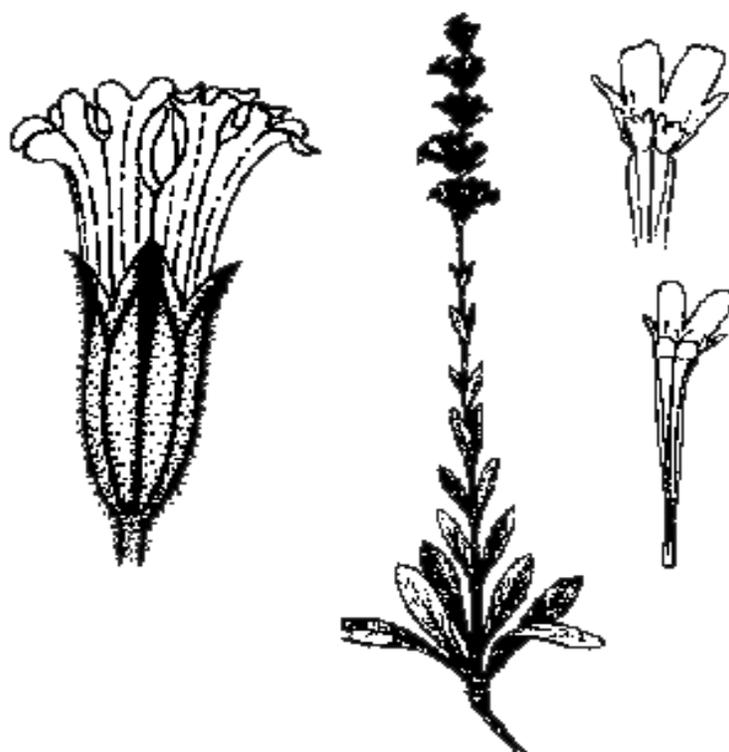


COSEWIC
Assessment and Status Report

on the

Coastal Scouler's Catchfly
Silene scouleri ssp. *grandis*

in Canada



ENDANGERED
2003

COSEWIC
COMMITTEE ON THE STATUS OF
ENDANGERED WILDLIFE
IN CANADA



COSEPAC
COMITÉ SUR LA SITUATION DES
ESPÈCES EN PÉRIL
AU CANADA

COSEWIC status reports are working documents used in assigning the status of wildlife species suspected of being at risk. This report may be cited as follows:

Please note: Persons wishing to cite data in the report should refer to the report (and cite the author(s)); persons wishing to cite the COSEWIC status will refer to the assessment (and cite COSEWIC). A production note will be provided if additional information on the status report history is required.

COSEWIC 2003. COSEWIC assessment and status report on the coastal Scouler's catchfly *Silene scouleri* ssp. *grandis* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 17 pp.

Fairbanks, M., and K. Wilkinson. 2003. COSEWIC status report on the coastal Scouler's catchfly *Silene scouleri* ssp. *grandis* in Canada, in COSEWIC assessment and status report on the coastal Scouler's catchfly *Silene scouleri* ssp. *grandis* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 1-17 pp.

For additional copies contact:

COSEWIC Secretariat
c/o Canadian Wildlife Service
Environment Canada
Ottawa, ON
K1A 0H3

Tel.: (819) 997-4991 / (819) 953-3215

Fax: (819) 994-3684

E-mail: COSEWIC/COSEPAC@ec.gc.ca

<http://www.cosewic.gc.ca>

Également disponible en français sous le titre Rapport du COSEPAC sur la situation du grand silène de Scouler (*Silene scouleri* ssp. *grandis*) au Canada

Cover illustration:

Coastal Scouler's catchfly — Enlarged illustration of flower by Jane Lee Ling from Douglas et al. 2002, with permission; illustrations of habit and of petal details by J.R. Janish from Hitchcock and Cronquist 1973, with permission.

©Her Majesty the Queen in Right of Canada 2003
Catalogue No. CW69-14/333-2003E-PDF
ISBN 0-662-35369-2
HTML: CW69-14/333-2003E-HTML
0-662-35370-6



Recycled paper



COSEWIC Assessment Summary

Assessment summary — May 2003

Common name

Coastal Scouler's catchfly

Scientific name

Silene scouleri ssp. *grandis*

Status

Endangered

Reason for designation

This is a species of highly restricted geographical occurrence in Canada with fewer than 350 plants comprising three remaining populations present on very small islands. Along with other historical population extirpations, a Vancouver Island population has recently been extirpated. These islands are located within an area of active shipping and recreational activities where invasive plants and human activities present ongoing risks.

Occurrence

British Columbia

Status history

Designated Endangered in May 2003. Assessment based on a new status report.



COSEWIC
Executive Summary

Coastal Scouler's Catchfly
Silene scouleri ssp. *grandis*

Species Information

Silene scouleri ssp. *grandis* (coastal Scouler's catchfly) is an erect, perennial forb growing in clumps from a taproot and a generally branched caudex. The plants have a rosette of basal leaves and paired opposite leaves on the stem. The leaves are hairy, entire and unstalked above. The inflorescence is a narrow spike of greenish-white to purple flowers. The calyx is prominently nerved and the petals have two lobes and two appendages. The fruit is a capsule containing numerous pimply seeds. This plant is distinct from other species within its habitat, even in vegetative form.

Distribution

In Canada, *Silene scouleri* ssp. *grandis* occurs on three small islands close to Victoria, British Columbia. Globally, it occurs along the Pacific coast from British Columbia to San Francisco Bay.

Habitat

Silene scouleri ssp. *grandis* occurs in grass-forb meadows close to sea level. It is shade-intolerant and occurs on soils that are at or near saturation throughout the winter but become very dry during the summer. It was formerly known from one higher elevation site (over 200 m) but that population had low vigour and appears to have disappeared as a result of natural causes.

Biology

Little research has been done on *Silene scouleri*, even at the species level. *Silene scouleri* ssp. *grandis* probably germinates in the spring when soil moisture and temperature conditions are most favourable. In Canada, spring and summer growth is slow and flowering does not occur until late summer or early autumn. Flowers are probably protandrous (anthers develop and wither before styles elongate) and most pollination is probably effected by insects, although plants may be capable of limited selfing.

Population Sizes and Trends

At least seven populations have disappeared since 1897. Trends in the two remaining populations are uncertain because of the lack of data. The Trial Island sub-population is very small (5 individuals) and careful searches in 2000, 2001 and 2002 did not reveal any young plants. The nearby sub-population on Little Trial Island consists of 23 mature plants. The Alpha Islet population is larger (250-300 plants) and was not surveyed for evidence of young plants.

