Island View Beach
Central Saanich Tsawout Reservation
Cordova Spit Municipal Park:
Inventory and Management Recommendations for Rare Plants

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Background

The southeastern portion of the Capital Regional District, with its unique climate, has an flora unique in Canada. Most of this special region has been converted from natural ecosystems to residential, industrial and agrarian use with a resulting decline in the extent and diversity of natural ecosystems and an decline in the abundance of many unusual plants. Shoreline habitats have been the most intensively altered and few large fragments remain in relatively natural condition. As a result, sand dune, marsh and associated ecosystems in the region contain a remarkable assemblages of rare plants in Canada.

The federal Species-at-Risk Act (SARA) provides a structure for the conservation of species which have been determined to be at risk, as well as incentives and penalties to encourage their sound management. The implementation of this act is facilitated by a federal-provincial organization known as RENEW. They have developed protocols for preparing and implementing recovery plans for species at risk.

The purpose of this document is to provide the Capital Regional District, Tsawout First Nation and Central Saanich Municipal Parks Department with specific guidance for the management of rare species in Island View Beach Regional Park, specified portions of the Central Saanich Tsawout Indian Reserve, and the whole of Cordova Spit Municipal Park (Central Saanich). Specifically, the project undertook to:

1. Conduct a rare vascular plants inventory in the designated area of interest (Figure 1), focussing on species ranked S3 (vulnerable) or higher.

2. For any targeted plant species, collect GPS coordinates and population data, list leading associated plant species, and note environmental characteristics (*e.g.*, slope, aspect, terrain surface shape and approximate depth of soil)

3. Indicate any immediate threats to the persistence of any targeted plant species

4. Identify areas of conservation priority for targeted plant species and make recommendations regarding their management

This project builds upon an earlier survey of one rare species, contorted-pod evening-primrose, at Island View Beach Regional Park (Fairbarns 2004).

Figure 1. Study Area

The project area is included within the red polygons.

Methods

Development of a List of Target Species

The majority of the study area consists of sand dunes, salt marshes and freshwater marshes – habitat types which are key to a number of rare plants in southwestern British Columbia. As well, the area includes a small area of upland rock knoll habitat where some species of Garry oak and associated ecosystems might occur.

A list of target species (Table 1) was prepared, included plants from all these habitat types. The table provides the scientific and English names for each species as well as their overall provincial status and (where it has been assessed) national status. The national status of plant species is assessed by COSEWIC (Committee on the Status of Endangered Wildlife in Canada), but only a small subset of the target species have been assess to date. The provincial status of all plant species has been determined by the B.C. Conservation Data Centre (Ministry of Environment), using standard methods

adopted across North America by the NatureServe network of provincial and state conservation agencies.

Over the past several years, inventories throughout southeast Vancouver Island, suggest that slender woollyheads (*Psilocarphus tenellus*) is not particularly threatened or inherently vulnerable in British Columbia. This species was down-listed from S2 (imperilled) to S3 (vulnerable) in 2007 and may be down-listed even further in the near future. In the project area, it is restricted to disturbed gravel roads where it is not likely to warrant conservation action. Accordingly, its distribution was not surveyed.

Small specimens of seaside arrow-grass (*Triglochin maritima*) with 2-lobed ligules were formerly recognized as graceful arrow-grass (*T. concinna*). This distinction has been rejected by contemporary taxonomists who have observed continuous variation of characters throughout the range of the species. In my project area, plants which would have formerly keyed out to graceful arrow-grass were observed sporadically throughout large populations of what has traditionally been recognized as seaside arrow-grass. These plants were not mapped because the species is no longer recognized.

Table 1. Target Species for Rare Plant Survey.

Scientific Name	English Name	National Status	Provincial Status
Abronia latifolia	yellow sand-verbena		S3 - Blue
Agrostis pallens	dune bentgrass		S3-Blue
Allium amplectens	slimleaf onion		S3-Blue
Alopecurus carolinianus	Carolina meadow-foxtail		S2-Red
Balsamorhiza deltoidea	deltoid balsamroot	Endangered	S1-Red
Camissonia contorta	Contorted-pod evening-primrose	Endangered	S1-Red
Carex tumulicola	foothill sedge	(in progress)	S1-Red
Convolvulus soldanella	beach bindweed		S3 - Blue
Glehnia littoralis ssp. leiocarpa	American glehnia		S3 - Blue
Jaumea carnosa	fleshy jaumea		S2S3-Blue
Lathyrus littoralis	grey beach peavine		S2-Red
Lomatium dissectum var. dissectum	fern-leaved desert-parsley	(in progress)	S1-Red
Lotus formosissimus	seaside birds-foot lotus	Endangered	S1-Red
Lotus unifoliolatus var. unifoliolatus	Spanish-clover		S2S3-Blue
Lupinus densiflorus var. densiflorus	dense-flowered lupine	Endangered	S1-Red
Lupinus lepidus var. lepidus	prairie lupine	Endangered	S1-Red
Lupinus oreganus var. kincaidii	sulphur lupine	(in progress)	SX-Red
Clarkia amoena var. caurina	farewell-to-spring		S3-Blue
Clarkia amoena var. lindleyi	farewell-to-spring		S3-Blue
Piperia candida	white-lip rein orchid	(potential)	S2-Red
Piperia elegans	elegant rein orchid		S3-Blue
Polygonum paronychia	black knotweed		S3 - Blue
Ranunculus californicus	California buttercup	(in progress)	S2-Red
Rupertia physodes	California-tea		S3-Blue
Sanicula arctopoides	bear's-foot sanicle	Endangered	S1-Red
Sanicula bipinnatifida	purple sanicle	Threatened	S2-Red
Toxicodendron diversilobum	poison oak		S2S3-Blue
Trifolium depauperatum var. depauperatum	poverty clover		S3-Blue
Trifolium dichotomum	Macrae's clover		S2S3-Blue
Triteleia howellii	Howell's triteleia	Endangered	S1-Red
Viola howellii	Howell's violet		S2S3-Blue
Viola praemorsa ssp. praemorsa	yellow montane violet	Threatened	S2-Red
Yabea microcarpa	California hedge-parsley	(in progress)	S1-Red

