Site Unit Symbol	Site Unit Name	Site Series Number
AS	**Trembling aspen - Slough sedge**	**00**

SITE DESCRIPTION

This is a seral open wooded wetland community that occurs on six sites in Helliwell Park. It is relatively rare in the Strait of Georgia. Typical environmental conditions are medium-textured, poorly drained soils in depressional areas between the 30 and 80 metre contour intervals. Bedrock (cg) is the dominant underlying surficial material. Soils are gleysols that have developed where there is poor to imperfect drainage. Soils are saturated to the surface throughout the wet seasons and remain moist during the summer. The soil surface is usually covered with a shallow ± 20 cm Ah layer consisting of dark brown organic material that contributes to the soil's rich nutrient status. The rooting depth is limited by compacted cobbles, pebbles and bedrock below the 20 cm depth. The open wooded wetland (30-60% total cover) is comprised primarily of trembling aspen, with the occasional red alder and shore pine. Pacific crabapple is an important indicator species in the shrub-tree layer. Slough sedge, common rush and ferns typically dominate the early stages of development, as well as the herbaceous understorey of later stages.

Assumed Site Modifiers: j, m

SITE DESCRIPTION

Elevation Range (m):	30 to 80
Slope Range (%):	none
Aspect (degrees):	none
Surficial Material:	hRmjx-w, hRhx-w
Moisture Regime:	Subhygric to Hygric
Nutrient Regime:	Rich to Very Rich

Distribution of Map Units Containing AS Units

◂ Trembling aspen – Slough sedge, Structural stage 3

Site Unit Symbol	Site Unit Name	BGC	Site Series No.
AS	Trembling aspen - Slough sedge	CDFmm	00
ASj gentle slope ASm medium-textured soils			

Map Symbol (Structural Stage)					
AS3 (Shrub/Herb)	**AS4 (Pole Sapling)**				
Dominant Species					
trembling aspen red alder shore pine slough sedge common rush	trembling aspen red alder shore pine slough sedge common rush				
Indicator Species					
Pacific crabapple Scouler's willow Pacific willow lady fern bluejoint Menzies' tree moss slender beaked moss sweet-scented bedstraw	Pacific crabapple Scouler's willow Pacific willow lady fern bluejoint Menzies' tree moss slender beaked moss sweet-scented bedstraw				
Associate Species					
trailing blackberry salal common horsetail bracken fern field mint[I] hair bentgrass[I]	baldhip rose black raspberry trailing blackberry salal curled dock[1] common horsetail bracken fern snowberry wild gooseberry field mint[I]				
Plots: VKDH-32, 9619820	VKDH-4, VKDH-8, 9619695, 9619697, 9619821				

[I] *Introduced species*

Additional notes: While relatively small in size, the six occurrences of this plant community in Helliwell Park are excellent examples that have not been fragmented or had their hydrological regimes altered. All are located away from the main trails and have long-term viability prospects.

Site Unit Symbol	Site Unit Name	Site Series Number
Beach	**BE**	**N/A**

SITE DESCRIPTION

Typically, an area with sorted sediments reworked in recent times by wave action. This unit also includes some rocky shore with gravels and/or sands. At Helliwell Park, the BE unit is only found next to salt water. On the north-eastern side of the park, the BE unit is associated with a midden site. While the north-eastern beaches have relatively easy access by land, the beaches on the shore of Tribune Bay are generally accesible only by water. The beaches of Flora Islet are all accessible by land and water and used as landing areas for casual boaters, kayakers and scuba divers. All are of excellent quality

Assumed Site Modifiers: c, j

SITE DESCRIPTION

Elevation Range (m):	0 to 5
Slope Range (%):	0 to 20
Aspect (degrees):	all aspects
Surficial Material:	spkWj
Moisture Regime:	N/A
Nutrient Regime:	N/A

Distribution of Map Units Containing BE Units

◄ Beach on eastern shore north of St. John's Point

Site Unit Symbol	Site Unit Name	Site Series Number
CD	**Black cottonwood - Red osier dogwood**	**08**

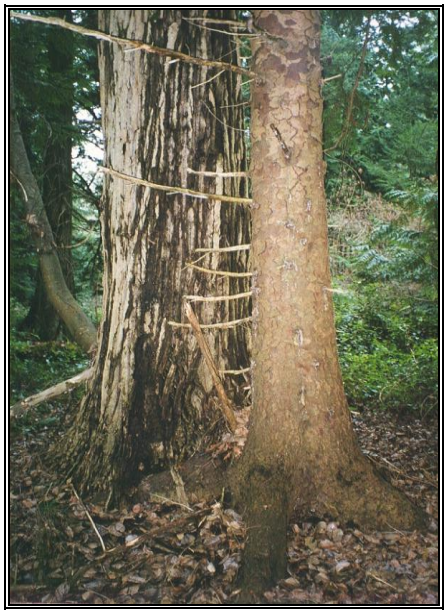
SITE DESCRIPTION

This unit typically occurs in several adjacent areas of the park in association with colluvial and fluvial surficial materials. Soils are deeper moist to wet gleysols with poor to imperfect drainage, developed in silty sandy colluvial deposits. Running water from ephemeral drainages provides moisture that saturates the soils and raises the water table throughout the wet seasons. The soil surface is usually covered with a humic enriched horizon (Ah) that contributes to the soil's rich nutrient status. The rooting depth is limited by cool, saturated soil at about 50cm depth. Sedges and ferns typically dominate the early stages of development as well as the herbaceous understory of later stages. The open forest is comprised primarily of maturing red alder, big-leaf maple and western redcedar. Black cottonwood is patchy, and some sites have very mature specimens. Grand-fir is less common on these sites in Helliwell Park than elsewhere in the CDF. Sitka spruce is rarely encountered, but small numbers of maturing specimens are found growing at one of the sites (see photo).