Limiting Factors and Threats

Populations have been lost through habitat destruction but the primary threats to the two remaining populations are habitat degradation due to invasion by exotic shrubs and grasses, altered fire regimes, trampling and marine pollution. Weak reproductive effort and limited powers of seed dispersal impede recovery of depleted populations.

Special Significance of the Species

Populations of *Silene scouleri* ssp. *grandis* are at the northern limit of its range and may represent a genetically distinct element important for the long-term survival of the species. *Silene scouleri* is an attractive garden plant commercially available from numerous sources. Essences of *Silene scouleri* are commercially available.

Existing Protection

There is no general protection for *Silene scouleri* ssp. *grandis* at the provincial or federal level. Both of the populations lie at least partly within ecological reserves where they are legally protected from collecting. Neither population is protected from trampling, competition from exotic weeds, ingrowth by native shrubs or marine oil pollution.

Summary of Status Report

Silene scouleri ssp. *grandis* occurs in Canada only on three small islands offshore of Victoria, British Columbia. The extent of occurrence is only 0.6 km² and the area of occupancy is only 0.0158 km² (1.58 ha). This distribution is severely fragmented and there is negligible opportunity for genetic interchange between the two populations. There is little remaining suitable habitat and the quality of occupied and potential habitat continues to decline as introduced grasses and shrubs continue to invade suitable sites. Occupied sites are subject to trampling, mowing and occasional herbicide use. Both populations are at risk from marine oil pollution.

There are fewer than 350 plants in Canada. There is negligible opportunity for unassisted colonization of unoccupied sites due to natural limitations on seed production and dispersal.



COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) determines the national status of wild species, subspecies, varieties, and nationally significant populations that are considered to be at risk in Canada. Designations are made on all native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fish, lepidopterans, molluscs, vascular plants, lichens, and mosses.

COSEWIC MEMBERSHIP

COSEWIC comprises representatives from each provincial and territorial government wildlife agency, four federal agencies (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biosystematic Partnership), three nonjurisdictional members and the co-chairs of the species specialist groups. The committee meets to consider status reports on candidate species.

DEFINITIONS

Species	Any indigenous species, subspecies, variety, or geographically defined population of wild fauna and flora.
Extinct (X)	A species that no longer exists.
Extirpated (XT)	A species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A species facing imminent extirpation or extinction.
Threatened (T)	A species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.
Not at Risk (NAR)**	A species that has been evaluated and found to be not at risk.
Data Deficient (DD)***	A species for which there is insufficient scientific information to support status designation.

* Formerly described as “Vulnerable” from 1990 to 1999, or “Rare” prior to 1990.

** Formerly described as “Not In Any Category”, or “No Designation Required.”

*** Formerly described as “Indeterminate” from 1994 to 1999 or “ISIBD” (insufficient scientific information on which to base a designation) prior to 1994.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list.



Environment Canada	Environnement Canada
Canadian Wildlife Service	Service canadien de la faune

Canada

The Canadian Wildlife Service, Environment Canada, provides full administrative and financial support to the COSEWIC Secretariat.

COSEWIC Status Report
on the
Coastal Scouler's Catchfly
Silene scouleri ssp. *grandis*
in Canada

Matt Fairbanks¹
Kathleen Wilkinson²

2003

¹BC Conservation Data Centre
P.O. Box 9344 Station Provincial Government
Victoria, BC
V3G 1E7

²2402 Mountain Drive
Abbotsford, BC
V3G 1E7

TABLE OF CONTENTS

SPECIES INFORMATION.....	3
Name and classification.....	3
Description.....	3
DISTRIBUTION.....	3
Global range.....	3
Canadian range.....	4
HABITAT.....	4
Habitat requirements.....	4
Trends.....	7
Protection/ownership.....	7
BIOLOGY.....	7
General.....	7
Reproduction.....	8
Survival.....	8
Physiology.....	9
Movements/dispersal.....	9
POPULATION SIZES AND TRENDS.....	9
LIMITING FACTORS AND THREATS.....	11
SPECIAL SIGNIFICANCE OF THE SPECIES.....	12
EXISTING PROTECTION OR OTHER STATUS.....	12
SUMMARY OF STATUS REPORT.....	13
TECHNICAL SUMMARY.....	14
ACKNOWLEDGEMENTS.....	15
LITERATURE CITED.....	15
THE AUTHORS.....	16
AUTHORITIES CONSULTED.....	17
COLLECTIONS EXAMINED.....	17

List of figures

Figure 1. Illustration of <i>Silene scouleri</i> ssp. <i>grandis</i>	4
Figure 2. North American distribution of <i>Silene scouleri</i> ssp. <i>grandis</i>	5
Figure 3. Distribution of <i>Silene scouleri</i> ssp. <i>grandis</i> in Canada.....	6

List of tables

Table 1. <i>Silene scouleri</i> ssp. <i>grandis</i> Population and Location Data.....	10
---	----

SPECIES INFORMATION

Name and classification

Scientific name: *Silene scouleri* Hook. ssp. *grandis* (Eastw.)
C.L. Hitch. & Maguire
Synonym: from Douglas and MacKinnon 1998, Hitchcock et al. 1964
S. grandis Eastw.
S. pacifica Eastw.
S. grandis var. *pacifica* Jeps.
S. scouleri var. *pacifica* (Eastw.) C.L. Hitchc.
S. scouleri Hook. ssp. *grandis* (Eastw.) C.L. Hitchc. & Maguire
S. scouleri Hook. ssp. *scouleri* var. *scouleri*
S. repens Patrin ex. Pers. var. *costata* (Williams) Boivin
Common name: coastal Scouler's catchfly
Family: Caryophyllaceae (pink family)
Major plant group: dicot flowering plant

Silene scouleri is the most complex element within its genus and its taxonomy is under active review. Regardless of which name is attached to the Pacific coast populations, they belong to a different subspecies from other populations in Canada (John Morton, Professor of Botany, University of Waterloo, March 13, 2002, pers. Com.).

Silene scouleri ssp. *scouleri* is also present in Canada but occurs in southcentral British Columbia. It is not listed as rare in the province (Douglas et al. 1998).