National status reports are in progress for five species and a sixth species has a significant potential for listing but no report has been initiated

Survey Procedures

The study area was surveyed for rare plants using the "directed search" method. This approach relies upon the surveyor's knowledge of the target species, their biology and their habitat preferences. Using this information, the investigator visits sites with potential habitat for one or more rare species in the appropriate season. The investigator

walks through suitable habitat, carefully examining it for the presence of target species. This is generally considered by rare plant specialists to be the most efficient and cost effective method of surveying for rare plants, and is the most common approach taken to date by botanists in British Columbia. Location information was collected using a hand-held GPS unit with an estimated accuracy of approximately 5-15m.

Populations or subpopulations occupying a small area (less than 10 m x 10 m) were represented by a single observation point. More extensive populations were mapped by establishing a grid of cells approximating 10 m x 10 m. The location of each cell was determined using the GPS unit and the presence or absence of the target species was recorded.

Results

The following rare plants were encountered during the surveys:

- American glehnia
- Beach bindweed
- Black knotweed
- Contorted-pod evening-primrose
- Fleshy jaumea
- Grey beach peavine
- Howell's Triteleia
- Yellow sand-verbena

Photographs of all of these species except for Howell's triteleia are presented in Figures 2 and 3.

Figure 2. Five Rare Plants

Top left: Contorted-pod evening-primrose: Top right: American glehnia (Beach carrot)
Middle left: Beach bindweed; Middle right: Grey beach peavine
Bottom: Fleshy jaumea

Figure 3. Two rare plants

Yellow sand-verbena growing within a patch of black knotweed (with green, needle-like leaves and small pink flowers clustered along the stems

Rare plant observation forms are provided in Appendix 1. The approximate distribution of each rare plant is mapped in each observation form. More detailed location data, in the form of GPS waypoints, have been submitted to the B.C. Conservation Data Centre.

Most of these occurrences had been previously reported from the project area. The most notable find was the rediscovery of a population of contorted-pod evening-primrose near the tip of Cordova Spit. This population had been reported in past years (1926, 1941, 1942 and 1976) but had not been seen for approximately 30 years. The COSEWIC status report for the species concluded; on the basis of unsuccessful surveys in 2002, 2003 and 2004; that this population had been extinguished. Its rediscovery, albeit in low numbers, is a significant step in the recovery of the species.

Threats and Recovery Prescriptions

The study area is an exceptionally attractive and heavily used location for a variety of recreational pursuits. The trails receive heavy use, and are popular with dog-walkers.

This recreational activity has a major some impact on some rare plants. Beaches and dunes on the Central Saanich Tsawout Indian Reserve and Cordova Spit Municipal Park receive heavy vehicle use and many sandy areas are heavily rutted. The lower portion of the spit, within the Indian Reserve, hosts a variety of other uses. A substantial portion of this area was cleared and used for camping at a special event in 2007.

To date, conservation management practices have little negative impact on rare plant populations. Future conservation actions, such as invasive species control, are likely to have a substantial negative impact on rare plants, unless the activities are carried out in an appropriate manner.

The CRD Parks Department has constructed facilities and developments, concentrated near the southern portion of Island View Beach Regional Park. It is quite likely that rare plant populations were lost during the construction and maintenance of these facilities.

Exotic, invasive species present one of the most serious threats to populations of rare plants in the study area.

Broad Multi-species Actions

Three actions would benefit a broad variety of rare plant species present in the study area (Table 1).

Table 1. Broad Multi-species Actions

Issues and Threats	Recovery Prescriptions
Park Operations: Ensure that conservation of rare plant species is considered during management and planning activities for the project area.	1. Train staff from CRD Parks. Central Saanich Parks and Tsawout First Nation to use the map of rare plant species in the study area. 2. Prepare a list of scheduled and ad-hoc management activities and develop procedures to ensure that they are not conducted without consideration of their impacts on rare plant species. 3. Provide staff with field- and classroom-based training on issues related to the management of rare plants in parks.
Public Awareness: Promote public appreciation of the rare plants of the project area, the nature of the threats they face, and the ways in which these threats can be reduced and/or mitigated.	4. Provide relevant interpretative signage at key locations in the study area. 5. Provide relevant natural history hikes. 6. Involve the public in projects to restore habitats in the park.
Access Management: Informal trails direct vehicles, walkers and dogs to ecological communities, inadvertently causing damage to rare plants.	7. Use fencing to direct vehicle traffic away from the sand dune environments to direct walkers away from rare species populations. 8. Monitor levels of activity in the vicinity of the rare plant populations to determine if a other access management actions are required in the future.
Recovery Habitat Improvement: Some rare plants likely have disappeared from portions of the study area. Invasive species - particularly beachgrass (*Ammophila arenaria*) Scotch broom (*Cytisus scoparius*) and Gorse (*Ulex europaeus*) - pose one of the greatest threats. The recovery of damaged populations is not possible in locations where these invasive species continue to dominate.	9. Remove exotic shrubs (with first emphasis on sand dune habitats) in order to improve the quality of potential habitat into which rare species may expand on their own or by transplanting and direct seeding.