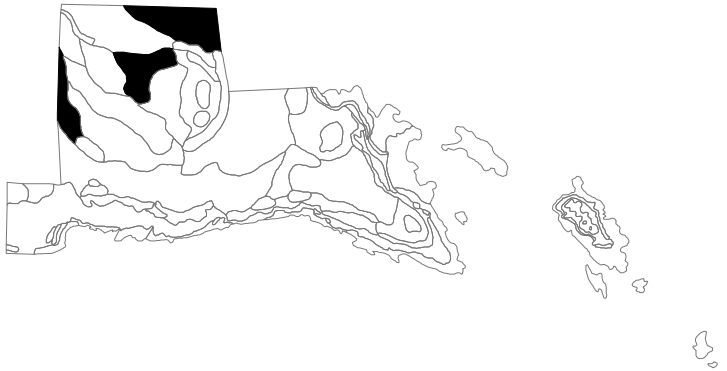
Assumed Site Modifiers: j, m

SITE DESCRIPTION

Elevation Range (m):	8 to 15
Slope Range (%):	0-10
Aspect (degrees):	none
Surficial Material:	spkCmb,p- im,p,mw
Moisture Regime:	Subhygric to Hygric
Nutrient Regime:	Rich to Very Rich



Distribution of Map Units Containing CD Units



◄ Black cottonwood – Red osier Dogwood, Structural stage 6

Site Unit Symbol	Site Unit Name	BGC	Site Series No.
CD	Black cottonwood – Red osier dogwood	CDFmm	08

CDd deep soils CDf fine-textured soils CDm medium-textured soils
CDj gentle slope CDs shallow soils

Map Symbol (Structural Stage)		
CD5 (Young Forest)	**CD6 (Mature Forest)**	
Dominant Species		
western redcedar slough sedge red alder black cottonwood	western redcedar grand fir Pacific crabapple black cottonwood slough sedge slender beaked moss	
Indicator Species		
grand fir Pacific crabapple deer fern blg-leaf maple lady fern sword fern sweet-scented bedstraw Menzies' tree moss slender beaked moss	deer fern lady fern sword fern sweet-scented bedstraw Menzies' tree moss	
Associate Species		
Pacific water-parsley trailing blackberry large leafy moss oceanspray common horsetail wall-lettuce [I] marsh violet common velvet-grass [I]	Pacific water-parsley trailing blackberry bog St. John's wort large leafy moss common horsetail marsh violet wall-lettuce [I] common velvet-grass [I]	
Plots: VKDH-36, 9619823	9804125	

[I] *Introduced species*

Additional notes: Part of extensive wetland complex at northern end of park.

Site Unit Symbol	Site Unit Name	Site Series Number
CL	**Cliff**	**N/A**

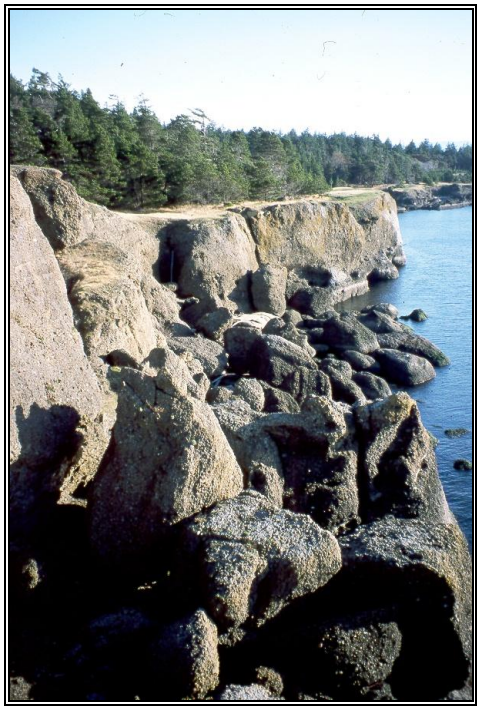
SITE DESCRIPTION

A steep, vertical or overhanging rock face above the shoreline. These are sparsely vegetated units and may include soil pockets with vegetation similar to the FC and OR units. Cliffs occur in the south end of Helliwell Park overlooking Tribune Bay, and are important waterbird nesting sites. Because of the sedimentary nature of the bedrock geology (conglomerate), all cliffs are prone to erosion and vulnerable to recreational overuse. Some of the cliffs are important waterbird nesting sites.

Assumed Site Modifiers: w,z

SITE DESCRIPTION

Elevation Range (m):	0 to 50
Slope Range (%):	> 30
Aspect (degrees):	all aspects
Surficial Material:	Rs (cg) Rm (cg)
Moisture Regime:	N/A
Nutrient Regime:	N/A



Distribution of Map Units Containing CL Units

◄ Cliff along Tribune Bay

Site Unit Symbol	Site Unit Name	Site Series Number
CO	**Cultivated Orchard**	**N/A**

SITE DESCRIPTION

Typically, a cultivated agricultural area composed of single or multiple fruit tree varieties planted in rows. With annual pruning low, bushy trees are maintained. At Helliwell Park, the orchard has been abandoned and successional processes have allowed the forest (Douglas-fir & Douglas' maple) to advance and close canopy. Fruit (apple, plum) and nut (*Juglans regia*) trees still persist throughout the understorey in the area near the outhouse located at the northeastern corner of the park. Closer to the northern park boundary, the orchard remains partially open, and the understory vegetation has converted to "old field" and is dominated by non-native grasses and herbs. Rocky mountain juniper has invaded this site. The canopy has closed in around the outhouse and modified site conditions have allowed record-sized Douglas maples to become established.

Assumed Site Modifiers: j

SITE DESCRIPTION

Elevation Range (m):	2 to 16
Slope Range (%):	8 to 10
Aspect (degrees):	NE
Surficial Material:	spkCpmb-mw
Moisture Regime:	Mesic
Nutrient Regime:	Medium

Distribution of Map Units Containing CO Units

◂ Cultivated Orchard (abandoned)

Site Unit Symbol	Site Unit Name	Site Series Number
CR	**Cladina - Racomitrium outcrop**	**00**

SITE DESCRIPTION

This bryophyte community is sparsely interspersed (<5% total cover) within the extensive FC meadow community that dominates the south-western and eastern areas of the park, and has not been mapped as a separate unit. CR occurs on less-disturbed outcropping sandstone and conglomerate exposed bedrock patches within the FC meadow areas, and its distribution has been somehat reduced to a narrow margin along the extreme edges of outcropping cliffs where recreational trampling disturbance has not occurred. Soils are non-existent to very thin sandy veneers that are capable of supporting mat forming carpets of reindeer lichens (*Cladina* spp.), roadside rock moss (*Racomitrium canescens*) and broom moss (*Dicranum scoparium*). Unlike other sites where Cladina ecosystems are found, Wallace's selaginella (*Selaginella wallacei*) is rarely encountered. Further sampling is required throughout the CDF to describe the bryophyte communities in greater detail. All occurences of CR in Helliwell Park are structural stage 1b.

