

Place Making at Esquimalt Lagoon:
Terrestrial Ecology

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1. Introduction:

“ The unique geological history and physical processes of Esquimalt Lagoon have created an area rich in wildlife, that is highly valued by locals and visitors to the area. ”

(Capital Regional District, 2013)

The diverse ecology found around the Esquimalt Lagoon stems from the distinct ecosystems that make up the area and the interactions between them. The most prominent feature is the Esquimalt lagoon itself, which is connected to the ocean via tidal processes and has a long geologic history. Upon visiting the site, individuals are likely to come across a range of ecosystems varying from endangered Garry Oak ecosystems to very rare sensitive dune ecosystem within the Coburg Peninsula (technically a barrier spit, not a peninsula). The site is also home to some of the oldest Coastal Douglas Fir left in the Victoria area (Capital Regional District, 2013). The Capital Regional District (CRD) calls the shoreline “the least modified shoreline among the CRD harbors,” although pollution, invasive species, and the loss of habitat are of concern in the area (Capital Regional District, 2013).

The Esquimalt Lagoon Watershed extends well past the shores of the lagoon (see Image 5 below), highlighting the interconnectedness of the lagoon, the surrounding ecosystems, and the areas people inhabit upstream. It is important to acknowledge the history and the diverse array of ecosystems found around the Esquimalt lagoon in order to create a sense of place that encourage protection and restoration of the area within the broader public. Our hope is that by discussing individual components (i.e. the Coburg Peninsula, sand dune ecosystems) and the rich ecology of the surrounding area it will educate the public about the importance of the area’s terrestrial ecology and enhance conservation efforts.

2. The Geologic History of Coburg Peninsula

The Coburg Peninsula has a rich geologic history as it was formed during the Fraser Glaciation approximately 13,000 years ago (Capital Regional District, 2013). During this time period, the glacier began to retreat from the area creating a depression where a mass of ice, approximately 100 meters thick, was left behind and melted in situ. As the sea level rose, water flooded and accumulated into the depression, which is now known as Esquimalt Lagoon. Glacio-fluvial sediment

was deposited in the area from the retreating glacier forming the Colwood delta (Capital Regional District, 2013). The Colwood delta plays a key role in replenishing the barrier spit with sediment (See Image 1 below). The delta constantly erodes providing sediment along the shoreline strengthening its structure.

2.1 Formation of Colburg Peninsula

The peninsula, or barrier spit, was formed by coastal processes, such as long shore drift of sediments, supplied by the Colwood delta. Long shore drift is the parallel movement of the waves against the shoreline, depositing sediment through swash and backwash processes, in turn, creating beaches and dune ecosystems. According to Dr. Ian Walker, a coastal geomorphologist and professor at the University of Victoria, the spit emerged initially as an accumulation of sediments that were submarine. As the sediment accumulated over time by wave action, the barrier spit emerged to form what we know as the Colburg Peninsula (Walker, 2013). Littoral transportation of sediment and wave action are the primary sources for the formation of the spit.