Specific Actions for Rare Species

No specific actions are proposed for the conservation of Fleshy jaumea because the species is restricted to salt marshes in the project area, where it is virtually free of threats to the plants or their habitat.

Specific Management Actions for Contorted-pod evening-primrose

Issues and Threats	Recovery Prescriptions
• **Trampling by people and dogs on trail** o The large population in Island View Beach Regional Park receives moderate to heavy trampling damage from walkers and dogs which uproots and/or crushes plants. The smaller population in Cordova Spit Municipal Park receives little trampling damage but this may change.	• Fence off existing and recovery habitat for each subpopulation. • Provide on-site displays by the fences protecting existing populations. • Encourage dog-owners to use alternate locations.
• **Vehicle traffic** o The large population in Island View Beach Regional Park is protected from vehicle traffic. The population ends abruptly at the boundary between the regional park and the Central Saanich Tsawout Indian Reserve. The absence of Contorted-pod evening-primrose on the Indian reserve is presumably due to the heavy disturbance the site receives from vehicle traffic. While Contorted-pod evening-primrose was rediscovered in the municipal park it was restricted to a small site which has escaped vehicle traffic. Similar areas around the occupied site have been heavily damaged by vehicle traffic.	• Further damage from vehicle traffic could be prevented by establishing barricades at the base of Cordova Spit and across the track leading south from the water filtration plant. The soils will probably recover quickly once vehicle traffic is removed.
• **Invasive shrubs** o The large population in Island View Beach Regional Park is threatened with invasion by Scotch broom	• Once populations have been fenced, remove Scotch Broom and other invasive shrubs from the existing populations and a buffer of at least 10 metres. Fencing should be constructed first, otherwise shrub removal may stimulate increased pedestrian and dog activity. Shrub removal should be planned and timed to minimize impacts to species at risk. • Maintain the fenced area free of invasive shrubs by implementing an annual schedule of shrub removal.
• **Population collapse** o The small population in Cordova Spit Municipal Park is threatened with population collapse because there may be too few plants to survive chance events	• Inspect populations annually during each growing season to determine population size and assess threats and damage. • Establish new subpopulations or expand the existing one by o Developing a restoration plan that addresses horticulture, experimental design, ecology, genetics and rehabilitation components. o Marking priority sites for reintroduction. This should be done by an experienced botanist immediately prior to restoration activities. o Removing invasive species from re-introduction sites and raking any accumulations of plant litter to expose bare sand substrates. o Establishing a fence and signage at restoration sites. • Establish experimental re-introduction plots and monitor them to determine population dynamics of re-introduced populations.

Specific Management Actions for Howell's Triteleia

Issues and Threats	Recovery Prescriptions

• **Population collapse**
  ○ The small population in Central Saanich Indian Reserve is threatened with population collapse because there may be too few plants to survive chance events.
	• Inspect populations annually during each growing season to determine population size and assess threats and damage.
	• Establish new subpopulations or expand the existing one by
	  ○ Developing a restoration plan that addresses horticulture, experimental design, ecology, genetics and rehabilitation components.
	  ○ Marking priority sites for reintroduction. This should be done by an experienced botanist immediately prior to restoration activities.
	  ○ Removing invasive species from re-introduction sites.
	• Establish experimental re-introduction plots and monitor them to determine population dynamics of re-introduced populations.

Specific Management Actions for Grey Beach Peavine

Issues and Threats	Recovery Prescriptions
• **Status assessment** o Currently, Grey beach peavine is only known from about sites in Canada (and some of these locations were transient populations which were probably wiped out by winter storms in the year following discovery). Recent surveys of suitable habitat along the west coast of Vancouver Island, from Port Renfrew to Nuchatlitz Inlet have failed to discover new populations. These data suggest the species may be a strong candidate for national assessment, likely warranting "Threatened" status. Determination of the species national status would allow land managers in the study area to determine the appropriate degree of conservation action.	• Form a partnership with Parks Canada and the BC Ministry of Environment to conduct surveys in remaining "gap areas" and prepare a COSEWIC status report on the species.
• **Vehicle traffic** o Both subpopulations (in Central Saanich Tsawout Indian Reserve and Cordova Spit Municipal Park) are subjected to significant disturbance from vehicle traffic. Similar areas around the occupied sites have been heavily damaged by vehicle traffic which suggests that the existing plants may be remnants of what was once a much larger population.	• Barricades proposed to protect Contorted-pod evening-primrose (see above) would also prevent further damage to sites supporting Grey beach peavine. This may be sufficient for the populations to expand without additional augmentation actions.
• **Population collapse** o The small subpopulations in Central Saanich Indian Reserve and Cordova Spit Municipal Park may be threatened with population collapse because there may be too few plants to survive chance events.	• Inspect populations annually during each growing season to determine population size and assess threats and damage. • Periodically assess the need for population augmentation based on monitoring results.

