat Atlas as sensitive.

2.4 NATURAL HAZARD AREAS

Natural hazard areas are sources of potentially dangerous chance events. Examples of natural hazards are: floods, mass movement of land, landslides and earthquakes. Potential hazard areas are identified on Map No. 1.

Within the Plan Area many areas are subject to potential flooding. The lands surrounding river mouths and estuaries have the highest risk. Other areas with flood potential are isolated lowland areas and shore land adjoining watercourses, lakes, creeks and wetlands. The Horne Lake area also faces the risk of potential flooding due to the fact that the level of the lake can be modified by altering the rate of water release from the Big Qualicum River Dam.

The Plan Area contains a number of areas where mass movements of land are a possibility. The highland and mountain areas are particularly susceptible to mass movements of land, such as rockfalls and avalanches, due to the steepness of these areas and the veneer of colluvial material over bedrock. It is also important to note that the removal of vegetation from steep banks may destabilize the bank and consequently result in its failure.

Potential landslides along the coastline are a major concern within the Plan Area. Some areas along the shore zone are straddling steep wave cut bluffs (with slopes between 30% and 60%) and are composed of unconsolidated sand. The threat of landslides is particularly concerning in areas where homes have been constructed near the edges of these unstable slopes.

Seismic activity is a distinct possibility within the Plan Area. Vancouver Island is classified as a Zone 3 area according to the Seismic Zoning Map. This indicates that the area is at high risk for seismic activity. A major earthquake may cause serious damage to the area. Potential damage caused by seismic activity may be further exacerbated given

that many buildings and structures within the Plan Area may have been constructed on or adjacent to unstable slopes, and/or below Building Code standards.

2.4.1 Objectives	NATURAL HAZARD AREAS
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- Protect area residents from loss of property and personal injury.
- Identify, conserve and protect natural hazard areas and adjacent lands from damage due to development, subdivision or alteration of land.
- Encourage mitigation measures, which are compatible with the needs of local residents and are sensitive to the affects on the local environment.

2.4.2 Policies	NATURAL HAZARD AREAS
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1. Land susceptible to flooding, mass movement, unstable slopes, high rates of erosion, steep slopes or land that would pose a threat to property or lives if developed is deemed a natural hazard area. These areas are identified on Map No. 1.
2. Natural Hazard areas as shown on Map No. 1 are not limited to the boundaries indicated. Adjustments may be made to reflect changing on-site conditions or environmental assessments.
3. The Regional District may consider establishing Building Inspection services in the Plan Area to help ensure that sites with natural hazard conditions (which may or may not have been identified on Map No. 1) are identified and that appropriate measures are taken, so development will be safe from these hazards. Approval from the residents of Electoral Area 'H' will be sought before implementing building inspection.
4. In order to protect property and lives from hazardous conditions, those areas indicated as Natural Hazards on Map No. 1 shall be included in a Development Permit Area. The Regional District shall not support the development, subdivision or alteration of land in a natural hazard area unless the applicant or appropriate authority provides evidence that measures can and will be taken to render the development capable of withstanding the effects of the hazard and to protect adjacent properties from possible impacts.

2.5 COASTAL ZONE MANAGEMENT

The Community Plan provides guidelines for the management of the harbour and shore areas to complement Provincial management of Crown Foreshore resources and Federal Management of marine waters. The community plan encourages water surface uses where they are coordinated with upland uses and where they are compatible with other water surface uses. The coastal zone is one of the prime features of the natural environment of

the Plan Area, and includes recreational beaches, productive shellfish and aquaculture

areas, sheltered embayed areas and sensitive estuaries. The coastal zone also includes hazardous bluff shoreline susceptible to erosion and landslides in some areas.

Historically the coastal zone has been the focus of residential and tourist commercial development in the Plan Area. Continued development or intensification of neighbourhoods along the coastal strip may result in alienation of foreshore areas, and an unattractive coastal appearance and therefore should be discouraged. The shore zone should be recognized as a finite resource. Policies should support the enhancement of the physical, recreational and visual qualities of the area, while recognizing the relationship of upland foreshore land uses.

The coastline of the Plan Area, particularly along the Deep Bay salt marshes, is capable of sustaining commercial aquaculture operations, including oyster and other shellfish harvesting. The management of these resources is the joint responsibility of the Ministry of Agriculture, Food and Fisheries (aquacultural practices) and the Ministry of Environment, Lands and Parks (environmental protection and Crown Foreshore lease tenure).

The Deep Bay Harbour is the only marine harbour in the Plan Area. The Deep Bay Harbour Authority regulates the commercial and recreational use of the Harbour in coordination with Crown foreshore and marine waters legislation. The Harbour is the only natural harbour in the Plan Area, and offers moorage to both sport and commercial fishing vessels. Deep Bay also includes a commercial fish sales outlet/operation.

BC Lands is responsible for the administration and allocation of leases respecting the aquatic crown foreshore portion of the shore zone, pursuant to the *Land Act*. The Regional District has the jurisdiction to regulate the use of land and water surfaces through zoning regulations. Both the jurisdictions of BC Lands and the Regional District do not extend to marine water management but may require coordination or cooperation with the Deep Bay Harbour Commission, the Federal Fisheries Department and the Ministry of Small Crafts and Harbours with respect to the interrelationship of the shore zone. The Ministry of Transportation and Highways is responsible for the management of beach access road right of ways. As these rights of way comprise a major proportion of the public lands along the coastal shore zone, the Ministry of Transportation and Highways should also be involved in the coordinated and cooperative management of the shore zone.

2.5.1 Objectives	COASTAL ZONE MANAGEMENT
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- *Recognize* the foreshore and waterfront areas as an integral part of the community character, and as a major destination for leisure and recreational pursuits.
- *Support* the development of aquaculture in appropriate locations on the foreshore, in a manner, which does not conflict with recreational public uses of the coastal zone.
- *Discourage* development, which would alienate the foreshore from public access or impact on the natural environment.
- *Encourage* water surface uses where they are coordinated with upland uses and where they are compatible with other water surface uses.

- *Foster* the public ownership and stewardship of the waterfront.
- *Advocate* cooperation and coordination between agencies responsible for the use and management of marine, foreshore and upland resources in order to assure more comprehensive management of the coastal zone.
- *Ensure* that future construction upland from the shore is safe from hazardous slope conditions, which may exist adjacent to the shoreline.

2.5.2 Policies

COASTAL ZONE MANAGEMENT

1. The entire foreshore shall be considered the Environmentally Sensitive in addition to those areas identified as Environmentally Sensitive Area on Map No. 1. The Regional District shall encourage the users of the shoreline and ocean to minimize the disturbance or pollution of marine and related terrestrial natural habitats.
2. The construction of seawalls, fill or other intrusions along the foreshore shall not be permitted in a manner that obstructs pedestrian access to public beaches or foreshore areas. Where a lease is obtained through the appropriate agency, the Regional District shall recommend to the agency that the structure be designed to permit public access and recreational activity along the foreshore.
3. The Regional District shall not zone the surface of water within the Plan Area for residential or industrial purposes.
4. The Plan recognizes the existing shellfish culture leases west of Deep Bay. All water lots leased for shellfish culture or aquaculture purposes shall be zoned accordingly. Seafood processing shall not be permitted.
5. Where any part of the coastal zone lies within a Natural Hazard Area, that part shall be included within a Development Permit Area.
6. Lands within environmentally sensitive or hazardous areas in the coastal zone shall not be designated for high density residential purposes.
7. The Ministry of Transportation and Highways shall be encouraged to foster the improvement of beach access road right of ways for public recreational use and beach access or designation for park purposes where appropriate.