Assumed Site Modifiers: j, m, r, v

SITE DESCRIPTION

Elevation Range (m):	50-140
Slope Range (%):	level to < 30
Aspect (degrees):	all aspects
Surficial Material:	hRhx-w, Rks (cg) (ss)
Moisture Regime:	Xeric to Sub-mesic
Nutrient Regime:	N/A

Distribution of Map Units Containing CR Units

◂ Cladina - Racomitrium outcrop– Structural stage 1b

Site Unit Symbol	Site Unit Name	BGC	Site Series No.
CR	Cladina - Racomitrium outcrop	CDFmm	00

Map Symbol (Structural Stage)
CR1b (Sparse/Bryoid)
Dominant Species
Cladina spp. Broom moss Roadside rock moss Hairy cat's-ear [I]
Indicator Species
Juniper haircap moss Wallace's selaginella Red roof moss Hoary rock moss Awned haircap moss
Associate Species
red fescue few-flowered panic grass shepherd's cress western lady's mantle Bigelow's plantain California oatgrass thimble clover field chickweed sticky chickweed water chickweed Howell's montia prickly-pear cactus dwarf owlclover sheep sorrel [I] silver hairgrass[1] early hairgrass [I] small-flowered blue-eyed Mary
Plots: VKDH-25, VKDH-27

[I] *Introduced species*

Additional notes: Exclosures would allow recovery of this community in areas of high recreational use.

Site Unit Symbol	Site Unit Name	Site Series Number
CS	**Red alder - Slough sedge [Black cottonwood]**	**14**

SITE DESCRIPTION

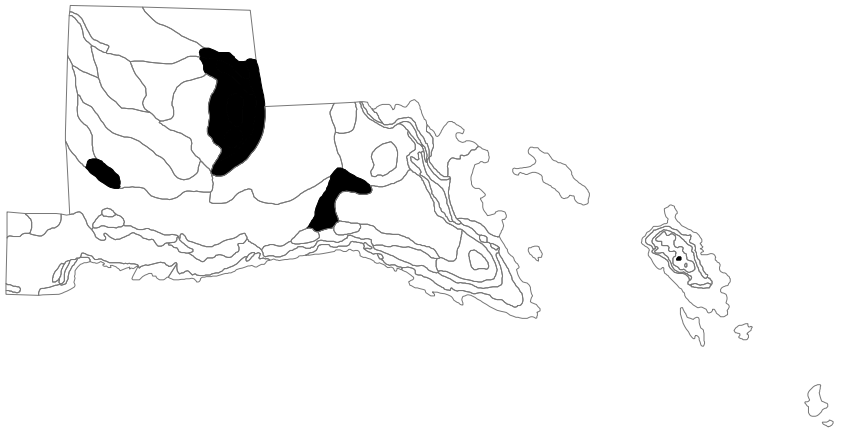
This edaphic unit typically occurs in several depressional areas, with deeper, medium-textured, imperfectly to poorly drained soils. Soils are moist to wet gleysols with poor to imperfect drainage, developed in silty sandy colluvial deposits. The soils are saturated to the surface throughout the wet seasons and can remain wet with high water tables up to about 5 cm during the summer. The soil surface is usually covered with a humic enriched horizon (Ah) that contributes to the soil's rich nutrient status. The rooting depth is limited by cool, saturated soil at about 50cm depth. Sedges and ferns typically dominate the early stages of development as well as the herbaceous understory of later stages. The open forest (total cover 40-60%) is comprised primarily of red alder and western redcedar with some big-leaf maple and the occasional grand fir. Black cottonwood is patchy. Part of an extensive wetland complex.

Assumed Site Modifiers: d, j, m

SITE DESCRIPTION

Elevation Range (m):	8 to 15
Slope Range (%):	none
Aspect (degrees):	none
Surficial Material:	spkCmb,p- im,p,mw
Moisture Regime:	Subhygric to Hygric
Nutrient Regime:	Rich to Very Rich

Distribution of Map Units Containing CS Units



◂ Red alder – Slough sedge [Black cottonwood]

Site Unit Symbol	Site Unit Name	BGC	Site Series No.
CS	Red alder - Slough sedge [Black cottonwood]	CDFmm	14

CSd deep soils CSf fine-textured soils CSm medium-textured soils
CSj gentle slope CSs shallow soils

Map Symbol (Structural Stage)					
CS2 (Herb)		**CS4 (Pole Sapling)**	**CS5 (Young Forest)**	**CS6 (Mature Forest)**	
Dominant Species					
slough sedge common rush creeping bentgrass common velvet-grass [I]		red alder western redcedar slough sedge black cottonwood sitka spruce	slough sedge red alder black cottonwood western redcedar sitka spruce	western redcedar black cottonwood sitka spruce grand fir slough sedge slender beaked moss	
Indicator Species					
red alder trembling aspen black cottonwood western redcedar big-leaf maple shore pine deer fern lady fern sword fern Menzies' tree moss slender beaked moss sweet-scented bedstraw		grand fir Pacific crabapple bluejoint deer fern lady fern sword fern Menzies' tree moss slender beaked moss sweet-scented bedstraw	grand fir Pacific crabapple deer fern lady fern sword fern sweet-scented bedstraw Menzies' tree moss slender beaked moss	deer fern lady fern sword fern sweet-scented bedstraw Menzies' tree moss	
Associate Species					
Pacific water-parsley large leafy moss purple-leaved willowherb field mint [I] hairy cat's-ear [I] common horsetail marsh violet bog St. John's-wort bracken fern bog haircap moss hair bentgrass [I] common speedwell self-heal wall-lettuce [I]		Pacific water-parsley trailing blackberry large leafy moss red huckleberry field chickweed sheep sorrel [1] common horsetail bracken fern wall-lettuce [I] common velvet-grass [I]	Pacific water-parsley trailing blackberry large leafy moss common horsetail hairy honeysuckle baldhip rose bracken fern wall-lettuce [I]	Pacific water-parsley trailing blackberry large leafy moss common horsetail baldhip rose wall-lettuce [I] English ivy [I] hairy honeysuckle evergreen huckleberry	
Plots: 9619691, 9804121		VKDH-9, 10, 9804123	VKDH-16, 98014124	VKDH-16, 9619690, 9619692	