No specific actions are proposed for the conservation of because American glehnia, Beach bindweed, Black knotweed or Yellow sand-verbena. Broad multi-species actions mentioned above, and specific actions for the conservation of Contorted-pod evening-primrose, would provide adequate protection for these species.

Literature Cited

Fairbarns, M.D. 2004. Potential recovery actions for Contorted-pod Evening-primrose in CRD Parks. Unpublished report for CRD Parks. 16 pp.

Appendix 1: Rare Species Observation Forms

B.C. Conservation Data Centre
FIELD SURVEY FORM (PLANTS)

Species: ***Abronia latifolia*** **(Yellow Sand-verbena)**

Project name: Island View - Tsawout survey 2007

Name of surveyor: Matt Fairbarns
Contact: 2130 Kings Road, Victoria BC Canada V8R 2P9; aruncus_consulting@yahoo.ca
Survey Date: May-June, 2007 (multiple dates)
Specimen Collection # & Herbarium: none collected
Location/Directions: shoreline from Island View Beach Regional Park through Tsawout Indian Reserve to north tip of Cordova Spit Municipal Park
UTM grid reference: ZONE 10 U **NAD 83**
See accompanying map and data file
Did you use a GPS unit to determine this UTM point? **Y** Precision of point (+/- metres) 5-10 m
Habitat: sand flats and upper beach zone
Topographic features: Elevation: 0-2 m **Slope:** 0-5% **Aspect:** various

Light:	**Position:**	**Moisture:**
open	Slope toe	xeric

Population Size:
Estimated Number of Individuals:
Unknown –the branching nature of the species precludes accurate estimation but likely 500-5,000 plants.
Area covered by population:
10 ha
Phenology: Indicate the number observed in each category (or check if numbers are unknown):
in leaf in bud **in flower** **immature fruit** mature fruit seed dispersing dormant seedlings
Landscape context

Landscape context presents major limitations on the occurrence.
Fragmentation/Connectivity: The surrounding landscape is a heavily-fragmented coastline. Similar sand flats and dune ecosystems are widely separated along the coast.
Species Composition: The native species composition of similar sites is likely to have a light impact on their suitability for *Abronia latifolia*.
Biological Structure: Exotic plants (particularly Scotch broom=*Cytisus scoparius* and European Beach grass=*Ammophila arenaria*) in similar sites are likely to have a significant impact on their suitability for *Abronia latifolia* but species richness and species evenness are unlikely to present a problem.
Ecological Processes: The successional processes and patterns of resource cycling prevailing on similar coastal sites in the area are well suited to *Abronia latifolia*.
Abiotic Factors: Summer drought and salt spray play an important role in maintaining habitat quality by establishing a high-stress environment where *Abronia latifolia* can avoid suppression by woody shrubs and robust herbaceous species. This combination of factors is consistent element of similar sites in the area.

Condition of Occurrence:

The occurrence itself is in excellent condition.
Reproduction and Health: The plants are of high vigour and reproducing abundantly. There was negligible evidence of disease or herbivory which is probably insufficient to have a significant impact on reproduction and survival.
Ecological Processes: Natural processes do not pose a significant threat to the long-term viability of the population. The plants occur on actively eroding sandy habitats but are probably well-adapted to such circumstances.
Species Composition: Neither the species richness, evenness of species distribution place significant limitations on the site suitability for *Abronia latifolia*. There are numerous exotics within the occurrence and they pose a moderate threat because they may shade out *Abronia latifolia* or compete effectively for moisture and create a poor seedbed. The most serious threats come from Scotch broom=*Cytisus scoparius* and European Beach grass=*Ammophila arenaria*.
Abiotic Physical/Chemical Factors: Trampling and vehicle traffic present a major threat. Otherwise, abiotic physical/chemical factors do not limit the quality of the occurrence.

Notes: The site is on lands belonging to Capital Regional District, Tsawout First Nation and the municipality of Central Saanich.

B.C. Conservation Data Centre
FIELD SURVEY FORM (PLANTS)

Species: ***Camissonia contorta*** **(Contorted-pod Evening-primrose)**

Project name: Island View - Tsawout survey 2007

Name of surveyor: Matt Fairbarns
Contact: 2130 Kings Road, Victoria BC Canada V8R 2P9; aruncus_consulting@yahoo.ca
Survey Date: May 2007 (multiple dates)
Specimen Collection # & Herbarium: none collected
Location/Directions: shoreline from Island View Beach Regional Park through Tsawout Indian Reserve to north tip of Cordova Spit Municipal Park
UTM grid reference: ZONE 10 U **NAD 83**
See accompanying map and data file
Did you use a GPS unit to determine this UTM point? **Y** Precision of point (+/- metres) 5-10 m
Habitat: sand flats above beach
Topographic features: Elevation: 0-3 m **Slope:** 0-15% **Aspect:** various

Light:	**Position:**	**Moisture:**
open	Slope toe	xeric

Population Size:
Estimated Number of Individuals:
200-400 flowering plants.
Area covered by population:
0.3 ha
Phenology: Indicate the number observed in each category (or check if numbers are unknown):
in leaf in bud **in flower** **immature fruit** mature fruit seed dispersing dormant seedlings
Landscape context

