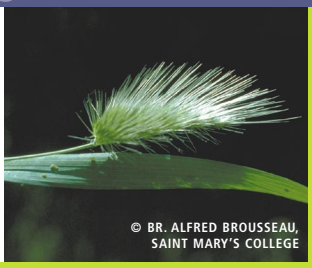
Invasive Species in Garry Oak and Associated Ecosystems

IN BRITISH COLUMBIA

grasses and grass-like plants



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forbs and woody plants

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GARRY OAK ECOSYSTEMS RECOVERY TEAM

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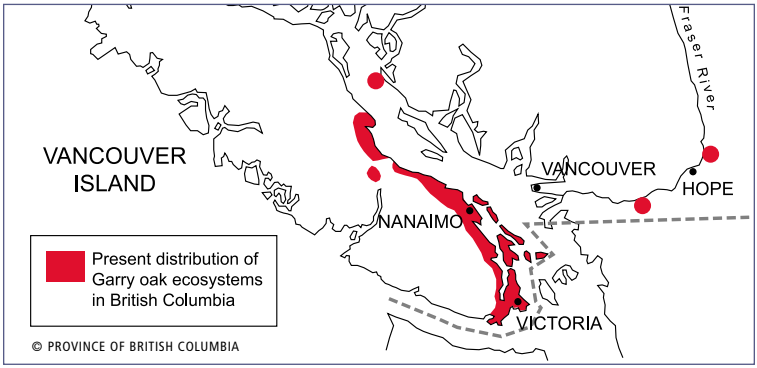
What are Garry Oak and Associated Ecosystems?

A Garry oak ecosystem is one with naturally occurring Garry oaks (*Quercus garryana*) and some semblance of the ecological processes and communities that prevailed before European settlement. In British Columbia, these ecosystems range from closed-canopy woodlands to open meadows with scattered trees. Garry oaks sometimes also form mixed-canopy stands with other trees, primarily arbutus (*Arbutus menziesii*) and Douglas-fir (*Pseudotsuga menziesii*). The understories of Garry oak woodlands vary from open fields of grasses and forbs to dense layers of shrubs such as snowberry (*Symphoricarpos albus*). Garry oak ecosystems are inhabited by diverse assemblages of native flora, including dazzling displays of spring wildflowers and other forbs as well as shrubs, grasses and bryophytes. They are also home to many lichens and fungi, and a suite of fauna that are dependent on the varied structural characteristics of these ecosystems.

Garry oak woodlands form mosaics with associated ecosystems that lack any oak cover. These associated sites share many characteristics with Garry oak ecosystems, including disturbance regimes and ecological processes. Some of the species that occur in associated ecosystems are also common to Garry oak woodlands, while others have highly specialised requirements that restrict them to particular habitats. Associated ecosystems are highly varied in character and include rocky outcrops and coastal bluffs, maritime meadows and treeless grasslands, and vernal pools and other ephemeral wetlands.

Where do Garry Oak and Associated Ecosystems Occur?

In Canada, Garry oak ecosystems occur only in British Columbia. They are found along the narrow coastal strip of southeast Vancouver Island, as well as on the adjacent

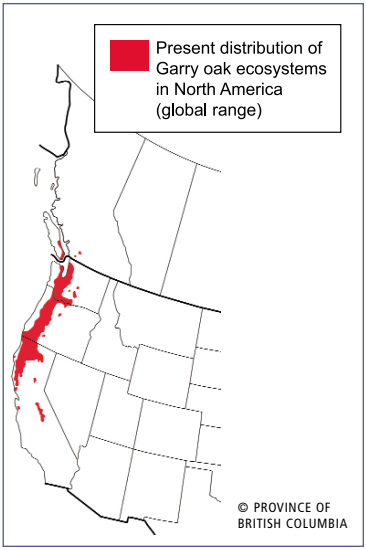


islands and at 2 sites in the lower Fraser River Valley. The current global distribution of Garry oak ecosystems ranges from southwestern British Columbia to southern California.

Why are Garry Oak and Associated Ecosystems Important?

Together, Garry oak and associated ecosystems are home to more plant species than any other terrestrial ecosystem in coastal British Columbia. Many of these species occur nowhere else in Canada. At this time, approximately 100 species of plants, mammals, reptiles, birds, butterflies and other insects, and an earthworm, are officially listed as at risk in these ecosystems. Several taxa have already been lost in British Columbia. Collectively, Garry oak ecosystems are among the most endangered in Canada – less than 5% of the original habitat remains in a near-natural condition. Despite this rarity, if we retain their components, Garry oak ecosystems may be "the ecosystems of the future." If regional warming trends continue, these ecosystems could conceivably expand in range to cover larger areas of southwestern British Columbia.