[I] *Introduced species*

Site Unit Symbol	Site Unit Name	Site Series Number
DA	**FdPl - Arbutus**	**02**

SITE DESCRIPTION

The DA ecosystem typically occurs on upper slope to crest positions. The elevational range of this unit is from 40 metres to greater than 150m. Sampled sites included a wide range of slope gradients (0 - 30%) usually on warm south-facing aspects. Slope positions include shedding, dry, crest-like sites; the terrain consists mainly of moderately sloping (10 to 50%) bedrock. The soils are very lithic, shallow, rubbly Humo-Ferric Podzols, that are rapidly to well drained. This unit is characterized by an open forest of Douglas-fir and arbutus with the occasional shore pine and Garry oak scattered throughout the canopy. Total canopy closure in older forest stands is 50-70%. Early successional stages are often dominated by shrubs. Shore pine and arbutus form dense stands following disturbance such as fire, which has occurred near St. John's Point. Older forest stands provide evidence of the past fire history of this community type.

Assumed Site Modifiers: h, j, sw

SITE DESCRIPTION

Elevation Range (m):	40 to 140
Slope Range (%):	level to >30
Aspect (degrees):	all aspects, level
Surficial Material:	hRhx-w, hRmjx-w
Moisture Regime:	Xeric to Submesic
Nutrient Regime:	Poor to Medium

Distribution of Map Units Containing DA Units

◄ Douglas fir - shore pine – Arbutus, Structural Stage 7

Site Unit Symbol	Site Unit Name	BGC	Site Series No.
DA	FdPl - Arbutus	CDFmm	02

DAf fine-textured soils
DAh hummocky
DAj gentle to moderate slope
DAm medium-textured soils
DAr ridge or ridge crest
DAsw shallow soils, warm aspect

Map Symbol (Structural Stage)					
DA2 (Sparse/Bryoid)	**DA3 (Shrub/Herb)**	**DA4 (Pole Sapling)**	**DA5 (Young Forest)**		**DA7 (Old Forest)**
Dominant Species					
red fescue western ryegrass early hairgrass [I] common velvet-grass [I] sweet vernalgrass barren fescue [I] wild strawberry	arbutus Douglas-fir western ryegrass wild strawberry	arbutus Douglas-fir salal western ryegrass	Douglas-fir arbutus salal western ryegrass		Douglas-fir arbutus salal western ryegrass
Indicator Species					
Cladina spp. hoary rock moss broom moss hairy honeysuckle arbutus blue wildrye	Garry oak Cladina spp. shore pine oceanspray hoary rock moss broom moss curly heron's-bill moss blue wildrye hairy honeysuckle barren fescue [I] early hairgrass [I] Oregon beaked moss	Garry oak dull Oregon grape Cladina spp. shore pine oceanspray broom moss curly heron's-bill moss blue wildrye Pacific sanicle hairy honeysuckle early hairgrass [I] Oregon beaked moss barren fescue [I] wild strawberry hoary rock moss	Garry oak shore pine oceanspray dull Oregon grape sword fern Cladina spp. Oregon beaked moss broom moss curly heron's-bill moss Pacific sanicle blue wildrye hairy honeysuckle barren fescue [I] wild strawberry hoary rock moss		Garry oak shore pine oceanspray Cladina spp. Oregon beaked moss broom moss curly heron's-bill moss blue wildrye hairy honeysuckle early hairgrass [I] wild strawberry hoary rock moss western fescue licorice fern yerba buena Pacific sanicle dull Oregon-grape baldhip rose Alaska oniongrass

Map Symbol (Structural Stage)					
DA2 (Sparse/Bryoid)	**DA3 (Shrub/Herb)**	**DA4 (Pole Sapling)**	**DA5 (Young Forest)**		**DA7 (Old Forest)**
Associate Species					
salal sweet-scented bedstraw cleavers hairy cat's-ear [I] California oatgrass sheep sorrel [I] common dandelion [I] woodland tarweed yarrow western buttercup bracken Wallace's selaginella	salal sweet-scented bedstraw cleavers hairy cat's-ear [I] Columbia brome [I] California oatgrass sheep sorrel [I] woodland tarweed yarrow western buttercup chocolate lily English plantain [1] yerba buena dovefoot geranium [1] early blue violet self-heal field chickweed bracken sweet vernal grass [1] dandelion [1] Wallace's selaginella	salal sweet-scented bedstraw hairy cat's-ear [I] Columbia brome [I] California oatgrass field chickweed wall lettuce [1] dandelion step moss electrified cat's tail moss English holly [1] bracken Wallace's selaginella	Columbia brome [I] hairy cat's ear [I] sweet-scented bedstraw bracken step moss electrified cat's tail moss Saskatoon mock orange Wallace's selaginella		wild gooseberry Columbia brome [I] hairy cat's-ear [I] sweet-scented bedstraw step moss electrified cat's tail moss rattlesnake plantain wild strawberry cleavers broad-leaved starflower bearded fescue western trumpet honeysuckle big-leaved sandwort purple peavine bracken Saskatoon Wallace's selaginella
Plots: VKDH-18, 19	9619688, 9619689, 9619696, 9619698, 9804122, 9804129, VKDH-1, 2, 3, 7, 24, 27, 35	VKDH-11, 18, 9619822	VKDH-3, 9804116		VKDH-12, 31, 9619693, 9619694

[I] *Introduced species*

Additional notes: This plant community occupies an extensive area of the park.

