1. APPENDICES

5.1. Deeds of Trust (1988 and 1951, posted separately on website)
5.2. Matthews Point Regional Park Management Plan (highlights)
5.3. Ecosystem Report
5.4. Land Use Bylaws
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Map 1 Location (south Galiano Island)
Map 2 Location (Plan A, Section 2 & 4)
Map 3 Ecological Communities
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Appendix 5.2: Matthews Point Regional Park Management Plan

The vision and priority management actions for Matthews Point are as follows:

Vision:
"Matthews Point Regional Park is recognized as a small gem within the larger landscape. The park maintains the natural character of a portion of the north shore of Active Pass, providing a natural view-scape for those travelling on the water. Further, it provides Galiano residents and island visitors opportunities to connect with nature and helps protect the Coastal Douglas-fir ecosystem. Together with adjacent natural areas, the regional park is part of a wider natural area network that facilitates a healthy community."

Management Actions:

- "Remove the former land owner's shed and related infrastructure.
- Formalize the Ridge Trail route, linking the two park access points, as the main trail opportunity in the park.
- Formalize a trail link to the adjacent Bluffs Park and close the dead-end informal path beyond that point.
- Create a small parking area (3 – 4 cars) at the north park entrance.
- Work with appropriate groups, such as local or regional conservation non-government organizations or universities, to develop and implement a restoration plan for the park.
- Link the Ridge Trail to the proposed Regional Trail along Bluff Road East (identified in the Gulf Islands Regional Trails Plan) to create a loop trail opportunity."

Appendix 5.3: Ecosystem Report – Andrew Simon

Bluffs Park Ecological Communities

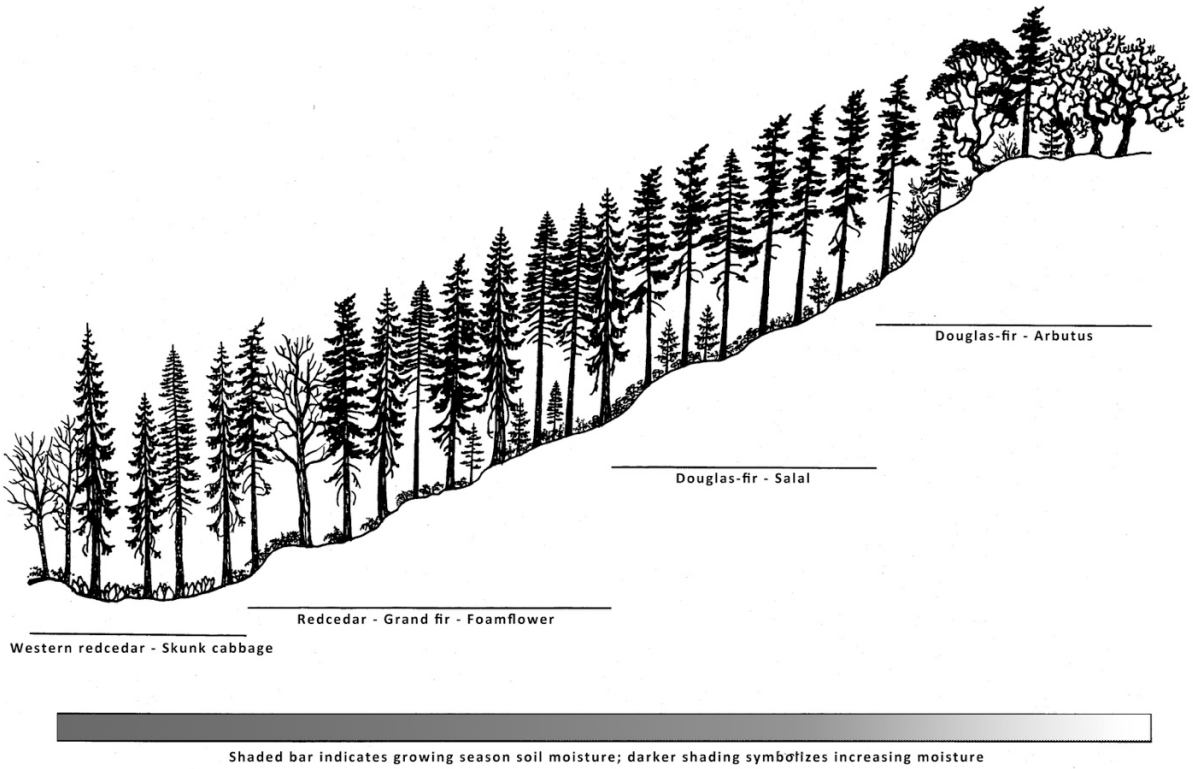
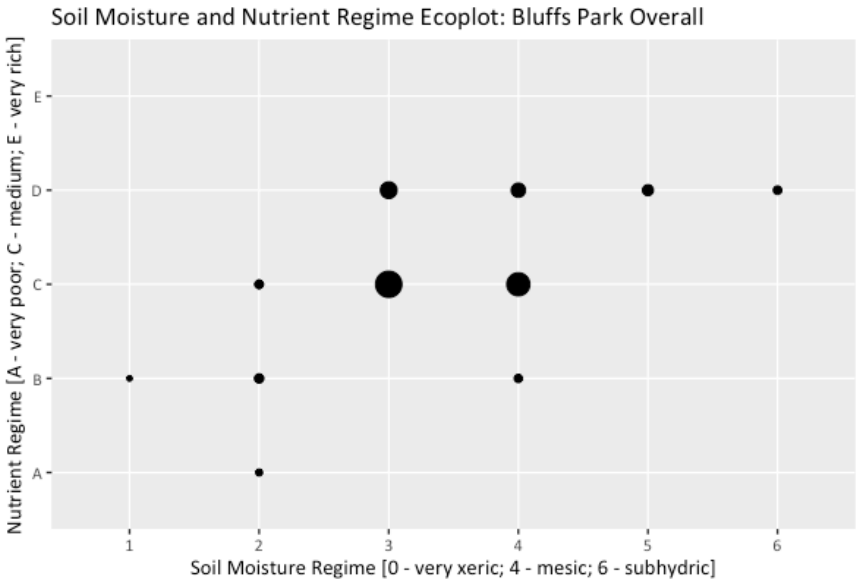


Fig.1. Soil moisture profile of CDF forests, adapted from Meidinger & Pojar (1991). Profile shows four dominant site associations of representative vegetation found across the topographic profile of Bluffs Park.

