

**Effect of Habitat loss and invasion by Scotch Broom
(*Cytisus scoparius*) on rare butterflies of Garry Oak meadows.**

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Within Garry oak (*Quercus garryana*) ecosystems in British Columbia there are a number of species that are rare and endangered, including several species of insects. Habitat loss and degradation are undoubtedly factors in the endangerment of many of these species, as only five percent of the original Canadian distribution of Garry Oak ecosystems remains in an undeveloped state. Many of the remaining sites are found in remote locations in the Southern Gulf Islands.

This project examines metapopulations of rare butterfly species to determine 1) the effect of loss and fragmentation of habitat on butterfly populations, and 2) the effect of degradation of habitat quality of Garry oak meadows due to the invasive weed, Scotch Broom. Identification of which characteristics of meadows (nectar resources, larval host plant abundance, meadow size / spatial location, and abundance of Scotch Broom) have the strongest effect on viability of populations of several different species of butterfly is the goal of this project.

Two networks of meadows (~100 meadows each) were surveyed in Duncan and on Saltspring Island. Logistic regression and ordination were used to define habitat quality. For example, there were significant positive relationships between butterfly populations and increasing meadow size, density of oak trees, and presence of certain flower species. These data were used to adjust for 'effective habitat area' and to parameterize a predictive metapopulation model.

The butterflies are of interest themselves as threatened species, and also act as a representative indicator of the health of the ecosystem. The analysis method used in this study allows identification of which meadows, and which habitat qualities, play the biggest role in overall metapopulation persistence. The results will help identify the best locations for restoration, reintroduction, and conservation purposes, to promote regional persistence of the species of interest. Development of a predictive indicator model will be a key feature, to serve as a tool for assessing alternative management strategies for conservation of populations of vulnerable and endangered butterflies.