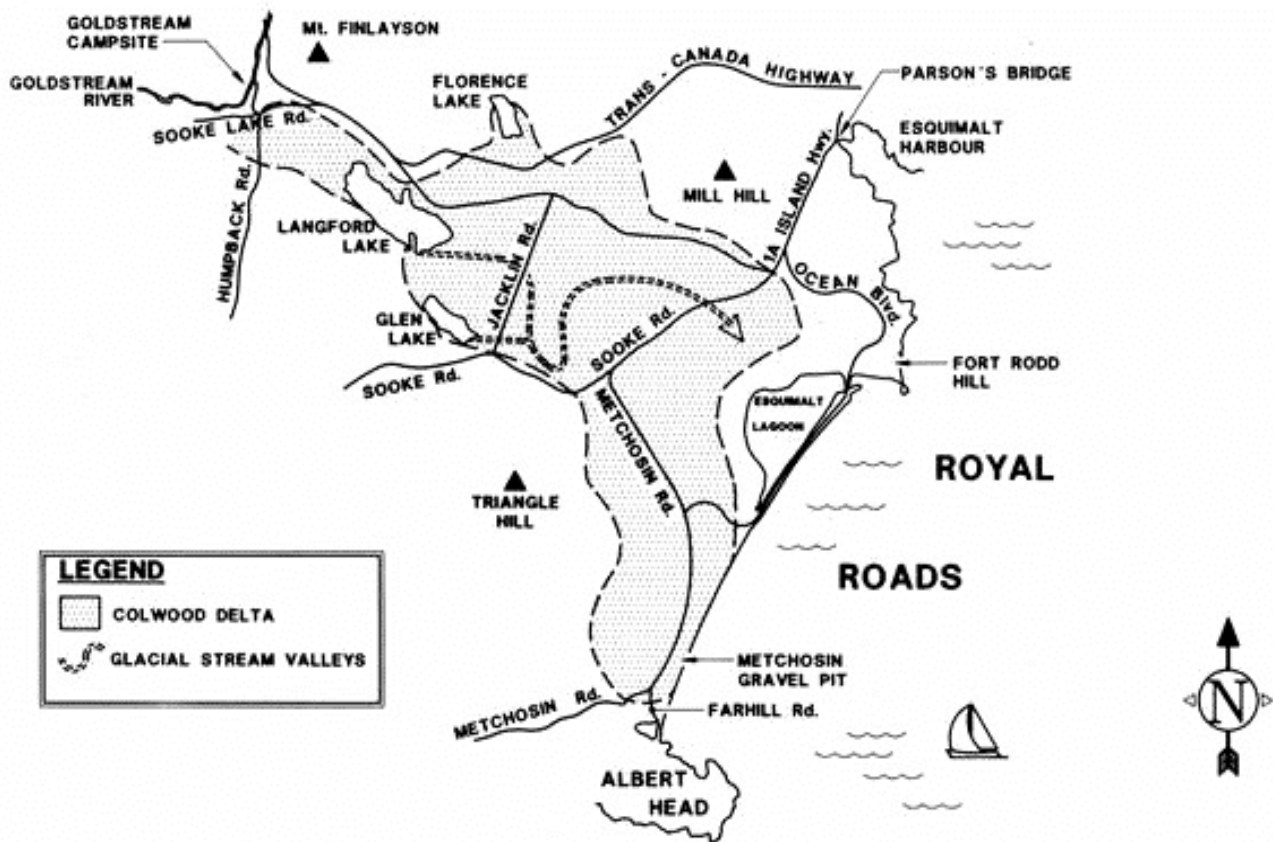


Image 1: Colwood Delta
(Capital Regional District, 2013)

2.2 The Coburg Peninsula and the Gravel Pit

The sediment from the Coburg delta has been mined since the 1900's at a Metchosin Gravel pit just south west of the barrier spit. The Gravel pit dispersed sand along the shoreline providing a new source of sediment to the barriers spit. Before the gravel pit started its operations the beach consisted of natural coarse sediment. The gravel pit has changed its structure to its present structure consisting of sandy sediment (Capital Regional District, 2013). However, since the gravel pit shut down in 2007, the beach is being sediment starved as its sand supply is cut off. The lack of continuous sediment nourishment of the beach increases not just the amount of erosion but the amount of wave energy available for erosion (Walker, 2013). At present time there is a continuous erosion of the peninsula threatening its structure and durability.

2.3 The Coburg Peninsula and the Road

The construction of the road negatively impacted the hydrological processes of the area. During the construction of the road, the southwestern end was filled up and the water was diverted (Bein, 2005). The Esquimalt Lagoon is connected to the sea at the northeast end, which is in a constant flux and migration progression. As stated by Scrimger, the 600-foot narrow channel under the bridge essentially has turbulent inward flow and laminar outward flow (Scrimger, 1960). This connection to the sea keeps tidal currents circulating and a reliable water cycle available for both the marine organisms, such as the clam bed, as well as the biogeochemical cycles, such as the hydrological cycle. This point of input and output of water plays a key role on tidal flushing and circulation.