The following section provides a summary of Bluffs Park's ecological communities, which are collectively represented in Map 2. These communities were mapped during inventory work conducted from April through August 2018 by Andrew Simon and Quirin Hohendorf. A preliminary map of the Park ecosystems was first compiled using available Terrestrial Ecosystem Mapping (TEM) data and 16 vegetation plots subsequently established on May 23, 2018, to assess the structure and composition of each ecological community. Community composition was measured in percent cover of vascular plant species identified within each plot, from the canopy to the understory layer. Forest age and structural stage was estimated and stand density measured using a cruising gauge to determine the mean basal area of dominant tree species. Stand basal area data are reported in m^2/hectare in Table 9.

Community composition is reported in table format, summarizing the percent cover, relative abundance and frequency of occurrence of species within plots representative of each mapped

ecological community.[1] In addition to these tables, "ecoplots" are presented to visualize the soil moisture and nutrient regime of each site according to the percent cover of key indicator species. Species at risk are identified in Section 2.2.6. A comprehensive inventory of Bluffs Park's flora and fauna based on historical data and community inventory work conducted since 2016 is provided in Appendix 5.6.



Ecoplot 1. Bluffs Park Overall. Note: Soil Moisture Regime values do not extend beyond moist (subhydric) conditions as the Park ecology does not host indicator species reflective of wetter hydric conditions. On average, dominant vegetation throughout the Park's forested ecosystems reflect a submesic-mesic soil moisture and medium soil nutrient regime.

Ecoplots use ecological data derived from E Flora (http://ibis.geog.ubc.ca/biodiversity/eflora/), which is based on the research of the BC Ministry of Forests and Range. Details regarding these classifications can be found in the Field Manual for Describing Terrestrial Ecosystems (BC Ministry of Environment Lands and Parks and BC Ministry of Forests, 1998).

Dots represent ecological preferences of vascular plant species recorded during vegetation plot assessment, with dots scaled to visually represent the abundance of species. Dots in the lower left corner represent species that are commonly found in very dry (xeric) and very poor soil nutrient conditions. In contrast, dots in the upper right corner represent species associated with saturated (hydric) and very rich soils. The distribution of species across each ecoplot provides an indication of the prevailing soil conditions of the ecological community.

The ecological communities of Bluffs Park span a range of soil moisture and nutrient regimes, represented in the "Bluffs Park Overall" plot. Species associated with very dry (very xeric) to

[1] Note these data are not reported for each layer, but instead summed across layers for the sake of economy. For a summary of the plant composition of each plot by layer, see raw data.

moderately wet (subhygric) conditions are present, with the soil nutrient preferences of each species reaching from very poor to rich. These values provide a baseline for monitoring future climate impacts as community composition may be expected to shift in the future, with species indicative of moist conditions predicted to decrease in abundance and those indexing relatively dry conditions predicted to increase in abundance.

In addition to the 16 vegetation plots established throughout the forested ecological communities Bluffs Park, 8 (2x15m) belt transects were monitored over five discrete sampling periods during the months of April, May, June, July and August. Species occurrences were measured at each 1m interval as counts of flowering shoots and soil moisture conditions measured using a Field Scout soil moisture probe at 1, 5, 10 and 15 m intervals. This dataset captures a high-resolution picture of the phenology of flowering plant communities represented in the woodlands and associated rock outcrop communities of Bluffs Park. These data are represented in several graphs showing the relative diversity of native vs exotic species flowering over the course of the time series, with species phenology varying as a function of diminishing soil moisture availability.

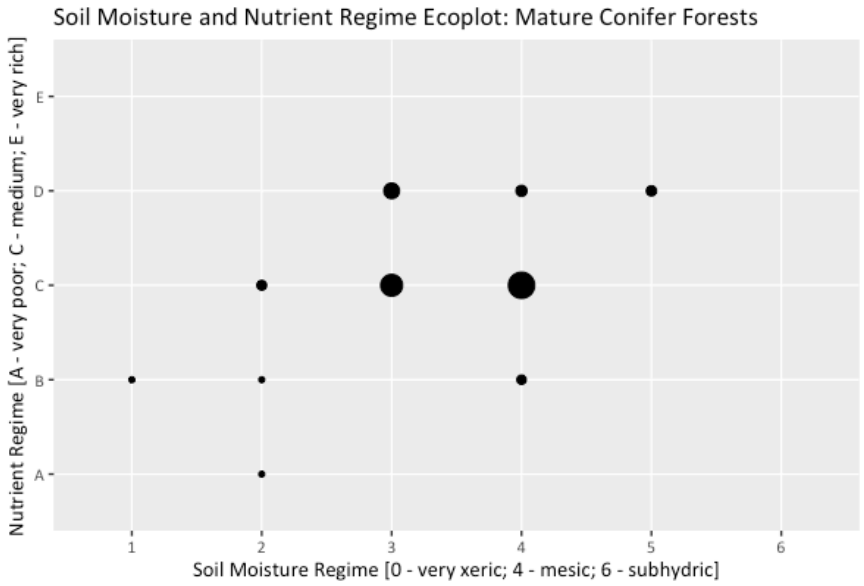
Mature Forests

Natural windfall creates small to medium sized canopy gaps promoting diversity in the mature forests of Bluffs Park by providing light for the understory and deciduous trees such as *Acer macrophyllum* and *Prunus emarginata*.

The majority of Bluffs Park (84.3 ha) consists of mature conifer forests dating to around the turn of the 20th century. These conifer forests largely classify as the “zonal” forest ecosystem typical of the CDF Biogeoclimatic Zone and make up about 60% of the parkland.