Garry oak and associated ecosystems are important for their biological diversity and their possible role in the future.



What are Invasive Species?

Invasive species are plants, animals and micro-organisms that are non-native (or alien) to an ecosystem and cause economic or environmental harm to that ecosystem. These species are primarily transported to their new location by humans, either accidentally or intentionally.

Why Should We Care?

All Garry oak ecosystems have been invaded to a greater or lesser extent by invasive species and the ecosystems continue to be at risk of further invasions. To date, at least 173 invasive species (not including invertebrates) have been identified in Garry oak ecosystems, including 4 trees, 14 shrubs, 142 herbs, 1 reptile, 6 birds and 7 mammals. The consequences of invasions can be particularly severe for species at

risk, as they may suffer local or possibly even global extinctions.

Invasive species are among the three primary threats to Garry oak ecosystems.

How do Invasive Species Harm Native Species, Communities and Ecosystems?

The impacts of invasive species vary in scope and scale. Invasive species may do one or more of the following:

- Hybridise with native species, potentially decreasing genetic integrity and diversity
- Parasitise, predate, graze and/or browse native species
- Compete with native species for limited resources
- Introduce parasites and diseases
- Degrade or destroy habitat by altering vegetation structure and/or ecosystem processes such fire and nutrient cycling
- Alter ecosystems in ways that may promote further invasion by other invasive species

Stages of Invasive Species Management

Management requires a co-ordinated approach based on site characteristics (including presence of species at risk) and identities and level of invasion of the invasive species.

1. PREVENTING INTRODUCTIONS OF INVASIVE SPECIES

The most cost-effective means to combat invasive species is to prevent them from establishing.

Ideally, agencies should develop risk-based screening systems for evaluating introductions in consultation with experts and relevant agencies, and consistent with applicable regulations. In addition, regulations to prevent introductions should be enacted and enforced. To help prevent introductions to specific sites, landowners, managers and others should also:

- Clean mud, seeds and egg masses from shoes, camping gear, tools, vehicles and other objects and equipment before entering Garry oak or other natural ecosystems
- Plant only non-invasive or native species when gardening and landscaping, and refrain from bringing garden refuse, soil, mulch and/or other non-local materials into natural ecosystems
- Refrain from releasing unwanted pets into the environment

2. EARLY DETECTION AND RAPID RESPONSE

Not all introductions can be prevented, but early detection of invasive species and quick response can eradicate or contain invasive species more effectively and at lower cost than long-term control. Co-operation among agencies and different levels of government is required for co-ordinated and effective action. In addition, landowners and managers should incorporate the following principles into management activities:

- Eradicate introduced invasive species prior to their establishment and spread. Invasive species are most easily controlled when first introduced and few in number.

- Target initial actions towards containing invasive species within a designated area to restrict the species' spread

3. CONTROL AND MANAGEMENT

Approaches to control and management of invasive species may include eradication, population suppression, limiting spread and/or reducing impacts. At heavily invaded sites, it may not be possible to completely eradicate the invaders and the priority may be to prevent their spread and lessen their impacts. Potential management activities include:

- Physical removal of invasive species
- Careful use of pesticides or herbicides. Pesticides and herbicides should be used only by people trained and certified in their application.
- Installation of fences, nets or other restraints to the movement or spread of invasive species
- Prevention of, or interference with, the reproduction of these species
- Promotion of parasites, predators and diseases of invasive species to function as biological controls
- Maintenance, restoration and manipulation of ecological processes and disturbance regimes to favour native species
- Minimising soil disturbance and the use of fertilisers in natural areas

4. PROPER DISPOSAL

Careful disposal of invasive species will ensure that they do not cause further problems. Do not pile or dump plant materials in Garry oak or other natural ecosystems. Use humane euthanisation for any invasive animals; do not release them into other natural areas.

Humane euthanisation should use methods appropriate for the species, and requires research, planning, and perhaps acquisition of equipment. More information about methods is available from the Canadian Council of Animal Care at www.ccac.ca/english/gui_pol/guides/english/toc_v1.htm.

Hunting and Trapping

You must follow all relevant federal, provincial and municipal regulations, including possession of applicable federal and provincial firearm, hunting and trapping licenses, if you are considering hunting or trapping invasive species.

