Backgrounder

On Recovery Strategies for Recovery of Species at Risk associated with Garry Oak Woodlands, Meadows, Vernal Pools and Rigid Apple Moss

Garry Oak Ecosystems

All of Canada's Garry oak ecosystems (and associated ecosystems such as meadows and rock outcrops) occur almost exclusively within a narrow coastal strip of southeast Vancouver Island, in the nearby Gulf Islands, and in two small stands in the Fraser Valley. These ecosystems are home to more plant species than any other terrestrial ecosystem in coastal British Columbia. Many of these plants occur nowhere else in Canada. Most Garry oak habitat in Canada has been cleared and converted for agricultural, residential and industrial development: all remaining sites are degraded and under threat and it is estimated that less than 5% remains in a near natural condition.

Threats include loss of habitat, habitat degradation and fragmentation, invasive exotic species and the suppression of fire, which formerly played an important role in maintaining open grasslands and savannas. Such threats have led to more than 100 Garry oak ecosystems species being listed as "at risk" in B.C. and about 40 being listed as "at risk" in Canada. Many more species will be listed once they have been assessed. Only a concerted, coordinated, long-term effort will conserve Garry oak ecosystems and their associated species at risk.

Recovery of Garry Oak Ecosystems

The Garry Oak Ecosystems Recovery Team (GOERT) was formed in 1999 to coordinate efforts to save endangered Garry oak and associated ecosystems and the species that inhabit them. GOERT prepared an umbrella strategy for the recovery of Garry oak and associated ecosystems and their associated species at risk. GOERT has now prepared strategies for the recovery of species at risk within maritime meadows, vernal pools, Garry oak woodlands along with rigid apple moss. The recovery documents (prepared by species at risk specialists and other GOERT members) underwent substantial technical review and community input prior to receiving government approval. Public, stakeholder and government endorsement allows GOERT to conduct more detailed planning for the recovery of specific habitats and species at risk and facilitates access to support needed to effect meaningful recovery. While this is a long process for species at risk awaiting action it provides opportunity for substantive dialogue so we can collectively choose a path to recovery that best meets the recovery needs of the imperilled habitats, species at risk dependent on these sites and the needs of the broader community affected by such decisions.

Species Addressed Within the Four GOERT Recovery Strategies

Garry Oak Woodland Multi-species Strategy

	Federal Status
• Deltoid balsamroot (*Balsamorhiza deltoidea*)	Endangered
• White-top aster (*Sericocarpus rigidus*)	Threatened
• Small-flowered tonella (*Tonella tenella*)	Endangered
• Howell's triteleia (*Triteleia howellii*)	Endangered
• Yellow montane violet (*Viola praemorsa* ssp. *praemorsa*)	Threatened

Vernal Pool Multi-species Strategy

• Bog birds-foot trefoil (*Lotus pinnatus*)	Endangered
• Tall woolly-heads (*Psilocarphus elatior*)	Endangered
• Water-plantain buttercup (*Ranunculus alismifolius* var. *alismifolius*)	Endangered
• Kellogg's rush (*Juncus kelloggii*)	Endangered
• Rosy owl-clover (*Orthocarpus bracteosus*)	Endangered
• Dwarf sandwort (*Minuartia pusilla*)	Endangered

Garry Oak Meadow Multi-species Strategy

• Island marble (*Euchloe ausonides insulanus*)	Extirpated
• Taylor's checkerspot (*Euphydryas editha taylori*)	Endangered
• Bearded owl-clover (*Triphysaria versicolor* spp*. versicolor*)	Endangered
• Bear's-foot sanicle (*Sanicula arctopoides*)	Endangered
• Coastal Scouler's catchfly (*Silene scouleri* ssp*. grandis*)	Endangered
• Golden paintbrush (*Castilleja levisecta*)	Endangered
• Prairie lupine (*Lupinus lepidus* var*. lepidus*)	Endangered
• Purple sanicle (*Sanicula bipinnatifida*)	Threatened
• Seaside birds-foot lotus (*Lotus formosissimus*)	Endangered

Rigid Apple Moss Recovery Strategy

• Rigid Apple Moss (*Bartramia stricta*)	Endangered

Recovery Strategy Overviews

Vernal Pools Recovery Strategy Overview

Vernal pools are spatially discrete, seasonally flooded depressions that form on top of impermeable layers. Variations on this include 3 other habitat types; vernal seeps, vernal swales and seasonally wetted wetland margins. At present there may be fewer than 100 functioning vernal pool complexes remaining in southwestern B.C. Garry oak ecosystem-related vernal pools occur from Victoria to Nanaimo including Gabriola and Ballenas Islands as well as isolated coastal bluffs on the southeastern side of the island and small undeveloped islands adjacent to the coast.