Description

Silene scouleri ssp. *grandis* is a greenish-white to purplish perennial herb from a simple or branched stem-base, 15-80 cm tall (Figure 1). The basal leaves are hairy, 6-20 cm long to 1.5 cm wide. The stems leaves are opposite, hairy, in 3-11 pairs and gradually become stalkless above. Flowers are arranged in an elongated narrow inflorescence. Petals are 5, greenish-white to purplish, stalklike at the base and 7-16 mm long. Petals vary from being divided into two, to being almost 4-parted. There are prominent teeth on each lobe of the petal. The sepals form a tube 10-18 mm long and have 10-veins. The fruits are elliptical capsules that contain 0.9-1.5 mm long, greyish-brown seed with pimples on the surface (Douglas and MacKinnon 1998).

DISTRIBUTION

Global range

Silene scouleri ssp. *grandis* is a strictly coastal taxon found from the Victoria area of southern B.C. south to San Mateo County south of San Francisco Bay (Hitchcock et al. 1964, Wilken 1993, Douglas and MacKinnon 1998; see Figure 2).

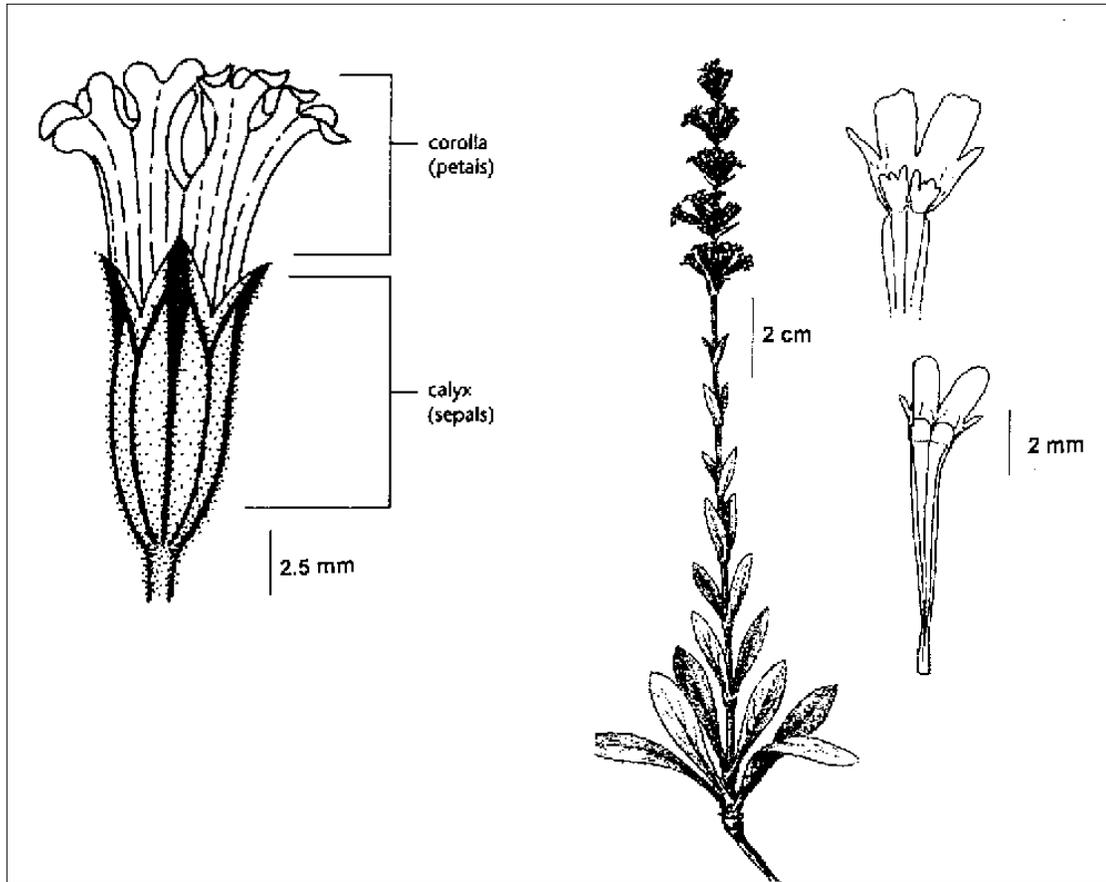


Figure 1. Illustration of *Silene scouleri* ssp. *grandis*. Enlarged illustration of flower by Jane Lee Ling from Douglas et al. 2002, with permission; illustrations of habit and of petal details by J.R. Janish from Hitchcock and Cronquist 1973, with permission.

Canadian range

In Canada, *Silene scouleri* ssp. *grandis* is restricted to the Victoria area in British Columbia where it occurs on Trial Island, Little Trial Island and Alpha Islet (see Figure 3).

HABITAT

Habitat requirements

There is no detailed information on habitat relationships of *Silene scouleri* ssp. *grandis* but parallels can be drawn to similar taxa: *S. douglasii* var. *oraria* and *S. spaldingii*. Kephart and Paladino (1997) found that shallow rocky soils were not optimal for *S. douglasii* var. *oraria* and that its abundance is also negatively correlated with vegetation height, cover and soil depth. *Silene spaldingii* is tolerant of light to moderate grazing (Schassberger 1988) and may benefit from prescribed burning (Lesica 1992).