Douglas-fir, western redcedar and a small component of grand fir and western hemlock form the canopy of this forest ecosystem, with patches of deciduous trees sporadically occurring in gaps and in other areas of disturbance, such as along the Park road. Salal (*Gaultheria shallon*), Oregon-grape (*Mahonia nervosa*), oceanspray (*Holodiscus discolor*) and trailing blackberry (*Rubus ursinus*) comprise the understory, alongside broad-leaved starflower (*Lysimachia*

latifolia), sword fern (*Polystichum munitum*) and bracken fern (*Pteridium aquilinum*), with a layer of moss beneath dominated by *Kindbergia oregana*, *Hylocomium splendens* and *Rhytidiadelphus triquetrus*. Soils are morainal and occasionally colluvial or marine, with the soil nutrient regime predominately medium to slightly poor. This zonal or typical CDF ecosystem class transitions on forest ecosystems in both drier and wetter conditions, situated at the moisture-shedding crests and on moisture-receiving slopes and depressions respectively.



Ecoplot 2. Mature Conifer Forests (Douglas-fir dominated, Plots 4, 5, 12, & 15)

At the dry end of the spectrum, transitioning on woodlands to the south, is the Douglas-fir-arbutus site association. Douglas-fir and arbutus (*Arbutus menziesii*) form a moderately open canopy, with oceanspray, snowberry (*Symphocarpus albus* and *S. mollis*) and dull Oregon grape in the understory alongside trailing blackberry and baldhip rose (*Rosa gymnocarpa*). These dry woodland ecosystems interface with open meadow communities characterized by Alaska onion grass (*Melica subulata*), Pacific sanicle (*Sanicula crassicaulis*), yerba buena (*Clinopodium douglasii*), big-leaved sandwort (*Moerhingia macrophylla*), and white fawn lily (*Erythronium oreganum*).

Toward the southern extent of Bluffs Park mature conifer forests becomes more open and grassy, transitioning into a woodland environment. Trees are smaller, reflective of shallower soils, and the canopy consists almost exclusively of Douglas-fir, with arbutus occurring sporadically. Understory vegetation almost fully covers the forest floor, composed of a mosaic of grasses, mosses and herbaceous species.

At the wetter end of the spectrum, zonal conifer forests transition on moist forests of mixed coniferous and deciduous composition, featuring Douglas-fir, grand fir, bigleaf maple (*Acer macrophyllum*) and Pacific yew (*Taxus brevifolia*) at mid-slope and western redcedar at the toes. Mosses such as Menzies' tree moss (*Leucolepis acanthoneuron*) and badge moss (*Plagiomnium insigne*) are good indicators of this relatively moist forest type. The historical decline of this mixed forest ecosystem is due largely to the forestry industry, which placed high value on the large volumes of timber yielded from its relatively richer soils.

Coastal Douglas-fir conifer forests, when allowed to regenerate naturally, typically mature with 30-50% canopy closure, developing a complex canopy structure. Natural disturbances are primarily driven by forest fire, laminated root rot (*Phellinus weirii*), and to a lesser extent honey fungi (*Armillaria*). Forest fire was particularly important historically in maintaining open woodland environments, such as those found about the Park lookout. In contemporary times, however, due to intensive forestry and fire suppression practices, these natural successional patterns have been altered, giving rise to forests with denser canopies.

Canopy closure ranges from open to dense and understory vegetation varies accordingly. Beneath canopy openings salmonberry, oceanspray and salal make up a rather dense shrub layer. Under a closed canopy, understory vegetation is sparse and consists mainly of sword fern and various herbaceous plants. The mature areas of the forest have high volumes of large coarse woody debris: a sign of mature forest structure. Coarse woody debris and understory vegetation provides important habitat for birds, mammals, and arthropods.

Taxon	1	4	5	9	12	14	Abundance	Frequency
Abies grandis					5		scattered	infrequent
Acer macrophyllum						5	scattered	occasional
Achlys triphylla					+	+	1	scattered common
Alnus rubra							15	scattered infrequent
Anisocarpus madioides							+	scattered infrequent
*Anthoxanthum odoratum**							+	scattered infrequent
Arbutus menziesii	5						scattered	infrequent
Berberis nervosa	+				5	+	5	scattered common
Crataegus douglasii	+						scattered	infrequent
Festuca occidentalis	+						scattered	infrequent
Galium aparine						+	+	sparse occasional
Galium triflorum						+	2	scattered occasional
Gaultheria shallon					5		20	70 patchy common
Hieracium albiflorum							+	scattered infrequent
Holodiscus discolor							10	2 scattered occasional
*Ilex aquifolium**	+					+		scattered occasional
Lonicera hispidula	+				+	+	+	scattered common
Lysimachia latifolia					+		1	scattered occasional
Melica subulata							70	patchy occasional
Nemophila parviflora							+	scattered occasional
Polystichum munitum					+	+	5	1 15 patchy common
Pseudotsuga menziesii					75	55		40 10 abundant dominant
Pteridium aquilinum					+			+ scattered occasional
Rosa gymnocarpa							+	scattered occasional
Rubus ursinus						+	+	scattered occasional
Sanicula crassicaulis								+ scattered infrequent
Thuja plicata	90	20	35		95		50	abundant dominant
Tsuga heterophylla					11			scattered infrequent
Vaccinium ovatum	10							scattered infrequent
*Vicia sativa**						+		scattered infrequent

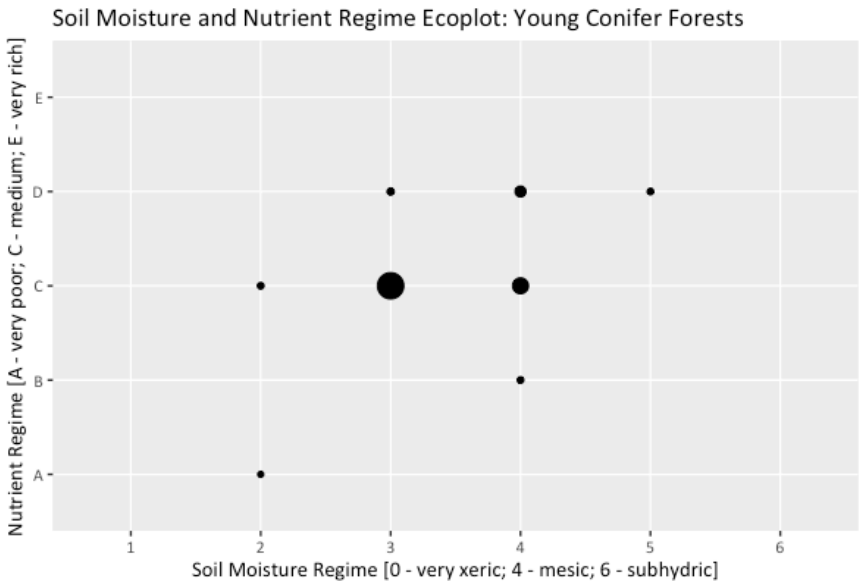
Table 2. Percent cover of vascular plant species reported for plots within the Mature Conifer forest community. Abundance describes the proportional cover of species within the community and frequency indicates the likelihood of a species occurrence across samples sites (+ indicating trace occurrences). Exotic species are indicated with an *. See Appendix for more information on classifications, conservation status and common names of plant species.