Landscape context presents major limitations on the occurrence.
Fragmentation/Connectivity: The surrounding landscape is a heavily-fragmented coastline. Similar sand flats and dune ecosystems are widely separated along the coast.
Species Composition: The native species composition of similar sites is likely to have a light impact on their suitability for *Camissonia contorta*.
Biological Structure: Exotic plants (particularly Scotch broom=*Cytisus scoparius* and European Beach grass=*Ammophila arenaria*) in similar sites are likely to have a significant impact on their suitability for *Camissonia contorta* but species richness and species evenness are unlikely to present a problem. Site stabilization (due to the establishment of a carpet of *Racomitrium canescens*) will continue to reduce the availability of germination sites for *Camissonia contorta.*
Ecological Processes: The successional processes and patterns of resource cycling prevailing on similar coastal sites in the area are well suited to *Camissonia contorta*.
Abiotic Factors: Summer drought and salt spray play an important role in maintaining habitat quality by establishing a high-stress environment where *Camissonia contorta* can avoid suppression by woody shrubs and robust herbaceous species. This combination of factors is consistent element of similar sites in the area.

Condition of Occurrence:

The occurrence itself is in moderate condition.
Reproduction and Health: The plants are of moderate vigour and reproducing abundantly. There was negligible evidence of disease or herbivory which is probably insufficient to have a significant impact on reproduction and survival.
Ecological Processes: Natural processes do not pose a significant threat to the long-term viability of the population. The plants occur on actively eroding sandy habitats but are probably well-adapted to such circumstances.
Species Composition: Neither the species richness, evenness of species distribution place significant limitations on the site suitability for *Camissonia contorta*. There are numerous exotics within the occurrence and they pose a moderate threat because they may shade out *Convolvulus soldanella* or compete effectively for moisture and create a poor seedbed. The most serious threats come from Scotch broom=*Cytisus scoparius* and European Beach grass=*Ammophila arenaria*. Mosses also pose a threat (see above).
Abiotic Physical/Chemical Factors: Trampling and vehicle traffic present a major threat. Otherwise, abiotic physical/chemical factors do not limit the quality of the occurrence. **Notes:** The site is on lands belonging to Capital Regional District, Tsawout First Nation and the municipality of Central Saanich.

B.C. Conservation Data Centre
FIELD SURVEY FORM (PLANTS)

Species: ***Convolvulus soldanella*** **(Beach Morninglory)**

Project name: Island View - Tsawout survey 2007

Name of surveyor: Matt Fairbarns
Contact: 2130 Kings Road, Victoria BC Canada V8R 2P9; aruncus_consulting@yahoo.ca
Survey Date: May-June, 2007 (multiple dates)
Specimen Collection # & Herbarium: none collected
Location/Directions: shoreline from Island View Beach Regional Park through Tsawout Indian Reserve to north tip of Cordova Spit Municipal Park
UTM grid reference: ZONE 10 U **NAD 83**
See accompanying map and data file
Did you use a GPS unit to determine this UTM point? **Y** Precision of point (+/- metres) 5-10 m
Habitat: sand flats above beach
Topographic features: Elevation: 0-4 m **Slope:** 0-25% **Aspect:** various

Light:	**Position:**	**Moisture:**
open	Slope toe	xeric

Population Size:
Estimated Number of Individuals:
Several hundred flowering ramets. The rhizomatous nature of this species precludes calculation of number of individuals.
Area covered by population:
4.8 ha
Phenology: Indicate the number observed in each category (or check if numbers are unknown):
in leaf in bud **in flower** **immature fruit** mature fruit seed dispersing dormant seedlings
Landscape context

Landscape context presents major limitations on the occurrence.
Fragmentation/Connectivity: The surrounding landscape is a heavily-fragmented coastline. Similar sand flats and dune ecosystems are widely separated along the coast.
Species Composition: The native species composition of similar sites is likely to have a light impact on their suitability for *Convolvulus soldanella*.
Biological Structure: Exotic plants (particularly Scotch broom=*Cytisus scoparius* and European Beach grass=*Ammophila arenaria*) in similar sites are likely to have a significant impact on their suitability for *Convolvulus soldanella* but species richness and species evenness are unlikely to present a problem.
Ecological Processes: The successional processes and patterns of resource cycling prevailing on similar coastal sites in the area are well suited to *Convolvulus soldanella*.
Abiotic Factors: Summer drought and salt spray play an important role in maintaining habitat quality by establishing a high-stress environment where *Convolvulus soldanella* can avoid suppression by woody shrubs and robust herbaceous species. This combination of factors is consistent element of similar sites in the area.

Condition of Occurrence:

The occurrence itself is in excellent condition.
Reproduction and Health: The plants are of high vigour and reproducing abundantly. There was negligible evidence of disease or herbivory which is probably insufficient to have a significant impact on reproduction and survival.
Ecological Processes: Natural processes do not pose a significant threat to the long-term viability of the population. The plants occur on actively eroding sandy habitats but are probably well-adapted to such circumstances.
Species Composition: Neither the species richness, evenness of species distribution place significant limitations on the site suitability for *Convolvulus soldanella*. There are numerous exotics within the occurrence and they pose a moderate threat because they may shade out *Convolvulus soldanella* or compete effectively for moisture and create a poor seedbed. The most serious threats come from Scotch broom=*Cytisus scoparius* and European Beach grass=*Ammophila arenaria*.
Abiotic Physical/Chemical Factors: Trampling and vehicle traffic present a major threat. Otherwise, abiotic physical/chemical factors do not limit the quality of the occurrence.