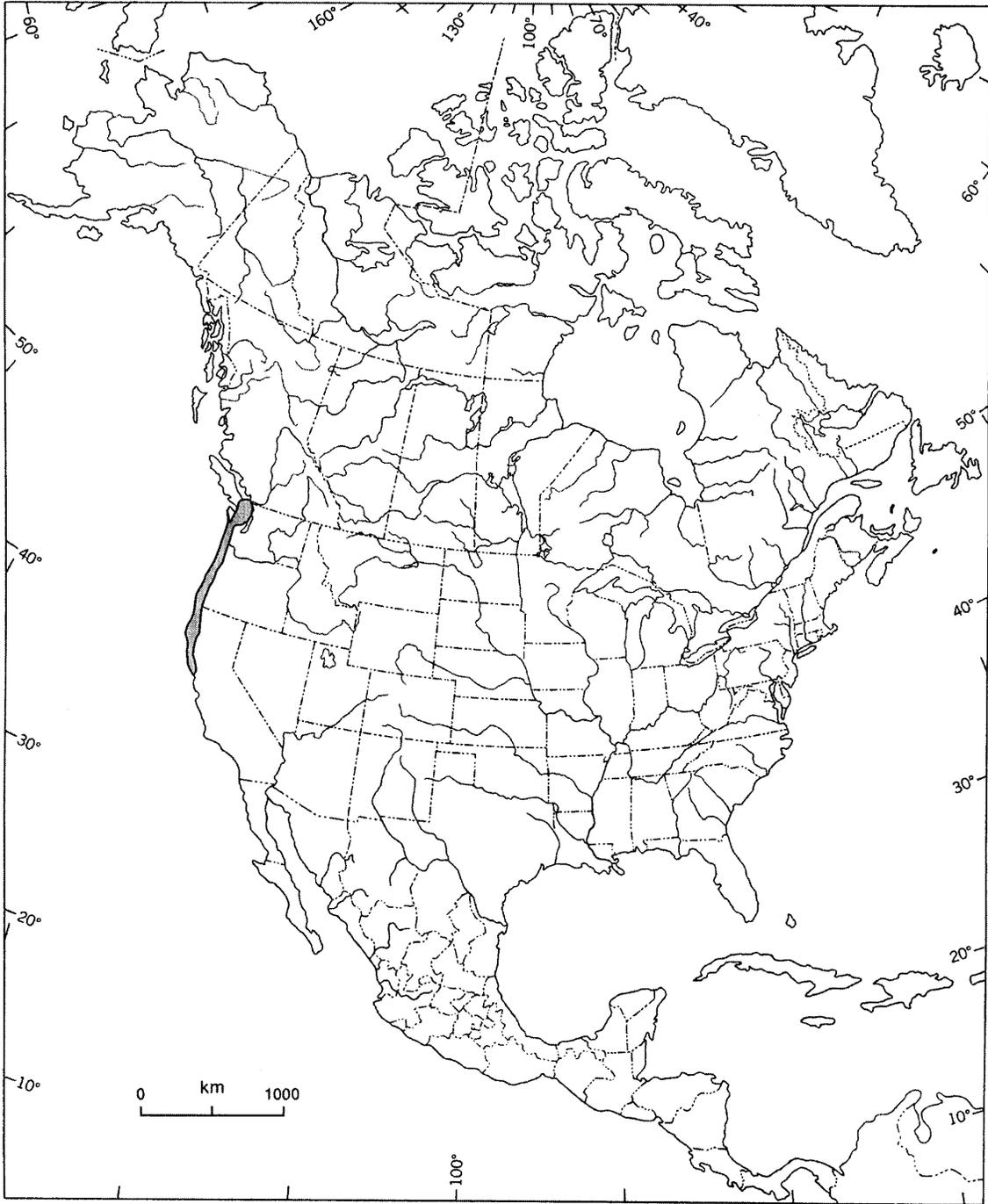


Figure 2. North American distribution of *Silene scouleri* ssp. *grandis*.

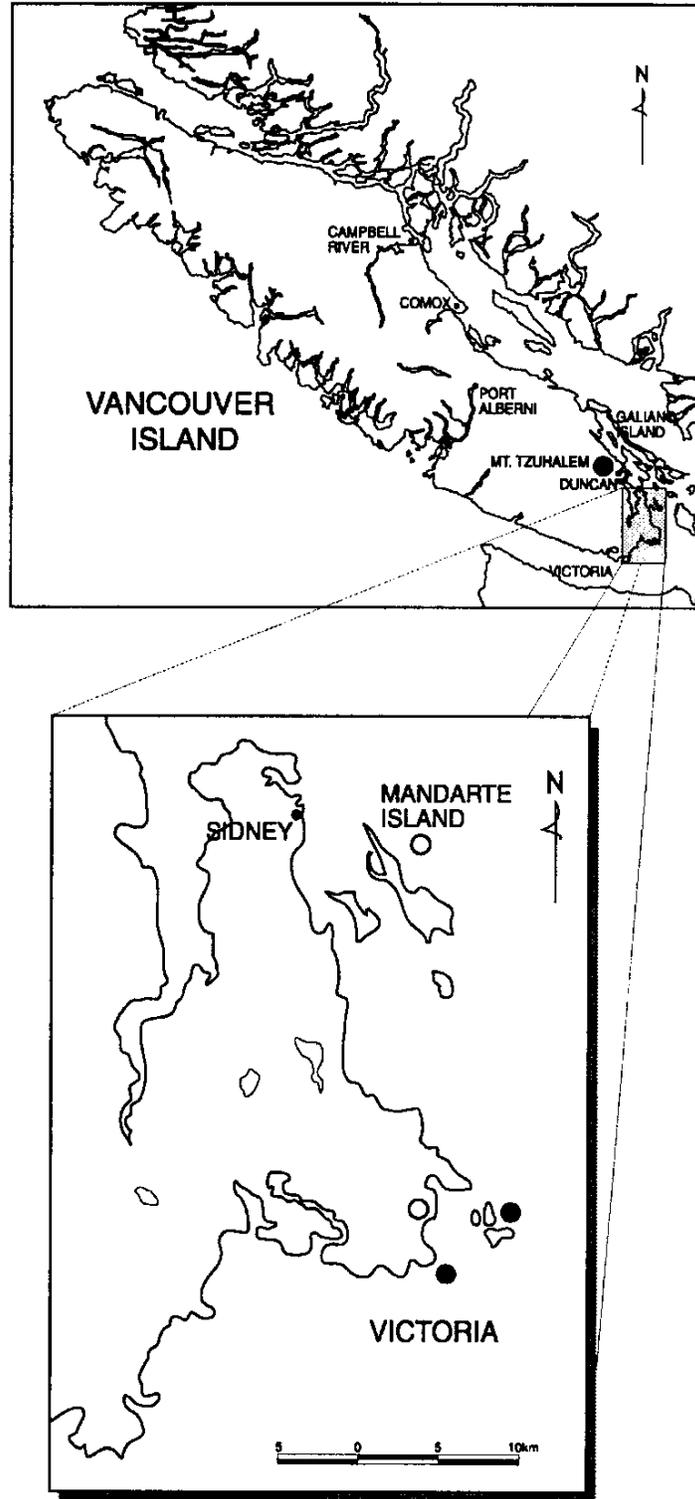


Figure 3. Distribution of *Silene scouleri* ssp. *grandis* in Canada.