Summary of Proposed Recovery Strategy Objectives

1. Secure permanent protection (legal or in principle) for all species at risk occurrences.
2. Engage the cooperation of all implicated landholders in habitat protection.
3. Mitigate threats to habitat and survival from recreational activities, hydrologic alterations, and eutrophication.
4. Mitigate threats to habitat and survival from secondary succession and invasive species encroachment.
5. Restore to functioning condition a minimum of 10 historic vernal pool sites.

6. Identify and rank 5-10 potential recovery sites for each species at risk.
7. Establish new populations of each species a risk.
8. Increase plant population sizes and/or population growth rates at extant sites.
9. Establish Vernal Pool Conservation Areas at Uplands Park, Trial Island, Rocky Point, and Harewood Plains.
10. Increase public awareness of vernal pools and associated species at risk.

Survival habitat for the vernal species is described as any occupied habitat needed to maintain the current population size. In this strategy only survival habitat has been designated as proposed critical habitat. Survival habitat includes all currently occupied habitat on federal and municipal lands as well as any other occupied habitat considered to be under imminent threat (together with the associated upland areas that directly contribute to sustaining hydrological function). Critical habitat will be proposed in the Recovery Action Plan stage after consultation with affected land owners and land managers.

Summary of Key Threats

- Wetland loss
- Coastal bluff development
- Recreational use on or around vernal pools
- Hydrological disruption such as wetland draw-down, dredging, draining, ditching, mowing
- Encroachment by native trees and shrubs due to fire suppression and residences
- Non-native invasive species encroachment
- Eutrophication from agricultural and residential runoff, and increased nitrogen inputs from gulls.
- As well as: algal mats, marine pollution, mowing, vertebrate/invertebrate herbivory, bird grubbing, garbage dumping

Key Vernal Pool Locations

- Rocky Point - only occurrence of Dwarf sandwort
- Ballenas Island – Water plantain buttercup one of 2 known occurrences.
- Uplands Park – Kellogg's Rush, Water-plantain buttercup, and Tall Woolly Heads
- Trial Island Ecological Reserve - Rosy owl-clover
- Gabriola Island – Bog bird's-foot trefoil
- Harewood Plains, near Nanaimo – Bog bird's-foot trefoil
- Somenos Lake – Tall woolly heads.

Garry Oak Woodlands Recovery Strategy Overview

Garry Oak Woodlands range from open parkland with scattered Garry oak trees, a sparse shrub layer and a diverse herb layer, to closed Garry oak woodlands, sometimes including arbutus and Douglas-fir trees, with a patchy mix of shrub thickets and meadow clearings. These occur as patches within the Coastal Douglas-fir biogeoclimatic zone as a result of climatic, edaphic, and cultural factors.

Summary of Proposed Recovery Objectives

1. Secure effective protection of species at risk populations.
2. Involve landowners in habitat protection and species recovery.
3. Monitor populations and habitat.
4. Identify and define habitat attributes of populations.
5. Conduct biological and ecological research.
6. Establish site-specific, adaptive management plans for habitat restoration.
7. Identify and rank recovery sites for each species.
8. Augment population numbers.
9. Establish new populations or subpopulations of each species as per recovery goals.

In this strategy only survival habitat has been designated as proposed critical habitat. All currently occupied habitat on federal and municipal lands as well as any other occupied habitat considered to be under imminent threat is proposed as survival habitat for four of the five species in this strategy. Critical habitat for Howell's triteleia and any further critical habitat or other Garry oak woodland species will be proposed in the Recovery Action Plan after consultation with affected land owners and land managers..