Notes: The site is on lands belonging to Capital Regional District, Tsawout First Nation and the municipality of Central Saanich.

B.C. Conservation Data Centre
FIELD SURVEY FORM (PLANTS)

Species: ***Glehnia littoralis*** **(American Glehnia)**

Project name: Island View - Tsawout survey 2007

Name of surveyor: Matt Fairbarns
Contact: 2130 Kings Road, Victoria BC Canada V8R 2P9; aruncus_consulting@yahoo.ca
Survey Date: May-June, 2007 (multiple dates)
Specimen Collection # & Herbarium: none collected
Location/Directions: shoreline from Island View Beach Regional Park through Tsawout Indian Reserve to north tip of Cordova Spit Municipal Park
UTM grid reference: ZONE 10 U **NAD 83**
See accompanying map and data file
Did you use a GPS unit to determine this UTM point? **Y** Precision of point (+/- metres) 5-10 m
Habitat: sand flats above beach

Topographic features: Elevation: 0-4 m **Slope:** 0-2% **Aspect:** various

Light:	**Position:**	**Moisture:**
open	Slope toe	xeric

Population Size:
Estimated Number of Individuals:
200-400
Area covered by population:
2.3 ha
Phenology: Indicate the number observed in each category (or check if numbers are unknown):
in leaf in bud **in flower** **immature fruit** mature fruit seed dispersing dormant seedlings
Landscape context

Landscape context presents major limitations on the occurrence.
Fragmentation/Connectivity: The surrounding landscape is a heavily-fragmented coastline. Similar sand flats and dune ecosystems are widely separated along the coast.
Species Composition: The native species composition of similar sites is likely to have a light impact on their suitability for *Glehnia littoralis*.
Biological Structure: Exotic plants (particularly Scotch broom=*Cytisus scoparius* and European Beach grass=*Ammophila arenaria*) in similar sites are likely to have a significant impact on their suitability for *Glehnia littoralis* but species richness and species evenness are unlikely to present a problem.
Ecological Processes: The successional processes and patterns of resource cycling prevailing on similar coastal sites in the area are well suited to *Glehnia littoralis*.
Abiotic Factors: Summer drought and salt spray play an important role in maintaining habitat quality by establishing a high-stress environment where *Glehnia littoralis* can avoid suppression by woody shrubs and robust herbaceous species. This combination of factors is consistent element of similar sites in the area.

Condition of Occurrence:

The occurrence itself is in good condition.
Reproduction and Health: The plants are of high vigour and reproducing abundantly. There was negligible evidence of disease or herbivory which is probably insufficient to have a significant impact on reproduction and survival.
Ecological Processes: Natural processes do not pose a significant threat to the long-term viability of the population. The plants occur on actively eroding sandy habitats but are probably well-adapted to such circumstances.
Species Composition: Neither the species richness, evenness of species distribution place significant limitations on the site suitability for *Glehnia littoralis*. There are numerous exotics within the occurrence and they pose a moderate threat because they may shade out *Glehnia littoralis* or compete effectively for moisture and create a poor seedbed. The most serious threats come from Scotch broom=*Cytisus scoparius* and European Beach grass=*Ammophila arenaria*.
Abiotic Physical/Chemical Factors: Trampling and vehicle traffic present a major threat. Otherwise, abiotic physical/chemical factors do not limit the quality of the occurrence.

Notes: The site is on lands belonging to Capital Regional District, Tsawout First Nation and the municipality of Central Saanich.

B.C. Conservation Data Centre
FIELD SURVEY FORM (PLANTS)

Species: ***Jaumea carnosa*** **(Fleshy Jaumea)**

Project name: Island View - Tsawout survey 2007

Name of surveyor: Matt Fairbarns
Contact: 2130 Kings Road, Victoria BC Canada V8R 2P9; aruncus_consulting@yahoo.ca
Survey Date: July, 2007 (multiple dates)
Specimen Collection # & Herbarium: none collected
Location/Directions: salt marshes and wet depressions along the central and west side of Cordova Spit.
UTM grid reference: ZONE 10 U **NAD 83**
See accompanying map and data file
Did you use a GPS unit to determine this UTM point? **Y** Precision of point (+/- metres) 5-10 m
Habitat: moist depressions, mostly with *Salicornia virginiana* or *Distichlis stricta*

Topographic features: Elevation: 0-2 m **Slope:** 0-5% **Aspect:** various

Light:	**Position:**	**Moisture:**
open	depressions	Hydric to subhydric

Population Size:
Estimated Number of Individuals:
Unknown –the branching nature of the species precludes accurate estimation but likely 500-5,000 plants.
Area covered by population:
4 ha
Phenology: Indicate the number observed in each category (or check if numbers are unknown):
in leaf in bud **in flower** immature fruit mature fruit seed dispersing dormant seedlings

Landscape context

Landscape context presents major limitations on the occurrence.
Fragmentation/Connectivity: The surrounding landscape is a heavily-fragmented coastline. Similar Salicornia salt flats are widely separated along the coast.
Species Composition: The native species composition of similar sites is likely to have a light impact on their suitability for *Jaumea carnosa*.
Biological Structure: Neither exotic plants nor species richness/evenness present a problem.
Ecological Processes: The successional processes and patterns of resource cycling prevailing on similar coastal sites in the area are well suited to *Jaumea carnosa*.
Abiotic Factors: Tidal inundation and salt spray play an important role in maintaining habitat quality by establishing a high-stress environment where *Jaumea carnosa* can avoid suppression by woody shrubs and robust herbaceous species. This combination of factors is consistent element of similar sites in the area.