Old stumps of large diameter Douglas-fir trees can be found throughout the mature conifer forests of Bluffs Park testament to past logging. Notches for springboards are indicative of logging practices that predate the widespread adoption of chainsaws (ca.1950).

Young Forests

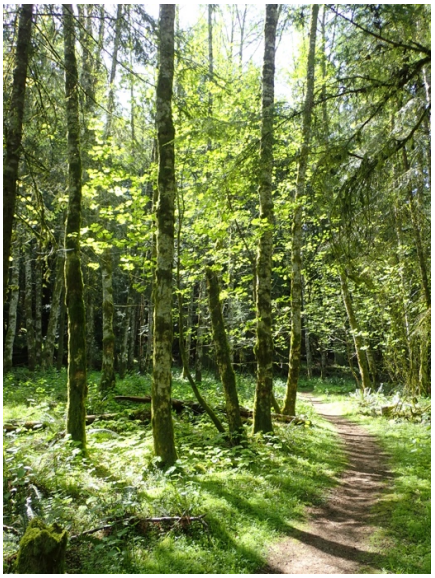
Young coniferous forests tend to be dominated by even-aged Douglas-fir trees. However, this age class takes on a mixed composition on slopes toward the central region of the Park (Plot 7), where western redcedar dominates the canopy.

Approximately 29.7 ha of Bluffs Park consists of young forests dating to *ca.*1950s. These young forests represent about 22% of the total Park area. Much of these forest are coniferous, dominated by even aged stands of Douglas-fir, with mixed late seral communities dominated by bigleaf maple and red alder (*Alnus rubra*) occurring prominently along gradual, moisture-receiving slopes to the north of the height of land.



Ecoplot 4. Young Conifer Forests (Plots 2, 7, 8 & 11)

Stands are dense within young conifer forests and little light penetrates the canopy, so conifers tend to shed their lower boughs. Throughout much of the young forest, the forest floor is dominated by a dense moss layer. Yet the natural death of trees continues to create canopy gaps where salal dominates the understory. Small accumulations of coarse woody debris occur as evidence of self-thinning and stumps from past logging are also present in these sites. Ecological succession will proceed in mixed young forests as red alder dies back over the coming decades, with young stands maturing to become mature zonal CDF forest. Some of these young stands, however, may retain a mixed composition maturing as relatively moist forests in moisture-receiving pockets of the landscape.



Young mixed forests have similar characteristics to young coniferous forest, but the canopy layer includes a significant percentage of deciduous trees. In old canopy gaps mature bigleaf maples are still present and relatively large red alder add to the diversity of canopy trees.

While vegetation plots in the Young Forest class locally supported existing TEM data, it proved difficult to assess the perimeter of this forest type as distinct from surrounding mature conifer forests. Ground surveys suggested recent harvesting events to be somewhat more extensive along slopes north of the road toward the eastern extent of the Park. However, it would be necessary to reference historical aerial photography to resolve these boundaries with any degree of certainty. Existing TEM data indicates these areas had previously been ground-truthed with a high degree of certainty, yet some areas did not resolve as formerly mapped, including a small stand of mixed young forest along the road near the entrance to the Park lookout (now mapped as coextensive with the mature conifer forest class). Heterogeneity in the structure of these young forests suggests multiple harvesting events resulting in stands of uneven age. For lack of historical aerial photography and tree coring data, the original outline of the Young Forest class has for the most part been conserved in the final map, with some minor adjustments made based on ground surveys.

Taxon	2	7	8	11	Abundance	Frequency
Acer macrophyllum		20		+	sparse	occasional
Achlys triphylla	+	3	2		scattered	common
Berberis nervosa	3		+	2	scattered	common
Calypso bulbosa var. occidentalis	+				scattered	infrequent
Campanula scouleri			+		scattered	infrequent

*Cardamine hirsuta**		+			scattered	infrequent
*Epipactis helleborine**				1	scattered	infrequent
Festuca occidentalis	+				scattered	infrequent
Galium aparine		20	+	1	sparse	common
Galium triflorum		1			scattered	infrequent
Gaultheria shallon	1	3	+		sparse	common
Goodyera oblongifolia	+		+		scattered	occasional
*Ilex aquifolium**		1		+	scattered	occasional
Lonicera hispidula	+		+	1	scattered	common
Lysimachia latifolia	+	+	2	+	sparse	common
Melica subulata				2	scattered	infrequent
*Mycelis muralis**			+		scattered	infrequent
Nemophila parviflora	+	+	+		scattered	common
Osmorhiza berteroi		+			scattered	infrequent
Polypodium glycyrrhiza	+				scattered	infrequent
Polystichum munitum	+	5	+	+	sparse	dominant
Pseudotsuga menziesii	80	20	70	120	abundant	dominant
Thuja plicata	10	40	21	2	abundant	dominant
Trisetum cernuum				10	sparse	infrequent
Vaccinium ovatum	1				scattered	infrequent
Vaccinium parvifolium	+				scattered	infrequent

Table 3. Percent cover of vascular plant species reported for plots within the Young Conifer and Young Mixed Forest communities.

Ecosystems	Bluffs Park	Galiano Island	% Bluffs Park	% Galiano
Oldgrowth conifer forest	3.7 ha	11.3 ha	3	33
Mature conifer forest	84.3 ha	1544.1 ha	60	5
Young conifer forest	18.7 ha	1057.1 ha	14	2
Young mixed forest	11.1 ha	301.1 ha	8	4
Woodlands / rock outcrop	17.3 ha	131 ha	12	13

Wetlands	1.2 ha	94.7 ha	1	1

Table 4. Proportional representation of Galiano Island's terrestrial ecosystems protected within Bluffs Park, based on available TEM data as adjusted through recent survey work. Note: the littoral ecosystem is not considered here. Approximately 2% of the parkland is otherwise classified as ruderal or developed.

