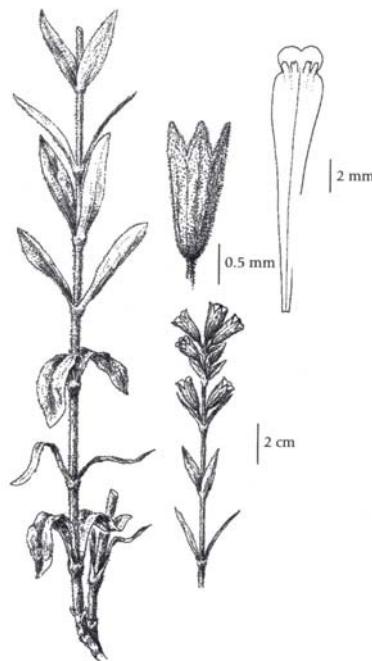


COSEWIC Assessment and Status Report

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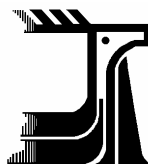
Spalding's Campion *Silene spaldingii*

in Canada



**ENDANGERED
2005**

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:

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Production note:

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Également disponible en français sous le titre Évaluation et Rapport de situation du COSEPAC sur le silène de Spalding (*Silene spaldingii*) au Canada.

Cover illustration:

Spalding's campion — From Douglas and MacKinnon (1998) with permission.

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COSEWIC Assessment Summary

Assessment Summary – May 2005

Common name

Spalding's campion

Scientific name

Silene spaldingii

Status

Endangered

Reason for designation

This long-lived perennial herb is a globally imperilled species restricted to two small areas west of the Rockies with only a single population in southern British Columbia. The Canadian population is one of the largest populations known but may contain fewer than 250 mature plants. These plants are at risk from ongoing habitat loss and degradation especially by introduced weeds.

Occurrence

British Columbia

Status history

Designated Endangered in May 2005. Assessment based on a new status report.



COSEWIC
Executive Summary

Spalding's Campion
Silene spaldingii

Species information

Silene spaldingii is a perennial herb growing from a simple or branched stem base. The erect stems are glandular and hairy, with four to seven pairs of leaves. The inflorescence consists of several to many white flowers in a leafy and usually compact cluster. The fruit consists of an oblong capsule containing light brown seeds.

Distribution

Globally, *Silene spaldingii* occurs from southeastern British Columbia to northwestern Montana and from north-central Idaho into eastern Washington and northeastern Oregon. In Canada, *S. spaldingii* is limited to an area of less than 1 km² on the rolling Tobacco Plains in the vicinity of the town of Roosville.

Habitat

Silene spaldingii occurs between 580 and 1220 m elevation in the mesic grasslands that make up the Palouse prairie, a division of the Pacific Northwest bunchgrass habitat type. *S. spaldingii* populations are also known to extend into the edge of *Pinus ponderosa* woodlands. The species occurs in fragmented patches as a result of large-scale anthropogenic changes to its habitat over the last century, and seems to prefer gently sloping, northerly aspects.

Vegetation associated with *Silene spaldingii* in Canada includes *Festuca* species, *Lupinus sericeus*, *Hypericum perforatum*, *Castilleja tenuis* and *C. thompsonii*. The *Silene spaldingii* habitat is heavily grazed, with introduced *Bromus tectorum* occurring throughout.

Biology

Silene spaldingii is a perennial herb arising from a simple or branched stem base formed above a long, slender taproot. Its shoot tips are buried in the ground during the plant's dormant stage which is typical of plants called "geophytes". In the plant's first year, rosettes are formed, after which vegetative stems are produced. Rhizomes or other means of vegetative propagation are lacking. Flowers are borne in a branched,

terminal, inflorescence and bloom in July, setting seed in August. Plants spend nearly 50% of their summers in a dormant condition.