Condition of Occurrence:

The occurrence itself is in excellent condition.
Reproduction and Health: The plants are of high vigour and reproducing abundantly. There was negligible evidence of disease or herbivory which is probably insufficient to have a significant impact on reproduction and survival.
Ecological Processes: Natural processes do not pose a significant threat to the long-term viability of the population. The plants occur on regularly flooded habitats but are well-adapted to such circumstances.
Species Composition: Neither the species richness, evenness of species distribution place significant limitations on the site suitability for *Jaumea carnosa*. There few exotics within the occurrence and they pose little threat.
Abiotic Physical/Chemical Factors: Abiotic physical/chemical factors do not limit the quality of the occurrence.

Notes: The site is on lands belonging to the Tsawout First Nation and the municipality of Central Saanich.

B.C. Conservation Data Centre
FIELD SURVEY FORM (PLANTS)

Species: ***Lathyrus littoralis*** **(Grey Beach Peavine)**

Project name: Island View - Tsawout survey 2007

Name of surveyor: Matt Fairbarns
Contact: 2130 Kings Road, Victoria BC Canada V8R 2P9; aruncus_consulting@yahoo.ca
Survey Date: May-June, 2007 (multiple dates)
Specimen Collection # & Herbarium: none collected
Location/Directions: shoreline from Island View Beach Regional Park through Tsawout Indian Reserve to north tip of Cordova Spit Municipal Park
UTM grid reference: ZONE 10 U **NAD 83**
See accompanying map and data file
Did you use a GPS unit to determine this UTM point? **Y** Precision of point (+/- metres) 5-10 m
Habitat: sand flats and upper beach zone

Topographic features: Elevation: 0-2 m **Slope:** 0-5% **Aspect:** various

Light:	**Position:**	**Moisture:**
open	Slope toe	xeric

Population Size:
Estimated Number of Individuals:
100-200
Area covered by population:
0.2 ha
Phenology: Indicate the number observed in each category (or check if numbers are unknown):
in leaf in bud **in flower** immature fruit mature fruit seed dispersing dormant seedlings
Landscape context

Landscape context presents major limitations on the occurrence.
Fragmentation/Connectivity: The surrounding landscape is a heavily-fragmented coastline. Similar sand flats and dune ecosystems are widely separated along the coast.
Species Composition: The native species composition of similar sites is likely to have a light impact on their suitability for *Lathyrus littoralis*.
Biological Structure: Exotic plants (particularly Scotch broom=*Cytisus scoparius* and European Beach grass=*Ammophila arenaria*) in similar sites are likely to have a significant impact on their suitability for *Lathyrus littoralis* but species richness and species evenness are unlikely to present a problem.
Ecological Processes: The successional processes and patterns of resource cycling prevailing on similar coastal sites in the area are well suited to *Lathyrus littoralis*.
Abiotic Factors: Summer drought and salt spray play an important role in maintaining habitat quality by establishing a high-stress environment where *Lathyrus littoralis* can avoid suppression by woody shrubs and robust herbaceous species. This combination of factors is consistent element of similar sites in the area.

Condition of Occurrence:

The occurrence itself is in good condition.
Reproduction and Health: The plants are of moderate vigour and reproducing well. There was negligible evidence of disease or herbivory which is probably insufficient to have a significant impact on reproduction and survival.
Ecological Processes: Natural processes do not pose a significant threat to the long-term viability of the population. The plants occur on actively eroding sandy habitats but are probably well-adapted to such circumstances.
Species Composition: Neither the species richness, evenness of species distribution place significant limitations on the site suitability for *Lathyrus littoralis*. There are numerous exotics within the occurrence and they pose a moderate threat because they may shade out *Lathyrus littoralis* or compete effectively for moisture and create a poor seedbed. The most serious threats come from Scotch broom=*Cytisus scoparius* and European Beach grass=*Ammophila arenaria*.
Abiotic Physical/Chemical Factors: Trampling and vehicle traffic present a major threat. Otherwise, abiotic physical/chemical factors do not limit the quality of the occurrence.

Notes: The site is on lands belonging to Capital Regional District, Tsawout First Nation and the municipality of Central Saanich.