Site Unit Symbol	Site Unit Name	Site Series Number
DO	**Douglas-fir - oniongrass**	**03**

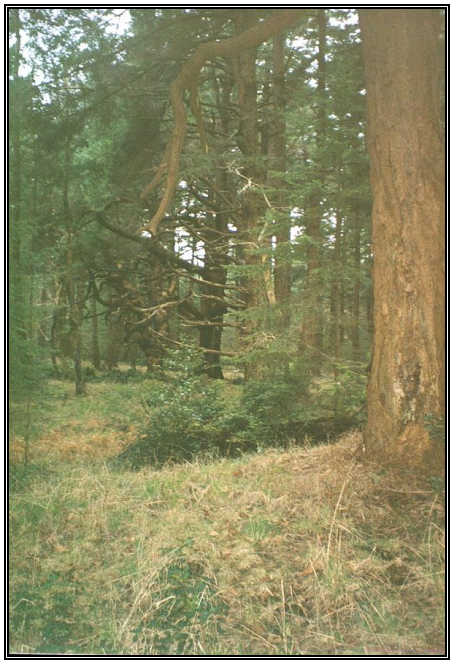
SITE DESCRIPTION

This plant community occurs across a range of upper slope to mid-slope positions with an elevational range from 20 metres to greater than 100m. Sampled sites covered a range of slope gradients (0 - 20%), with most forming on gentle rises across all aspects. Surficial expressions are primarliy include dry, rolling topography. The terrain consists mainly of moderately sloping (10 to 50%) bedrock. The soils are thin veneers of dry, well-drained sandy loam. The presence of Garry oak in this community ensures that there is an LFH layer, generally about 2 cm in depth. This unit is characterized by an open forest of Douglas-fir and arbutus, with Garry oak persisting mainly in the canopy gaps. Canopy closure varies from 50 to 70%. Shore pine is scattered throughout the canopy. Early structural stages are dominated by a variety of grasses, meadow forbs and Garry oak. Older forest stands provide evidence of the past fire history of this community type, as does a thin black layer in the Ah soil horizon.

Assumed Site Modifiers: h, j, sw

SITE DESCRIPTION

Elevation Range (m):	20 to 100
Slope Range (%):	level to >20
Aspect (degrees):	all aspects, level
Surficial Material:	hRmjx-w
Moisture Regime:	Xeric to Submesic
Nutrient Regime:	Medium to Very Rich



Distribution of Map Units Containing DO Units

Douglas-fir - oniongrass, Structural Stage 7

Site Unit Symbol	Site Unit Name	BGC	Site Series No.
DO	Fd - Oniongrass	CDFmm	03

DOh hummocky
DOj gentle to moderate slope
DOm medium-textured soils
DOsw shallow soils, warm aspect

Map Symbol (Structural Stage)					
DO2 (Sparse/Bryoid)	**DO3 (Shrub/Herb)**	**DO4 (Pole Sapling)**	**DO5 (Young Forest)**		**DO7 (Old Forest)**
Dominant Species					
early hairgrass [I] common velvet-grass [I] barren fescue[I] wild strawberry red fescue Cladonia sp.	arbutus Douglas-fir western ryegrass wild strawberry	arbutus Douglas-fir Garry oak western ryegrass	Garry oak Douglas-fir arbutus western ryegrass		Douglas-fir arbutus western ryegrass
Indicator Species					
hoary rock moss broom moss hairy honeysuckle Douglas-fir blue wildrye electrified cat's tail moss field wood-rush	Garry oak shore pine Cladonia sp. oceanspray hoary rock moss broom moss curly heron's-bill moss blue wildrye hairy honeysuckle barren fescue[I] early hairgrass [I] Oregon beaked moss	dull Oregon grape shore pine oceanspray broom moss curly heron's-bill moss blue wildrye Pacific sanicle hairy honeysuckle early hairgrass [I] Oregon beaked moss barren fescue[I] wild strawberry hoary rock moss	salal shore pine big-leaved sandwort oceanspray dull Oregon grape sword fern Oregon beaked moss electrified cat's tail moss broom moss curly heron's-bill moss Pacific sanicle blue wildrye hairy honeysuckle barren fescue[I] wild strawberry hoary rock moss		salal Garry oak shore pine oceanspray Oregon beaked moss electrified cat's tail moss broom moss curly heron's-bill moss blue wildrye hairy honeysuckle wild strawberry western fescue licorice fern bracken Pacific sanicle dull Oregon-grape baldhip rose Alaska oniongrass big-leaved sandwort

Map Symbol (Structural Stage)					
DO2 (Sparse/Bryoid)	**DO3 (Shrub/Herb)**	**DO4 (Pole Sapling)**	**DO5 (Young Forest)**		**DO7 (Old Forest)**
Associate Species					
salal sweet-scented bedstraw cleavers hairy cat's-ear [I] California oatgrass sheep sorrel [I] common dandelion [I] woodland tarweed yarrow western buttercup bracken Cladina spp. red maids common forget-me-not[1]	salal sweet-scented bedstraw cleavers hairy cat's-ear[I] California oatgrass sheep sorrel [I] woodland tarweed yarrow western buttercup English plantain[1] dovefoot geranium[1] early blue violet self-heal field chickweed bracken sweet vernal grass[1] dandelion[1] Cladina spp. red maids common forget-me-not[1]	salal sweet-scented bedstraw hairy cat's-ear [I] California oatgrass field chickweed wall lettuce[1] dandelion Oregon beaked moss electrified cat's tail moss bracken Cladina spp.	hairy cat's ear [I] sweet-scented bedstraw California oatgrass bracken Oregon beaked moss electrified cat's tail moss snowberry evergreen blackberry Cladina spp. lanky moss wall lettuce[1] evergreen huckleberry		snowberry hairy cat's-ear [I] sweet-scented bedstraw evergreen blackberry rattlesnake plantain cleavers broad-leaved starflower bearded fescue western trumpet honeysuckle purple peavine bracken Cladina spp. English holly[1] curly hypnum Douglas' neckera lanky moss wall lettuce[1] evergreen huckleberry
Plots: VKDH-26	VKDH-33	VKDH-34	9804117		VKDH-30, 9619699, 721

[I] *Introduced species*

Additional notes: This plant community occupies an extensive area of the forested park interior.