Silene spaldingii is long-lived, usually surviving for at least five years. Recruitment of *S. spaldingii* is sporadic, and populations are able to persist many years without growth in population numbers. Loss of habitat is the primary factor affecting survival and recruitment in the species. Climatic fluctuations may also be a threat to *S. spaldingii* populations, particularly drought conditions. Non-native plants compete with *S. spaldingii* for water, nutrients and light, as well as pollinators.

Population sizes and trends

The Canadian *Silene spaldingii* population consisted of approximately 100 plants in 1995. In 2003 no plants were apparent at the site, probably due to the dormancy characteristics of the species. It is not currently possible to assess the population trend due to lack of information.

Limiting factors and threats

Habitat loss has historically presented the greatest threat to *Silene spaldingii*. The remaining *S. spaldingii* habitat is increasingly affected by invasion of non-native species due to grazing. Fire suppression also threatens *S. spaldingii* by allowing ingrowth of woody vegetation and accumulation of plant litter. In addition, drought conditions over the past few years are likely increasing stress on *S. spaldingii*, intensifying anthropogenic pressures.

Special significance of the species

The Canadian population of *Silene spaldingii*, a total of 100 plants, is at the northern extent of the species' range and, along with the Montana populations, may represent a genetically distinct element important for the long-term survival and evolution of the species, but this research has yet to be conducted. The species has no commercial value and is not known in cultivation, nor is it known to have cultural, medicinal or spiritual uses.

Existing protection or other status designations

Silene spaldingii is globally ranked as imperiled (G2), and is listed as threatened under the *Endangered Species Act* (U.S.A.), providing protection for the species on U.S. federal lands. In Canada, the species is ranked N1 but has no federal or provincial protection since the population occurs on private property.



COSEWIC HISTORY

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. On June 5, 2003, the *Species at Risk Act* (SARA) was proclaimed. SARA establishes COSEWIC as an advisory body ensuring that species will continue to be assessed under a rigorous and independent scientific process.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the national status of wild species, subspecies, varieties, or other designatable units that are considered to be at risk in Canada. Designations are made on native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fishes, arthropods, molluscs, vascular plants, mosses, and lichens.

COSEWIC MEMBERSHIP

COSEWIC comprises members 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 Biodiversity Information Partnership, chaired by the Canadian Museum of Nature), three non-government members and the co-chairs of the species specialist and the Aboriginal Traditional Knowledge subcommittees. The Committee meets to consider status reports on candidate species.

DEFINITIONS (NOVEMBER 2004)

Wildlife Species	A species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and it is either native to Canada or has extended its range into Canada without human intervention and has been present in Canada for at least 50 years.
Extinct (X)	A wildlife species that no longer exists.
Extirpated (XT)	A wildlife species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A wildlife species facing imminent extirpation or extinction.
Threatened (T)	A wildlife species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
Not at Risk (NAR)**	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient (DD)***	A wildlife species for which there is inadequate information to make a direct, or indirect, assessment of its risk of extinction.

* 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.



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

COSEWIC Status Report

on the

Spalding's Champion

Silene spaldingii

in Canada

2005

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SPECIES INFORMATION

Name and classification

Scientific name: *Silene spaldingii* S. Wats.
Synonyms: none
Common name: Spalding's campion
Family: Caryophyllaceae (Pink family)
Major plant group: Dicot flowering plant

Description

Silene spaldingii is a light-green perennial herb growing from a simple or branched stem base (Figure 1). The 20-60 cm tall stems are erect, branched above, long, woolly-hairy and more or less glandular-hairy. The basal leaves are few and soon deciduous. Stem leaves are opposite, with 4-7 pairs, oblanceolate below to lanceolate above, long woolly-hairy and more or less glandular-hairy, 6-7 cm long, 0.5-1.5 cm wide, unstalked and slightly fused, with stipules lacking. The inflorescence consists of several to many flowers in a leafy and usually compact cluster (Figure 2). The 5 petals are white, and stalk-like at the bases; the stalks are about 15 mm long while the blades are very short, egg-shaped, about 2 mm long, entire or shallowly notched at the tip, with appendages 4 (5-6). The 5 sepals are united, 10-nerved, forming a tube about 15 mm long at flowering time, becoming more nearly club- or bell-shaped in fruit. The capsules are oblong and 1-celled, and the seeds are light brown, 2.0 mm long, corrugate-wrinkled and inflated.