For further information about hunting, trapping and firearms regulations see wlapwww.gov.bc.ca/wld/hunting.htm and www.cfc-ccaf.gc.ca.

Only live box traps should be used in Garry oak ecosystems; do not use kill or snare traps which can catch native, non-target species.

5. RESTORATION

An important follow-up to the control and management of invasive species is restoration of habitat conditions and ecological communities. Components of a restoration program include:

- Propagation of native plant materials for re-introduction at the site, using ecologically appropriate species sourced from local genetic stock
- Planting of seeds, seedlings, plugs, or other materials, using only sterile or on-site soil and woody debris to avoid introducing invasive species
- Protection of newly restored areas until they are established

Steps to a Successful Management Plan

1. IDENTIFY AND ASSESS

A thorough site assessment should include a comprehensive inventory and map of the invasive species as well as any other native species that may be affected by management options. Be sure to include inventories for species at risk by qualified experts. Check with the British Columbia Conservation Data Centre (srmwww.gov.bc.ca/cdc) to find out what inventories have already been done and what species at risk have been found at your site.

2. GATHER INFORMATION

Management of invasive species is an evolving topic and further research will help to define the best practices for their management. Expert advice about invasive species management and the biology and management of species at risk can be obtained from university researchers, specialised consultants, local stewardship groups and government biologists. Information is also available in the Decision Support Tool for Invasive Species in Garry Oak and Associated Ecosystems (DST), at www.goert.ca.

3. PLAN

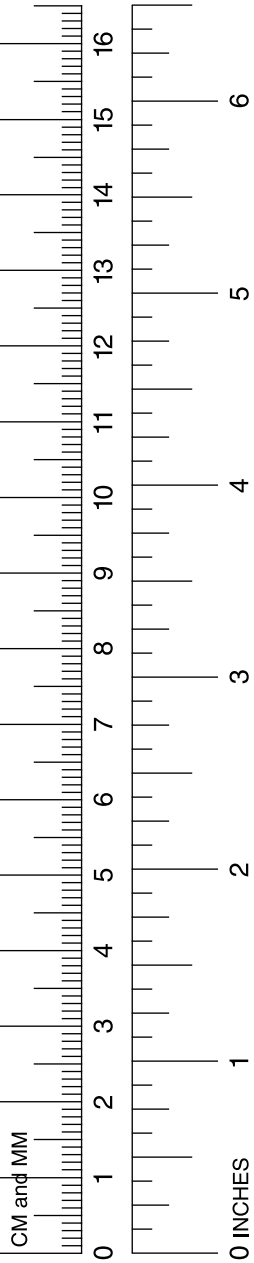
Developing an invasive species management plan requires integration of ecological (site assessment, species biology), economic (costs, resources) and social (management objectives) factors. The timing of controls should be closely tied to the ecology of the invasive species and Garry oak ecosystems and to the ecology of any species at risk at the site. The DST can help guide you through plan development. Be sure to include a plan for monitoring the effectiveness of your management program.

4. IMPLEMENT THE PLAN

Apply treatments according to your plan. If you deviate from your plan, document how and why.

5. MONITOR

Assess the area for reinvasion and assess the control methods to make sure they are working and not having unexpected impacts. If there are species at risk at the site, be sure to include monitoring the effects of treatments on species at risk, under the guidance of qualified experts.



About This Manual

INTENDED AUDIENCE

This manual is intended for use by public and private land managers, land stewards and field staff who are involved in the management and restoration of Garry oak ecosystems. The sheets are designed to help identify species, locate additional resources and offer suggestions for management practices.

HOW THIS MANUAL IS ORGANISED

It is intended that additional species accounts will be developed in the coming years as part of this series. For this reason, the pages are not numbered, but are instead arranged alphabetically by scientific name within the taxonomic groupings. Additional sheets will be distributed as they are produced for you to insert into your binder. All species accounts will also be posted at www.goert.ca.

TAXONOMIC AUTHORITIES

Unless otherwise noted, nomenclature for plants in this guide follows

Douglas, G.W., G.B. Straley (*Volumes 1 & 2*), D. Meidinger and J. Pojar (eds.), 1998-2002. *Illustrated Flora of British Columbia*, *Volumes 1-8*. Ministry of Environment, Lands and Parks, Ministry of Forests (*Volumes 7 & 8*. Ministry of Sustainable Resource Management, Ministry of Forests), Victoria, BC.

FURTHER INFORMATION

Annotated bibliographies including the references used to produce the fact sheets as well as additional sources of information can be found at www.goert.ca.