In Oregon, *Silene scouleri* ssp. *grandis* occurs on seaward slopes along the coast (Peck 1941). In California, it occurs on rocky slopes and coastal bluffs under 300 m elevation (Hickman 1993). In Canada, *Silene scouleri* ssp. *grandis* is restricted to the lowland Coastal Douglas-fir biogeoclimatic zone. It prefers winter wet/summer dry grassy openings on gently-sloping sites, generally under 30 m elevation (locally referred to as maritime meadows). Common associates include *Rosa nutkana*, *Symphoricarpos albus*, *Pteridium aquilinum*, *Festuca rubra*, *Achillaea millefolium*, *Grindelia integrifolia*, *Fragaria chiloensis*, *Piperia maritima*, *Lomatium nudicaule*, *Hypochaeris radicata*, *Camassia* sp. and *Aira praecox*. It is absent from shrub thickets and from patches of robust introduced grasses within both populations. The Mount Tzuhalem population, now presumed extirpated, was atypical with respect to elevation (over 200 m); otherwise the site and vegetation characteristics of that location are similar to conditions at Trial Island, Little Trial Island and Alpha Islet.

Trends

The loss of Garry oak ecosystems in Victoria parallels the loss of suitable habitat for *Silene scouleri* ssp. *grandis*. The extent of these ecosystems decreased 95% from 10,510 ha in 1800 to 512 ha in 1997 (Lea 2002). This loss is almost entirely attributable to agricultural conversion followed by residential and recreational development.

Silene scouleri ssp. *grandis* is now restricted to open meadows a few metres above sea level on offshore islets. Habitat quality has decreased on these islets as several introduced species of shrubs, grasses and forbs have formed thick swards at many locations. Aboriginal burning to improve camas crops may have maintained habitat in the past. If so, fire suppression may now favour the development of dense patches of native shrubs where *Silene scouleri* ssp. *grandis* cannot survive.

Protection/ownership

Silene scouleri ssp. *grandis* populations are restricted to areas that are provincially owned. No populations are known to occur on private lands. The Alpha Islet population occurs in Oak Bay Islands Ecological Reserve and the Little Trial Island sub-population occurs in Trial Islands Ecological Reserve while the Trial Island sub-population occurs on lands leased to Seacoast Communications, who maintain radio-communication towers on the site.

BIOLOGY

General

Silene scouleri ssp. *grandis* is a tap-rooted perennial species with a shallowly buried caudex that gives rise to multiple stems that form compact genets. Large clumps may die off in segments as in *Silene douglasii* var. *oraria* (Kephart and Paladino 1997). This could produce gaps creating several weakly separated clumps from a single genet. *Silene*

scouleri ssp. *grandis* does not possess rhizomes or any other means of vegetative reproduction. No information is available on its biology and ecology in B.C.

Reproduction

Little is known about pollination and reproduction in *Silene scouleri* ssp. *grandis*. Several species of *Silene* are self-compatible (Kephart and Nebenzahl 1983, Lesica 1993, Menges 1995). Jürgens *et al.* (1996) noted that the stigmas of some *Silene* are receptive in the bud and flowers may be capable of selfing. Lesica (1993) concluded that flowers of *S. spaldingii* rarely self-pollinate because the anthers shed their pollen before styles expand, although he observed limited fruit development in flowers denied access to pollinators.

Sticky-glandular hairs on the foliage and calyx tube capture small insects that try to steal nectar without pollinating the flowers hence the common name, catchfly.

Seed production in some species of *Silene* decreases greatly when pollinators are excluded (Lesica 1993, Menges 1995) and juvenile plants from selfed seed may be substantially smaller than those from open-pollinated seed (Lesica 1993). Many species of *Silene* are pollinated by insects including bumblebees, moths and mosquitoes (Brantjes and Leemans 1976, Kay *et al.* 1984, Kephart and Nebenzahl 1983, Lesica 1993, Pettersson 1991). They typically possess nectaries at the base of their stamens (Jürgens *et al.* 1996). The larger and more colourful *Silene regia* is pollinated by hummingbirds rather than insects (Menges 1995) but this appears to be an exception.

Silene scouleri ssp. *grandis* at Trial Island matured slowly in 2001 and 2002. A few of the earliest flowers produced abundant mature seed as early as September while others still had pale, small seeds or no seeds at all by late October.

Survival

Silene scouleri seeds typically germinate best at about 20°C when sown in a pot of stone mulch such as grani-grit, placed in polyethylene bag. Germination occurs over 2-5 weeks (Deno 1994; Jane Grushow, professional gardener, pers. com. February 2002; Tom Clothier, native seed supplier, <http://users.anet.com/~manytimes/page62.htm>). Seeds of *Silene douglasii* and *S. spaldingii*, two closely related species, appear to require cold stratification as germination occurs mainly in spring (Lesica 1988, Kephart and Paladino 1997).

There is no documentation of factors affecting the establishment of *Silene scouleri* ssp. *grandis* seedlings. Seedlings of *Silene douglasii* var. *oraria* had higher survival rates in burned areas compared to unburned plots, which may be attributable to higher seedling mortality in areas of thick litter (Kephart and Paladino 1997). *Silene spaldingii* produces rosettes in the first summer and flowers during or after the second season (Lesica 1993).

Perennial species of *Silene* may survive for several to many years under natural conditions (Marsden-Jones and Turrill 1957).

Field observations of the Trial Island population during the summers of 2000, 2001 and 2002 did not reveal any significant cases of adult mortality. There was no evidence of leaf or flower herbivory in either population, aside from a light infestation of spittlebugs on one Trial Island plant in 2001.

The small population that once occurred on Mount Tzuhalem gradually declined in vigour during the 1990s, first failing to flower and finally failing to overwinter. This atypical site is approximately 250 m above sea level and climatic limitations may have led to the population's demise.

Individuals of both *Silene spaldingii* and *S. douglasii* var. *oraria* may reappear after a year of dormancy, as desiccated stems produce new plants (Kephart and Paladino 1997, Lesica and Steele 1994).

Physiology

The physiology of *Silene scouleri* ssp. *grandis* has not been studied.

Movements/dispersal

There is no information on gene dispersal by *Silene scouleri* ssp. *grandis*. Insects are presumably capable of dispersing pollen over short distances but between-population dispersal in Canada is unlikely given the distances involved. It is possible that some gene exchange may occur between Trial Island and Little Trial Island, which are only 500 m apart.

Seeds of *Silene scouleri* ssp. *grandis* lack any strong adaptations for long-distance dispersal and most seeds are probably gravity-dispersed, although the pimply surface texture may aid in short-distance wind dispersal as with other species in the genus (Marsden-Jones and Turrill 1957). During a 10-year study, *Silene douglasii* var. *oraria*, another rare species of coastal grasslands, was not able to colonize a network of vacant quadrats within an established population (Kephart and Paladino 1997).

The localized distribution and well-documented history of populations in British Columbia suggest that dispersal and establishment of new populations is rare.