2.4 The Future of the Coburg Peninsula

Currently the Coburg Peninsula is used as by many people for different purposes. It is part of the bird sanctuary as well as an important transportation route for the people of Colwood. The Coburg Peninsula is facing serious threats from natural as well as anthropogenic causes. Sea level rise as well as increased storm frequency and strength are and will continue to pose major threats to the structure of the spit. The road constructed along the spit that serves as an emergency evacuation route for the citizens of Colwood is also at risk. Since the peninsula is eroding and the spit is constructed of sediment, the road would be unstable if a mega thrust earthquake or tsunami were to hit the shore (Walker, 2013). There is a high probability of the spit settling and collapsing under such a high-risk disaster.

A development of 28,000 housing units is planned for the gravel pit site, which will further decrease sediment supply and negatively impact the ecology of the Esquimalt Lagoon (Capital Regional District, 2013). As the peninsula erodes even further due to the effects of a lack of sediment input, it is expected that without intervention the feature will eventually migrate landwards and erode completely.



Image 2: The Esquimalt Lagoon spit, illustrating the road and eroding beach. (Capital Regional District, 2013)

3. Coastal Sand Dunes

Coastal sand dunes are mounded structures situated along the shoreline created by sediment transported by currents and waves. Once the sediment is on shore it is dispersed by wind building up the dune with the help of vegetation and other obstacles. Generally dunes become steeper with coarser grained sediment in the winter due to harsher waves and wind, while in the summer such factors lessen and the dunes form as a shallower slope with finer grained sediment. The structure coastal sand dunes consist of beach (presenting no vegetation due to intense effect of the waves), fore dune (which is closest to the ocean and the vegetation is affected by salt splash) and the established dune or back dune (positioned in land and less affected by marine pressures). Vegetation growing on dunes is vital for bonding grains of sand together holding the sediment in position. Dune vegetation has long roots and stems that act like anchors (Capital Regional District, 2013).

3.1 Coastal Sand Dunes of Esquimalt Lagoon

The Esquimalt Lagoon dunes are located along the Coburg barrier spit (or Peninsula) of the Esquimalt region. This is the only coastal sand dune ecosystem in the main urban harbours of Victoria, and expands less than 2.5 hectares (Capital Regional District, 2013). The current structure of the Esquimalt Lagoon's coastal sand dunes is as follows: The beach is sediment starved, as stated before; the beach was continually supplied with sand sediment until the closure of the gravel pit in 2007. The fore dune shows signs of erosion and human disturbance. There is little existing back

dune due to the presence of the road that currently lies on the spit. Along the fore dunes and partial back dunes there are various species of vegetation that hold the dune sediment in place (Watson, 2013). See table 1 in appendix for a list of inventoried plant species (ELSI, 2007).

3.2 Functional Significance

Plants within the dune ecosystems have roots and stems that hold soil and sand together, preventing erosion of the Coburg barrier spit. This spit forms a functional barrier for the lagoon region which acts as a protected migratory bird habitat, foraging fish habitat and much more (Watson, 2013).

3.3 Ecological Significance

The dunes are home to many native and exotic species that are listed in table 1 of the appendix. Dune ecosystems like this one are harsh habitats in which only certain species can thrive and therefore provide a unique habitat for certain plants that are specifically adapted to its conditions. If diversity of these types of native plant species is to be preserved then dune ecosystems need to be protected as well. Dunes like those found at the Esquimalt Lagoon site further provide habitat for many types of wildlife which include: amphipods, garter snakes, mice, shrews, spiders, and many insects. There are also birds the endangered Horned Lark (*Eremophila alpestris strigata*), Semipalmated Plover (*Charadrius semipalmatus*) and Killdeer that nest within dune habitats (CRD: coastal sand dunes, 2013).