Proposed survival habitat is as follows:

- Deltoid balsamroot –Fort Rodd Hill National Historic Site.
- White-top aster – federal land on Trial Island and Little Saanich Mountain (Federal), and on Harmac lands (private), southeast of Nanaimo.
- Small-flowered tonella – private land near Sansom Narrows
- Yellow montane violet – federal land on Little Saanich Mountain.

Summary of Key Threats

- Habitat destruction, fragmentation, and degradation
- Fire suppression leading to forest and shrub encroachment
- Invasion of exotic plant species
- Herbivory by exotic species such as slugs, squirrels, and rabbits and grazing by deer
- Inadequate protection on private land

Maritime Meadows Recovery Strategy Overview

Maritime meadows ecosystems are naturally fragmented ecosystems that occur along shorelines and small islands. Maritime meadows are characterized by mild winters with frequent coastal fogs and cool, dry summers. All species at risk included under this strategy are at the northern limits of their distribution in Canada. None of these species are known to be keystone species, ecologically dominant, or pests. All prefer open habitat, and each of the plant species is relatively shade-intolerant and have limited seed dispersal mechanisms. With the exception of purple sanicle we are unaware of First Nations' use of the species in this recovery strategy (Miwok people of California and Nevada).

Survival habitat has been identified for five of the nine species. Critical habitat will be identified for these species in the Recovery Action Plan after consultation with affect land owners and land managers.

Summary of Proposed Short-term Recovery Objectives

1. Establish protection for all existing populations.
2. Engage the cooperation of all implicated landowners in habitat protection.
3. Identify life history, dispersal and habitat constraints and methods for mitigating them.
4. Determine the causes of extirpation, and/or population decrease or loss.
5. Develop and implement a habitat monitoring and restoration plan.
6. Identify and prioritize sites for inventories and surveys.
7. Identify potential recovery habitat to establish new populations.
8. Develop priorities to establish new populations and one experimental population per species.

Summary of Key Threats

- Habitat destruction
- Restoration / Maintenance activities
- Alteration of hydrology
- Aerial spraying for exotic Gypsy moth is lethal to most butterfly and moth larvae.
- Cultivation of non-native plants adjacent to occurrences of species at risk may introduce new invasive species, increase herbicide use, alter moisture regimes, and decrease native foodplants for butterflies
- Recreational use such as off-road vehicles, cycling and trampling
- Habitat fragmentation and demographic collapse
- Fire suppression
- Invasion of exotic shrubs, grasses, forbs and invertebrates are a key threat to Garry oak and associated ecosystems and to all of the species at risk in this recovery strategy
- Oil spill fouling via saltspray during storm events
- Other activities such as herbivory, livestock grazing, marine pollution and climate change

Other Recovery Actions already underway

There are a number of recovery actions that are already underway such as research, surveys, and public outreach by agencies such as GOERT, the Capital Regional District, Department of National Defence, Parks Canada Agency and the City of Victoria Parks Department

Rigid Apple Moss Recovery Strategy Overview

Rigid apple moss is listed as endangered in Canada due to a highly restricted disjunct population with low numbers and small size occurring within a recognized habitat at risk. The overall recovery goal is to protect and maintain the extant populations of rigid apple moss. Proposed critical habitat for this species includes rock faces, crevices, and ledges of rock outcrops, as well as open, thin soil near the bases of outcrops within Garry oak and associated ecosystems. Clearer definition of critical habitat must be completed for two occurrences of this species. The key threats for this species include the loss and degradation of suitable habitat and encroachment by other species.

Summary of Proposed Recovery Objectives

I. Establish protection for extant populations and their habitats
II. Determine threats to the species and its habitat.
III. Conduct further scientific studies and monitoring.
IV. Conduct suitable habitat inventories.

Recovery Measures Taken

- DND has taken steps to conserve rare mosses on their Nanoose property.
- Surveys have been conducted in Colwood, Royal Oak, William Head, Thetis Lake, Mt. Tolmie, Clovelly Terrace, and Mary Hill

By 2008 the following studies are to be completed to identify critical habitat for the rigid apple moss:

- Determination of habitat attributes
- Inventory of other areas of suitable habitat
- Re-inventory of areas already searched