POPULATION SIZES AND TRENDS

Silene scouleri ssp. *grandis* has been recorded from up to 12 locations in Canada, all on southeast Vancouver Island or adjacent small islands (Table 1). Two locations, 'near Victoria' and Burnside District, are very imprecise and may well refer to other locations described in the table. The Mount Douglas, Beacon Hill, Oak Bay, Uplands and Ten Mile Point areas are frequently visited by botanists and the lack of recent records likely indicates the populations are now extirpated. The author surveyed suitable habitats in each of these locations in 2001.

Table 1. *Silene scouleri* ssp. *grandis* Population and Location Data.

Population	Last Observed	Observer	Extent*	Number of individuals**	Apparent Status
Trial Island	October 2001	M. Fairbarns	20 x 4 m	5	Extant subpop.
Little Trial Island	August 2002	M. Fairbarns	100 x 30 m	23	Extant subpop.
Alpha Islet	October 2001	M. Fairbarns	160 x 80 m	250-300	Extant
Mount Tzuhalem	July 2002	M. Fairbarns	2 x 2 m	No current - year growth	Extirpated
Griffin Island	August 1991	M.G. Shepard	Unknown	Unknown	Loc. Error
Ten Mile Point	August 1966	A.S. Harrison	Unknown	Unknown	Extirpated
Upands, Victoria	July 1953	M.C. Melburn	Unknown	Unknown	Extirpated
'near Victoria'	July 1938	J.W. Eastham	Unknown	Unknown	Location too vague
Burnside District	August 1935	E. Cooke	Unknown	Unknown	Location too vague
Oak Bay	August 1924	G.A. Hardy	Unknown	Unknown	Extirpated
Beacon Hill	1921	G.V. Copley	Unknown	Unknown	Extirpated
Bare (Mandarte?) Island	June 1915	J.R. Anderson	Unknown	Unknown	Extirpated?
Mount Douglas (Cedar Hill)	July 1897	J.R. Anderson	Unknown	Unknown	Extirpated

*Circumscribes entire population

** Each individual (genet) includes an average of about 3 shoots in a clump

The 'Bare Island' location (last observed in 1915) is probably Mandarte Island – the two names appear to be synonymous. This is an unoccupied reserve (Bare Island Indian Reserve 9). It was visited in 2002 and no plants could be found. Mandarte Island is a vast gull and cormorant colony. Gull numbers have apparently increased sharply over the past decades. The enriched soils are now dominated by rank pasture grasses including *Holcus lanatus*, *Dactylis glomerata* and *Anthoxanthum odoratum* – species that probably outcompete *Silene scouleri* on rich sites.

The Griffin Island population is problematic. This island is only a few metres from Alpha Islet, where the plant is abundant. Exhaustive surveys of Griffin Island during the peak flowering season in 2001 did not find any plants in flowering or vegetative state. It has only been reported on Griffin Island once, in 1991. The collector was not certain the plants were actually collected on Griffin Island (M.G. Shepard, naturalist, pers. com., May 2001). It seems likely the collection was made from Alpha Islet and the label is in error.

The Mount Tzuhalem population was first observed 'many years ago' by Adolf Ceska (ecologist, B.C. Conservation Data Centre, pers. com., Oct. 5, 2001). It never consisted of more than 2-3 shoots and was most recently observed in 2000 when it failed to flower. Detailed search of the precise location in 2001 and 2002 did not reveal any evidence of the plant and it is presumed extirpated from the site. This population was very unusual; it occurred well inland and much higher than any other observations or collections.

The three extant observations at Trial Island, Little Trial Island and Alpha Islet span a small area offshore from Oak Bay, a suburb of Victoria. The Little Trial and Trial Island populations are less than 500 m apart. They likely exchange DNA, through pollination, on a regular basis.

The current extent of occurrence of *Silene scouleri* ssp. *grandis* in Canada is approximately 0.6 km². The area of occupancy is 1.58 ha (0.0158 km²). Past observations of the other populations have included estimates of abundance but these appear to be too unreliable to use as a basis for tracking trends. Estimates from 2000 and 2001 suggest a total of between 278-328 individuals.

LIMITING FACTORS AND THREATS

Habitat loss presents a serious and urgent threat to *Silene scouleri* ssp. *grandis* in Canada. The specialized coastline habitats in Victoria and surrounding areas have been extensively developed for residential and commercial purposes and recreation facilities.

Habitat degradation compounds this threat. Both populations are threatened by the encroachment of exotic grasses and shrubs, most notably *Cytisus scoparius*, *Hedera helix*, *Ulex europaeus*, *Dactylis glomerata*, *Anthoxanthum odoratum*, *Lolium perenne*, *Bromus sterilis* and *B. hordeaceus*. No weed control strategies have been developed on the islands.

The warm dry sites that support *Silene scouleri* ssp. *grandis* were probably burned frequently by First Nations groups seeking to improve camas production on the adjacent uplands. Fire has been almost completely suppressed on coastal sites for several decades, which has favoured growth by introduced shrubs as well as native species including *Rosa nutkana*, *Symphoricarpos albus*, *Populus tremuloides* and *Pteridium aquilinum*. *S. scouleri* ssp. *grandis* was not found within dense patches of native or exotic shrubs or thick swards of introduced grasses.

Seed dispersal and rescue effects present a complex problem. At the broad scale, seed dispersal over distances greater than 10 m is probably extremely rare. The widely separated populations have no potential for unassisted re-colonization of former sites.

Kayakers frequently visit Trial Island, Little Trial Island and Alpha Islet. They may cause some mortality as they walk about the maritime meadows and their beach fires could escape and burn the uplands. In July 2000, an escaped beach fire intensely burned a significant portion of Little Trial Island adjacent to the area occupied by *Silene scouleri* ssp. *grandis* and may have killed some plants. While *Silene scouleri* ssp. *grandis* may benefit from light fires, heavy fuel build-ups due to the introduction of exotic shrubs and grasses may lead to intense fires that could kill the plant caudices.

The Trial Island population faces additional pressure from trampling by resident staff from both the federal coast guard lighthouse a few hundred metres away and workers associated with the radio-communications towers and associated facilities. Two of the five plants on Trial Island are within a metre of a maintained path and are susceptible to impacts from trail maintenance activities including mowing and herbicide application.

Both populations are also at risk from potential marine pollution as they grow close to the intertidal zone of one of the most active oil shipping lanes in North America.