Site Unit Symbol	Site Unit Name	Site Series Number
DS	**Douglas-fir - Salal**	**01**

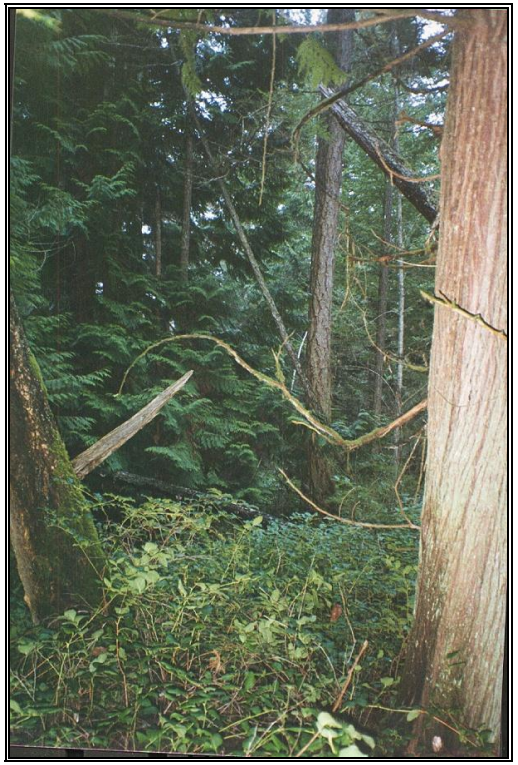
SITE DESCRIPTION

Typically occurs on gently sloping, mid to upper slope position, with deep, medium-textured soils, at a wide elevational range from near shoreline slopes to over 100m on the upper hills. The surficial materials consist mainly rapidly drained, thin rubbly, sandy colluvium. Mature forests typically have a closed canopy (>60%) dominated by Douglas-fir with some western redcedar and grand fir. The understory is primarily dense salal (<2m). Dense salal also dominates early successional stages in association with swordfern, baldhip rose and Oregon-grape.

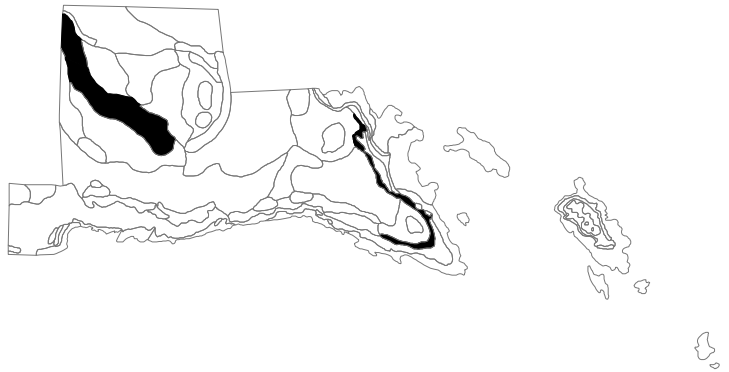
Assumed Site Modifiers: c, h,s

SITE DESCRIPTION

Elevation Range (m):	3 to 105
Slope Range (%):	level to 48
Aspect (degrees):	all aspects
Surficial Material:	spkCpmb-mw
Moisture Regime:	Mesic to Submesic
Nutrient Regime:	Poor to Medium



Distribution of Map Units Containing DS Units



◄ Douglas fir – salal, Structural stage 5

Site Unit Symbol	Site Unit Name	BGC	Site Series No.
DS	Fd - Salal	CDFmm	01
DSc coarse-textured soils DSh hummocky terrain DSs shallow soils			

Map Symbol (Structural Stage)				
			DS5 (Young Forest)	
Dominant Species				
			Douglas-fir Western redcedar salal	
Indicator Species				
			step moss Oregon beaked moss dull Oregon-grape sword fern baldhip rose trailing blackberry broad-leaved starflower oceanspray wall-lettuce[I] western redcedar	
Associate Species				
			Oregon beaked moss arbutus bitter cherry shore pine Pacific ninebark trailing blackberry western fescue hairy honeysuckle red huckleberry sweet-scented bedstraw wall lettuce[I] small-flowered alumroot rattlesnake-plantain evergreen huckleberry	
Plots:			VKDH-14, 9619824, 9619825	

Additional notes:

Site Unit Symbol	Site Unit Name	Site Series Number
FC	**Fescue - Camas**	**00**

SITE DESCRIPTION

This herbaceous community is found along the level to gently sloping cliff tops, with very shallow, medium textured soils and warm aspects. FC units are typically mapped as Coastal Bluffs (CB) and Terrestrial Herbaceous (HT) Sensitive Ecosystem Inventory (SEI) sites. These units are often exposed to strong seasonal winds and occasional sea spray. The soils are often 'blackish' in colour. Their texture is sandy loam and they rest on rolling conglomerate bedrock, which frequently outcrops to the surface. As such, the soils are very thin and droughty, with a rich nutrient regime derived from the cycling of annual grasses. This herbaceous meadow community is often dominated by introduced and native species such as common velvet-grass, red fescue, California oatgrass and meadow death-camus. Several *Cladina* species are also found in this community and when dominant, form small patches of the bryophyte community CR (see CR).

Assumed Site Modifiers: j, m, v

SITE DESCRIPTION

Elevation Range (m):	50 to 140
Slope Range (%):	level to <30
Aspect (degrees):	all aspects
Surficial Material:	hRhx-w, Rks(cg)
Moisture Regime:	Xeric to Submesic
Nutrient Regime:	Rich to Very rich

Distribution of Map Units Containing FC Units

◂ Fescue – Camas – Structural Stage 2

Site Unit Symbol	Site Unit Name	BGC	Site Series No.
FC	Fescue - Camas	CDFmm	00

FCf fine-textured soils FCm medium-textured soils FCr ridge or ridge crest
FCj gentle slopes FCv very shallow soils

Map Symbol (Structural Stage)

FC2 (Herb)

Dominant Species

Cladina sp.
red fescue
California oatgrass
bracken

Indicator Species

meadow death-camas	silver hairgrgass[1]
common camas	early hairgrass[I]
dark-throat shooting star	hairy cat's-ear[I]
Hooker's onion	yarrow
common sorrel	early hairgrass[1]
English plantain[1]	rattail fescue[I]

Associate Species

blue wildrye	western lady's mantle	field wood-rush
Wallace's selaginella	Menzies larkspur	fileree
common camas	common monkey flower	dove-foot geranium[1]
small blue-eyed Mary	gumweed	least hop clover
ladies-tresses	dandelion	thimble clover
sea-blush	purple everlasting cudweed	lance clover
sweet vernalgrass[1]	dwarf owlclover	common vetch
short-stemmed sedge	fine-leaf spring gold	windmill campion
long-stoloned sedge	slender plantain	prickly- pear cactus
miner's lettuce	few-flowered clover	

Plots: VKDH-1, VKDH-2, VKDH-18, VKDH-21, VKDH-24, VKDH-25, VKDH-33, 9619689, 9619698, 9804120, 9804122

[I] *Introduced species*

Additional notes: This unit usually has deeper soil pockets and a higher percentage of herbaceous cover than the CR unit. Exclosures would allow recovery of this community in areas of high recreational use.