Sensitive Ecosystems

A total of 22.2 hectares of Bluffs Park are mapped as sensitive ecosystems, representing approximately 16% of the total Park area (see Map 3). These sensitive ecosystems include oldgrowth coastal Douglas-fir forests, woodlands and associated rock outcrop communities, a small amount of wetland which lies along the northeastern, western and southwestern boundaries of the Park, and the Park's rocky shoreline.

Oldgrowth Conifer Forests

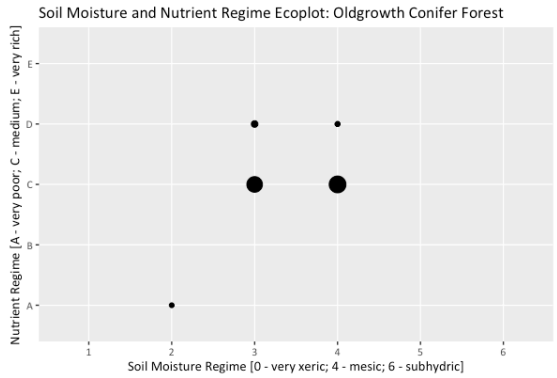
Areas mapped as oldgrowth include a stand retained at the Park's height of land (Plot 10, shown left) and moist mixed and coniferous forests established on slopes to the southwestern extent of the park (Plot 13). Much of the woodland described below also classifies as oldgrowth, including Plots 15 & 16, and an impressive stand of Douglas-fir to the southwest of Plot 16 (shown right). This community has been classified as woodland, however, owing to its shallow soils and the resulting open character of the stand.

Bluffs Park protects 3.7 ha or approximately 36% of Galiano Island's remaining oldgrowth coastal Douglas-fir forests. Oldgrowth conifer forests include densely forested areas of the park that have not been previously logged. Trees in the dominant canopy have large diameters, are tall and have thick bark, sometimes scared by past wildfires. Densities are relatively low but timber stock is high because of the large volume of timber a single tree can contain.

In accordance with the wishes of the Galiano Club management committee, trees were not cored in undertaking the Park inventory. Forest age was estimated based on available TEM data and community knowledge of the Park's history, and oldgrowth status surmised based on forest

structure and composition. In addition to these factors, a lack of stumps was taken to be a prime indicator of oldgrowth, serving as indirect evidence that logging had not happened in a given area.

A small portion of the Park's remaining oldgrowth coniferous forests occurs at the height of land within the Park (Plot 10), an upland area qualifying as mesic, or zonal CDF conifer forest. The greater extent of oldgrowth, however, has been retained in a water-receiving depression toward the southwestern border of the Park (Plot 13), representing a moister forest type dominated by western redcedar. These patches are estimated to be 150–500 years old and were likely retained because they presented little value as timber, or because slopes made harvesting challenging.



Ecoplot 5. Oldgrowth Conifer Forests (Plots 10 & 13)

Taxon	10	13	Abundance	Occurrence
Acer macrophyllum		+	scattered	occasional
Achlys triphylla	+		sparse	occasional
Berberis nervosa	5	+	patchy	common
*Daphne laureola**		+	scattered	occasional
Galium aparine	10		scattered	occasional
Gaultheria shallon	70		patchy	common
*Ilex aquifolium**		+	scattered	occasional
Lysimachia latifolia	+		scattered	occasional
Melica subulata	5		patchy	occasional
*Mycelis muralis**		+	scattered	occasional
Nemophila parviflora	1		sparse	common
Polystichum munitum		1	+	patchy common
Pseudotsuga menziesii	65	10	abundant	dominant
*Rumex acetosella**	+		scattered	occasional
Thuja plicata	90		abundant	dominant

Table 5. Percent cover of species reported for plots within the Young Conifer and Young Mixed Forest communities.

Woodlands and Associated Rock Outcrop Communities

The woodland communities of Bluffs Park vary significantly across the Park's topographic profile, from gradual north-facing meadow slopes to steep south-facing outcrops and shaded seeps.

Approximately 17.3 ha of woodland and conglomerate rock outcrops make up the popular lookout area of Bluffs Park, with steep rocky slopes descending south to the shoreline below. While this area represents less than 13% of the entire Park area, it features an exquisite exhibit of biodiversity. Of all the terrestrial ecosystems represented in Bluffs Park this complex of ecosystems is the most diverse, providing habitat for 87% of the Park's reported lichen, bryophyte and vascular plant diversity.

To sample this ecosystem, 8 transects were established along the Park's upper outcrops and slopes and monitored through the months of April, May, June, July & August, in addition to the two vegetation plots established in this ecological community in May 2018. Further intuitive searches were conducted throughout the area by bryologists Olivia Lee, Steve Joya in April of the same year to document bryophytes in the area. The Park was also visited by entomologist Scott Gilmore in the summers of 2017 and 2018, contributing to an inventory of the Park's arthropod diversity. Historical biological inventory data from this area span five decades and are reported in Appendix 5.6.

The structure and composition of Bluffs Park's woodlands and associated rock outcrop communities varies significantly according to this area's complex topography.

North of the lookout, woodlands transition to zonal CDF forest along gentle moisture-receiving slopes of a shaded northern aspect (Plot 15) that contrasts with dry woodlands on the southern slopes of the Park (Plot 16). Soils are shallow yet relatively moist, giving rise to trees of robust stature and a diverse moisture-loving herbaceous plant community, including enchanter's nightshade (*Circaea alpina*), little western bittercress (*Cardamine oligosperma*), meadow nemophila (*Nemophila pedunculata*), and native grasses such as Alaska onion grass. Released from the shade and competition of surrounding forests Douglas-firs develop a unique growth

form, retaining and extending their lower branches. In this aspect, Douglas-firs, Garry oaks (*Quercus garryana*) and arbutus are all comparably larger than those seen on the steep rocky slopes below, supporting a diverse epiphytic community of mosses and lichens.