SPECIAL SIGNIFICANCE OF THE SPECIES

Populations of *Silene scouleri* ssp. *grandis* in British Columbia are at the northern extent of their range and may represent a genetically distinct element important for the long-term survival and evolution of the species.

Silene scouleri is an attractive garden plant and a number of commercial nurseries supply the species (e.g. www.elkhornnursery.com/perennials.htm, www.cnps-yerbabuena.org/plantsale2000.html)

Essences of *Silene scouleri* are also commercially available from Flower Essence Services (www.fesflowers.com/flower_essences/research_essences.htm).

EXISTING PROTECTION OR OTHER STATUS

Silene scouleri ssp. *grandis* is not covered under the Convention on International Trade in Endangered Species (CITES), the Endangered Species Act (USA) or listed in the IUCN Red Data Book. NatureServe has designated a G5T?Q rank for the *Silene scouleri* var. *pacifica* but indicate they do not consider it to be completely synonymous with *S. scouleri* ssp. *grandis*. The G5 indicates that the species is classified as "common to very common; demonstrably secure and essentially ineradicable under present conditions". The T? ranking indicates that the subspecies has not been ranked and the Q indicates that the taxonomic validity of the variety is not clear.

The British Columbia Conservation Data Centre (2002) provincial ranking is S1, "critically imperiled, because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction. *Silene scouleri* ssp. *grandis* is currently on the B.C. Conservation Data Centre RED LIST, which includes any indigenous species or subspecies (taxa), considered to be Extirpated, Endangered, or Threatened in British Columbia.

Federal endangered species legislation has been passed in Canada but is, at present, not yet in effect. This is most likely to affect rare species on federal land but all populations of *Silene scouleri* ssp. *grandis* are restricted to provincial lands. Federal activities on the Trial Island lighthouse property may affect the species at this site.

British Columbia does not protect endangered species through legislation. The Alpha Islet population and the Little Trial Island sub-population occur within ecological reserves and are protected by law, as are all native plants within ecological reserves. B.C. Parks staff rarely visit Alpha Islet or Little Trial island and the legal protection is not backed up by a meaningful management presence.

The Trial Island sub-population is not included within Trial Island Ecological Reserve; instead it is a few metres inside a telecommunications lease. It has no formal or informal protection.

SUMMARY OF STATUS REPORT

Silene scouleri ssp. *grandis* is at considerable risk in Canada for the following reasons:

1. The extent of occurrence is very small covering only about 0.6 km² and the area of occupancy is about 1.58 ha (0.0158 km²). The distribution is severely fragmented with only two remaining populations with the Trial Island and Little Trial Island plants representing sub-populations. There is a continued decline in the area and quality of habitat as introduced grasses and shrubs achieve dominance in suitable sites, and there are only two confirmed locations in Canada, and
2. There are fewer than 350 mature individuals.

Additionally, the persistence of existing populations depends on the protection of fragmented habitats where they occur. There is an increasing threat from aggressive introduced species and from increasing foot traffic through the Trial Island population. Both populations are also at risk from potential marine pollution as they grow close to the intertidal zone of one of the most active oil shipping lanes in North America.

Suitable habitats for *Silene scouleri* ssp. *grandis* are extremely rare in Canada and are limited to southeastern Vancouver Island and adjacent local islands. There is negligible opportunity for dispersal of this species to other sites because of its lack of adaptations for seed dispersal and the great scarcity of microsites suitable for germination and establishment.

Populations of *Silene scouleri* ssp. *grandis* in British Columbia are at the northern extent of their range and may represent a genetically distinct element important for the long-term survival and evolution of the species.

Funding provided by the Garry Oak Ecosystem Recovery Team and the British Columbia Conservation Data Centre.

TECHNICAL SUMMARY

Silene scouleri* ssp. *grandis

Coastal Scouler's catchfly

grand silène de Scouler

Occurrence in Canada: British Columbia

Extent and Area information	
• extent of occurrence (EO)(km ²)	<1 km ² remaining
• specify trend	Declining
• are there extreme fluctuations in EO (> 1 order of magnitude)?	No
• area of occupancy (AO) (km ²)	~ 0.0158 km ² (1.58 ha)
• specify trend (decline, stable, increasing, unknown)	Declining
• are there extreme fluctuations in AO (> 1 order magnitude)?	No
• number of extant locations	2
• specify trend in # locations (decline, stable, increasing, unknown)	Decline
• are there extreme fluctuations in # locations (>1 order of magnitude)?	No
• habitat trend: specify declining, stable, increasing or unknown trend in area, extent or quality of habitat	Declining quality and extent
Population information	
• generation time (average age of parents in the population) (indicate years, months, days, etc.)	uncertain (2 years to flowering ?)
• number of mature individuals (capable of reproduction) in the Canadian population (or, specify a range of plausible values)	250-350
• total population trend: specify declining, stable, increasing or unknown trend in number of mature individuals	Decline (loss of one population since 2000 with possibly 1-3 plants lost)
• if decline, % decline over the last/next 10 years or 3 generations, whichever is greater (or specify if for shorter time period)	Very small ?
• are there extreme fluctuations in number of mature individuals (> 1 order of magnitude)?	Unlikely
• is the total population severely fragmented (most individuals found within small and relatively isolated (geographically or otherwise) populations between which there is little exchange, i.e., ≤ 1 successful migrant / year)?	Yes
• list each population and the number of mature individuals in each	Trial Island. sub-pop. 5 Little Trial Is. sub-pop. 23 Alpha Islet pop. 250-300
• specify trend in number of populations (decline, stable, increasing, unknown)	Decline
• are there extreme fluctuations in number of populations (>1 order of magnitude)?	No
Threats (actual or imminent threats to populations or habitats)	
- potential threats to these populations: habitat loss, habitat degradation, trampling, pollution, competition with exotic plants	
Rescue Effect (immigration from an outside source)	
• does species exist elsewhere (in Canada or outside)?	Low
• status of the outside population(s)?	USA
• is immigration known or possible?	Stable
• would immigrants be adapted to survive here?	Unknown
• is there sufficient habitat for immigrants here?	Yes
Quantitative Analysis	

ACKNOWLEDGEMENTS

The authors would like to acknowledge the very valuable assistance of the British Columbia Conservation Data Centre, and in particular Brenda Costanzo, in the preparation of this report. George Douglas gave us valuable advice on the complex taxonomy of this species and provided us with illustrations and the Canadian range map.

Funding provided by the Garry Oak Ecosystem Recovery Team and the British Columbia Conservation Data Centre.