B.C. Conservation Data Centre
FIELD SURVEY FORM (PLANTS)

Species: ***Polygonum paronychia*** **(Black Knotweed)**

Project name: Island View - Tsawout survey 2007

Name of surveyor: Matt Fairbarns
Contact: 2130 Kings Road, Victoria BC Canada V8R 2P9; aruncus_consulting@yahoo.ca
Survey Date: May-June, 2007 (multiple dates)
Specimen Collection # & Herbarium: none collected
Location/Directions: shoreline from Island View Beach Regional Park through Tsawout Indian Reserve to north tip of Cordova Spit Municipal Park
UTM grid reference: ZONE 10 U **NAD 83**
See accompanying map and data file
Did you use a GPS unit to determine this UTM point? **Y** Precision of point (+/- metres) 5-10 m
Habitat: sand flats and upper beach zone

Topographic features: Elevation: 0-2 m **Slope:** 0-5% **Aspect:** various

Light:	**Position:**	**Moisture:**
open	Slope toe	xeric

Population Size:
Estimated Number of Individuals:
Several thousand
Area covered by population:
12.2 ha
Phenology: Indicate the number observed in each category (or check if numbers are unknown):
in leaf in bud **in flower** immature fruit mature fruit seed dispersing dormant seedlings
Landscape context

Landscape context presents major limitations on the occurrence.
Fragmentation/Connectivity: The surrounding landscape is a heavily-fragmented coastline. Similar sand flats and dune ecosystems are widely separated along the coast.
Species Composition: The native species composition of similar sites is likely to have a light impact on their suitability for *Polygonum paronychia*.
Biological Structure: Exotic plants (particularly Scotch broom=*Cytisus scoparius* and European Beach grass=*Ammophila arenaria*) in similar sites are likely to have a significant impact on their suitability for *Polygonum paronychia* but species richness and species evenness are unlikely to present a problem.
Ecological Processes: The successional processes and patterns of resource cycling prevailing on similar coastal sites in the area are well suited to *Polygonum paronychia*.
Abiotic Factors: Summer drought and salt spray play an important role in maintaining habitat quality by establishing a high-stress environment where *Polygonum paronychia* can avoid suppression by woody shrubs and robust herbaceous species. This combination of factors is consistent element of similar sites in the area.

Condition of Occurrence:

The occurrence itself is in excellent condition.
Reproduction and Health: The plants are of high vigour and reproducing abundantly. There was negligible evidence of disease or herbivory which is probably insufficient to have a significant impact on reproduction and survival.
Ecological Processes: Natural processes do not pose a significant threat to the long-term viability of the population. The plants occur on actively eroding sandy habitats but are probably well-adapted to such circumstances.
Species Composition: Neither the species richness, evenness of species distribution place significant limitations on the site suitability for *Polygonum paronychia*. There are numerous exotics within the occurrence and they pose a moderate threat because they may shade out *Polygonum paronychia* or compete effectively for moisture and create a poor seedbed. The most serious threats come from Scotch broom=*Cytisus scoparius* and European Beach grass=*Ammophila arenaria*.
Abiotic Physical/Chemical Factors: Trampling and vehicle traffic present a major threat. Otherwise, abiotic physical/chemical factors do not limit the quality of the occurrence.

Notes: The site is on lands belonging to Capital Regional District, Tsawout First Nation and the municipality of Central Saanich.

B.C. Conservation Data Centre
FIELD SURVEY FORM (PLANTS)

Species: ***Triteleia howellii*** **(Howell's Triteleia)**

Project name: Island View - Tsawout survey 2007

Name of surveyor: Matt Fairbarns
Contact: 2130 Kings Road, Victoria BC Canada V8R 2P9; aruncus_consulting@yahoo.ca
Survey Date: June 12, 2007 (multiple dates)
Specimen Collection # & Herbarium: none collected
Location/Directions: salt marshes and wet depressions along the central and west side of Cordova Spit.
UTM grid reference: ZONE 10 U **NAD 83**
10U 47260 5381525 NAD 83
Did you use a GPS unit to determine this UTM point? **Y** Precision of point (+/- metres) 15 m
Habitat: Quercus garryana / Symphoricarpos albus / grass-forb woodland

Topographic features: Elevation: 7m **Slope:** 5% **Aspect:** southwest

Light:	**Position:**	**Moisture:**
shaded	mid slope	mesic

Population Size:
Estimated Number of Individuals:
1 flowering plant
Area covered by population:
<0.1 ha
Phenology: Indicate the number observed in each category (or check if numbers are unknown):
in leaf in bud **in flower** immature fruit mature fruit seed dispersing dormant seedlings

Landscape context

Landscape context presents major limitations on the occurrence.
Fragmentation/Connectivity: The surrounding landscape is a mosaic of developed areas, sand dunes and tidal ecosystems with few intact rock knolls suited to the species.
Species Composition: The native species composition of similar sites is likely to have a light impact on their suitability for *Triteleia howellii*.
Biological Structure: Exotic plants present a major limitation on similar sites in the area. Species richness/evenness does not present a problem.
Ecological Processes: The successional processes and patterns of resource cycling prevailing on similar rock knoll sites in the area are well suited to *Triteleia howellii* except where fire suppression has favoured the development of a significant understorey.
Abiotic Factors: Abiotic physical/chemical factors do not limit the quality of similar sites in the area.

Condition of Occurrence:

The occurrence itself is in poor condition.
Reproduction and Health: The plants are of moderate vigour and reproducing weakly. There was negligible evidence of disease or herbivory which is probably insufficient to have a significant impact on reproduction and survival.
Ecological Processes: Natural processes do not pose a significant threat to the long-term viability of the population.
Species Composition: Neither the species richness, evenness of species distribution place significant limitations on the site suitability for *Triteleia howellii*. There numerous exotics within the occurrence and they pose a significant threat, as does Common Snowberry (*Symphoricarpos albus*) which is flourishing due to fire suppression
Abiotic Physical/Chemical Factors: Abiotic physical/chemical factors do not limit the quality of the occurrence.

Notes: The site is on lands belonging to the Tsawout First Nation.