3.4 Human Importance

The Esquimalt Lagoon dunes hold up the spit that protects the lagoon from incoming waves and storms. The lagoon is surrounded by coastal properties of Esquimalt residents. Without the dunes it is possible that destructive forces like storm surges could cause major damage to homes and buildings (Capital Regional District, 2013). The dunes holding up the spit has also helped in forming the existing beach that is commonly used by beach goers, children, dog walkers and more. Without the dunes, the beach would not be in the same state that it is today. In addition, the road that runs along the spit might also not exist if it was not for the



Image 3: Picture of Esquimalt Lagoon Dunes.
Photo by Elyse Matthews

dunes that help to hold the structure of the spit in place. This road is important as it is commonly used by commuters and also is in place to act as a disaster exit point for residents (Capital Regional District, 2013)

3.5 Problems the Dunes are Facing

A major factor currently threatening the Esquimalt Lagoon dune's existence is decreasing amounts of the sediment coming from the Colwood gravel pit that was shutdown in 2007. Without new sediment being supplied to the coast, the dunes are unable to continually form their traditional structure. This is because they naturally erode from wind, waves and other factors but are not being built up again. This erosion was compounded by large storms in 2008 and 2009 along the Peninsula which removed large amounts of previously existing sediment that has not been returned. These two factors have led to much recession, especially in the Southern region close to the building and bridge (Watson, 2013).

Since the beach along the spit is heavily used by people, the dunes are also being degraded by trampling. Plants can no longer hold soil when trampled. For example native dune grass dies when its roots are crushed. Then when plants can no longer hold the dune in place, erosion of the dunes occurs (Capital Regional District, 2013). This is a major concern as the spit provides many ecological and structural purposes as mentioned above. There are currently restoration efforts at work and this will be discussed in the coming pages.

As indicated by table 1 in the appendix there are several invasive plant species in the dune ecosystems of Esquimalt Lagoon. Invasive species are a problem because they can create dense monocultures that take over the space and out compete native species (Capital Regional District, 2013). Often invasive species do not provide habitat for many of the wildlife that exists in traditional dunes. Invasive species are therefore a problem because they take over unique dune habitat that native plants and wildlife species once resided in.

There has also been a proposal for a Royal Bay development to build a ferry dock and an ocean side village and marina out of the previous gravel pit location in Colwood. The ferry would travel between Royal Bay and downtown Victoria to provide a different form of commuting for the growing residential region (Wilson, 2011). Any development along the beach would harden the shoreline and further slow down sediment flow towards the spit and deplete the dunes more rapidly (Watson, 2013). Dune recession would therefore have a negative impact on the Esquimalt Lagoon region as previously described.

As stated previously, dunes fulfill a structural purpose by fortifying the integrity of a lagoon. The current state of the Esquimalt Lagoon dunes is in poor shape for three main reasons:

1. Non-existent back-dune
2. Trampling caused by people and their pets
3. Invasive species

Healthy dune systems consist of two parts: a fore-dune and a back-dune. Currently, in Esquimalt, the back dune is non-existent due to the implementation of the parking spaces and the road. “Road and parking beds, have destroyed a large portion of the natural ecosystem... flattened the natural topography, and altered sediment flow of the complete system”(Bein, 2005). The importance attributed to a back-dune is connected to the extra space it provides for biodiversity and habitat, extra protection against heavily stormy weather and the added structural security for the lagoon itself.

Trampling is currently the biggest threat facing the dunes. Trampling by people and their pets walking over habitats, “certainly makes the loss of Coburg Peninsula likely happen a lot faster” (Watson, 2013). This kind of disturbance furthers the physical erosion as well as disrupts the growth of species whose roots would help to maintain and secure the structural form of the dunes. Furthering the damage is the fact that this sort of disruption often allows for invasive species to take over.



Image 4: Educational Sign and Volunteers. (Camosun College, 2012)

The Esquimalt Lagoon Stewardship Initiative (ELSI) performed a study of the area and found that “exotic plant species were present in every ecosystem class... They were most abundant in dunes” (Bein, 2005). The roots of invasive species do provide strength to the dunes but they cause damage by limiting the biodiversity; by beating out native species and creating monocultures that are not suitable habitats/food for the wildlife of the area.

3.6 Actions Aimed to Protect/Restore the Dunes of the Esquimalt Lagoon

ELSI is the leading group responsible for the guardianship of the lagoon. They recognize that, “as a sensitive ecosystem, it is recommended that the whole of Coburg Peninsula be considered a conservation area and that the high-impacts of recreation, like parking infrastructure, benches, beach access points be directed to either end of the spit. This would allow the natural recovery of degraded sites and would minimize stress on more intact habitats” (Bein, 2005). Many of their goals involve interaction with the community and providing education as to the importance and troubles facing the surrounding area.