LITERATURE CITED

- B.C. Conservation Data Centre. 2002. 2002 Provincial vascular plant tracking list. B.C. Conservation Data Centre, Ministry of Sustainable Resource Management. Victoria, B.C.
- Brantjes and Leemans. 1976. *Silene otites* (Caryophyllaceae) pollinated by nocturnal Lepidoptera and mosquitoes. *Acta Bot. Neerl.* 25: 281-295.
- Brown, E. & S. Kephart. 1999. Variability in pollen load: implications for reproduction and seedling vigour in a rare plant, *Silene douglasii* var. *oraria*. *International Journal of Plant Sciences* 160 (6): 1145-1152.
- Deno, N.C. 1994. Seed germination – theory and practice. 2nd edition. 240 pp. Self-published.
- Douglas, G.W. and A. MacKinnon. 1998. Caryophyllaceae. Pages 230-305 *In* G.W. Douglas, G.B. Straley, D. Meidinger and J. Pojar, eds. *Illustrated Flora of British Columbia. Volume 2: Dicotyledons (Balsaminaceae through Cuscutaceae)*. B.C. Ministry of Environment, Lands & Parks, B.C. Ministry of Forests, Victoria, B.C.
- Douglas, G. W., G.B. Straley & Del Meidinger. 1998. *Rare Native Vascular Plants of British Columbia*. B.C. Ministry of the Environment Lands and Parks.
- Hitchcock, C. L. and A. Cronquist. 1973. *Flora of the Pacific Northwest*. University of Washington Press. Seattle, Washington.
- Hitchcock, C.L., A. Cronquist, M. Ownbey and J.W. Thompson. 1964. *Vascular Plants of the Pacific Northwest. Part 2: Salicaceae to Saxifragaceae*. University of Washington Press, Seattle.
- Hitchcock, C.L. & B. Maguire. 1947. A revision of North American species of *Silene*. *Univ. Washington Publ. Biol.* 13: 1-73.
- Jürgens, A., Taina Witt & G. Gottsberger. 1996. Reproduction and pollination in central European populations of *Silene* and *Saponaria* species. *Botanica Acta* 109 (4): 316-324.
- Kay, Q., A. Lack, F. Bamber & C. Davies. 1984. Differences between sexes in floral morphology, nectar production and insect visits in a dioecious species, *Silene dioica*. *New Phytol.* 98: 515-529.
- Kephart, S. and S. Nebenzahl. 1983. Population status, phenology, and reproductive biology of an Oregon coastal endemic, *Silene douglasii* var. *oraria*. *Willamette Journal of the Liberal Arts* 1:27-42.

- *Kephart, S. & C. Paladino. 1997. Demographics and microhabitat variability in a grassland endemic, *S. douglasii* var. *oraria*. (Caryophyllaceae). *American Journal of Botany* 84: 179-189.
- Kruckeberg, A.R. 1961. Artificial crosses of western North American *Silenes*. *Brittonia* 13: 305-333.
- Lea, Ted. 2002. Historical Garry Oak Ecosystems of Greater Victoria and Saanich Peninsula. 1:20,000 Map. Terrestrial Information Branch, B.C. Ministry of Sustainable Resource Management. Victoria, B.C.
- Lesica, P. 1988. Germination requirements and seedling biology of Spalding's catchfly (*Silene spaldingii*). Prepared for: The Nature Conservancy, Montana/Wyoming Office, Helena Montana. Montana Natural Heritage Program, Helena. 2 pp.
- Lesica, P. 1992. The effects of fire on *Silene spaldingii*. 1992 progress report. Montana Natural Heritage Program. Helena. 14 pp.
- Lesica, P. 1993. Loss of fitness resulting from pollinator exclusion in *Silene spaldingii* (Caryophyllaceae). *Madrono* 40: 193-201.
- Lesica, P. and B. Steele. 1994. Prolonged dormancy in vascular plants and implications for monitoring studies. *Natural Areas Journal* 14: 209-212.
- Marsden-Jones, E.M. & W.B. Turrill. 1957. The Bladder Campions (*Silene maritima* and *S. vulgaris*). The Ray Society, London, England.
- Menges, E.S. 1995. Factors limiting fecundity and germination in small populations of *Silene regia* (Caryophyllaceae), a rare hummingbird-pollinated prairie forb. *American Midland Naturalist* 133: 242-255.
- Peck, M.E. 1941. A manual of the higher plants of Oregon. Binford and Mort. Portland, Oregon. 866 pp.
- Pettersson, M. 1991. Pollination by a guild of fluctuating moth populations: option for unspecialization in *Silene vulgaris*. *Journal of Ecology* 79: 591-604.
- Schassberger, L.A. 1988. Report on the conservation status of *Silene spaldingii*, a candidate threatened species. Montana Natural Heritage Program, Helena. 71 pp.
- Wilken, D. 1993. *Silene*. Pages 488-493 *In* J.C. Hickman ed., *The Jepson Manual. Higher Plants of California*. University of California Press. Berkeley.

THE AUTHORS

Matt Fairbarns has a B.Sc. in Botany from the University of Guelph (1980). He has worked on rare species and ecosystem mapping, inventory and conservation in western Canada for approximately 20 years.

Kathleen Wilkinson has a B.Sc.A., Plant Science Major, from the University of Manitoba (1972) and an M.Sc. in Plant Ecology from the University of Calgary (1981). She has worked as a resource planner, and for most of the last 25 years as an environmental consultant in western Canada. Kathleen has written two field guides to the native plants of Alberta.

AUTHORITIES CONSULTED

- Caplow, F. Botanist. February 2002. Washington Natural Heritage Program
Department of Natural Resources, Olympia, WA.
- Donovan, M. July 2001. Biological Information Coordinator. B.C. Conservation Data
Centre. B.C. Ministry of Sustainable Resource Management.
- Douglas, W. George. Program Botanist. B.C. Conservation Data Centre, B.C. Ministry
of Environment, Lands and Parks. Victoria, B.C.
- Grushow, J. Professional gardener.
- Kephart, S. Professor of Botany. Willamette University, Salem, Oregon.
- McNeill, J. Director Emeritus, Royal Ontario Museum, Honorary Associate, Royal
Botanic Gardens Edinburgh. Edinburgh, Scotland.
- Morton, J.K. Professor Emeritus. University of Waterloo, Waterloo, Ontario.

COLLECTIONS EXAMINED

The following collection was consulted:

- Royal BC Museum herbarium