DISTRIBUTION

Global range

Silene spaldingii is known from the Roosville area of southeastern British Columbia south into adjacent northwestern Montana and from north-central Idaho south through eastern Washington to northeastern Oregon (Figure 3). Montana has the largest population of *Silene spaldingii*, with an estimated 10,000 plants on the Dancing Prairie Preserve, approximately 7 km south of the Canadian population; this consists of a metapopulation that extends to within 1.3 km of the BC population. The earliest observation at the Dancing Prairie Preserve was in 1985. Based on the large size of this population it is, therefore, not a recent arrival in the area (Scott Mincemoyer, pers. com. 2005 to E. Haber). Since the nearby British Columbia population is likely a satellite population of the larger Dancing Prairie Preserve population, it is also reasonable to assume that the Canadian plants have been present for some time.

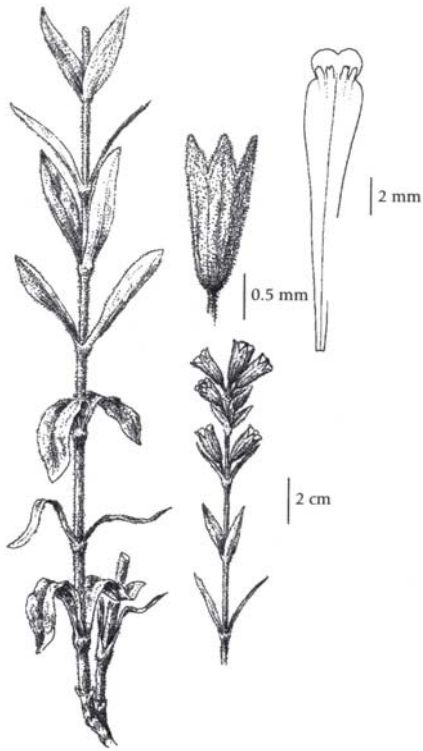


Figure 1. Illustration of *Silene spaldingii* (from Douglas and MacKinnon 1998, with permission): plant growth form (left and bottom centre) and highly enlarged calyx (top centre) and single petal (top right).



Figure 2. *Silene spaldingii* at Tobacco Plains, British Columbia (Photo courtesy of Mike Miller).