Taxon	15	16	Abundance	Occurrence
Acer macrophyllum		10	scattered	occasional
Achlys triphylla	+		scattered	occasional
Bromus vulgaris		15	sparse	occasional
Cardamine oligosperma	+		scattered	occasional
*Cerastium glomeratum**		1	scattered	occasional
Claytonia perfoliata	10	1	sparse	common
Clinopodium douglasii	+		scattered	occasional
Corallorhiza striata		+	scattered	occasional
*Daphne laureola**		+	scattered	occasional
Festuca occidentalis		5	scattered	occasional
Galium aparine	20	5	sparse	common
Gaultheria shallon	50		patchy	common
Lonicera hispidula	+	10	sparse	common
Lysimachia latifolia	1		scattered	occasional
Melica subulata	50	80	patchy	dominant
*Mycelis muralis**	+	2	scattered	occasional
Nemophila parviflora	1	1	scattered	common
Osmorhiza berteroi	+	15	sparse	common
Polystichum munitum	1		scattered	occasional
Pseudotsuga menziesii	85	90	abundant	dominant
Quercus garryana		20	scattered	occasional
Rosa gymnocarpa	1	1	scattered	occasional
Rubus ursinus	1		scattered	occasional
Sanicula crassicaulis		15	sparse	occasional
*Silene coronaria**		1	scattered	occasional

Table 6. Percent cover of vascular plant species reported for plots within the Woodland community.

On outcrops and slopes descending below the Park lookout, soils become more rocky and shallow and the vegetation more stunted and sparse. Open meadows are dominated by exotic grasses and a diverse herbaceous community of drought-tolerant native lupines (*Lupinus* spp.), clovers (*Trifolium* spp.), and onions (*Allium* spp.). Along the bases of outcrops, where water tends to seep, a niche opens up for moisture-loving herbaceous plants such as Menzies' larkspur (*Delphinium menziesii*), grassland saxifrage (*Micranthes integrifolia*), and monkeyflowers (*Erythranthe* spp.). Outcrops also support an extremely diverse nonvascular community, including no less than 42 moss species. Many of these moss species are drought-adapted, enabling them to occupy a selective niche within this dry woodland environment.

The steep southern slopes and outcrops of Bluffs Park descend from 140 m to sea level, leveling out into a series of gradual moisture-receiving slopes and narrow plateaus before dropping precipitously to the sea. A stand of oldgrowth Douglas-firs covers about 4.7 ha of these lower slopes toward the Park's southeastern extent. This magnificent stand includes many large diameter Douglas-firs which exhibit structurally complex crowns and low live-branch density. One large fallen tree with an obliterated crown was measured to be ~40–50m in height; another live-standing tree's circumference was measured at 5.2 m (1.65 m diameter). The stand displays many of the attributes of oldgrowth coastal Douglas-fir forest yet has been mapped as woodland because of its relatively open spacing, contrasting with the mature conifer forests established throughout the rest of the Park.

As these rock outcrops descend to the shoreline they become more precipitous, and vascular plant communities undergo a subtle shift to include species such as the lanceleaf stonecrop (*Sedum lanceolatum* ssp. *nesioticum*) and the brittle prickly pear (*Opuntia fragilis*).

These herbaceous communities provide an important foraging habitat for pollinators in the spring and summer months, with resources gradually dwindling as soil moisture levels drop and the diversity and abundance of flowering plants declines over the course of summer. The Park's changing foraging landscape is documented in Table 7, which tabulates the seasonality of various flowering plant species with reference to the average soil moisture conditions supporting each plant during its flowering cycle, in rank order of abundance for each month of the study period.

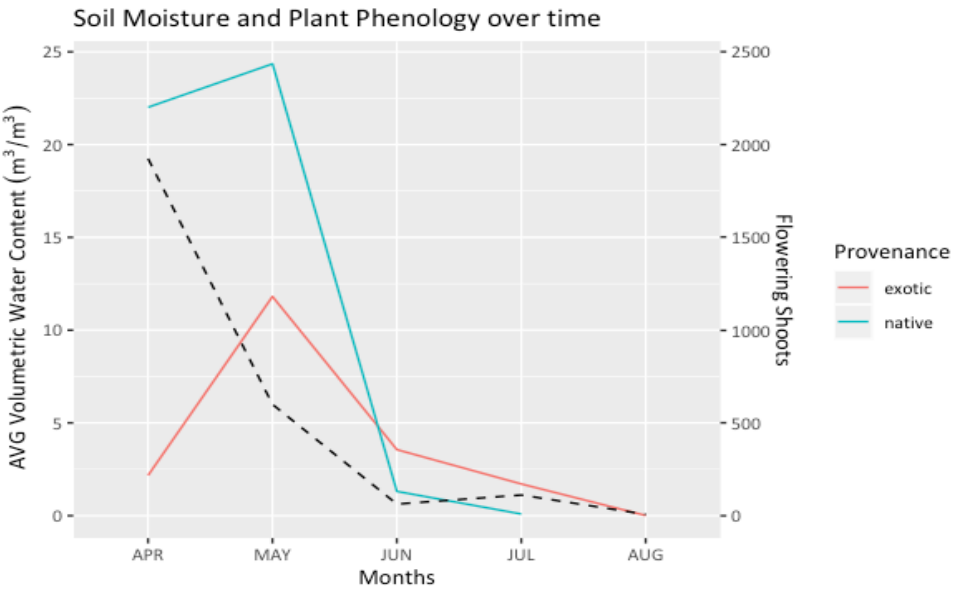


Fig. 2. Flowering plant phenology in Bluffs Park over the study period (April–August 2018). The dashed line shows average soil moisture availability dropping over time, with small amounts of precipitation slightly increasing soil moisture levels in July. The relative abundance of flowering native vs exotic species is shown by the green and red lines. Exotic species become more prominent as summer progresses, and by June the overall number of flowering native and exotic species has diminished significantly. Soil moisture was sampled along 8 transects, with four measurements of soil volumetric water content per transect, and values averaged for each monthly sample period. (Note: volumetric water content is expressed as the ratio of water to soil volume.)