Many of the most effective actions are either too expensive or require the proper permission from governmental institutions. Jody Watson sums up the predicament nicely by balancing effectiveness while staying within a reasonable budget by simply suggesting a vegetable buffer as one of the goals of the group. Ideas such as this are what the ELSI focuses on. Their overall goal is to educate the public in the hopes of mitigating further damage while they act to build up what has been degraded or lost (see Image 4). Their main influences include setting up 17 visual access points (Watson, 2013), with garbage cans at set locations, in order to implement easily identifiable entrance pathways in the hopes of minimizing trampling. Dispersing educational signs that explain negative activities (such as trampling) and providing explanations as to why the surrounding habitat is important to both the wildlife and by proxy the ecosystem. Lastly, ELSI organizes volunteer groups that plant native and remove invasive species in order to help with the restoration of the dune ecosystem. ELSI provides this and more by also providing a single group that is dedicated to a specific cause, ensuring that they remain focused.

3.7 Place-Making at the Esquimalt Lagoon Dunes

“Spits and dunes are considered sensitive ecosystems in Southern Vancouver Island, are extremely rare in the region, and provide specialized habitats to species, including birds, reptiles, and plants” (Ward, Radcliffe, Kirkby, Illingworth, & Cadrin, 1998). The affect dunes have on place-making depends upon the individual, community, culture, or other factors.

Two contrasting examples include the historic use of the Esquimalt and Songhees First Nations (Capital Regional District, 2013) and elementary school students. These groups used and continue to use the dune areas in a variety of ways which causes their personalized sense of place with the area. The dunes provided raw materials and food for First Nations people. The area was a

part of their way of life, allowing them adequate resources to sustain their way of life. Their connection to the area was exemplified in their decision to set up a burial ground in the area (Watson, 2013). In contrast, elementary school children today are experiencing the area through a new type of outdoor education program. The hope is that by learning about these ecosystems at a young age will teach them to respect the importance not only of the dunes, but the surrounding area. Place-making provides an opportunity to connect with a place, appreciate it, and develop a reciprocal relationship to care for the land that captivates us.

4. Terrestrial Ecology of Surrounding Area

As a fairly large patch of mixed natural and urban ecosystems, the surrounding area of Esquimalt Lagoon features incredible ecological diversity. Simply by touring the site one can observe a wide variety of ecological communities and processes. The importance of these are not lost on the ELSI, who has worked intensively to take inventory of native and invasive species alike, while also rigorously monitoring certain ecological processes like the nutrient cycling between terrestrial and marine ecosystems.

The Coburg Peninsula Plant Identification Field Booklet lists several notable invasive plant species as inhabitants of the surrounding area. Invasive species such as scotch broom (*Cytisus scoparius*), Himalayan blackberry (*Rubus armeniacus*), and Pacific brome (*Bromus pacificus*) are all listed within the field booklet as species found in the area (ELSI, 2007). In terms of ecology, invasive species like these and the others found around the site pose a threat to native plant species as they out compete natives for valuable resources. Furthermore, the presence of invasive plants can potentially add to issues of habitat loss. As a migratory bird sanctuary, the lagoon is used by many avian species - migratory or not. The surrounding area acts as valuable ecological habitat, and the presence of invasive species can have a significant impact on habitats, although it is not clear whether such changes would have a negative impact on certain bird species. The health of certain species, as well as the habitat they rely on, can act as important indicators as to the health of the overall ecosystem (Hess & Rubino, 2003). The presence of a keystone species can at times be used as an indicator of the overall health and function of the ecosystems they inhabit. An example of a keystone species present in the Esquimalt Lagoon area is the Barred Owl (*Strix varia*), Rubino and Hess use the Barred Owl as an example keystone species in suburban areas of Carolina characterized by hardwood forests and wetlands (Hess & Rubino, 2003). Approaches to conserving