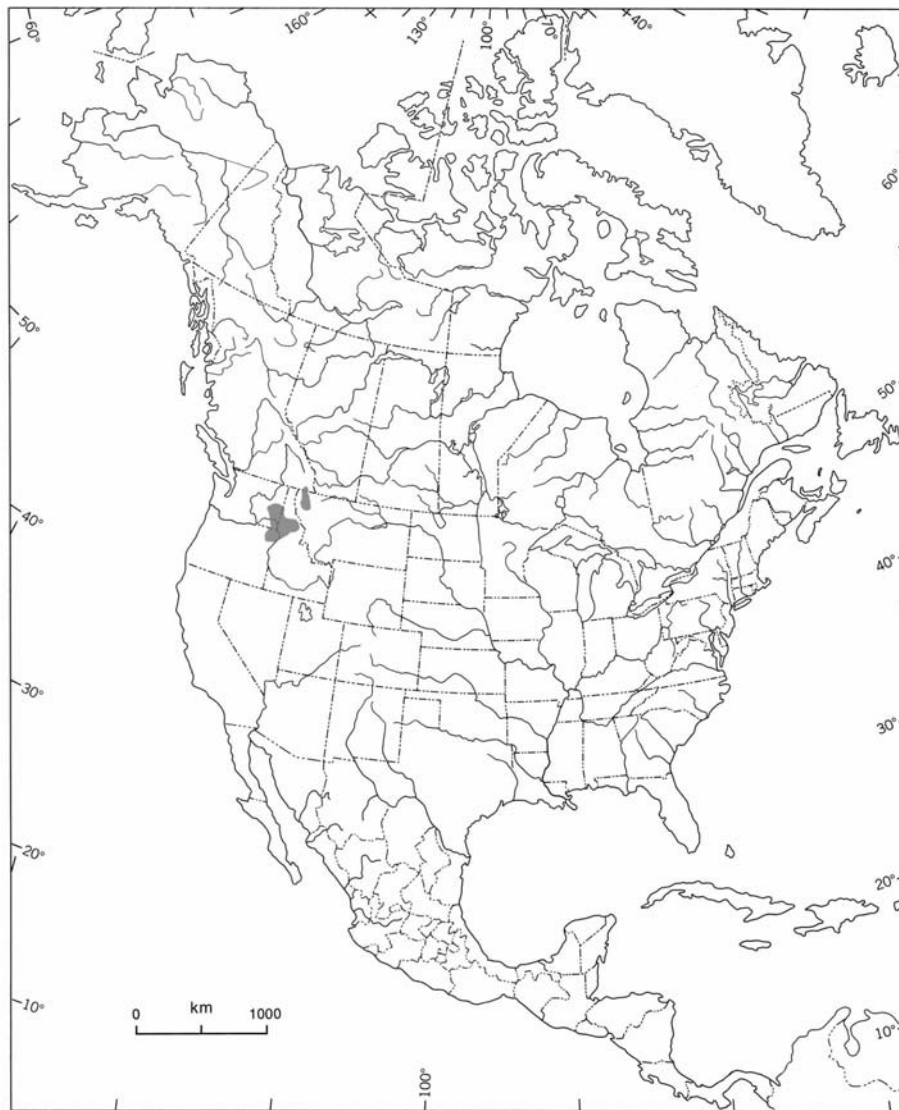


Figure 3. Global distribution of *Silene spaldingii* (USDI-FWS 2001, Lorain 1991, Lichthardt and Gray 2002).

Canadian range

The Canadian range of *Silene spaldingii* is limited to the northern section of Tobacco Plains that extends into southeastern British Columbia from Montana (Figure 4). Tobacco Plains is located in a narrow glacial valley at 835-850 m elevation, running approximately from Eureka, Montana through Roosville, British Columbia (Lesica 1999).