Seasonality of woodland and rock outcrop flowering plant communities

Month	Species	Common Name	Count	% Total Monthly Count	AVG SM (%)	Provenance
	Collinsia parviflora	Blue-eyed Mary	890	24.4	14	Native
	Claytonia perfoliata	Miner's lettuce	683	18.7	18	Native
	Acer macrophyllum	Bigleaf maple	550	15.1	16	Native
	Cytisus scoparius	Scotch broom	447	12.2	10	Exotic
	Cardamine oligosoperma	Western bittercress	223	6.1	20	Native
	Lomatium utriculatum	Spring-gold	166	4.5	15	Native
	Cardamine hirsute	Hairy bittercress	108	3.0	23	Native
	Stellaria media	Chickweed	101	2.8	19	Exotic

April	*Erythranthe alsinoides*	Wingstem monkeyflower	95	2.6	10	Native
	Galium aparine	Cleavers	73	2.0	12	Native
	Veronica arvensis	Corn speedwell	66	1.8	17	Exotic
	Nemophila parviflora	Small-flower nemophila	65	1.8	16	Native
	Nemophila pedunculata	Meadow nemophila	45	1.2	24	Native
	Montia fontana	Blinks	40	1.1	37	Exotic
	Erodium cicutarium	Redstem filaree	39	1.1	22	Exotic
	Collinsia grandiflora	Grand ol' Mary	17	0.5	10	Native
	Erythranthe microphylla	Small-leaf monkeyflower	16	0.4	17	Native
	Trifolium variegatum	Redstem filaree	10	0.3	10	Native
	Berberis aquifolium	White-tipped clover	9	0.2	15	Native
	Micranthes integrifolia	Grassland saxifrage	7	0.2	20	Native
	Ranunculus occidentalis	Western buttercup	2	0.1	16	Native
	Erythranthe nasuta	Seep monkeyflower	1	0.03	17	Native
May	*Acmispon parviflorus*	Short-flower deervetch	1114	18.1	3	Native
	Geranium molle	Western buttercup	576	9.3	6	Exotic
	Trifolium microcephalum	Dove's-foot	264	4.3	4	Native
	Cerastium arvense	Field chickweed	98	1.6	5	Native
	Myosotis discolor	Changing forget-me-not	88	1.4	7	Exotic
	Lupinus bicolor	Miniature lupine	63	1.0	3	Native
	Epilobium minutum	Little willowherb	57	0.9	4	Native
	Cerastium glomeratum	Sticky mouse-ear	56	0.9	11	Exotic
	Trifolium microdon	Thimble clover	42	0.7	7	Native
	Sanicula crassicaulis	Pacific sanicle	30	0.5	10	Native
	Trifolium dubium	Lesser hop clover	30	0.5	3	Exotic
	Trifolium oliganthum	Few-flowered clover	25	0.4	11	Native
	Sedum spathulifolium	Stonecrop	24	0.4	7	Native
	Trifolium wildenovii	Tomcat clover	19	0.3	3	Native
	Lupinus polycarpus	Small-flowered lupine	15	0.2	3	Native
	Epilobium foliosum	California willowherb	8	0.1	5	Native
	Delphinium menziesii	Menzies' larkspur	3	0.0	13	Native

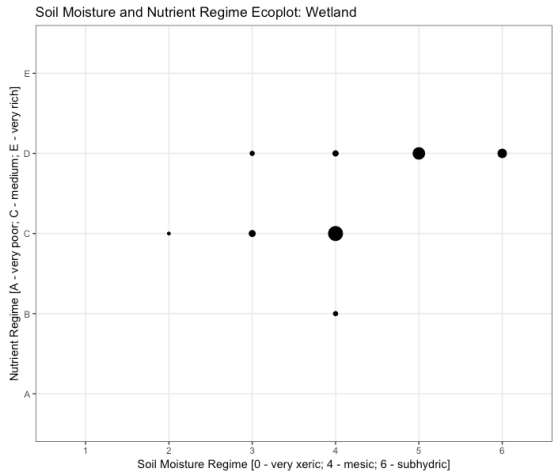
	Turritis glabra	Tower mustard	2	0.0	5	Native
	Toxicoscordion venenosum	Death camas	1	0.0	10	Native
June	*Hypochaeris radicata*	Hairy cat's ear	208	39.8	1	Exotic
	Silene coronaria	Rose campion	204	39.1	1	Exotic
	Madia gracilis	Grassy tarweed	59	11.3	0	Native
	Allium acuminatum	Hooker's onion	18	3.4	0	Native
	Clarkia amoena	Farewell-to-Spring	18	3.4	0	Native
	Eriophyllum lanatum	Woolly sunflower	12	2.3	0	Native
	Brodiaea coronaria	Crown brodiaea	3	0.6	0	Native
July	*Epilobium brachycarpum*	Tall willowherb	5	41.7	3	Native
	Grindelia hirsutula	Gumweed	3	25	0	Native
	Hypochaeris glabra	Smooth cat's ear	3	25	0	Exotic
	Achillea millefolium	Yarrow	1	8.3	2	Native

Table 7. Seasonality of 52 flowering plants across a soil moisture gradient. Plants are grouped by the month in which they occur most abundantly, though many species flower for longer periods of time. Table includes a summary of the total count of flowering shoots across all 8 transects and an estimate of their proportional abundance expressed as a percent of the total count of flowering shoots counted within each monthly sampling period. Also included is a summary of the mean soil moisture conditions associated with each plant species, averaged across all transects and sample periods.

Wetlands

Wetlands toward the northeastern (Plot 3, shown left) and southwestern Park boundary, and along the western part of the main access road to the Park (Plot 6, right) are dominated by red alder and western redcedar trees. The canopy is open and understory plants indicators of moist-to-wet / medium-to-rich conditions. Sword fern is abundant on all sites. Salmonberry and skunk cabbage are mostly present along the road.

Wetlands form a marginal component of the ecological mosaic of Bluffs Park, comprising approximately 1.2 ha or 1% of this protected area. These wetlands occur as cedar swamps, with an assemblage of skunk cabbage (*Lysichiton americanum*), salmonberry (*Rubus spectabilis*) and lady fern (*Athyrium filix-femina*), and as seasonally inundated floodplains dominated by slough sedge (*Carex obnupta*). Both plots sampled during this vegetation inventory are characteristic of cedar swamplands. Floodplains represent a much more marginal community similar in composition to cedar swamplands but with less of a shrub and tree component.