keystone species habitat are based on the theory that if species near the top of the food web are healthy, then populations related to them (and thus the ecological community) are also healthy. Examples like this one help to highlight the importance of natural habitat that is so highly integrated into an urban ecological context, such as the natural Barred Owl habitat within the Esquimalt Lagoon watershed. Considering the urban ecology of the surrounding area, it is important to look at not only the immediate area of the lagoon, but the entire Esquimalt Lagoon watershed (see Image 5 below). Research by Watanabe and Robertson has linked input of nutrients from freshwater streams within the watershed to algal blooms that negatively impact the health of fish and crabs in the lagoon. In a study of five streams draining to the Esquimalt Lagoon, it was found that all but one was a significant source of nitrate to the lagoon (Robinson & Watanabe, 1980). Marine environments are typically limited by the amount of nitrate as a nutrient, so it is likely that freshwater sourced nitrate in the lagoon is one cause of the algal blooms (Robinson & Watanabe, 1980). A common link between marine and terrestrial ecosystems in the Esquimalt Lagoon area is fringe marshes, which are valuable in mitigating the effects of runoff in this urban ecosystem.

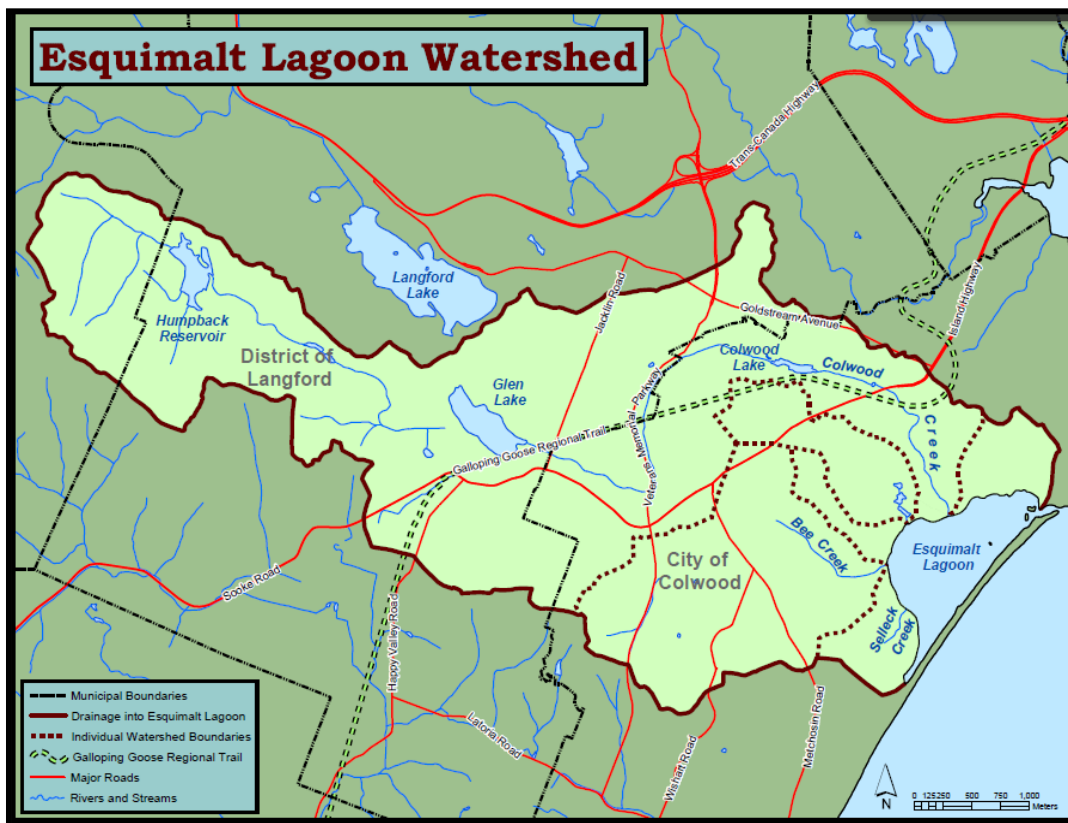


Image 5: Esquimalt Lagoon Watershed
(ELSI, 2008)