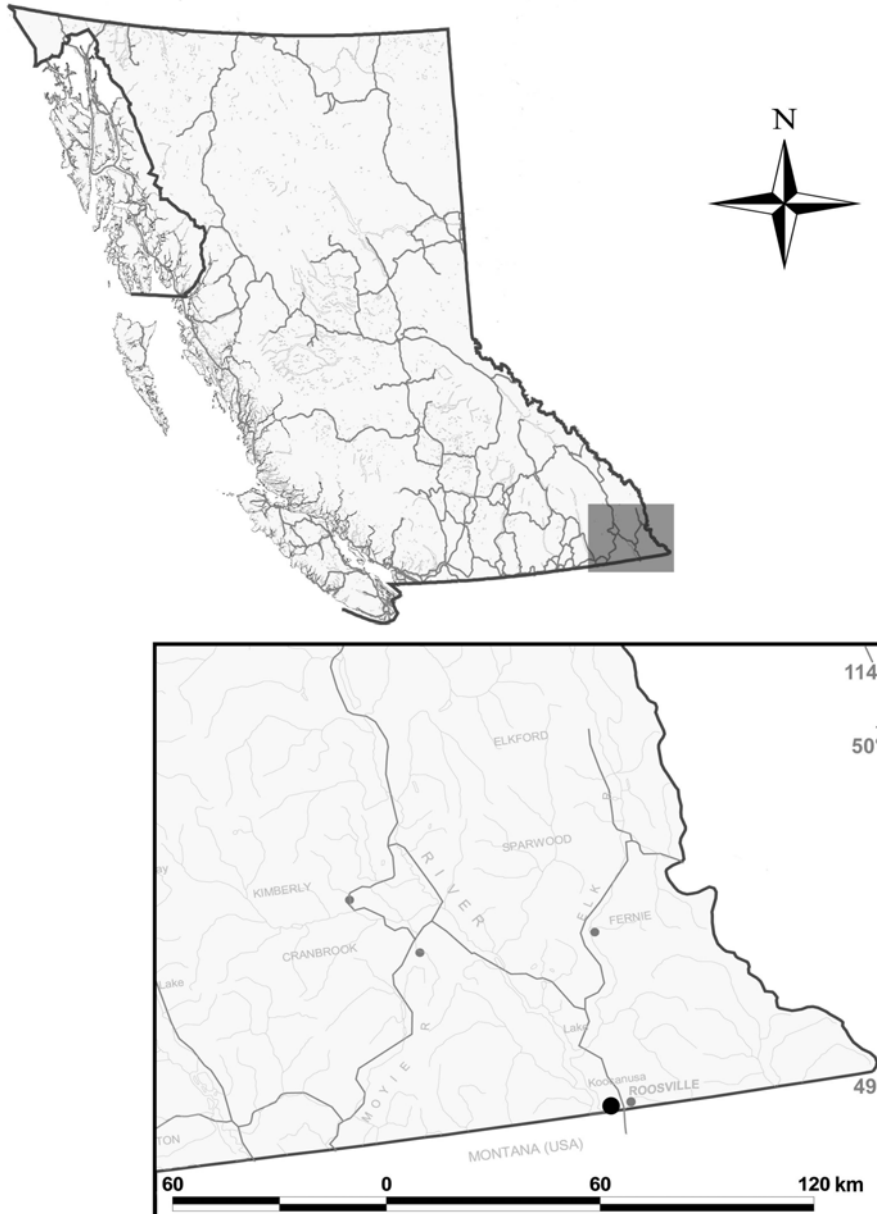


Figure 4. Distribution of *Silene spaldingii* in Canada (Douglas and MacKinnon 1998).

Silene spaldingii was first observed at Tobacco Plains in Canada in 1988 and later reported by Lorain (1991). The first collection of *S. spaldingii* in British Columbia was made by M. Miller in 1995 at Tobacco Plains (Miller and Allen 1997).

The known extent of *S. spaldingii* occurrence in Canada is estimated to be approximately 300 m² (Mike Miller, pers. comm.), with the same size area of occupancy. The reported population occurs in one known location, although intensive searches of an adjacent Indian Reserve have yet to be made. Approximately 50% of the Canadian Tobacco Plains area has been searched. Total potential habitat in the area around the original reported population is not likely more than .03 km² (ca 3 ha).

Silene spaldingii is just one of a number of species recently discovered (since the 1980s) along the British Columbia border from the Princeton area to the Roosville area. Some of these species include: *Antennaria flagellaris*, *Carex vallicola*, *Collomia tenellus*, *Floerkea proserpinacoides*, *Hedeoma hispida*, *Lipocarpa micrantha*, *Orobanche ludoviciana*, *Orthocarpus barbatus*, *Phacelia ramosissima*, *Psilocarphus brevissimus* and *Trichostema oblongum* (Douglas *et al.* 1998a). Most of these species have at least one thing in common; the areas in which they were found were never subjected to botanical collecting. Examination of collection localities in all major herbaria in Canada reveal that none of the many active field botanists working along the border ever collected in the immediate vicinity of the recently collected plants.

One of the earliest collections of this species made in Montana about 90 km south of the Roosville, BC, locality was in 1894 from the vicinity of Columbia Falls (Logan Creek 2005). This clearly indicates that the species has been in the immediate area south of the BC site for quite some time and likely has also been in Canada for at least as long.