Ecoplot 7. Wetlands (Plots 3 & 12)

Taxon	3	6	Abundance	Frequency
Alnus rubra	25	10	abundant	dominant
Athyrium filix-femina		5	sparse	common
Cardamine hirsuta	+	+	scattered	common
Cardamine oligosperma			+	scattered
occasional				
Carex obnupta		15	patchy	common
Cirsium brevistylum	+		scattered	occasional
Galium aparine	1		scattered	common
Gaultheria shallon	2		patchy	common
Lysichiton americanus			1	scattered
common				
Polystichum munitum		90	10	abundant
dominant				
Pteridium aquilinum	5		sparse	occasional
Rubus spectabilis		3	scattered	occasional

Rubus ursinus		1	scattered	occasional
Stachys cooleyae		1	scattered	occasional
Thuja plicata	20	38	abundant	dominant
Urtica dioica		+	patchy	occasional
Vaccinium ovatum	1	+	scattered	occasional
Veronica americana		+	scattered	occasional
Veronica serpyllifolia		+	scattered	occasional

Table 8. Percent cover of species reported for plots within the Wetland community.

Littoral

Aerial drone photograph showing woodlands and outcrops descending to the shoreline of Bluffs Park. A steep coastal bluff community dominated by Scotch broom is visible at the base of the slopes. Photograph by Kris Krüg.

Bluffs Park features nearly one kilometer of shoreline along the northwestern shores of Active Pass. This ocean-side or “littoral” community covers about half a hectare and is host to its own distinct assemblage of coastal species, interfacing with the richest ecosystem of the Salish Sea: the marine environment. This area is difficult to access and was not inventoried as part of the Bluffs Park Management Plan.

All values in m2 / hectare

Plot No	Class	Douglas-fir		Cedar	Oak	Alder	Arbutus	Grand fir		Maple	TOTAL
10	OGco	180	0	0	0	0	0	0	180		
13	OGco	80	400	0	0	0	0	0	480		
AVG	**OGco**	**130**	**200**	**0**	**0**	**0**	**0**	**0**	**330**		
15	WD	180	40	0	0	0	0	0	220		
16	WD	260	0	20	0	0	0	0	280		
AVG	**WD**	**220**	**20**	**10**	**0**	**0**	**0**	**0**	**250**		
1	MFco	60	280	0	0	20	0	0	360		
4	MFco	240	200	0	0	0	0	0	440		
5	MFco	120	80	0	0	0	20	0	220		
9	MFco	0	500	0	0	0	0	0	500		
12	MFco	40	40	0	0	0	0	0	80		
14	MFco	100	60	0	0	0	0	0	160		
AVG	**MFco**	**93**	**193**	**0**	**0**	**3**	**3**	**0**	**293**		
2	YFco	200	20	0	0	0	0	0	220		
8	YFco	300	80	0	0	0	0	0	380		
11	YFco	340	0	0	0	0	0	0	340		
7	YFmx	140	100	0	0	0	0	40	280		
AVG	**YF**	**245**	**50**	**0**	**0**	**0**	**0**	**10**	**305**		
3	WNsp	60	80	0	0	0	0	0	140		
6	WNsp	0	180	0	20	0	0	0	200		
AVG	**WNsp**	**30**	**130**	**0**	**10**	**0**	**0**	**0**	**170**		

Table 9. Estimated basal area of dominant tree species in Bluffs Park's ecological communities, as measured using a cruiser gauge at each vegetation plot. Basal area is reported in square meters per hectare (m^2/ha) with overall averages reported for each community: Oldgrowth conifer forest (OGco), Woodland (WD), Mature conifer forest (MFco), Young forest (YF), and Cedar swamp wetlands (WNsp).

See MAP 3 – Ecological Communities

See MAP 4 –Areas of Conservation Concern

Appendix 5.4. Land Use Bylaws

Official Community Plan Bylaw #108, section 7

Nature Protection

The protection of special natural areas, removed from the threat of future development, is an ongoing process on Galiano Island. Over the past decades, several Nature Protection areas resulted from the combined efforts of residents, visitors, non-profit organizations and public agencies. These protected areas, along with public lands intended for conservation, are designated as Nature Protection in this plan.

Nature Protection Objective

The objective of this subsection is:

1) *to preserve natural values*
2) *to create connections establishing a network of protected areas,*
3) *to protect and enhance the island's capacity for carbon storage.*

Nature Protection Policies

a) A separate zone for conservation shall be applied to new and existing Nature Protection areas.
b) Lands covenanted against further development or subdivision shall be identified through appropriate zoning designation.
c) Zoning for Nature Protection areas may permit trails, ecological restoration, and low impact recreation.
d) Where Nature Protection areas meet the high tide line, the water and foreshore shall be zoned for protection.

Nature Protection Advocacy Policies

e) B.C. Parks shall be requested to continue a public consultative process of developing and periodically reviewing management plans for all ecological reserves in the Galiano Island Local Trust Area.
f) Landowners are encouraged to protect sensitive areas on their lands through granting conservation covenants under the Natural Area Protection Tax Exemption Program (NAPTEP).

The Bluffs ("Bluffs Park") is zoned "Nature Protection" under Galiano Island Land Use Bylaw # 127.

<u>Nature Protection Zone</u>

Permitted Uses

1. *In the Nature Protection zone the following uses are permitted, subject to regulations set out in this section and the general regulations set out in parts 2 and 3, and all other uses are prohibited.*

11.1.1.1 ecological reserves and nature conservancies
11.1.1.2 research and educational activities
11.1.1.3 groundwater retention and recharge
11.1.1.4 ecological restoration
11.1.1.5 passive recreation

Buildings and Structures

2. *No buildings or structures of any kind, other than signs are permitted.*

Appendix 5.5. Park Guardian Program

Park/Forest Guardians

The Galiano Club Park/Forest Guardians are involved in the following tasks:

1. Checking for fallen trees on trails
2. Picking up litter
3. Removing small obstacles from the trails
4. Light pruning of branches
5. Checking for other safety hazards
6. Making sure signs are visible
7. Providing recommendations for signage
8. Reporting incidents of vandalism
9. Reporting any other concerns to the Club designate
10. Participating in organized broom cutting events
11. Making recommendations for opening up side trails
12. Providing information to the public when meeting on the trails
13. Participating in education events about the Park ecosystem