4.1 Ecosystems Around the Esquimalt Lagoon

The land surrounding the Esquimalt Lagoon provides a vast array of habitat type and structure that plays a key role in the survival of many of the species who inhabit the lagoon as well as provides important ecosystem functions and services that aid in the overall health of the area. Fringe marshes as well as other wetland areas act to filter contaminants from urban runoff and help protect the lagoon by acting as a natural buffer and providing ecosystem services that promotes the continued health of the area (ELSI, 2013). Areas of fringe marsh, which run along the shoreline, also provide important habitat that provides food and shelter for a variety of species. Areas considered in the tidal wetland zone included areas dominated by sea asparagus, *Salicornia virginica* marsh, as well as tidal meadows often containing *Festuca rubra* and *Grindelia integrifolia* (Bein, 2005). The coastal riparian zone consists of coastal meadow and coastal shrub areas with the coastal meadow being dominated by annual grass associations (Bein, 2005)

Anthropogenic areas such as the road and parking dominate the surrounding area covering over a third of spit which is more area than any single ecosystem class in the area (Bein, 2005). The forested and open upland areas surrounding the lagoon comprise many sensitive ecosystems. These sensitive ecosystems include woodland and riparian forests, Garry Oak meadows and wetlands (ELSI, 2013). Trees and shrubs found in these areas include *Arbutus menziesii* (arbutus), *Amelanchier alnifolia* (saskatoon), *Mahonia aquifolium* (tall Oregon grape), *Malus fusca* (pacific crab apple), *Pseudotsuga menziesii* (Douglas-fir), *Rosa nutkana* (Nootka rose), *Thuja plicata* (Western red cedar) and *Quercus garryana* (Garry Oak) to name a few (ELSI, 2007). The upland areas, which are owned by a variety of stakeholders, provide a variety of benefits which include providing important habitat, to helping control and promote healthy hydrological function, as well as aesthetic and cultural value. The diversity of habitat and ecosystems provides key habitat structures to support the plethora of species that inhabit that area. Trails also run through the forested areas providing recreational value to those who use the area and help keep people from trampling sensitive areas.

The Esquimalt Lagoon is also one of seven Federally Designated Migratory Bird Sanctuaries and provides key bird habitat to support the abundant populations. According to the Esquimalt Lagoon and Royal Roads Foreshore Environmental Land Use Assessment areas that are deemed sensitive lands include any areas within 50 m of the marine coast, the Lagoon, or a stream

indicating that any human actions in these areas would likely result in either direct, indirect, or cumulative impacts on the Lagoon or the marine ecosystem (Garner, 1993). This is indicative of the deep interconnectedness between the marine and terrestrial ecosystems that are affecting through complex biological and physical processes. Areas of mature forest were also designated sensitive lands as they support local wildlife, aid in the control of erosion and hydrological conditions in the ground water production areas, provide aesthetic value to those who use the area and represent a dwindling habitat type in the area (Garner, 1993). According to the Capital Regional District website, Esquimalt Lagoon is considered an estuarine area that provides a variety of ecosystem services including helping with water quality, atmospheric gas regulation, nutrient cycling, habitat for plants and animals, educational, recreational and tourism opportunities (Capital Regional District, 2013). The health of the lagoon is inextricably linked to the health of adjacent and surrounding lands. There is a large variety of vegetative diversity characteristic of a coastal Douglas-fir biogeoclimatic zone as well as a high presence of exotic or invasive species, such as Scotch broom and Himalayan Blackberry, as well as some introduced agricultural species such as those found in the orchard, such as *Malus pumila* (cultivated apple).

5. Conclusion

In conclusion, the Esquimalt Lagoon is a culturally significant landform, created by long shore drift of sediments over time. The geologic history and formation of the Coburg peninsula date back to the last glacial maximum. This feature took thousands of years to form, and with present human influences and impacts the demise of the spit is foreseeable in the near future. Dr. Ian Walker believes the spit will be gone within the next fifty years (Walker, 2013) since they are dynamic features and human impacts are forcing it to erode at a quick rate. With the gravel pit decommissioned, the beach is being starved of sediment, which it requires to replenish the dune ecosystems. The dunes are a sensitive ecosystem that few organisms can inhabit. It is essential to protect the dunes as they provide habitat for several types of wildlife as well as provide support for the spit. Without dunes, the spit would erode and collapse, bringing with it the entire road. Currently, the dunes face many issues, including erosion, lack of sediment, and invasive species. The surrounding terrestrial ecology of the lagoon is equally as important. Fringe marshes provide valuable ecosystem services such as suitable habitat and filtering contaminants from runoff. The terrestrial lands surrounding the lagoon provide a variety of ecosystem services and functions, as

well as provides key habitat birds and other species inhabiting the area. These areas also provide aesthetic value and recreational benefits to those who use the area. The terrestrial and marine ecosystems are inextricably linked which emphasizes the need to approach and evaluate the health of the entire area as a whole rather than the separate entities.