Site Unit Symbol	Site Unit Name	Site Series Number
LM	**Dunegrass – Beach pea**	**00**

SITE DESCRIPTION

This beach community occupies a narrow strip of land just above mean high water behind the strand. Typically this area is less active, and debris that has been tossed ashore accumulates and provides stability that allows the colonising species in this community to become established. These units are often exposed to strong seasonal winds, sea spray, and inundation during major storm events. The soils are azonal sands and gravels that are rapidly draining and very droughty, with a nutrient regime derived from the cycling of annual grasses and nitrogen input from the beach pea. This community is generally dominated by species such as dunegrass, beach pea, and gumweed.

Assumed Site Modifiers: j, m, v

SITE DESCRIPTION

Elevation Range (m):	2 to 5
Slope Range (%):	level to <30
Aspect (degrees):	all aspects
Surficial Material:	hRhx-w, Rks (cg)
Moisture Regime:	Xeric to Submesic
Nutrient Regime:	Very poor to poor

Distribution of Map Units Containing LM Units

◄ Dunegrass – Beach pea

Site Unit Symbol	Site Unit Name	BGC	Site Series No.
LM	Dunegrass – Beach pea	CDFmm	00

LMc coarse-textured soils LMj gentle slopes LMm medium –textured soils LMv very shallow soils

Map Symbol (Structural Stage)
LM
Dominant Species
dunegrass beach pea Nootka rose Scouler's willow
Indicator Species
hairy cat's-ear[I] gumweed
Associate Species
yarrow shore pine bull thistle Canada thistle
Plots: VKDH-22, VKDH-35

[I] *Introduced species*

Additional notes: This plant community is represented by early successional (pioneer seral) stages at Helliwell Park. Disturbance regimes such as major storm events and summer moisture deficits may restrict its progression to later seral and forested structural stages.

Site Unit Symbol	Site Unit Name	Site Series Number
OR	**Oceanspray - Rose**	**00**

SITE DESCRIPTION

Typically occurs on very steep cliff slopes (>35%), over shallow medium textured soils. Ephemeral seepages from higher elevations provide moisture during the winter months. Usually found in draws between two outcrop units. Advances to shrub stages when located near the toe of cliffs. Most commonly found on the south shore overlooking Tribune Bay. This dense shrub community typically includes Nootka rose, oceanspray, saskatoon, bitter cherry, and Scouler's willow.

Assumed Site Modifiers: m, s, w

SITE DESCRIPTION

Elevation Range (m):	2 to 50
Slope Range (%):	>100
Aspect (degrees):	all aspects
Surficial Material:	Rs(cg), Rks(cg), Rm(cg)
Moisture Regime:	Mesic to Subhygric
Nutrient Regime:	Poor to Medium

Distribution of Map Units Containing OR Units

◄ Oceanspray – Rose Community, to right of image

Site Unit Symbol	Site Unit Name	BGC	Site Series No.
OR	Oceanspray - Rose	CDFmm	00

Ork cool aspect ORs shallow soils
Orm medium-textured soils ORw warm aspect

Map Symbol (Structural Stage)

OR3 (Shrub/Herb)

Dominant Species

Nootka rose
ocean-spray
arbutus
saskatoon

Indicator Species

red fescue
early hairgrass[1]
snowberry
orange honeysuckle
evergreen blackberry
gumweed

Associate Species

bitter cherry
Douglas-fir
bracken
Scouler's willow
purple everlasting cudweed
hairy cat's-ear[I]
common velvet-grass [I]

Plots: VKDH-5, VKDH-6, VKDH-28

Additional notes: This community type occurs primarily in gullies or sloping seepage channels below cliff tops, where increased moisture availability supports dense shrub cover. Several shrub species tend to dominate the various sites. Tree species are wind pruned and form krummholz shapes.

Site Unit Symbol	Site Unit Name	Site Series Number
RK	**Western redcedar-Douglas-fir/Oregon beaked moss**	**05**

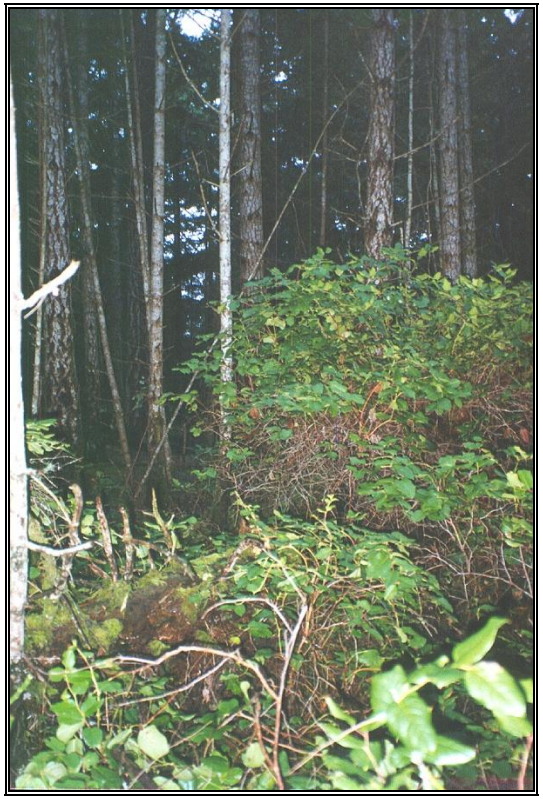
SITE DESCRIPTION

Typically occurs on gentle, lower slope, receiving positions, with deep medium-textured soils, mainly at lower elevations. The terrain consists of deep, colluvial deposits. The sandy loam soils are rich and have moderately well to imperfect drainage. Western redcedar commonly dominates this closed forest canopy, along with some grand fir, Douglas-fir and big-leaf maple. The lush understory is comprised primarily of swordfern. Early stages are typically dominated by herbs with more red alder present as the forest begins to develop.

Assumed Site Modifiers: j,m

SITE DESCRIPTION

Elevation Range (m):	6 to 43
Slope Range (%):	level to 48
Aspect (degrees):	all aspects
Surficial Material:	spkCmb-im
Moisture Regime:	Subhygric
Nutrient Regime:	Rich to Very rich



Distribution of Map Units Containing RK Units

◄ Western redcedar–Douglas-fir – Oregon beaked moss

Site Unit Symbol	Site Unit Name	BGC	Site Series No.
RK	Cw-Fd/ Foamflower	CDFmm	05

RKc coarse-textured soils
RKj gentle to moderate slope
RKm medium-textured soils

Map Symbol (Structural Stage)						
		RK4 (Pole Sapling)	**RK5 (Young Forest)**			
Dominant Species						
		red alder western redcedar **salal**	western redcedar Douglas-fir salal			
Indicator Species						
		wall-letttuce[1] Menzie's tree moss trailing blackberry common foxglove sword fern oceanspray red huckleberry sweet-scented bedstraw Douglas-fir	trailing blackberry common foxglove sword fern oceanspray red huckleberry sweet-scented bedstraw wall-letttuce[1] Menzie's tree moss red alder			
Associate Species						
		western hemlock Oregon beaked moss cleavers dull Oregon-grape lanky moss broad-leaved starflower hairy honeysuckle western fescue fireweed	western hemlock Oregon beaked moss dull Oregon-grape lanky moss broad-leaved starflower hairy honeysuckle western fescue cleavers			
Plots:		9804128	9804126, 9804128			

Additional notes: This forest community is located in the northwestern part of the park and provides a transition between the extensive wetland complex and the upland forested areas of the park.

Site Unit Symbol	Site Unit Name	Site Series Number
RO	**Rock outcrop**	**N/A**

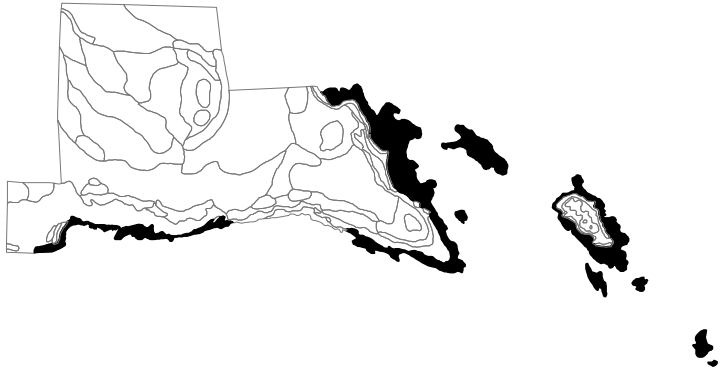
SITE DESCRIPTION

Typically consists of outcropping bedrock with gentle to steep slopes, little soil development and sparse vegetative cover. Very steep and overhanging slopes are classified as CL. The RO unit is found along the shoreline near sea level where rocks are washed by waves; just above this, rocks are subjected to sea spray. Flora Islet and several drying rocks located off St. John's Point are all classified as RO. Because of the exposure of these sites to harsh environmental conditions, terrestrial vegetation rarely survives within the sea spray zone. This unit is extremely droughty in summer and exposed to wind and rain during winter. The bedrock is either Gabriola Formation conglomerate (cg) or Gabriola Formation sandstone (ss). Weathering is an ongoing process and is the source of recent sediment for colluvial accumulations at the shoreline base of these slopes. Important marine mammal and shorebird habitat.

SITE DESCRIPTION

Elevation Range (m):	0 to 75
Slope Range (%):	0-30
Aspect (degrees):	all aspects
Surficial Material:	Rm (cg), Rm (ss)
Moisture Regime:	N/A
Nutrient Regime:	N/A

Distribution of Map Units Containing RO Units



◄ Rock outcrop on Flora Islet

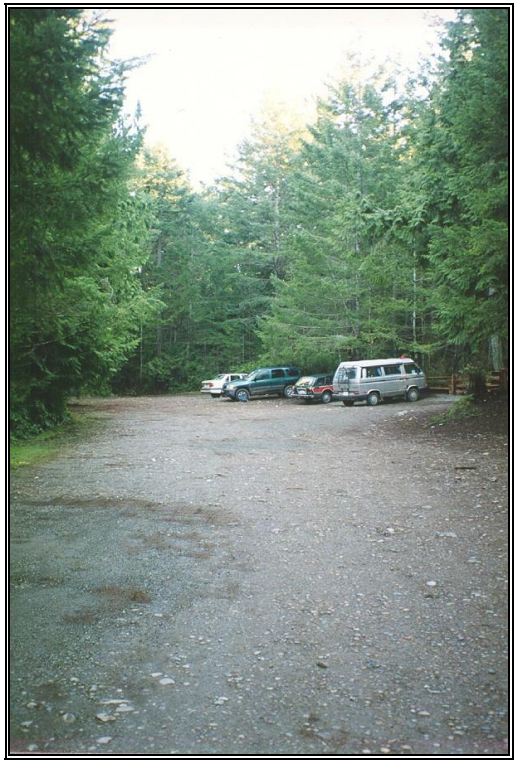
Site Unit Symbol	Site Unit Name	Site Series Number
RP	**Road Surface**	**N/A**

SITE DESCRIPTION

An area cleared and compacted for the purpose of transporting goods and services by vehicles. Also used to describe sites with hardened trail surfaces.

SITE DESCRIPTION

Elevation Range (m):	0 to 17
Slope Range (%):	level to 15
Aspect (degrees):	N/A
Surficial Material:	N/A
Moisture Regime:	N/A
Nutrient Regime:	N/A



Distribution of Map Units Containing RP Units

◄ Parking Lot at Park Entrance

Site Unit Symbol	Site Unit Name	Site Series Number
VP	**Vernal Pool**	**N/A**

SITE DESCRIPTION

Only one vernal pool was mapped within Helliwell Park, on Flora Islet. It has been disturbed in the past when the island supported several dwellings. The pool is located just west of the lighthouse in a shallow depressional area with imperfect drainage, and is currently being used during the wet seasons by otters. Vernal pools are ephemeral and fill with fresh water during the autumn rains. They remain inundated until the end of spring. During the summer moisture deficit period, waters evaporate from vernal pools and leave behind a shallow muddy depression. Vernal pools are critical breeding habitat for aquatic salamanders, frogs and toads; there is currently no evidence of these amphibians on Flora Islet.

SITE DESCRIPTION

Elevation Range (m):	10
Slope Range (%):	level to depressional
Aspect (degrees):	N/A
Surficial Material:	Rm(cg)
Moisture Regime:	Subhygric
Nutrient Regime:	Medium to Rich

Distribution of Map Units Containing VP Units

◄ Vernal Pool on Flora Islet