Overall, the future of the Coburg Peninsula is dim and detrimental. As sea levels rise and coastal storms increase in frequency and magnitude, as predicted by the IPCC, the peninsula will see a constant structural decay and migrate landwards at the expense of the lagoon's ecosystems. With a continuous lack of sediment supply, more erosion is expected to occur, in turn, disrupting the dune habitat and potentially destroying the spit. The demise of the peninsula is expected to take place in the near future, unless humans positively influence and physically alter the feature by supplying it with sediment. However, this is a highly costly solution. Many initiatives must be put forth to actively restore the surrounding ecosystems, including public awareness and action, to enhance conservation efforts.

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7. APPENDIX

Scientific Name	Common Name	Height	General Appearance	BC Status
<i>Aira praecox</i>	Early hair grass	5-25cm	Inflorescence spike-like, 1 to 3cm long	Exotic
<i>Bromus pacificus</i>	Pacific brome	not said	Soft hairy leaf blades and sheaths	Yellow
<i>Carex macrocephala</i>	Dune sedge	10-40cm	Leaves yellowy-green, channelled and sharp-pointed	Yellow
<i>Festuca rubra</i>	Red fescue	20-100cm	The base of stems are pulplish-red and often bent with narrow leaves	Yellow
<i>Holcus lanatus</i>	Velvet grass	30-100cm	Covered with soft, velvety grey hairs and stems are weak and fleshy	Exotic
<i>Leymus mollis</i>	Dune wild rye	05-1.5m	Grows in clumps with thick stems and flat leaves	Yellow
<i>Lolium sp.</i>	Perrenial rye grass	not said	not said because unidentified species	Exotic
<i>Vulpia sp.</i>	Annual fescue	not said	not said because unidentified species	Yellow or Exotic
<i>Polypodium glycyrrhiza</i>	Licorice fern	not said	Root distinctly taste like licorice	Yellow
<i>Achillea millefolium</i>	Yarrow	10-100cm	Feathery leaves and the plant is strongly aromatic	Yellow
<i>Ambrosia chamissonis</i>	Silver burweed	not said	Stems leafy, forming large clumps. Leaves are toothed with silver hairs	Yellow
<i>Daucus carota</i>	Wild carrot	20-120cm	Fruit is bird nest shaped. Plant looks like yarrow but not as aromatic	Yellow
<i>Grindelia integrifolia</i>	Pudget Gumweed	15-80cm	Hairy stems and flower bracts are glandular and sticky to touch	Yellow
<i>Hypochaeris radicata</i>	Hairy cat's ear	15-60cm	Milky white juice on plant and flowers appear dandelion like	Exotic
<i>Lathyrus japonicus</i>	Beach pea	Stretch up to 1.5m	Compound leaves and curly tendrils. Hairy pods that are black when ripe	Yellow
<i>Lomatium nudicaule</i>	Desert parsely	20-90cm	Hairless stems. Leaves, flowers, and fruit taste like celery	Yellow
<i>Lupinus bicolor ssp.</i>	Twocoloured Lupine	10-40cm	Hairy stems. Alternative leaves with 5-8 leaflets. Hairy pods	Yellow
<i>Rumex acetosella</i>	Sheep sorrel	15-50cm	Roughly arrow head shaped leaves. Flowers are red to yellowish in colour	Yellow
<i>Cytisus scoparius</i>	Scotch broom	3m	Green branches strongly 5-angled	Exotic

Table 1. This chart indicates a study done in 2007 of plant species inventory of the Esquimalt Lagoon Dunes. The scientific name, common name, height, general appearance, and B.C status are given (ELSI 2007).