Due to the relatively recent discovery of *Silene spaldingii* at Tobacco Plains, it is difficult to assess changes to the species' historical range. It may be assumed that range loss has occurred as a result of agricultural and residential development, as has occurred with *S. spaldingii* range in the U.S.A. (USDI-FWS 2001).

HABITAT

Habitat requirements

Silene spaldingii is primarily restricted to mesic grasslands that make up the Palouse prairie (Hitchcock and Maguire 1947; USDI-FWS 2001), a division of the Pacific Northwest bunchgrass habitat type (Tisdale 1982). The species occurs on the deep, productive silt/loam (loess) typical of the Palouse prairie (NatureServe 2003, Lorain 1991). *Silene spaldingii* populations are also known to extend into the edge of *Pinus ponderosa* woodlands (NatureServe 2003). The elevation ranges from 580 to 1220 m (NatureServe 2003).

Across its range, the species occurs in fragmented patches as a result of large-scale anthropogenic changes to the Palouse prairie over the last century (USDI-FWS

2001). In its US range, the plant is often found near scattered *Pinus ponderosa* trees, and there seems to be a preference for gently sloping, northerly aspects in the Palouse prairie (NatureServe 2003).

Silene spaldingii is typically associated with native perennial grasses such as *Festuca idahoensis*, *F. campestris*, and *Agropyron (Pseudoroegneria) spicatum*. Other associated species may include *Antennaria microphylla*, *Arnica sororia* and *Hieracium cynoglossoides (H. scouleri var. griseum)*, as well as *Koeleria cristata (K. macrantha)*, *Achillea millefolium*, *Geum triflorum*, *Geranium viscosissimum*, and *Balsamorhiza sagittata*. Associated shrubs include *Symphoricarpos albus* and *Rosa* spp. (USDI-FWS 2001, Lesica 1999). *Silene spaldingii* is also known to occur in association with *Pinus ponderosa* (USDI-FWS 2001, Lichthardt and Gray 2002).

The Canadian population of *Silene spaldingii* can be considered part of northwest Montana's metapopulation, also occurring on Tobacco Plains. *Silene spaldingii*, in Montana, has been more extensively studied than has the Canadian population. The British Columbia population is 1.3 km north of the closest Montana location. The grasslands of western Montana are transitional between the Palouse prairie type of Washington and Oregon and grasslands of the Northern Great Plains (Antos *et al.* 1983). In these grasslands, *S. spaldingii* occurs in the bottom of shallow swales and on cool slope exposures with relatively deep soil. Common grasses in these habitats include *Festuca campestris*, *F. idahoensis*, and *Poa pratensis*. Common forbs are *Antennaria microphylla*, *Arnica sororia*, and *Hieracium cynoglossoides (H. scouleri var. griseum)* (Lesica 1999). *Silene spaldingii* in Canada was observed growing with *Lupinus sericeus*, *Hypericum perforatum*, and *Castilleja thompsonii* (Miller and Allen 1997).

The mean precipitation for Eureka, Montana, six km south of Tobacco Plains, is 37 cm/yr for 1971-2000. The January minimum and July maximum temperatures for this period were -9.4° and 29°C, respectively (Eureka Ranger Station Normals, 2005).

Trends

Less than 2% of the Palouse prairie habitat remains due to agricultural conversion, grazing, invasion of nonnative plant species, altered fire regimes and urbanization (USDI-FWS 2001). The Palouse prairie on Canada's Tobacco Plains (Figure 5) appears to be affected by all these factors (Miller and Allen 1997).

In addition, the area is suffering from a prolonged drought. The U.S. National Weather Service office in Great Falls, Montana ranked the last water year (Oct 2002-Sept 2003) at Kalispell (approx. 100 km SE of Tobacco Plains), as the fifth driest year out of 103 years on record (NWS – Great Falls 2003). In addition, precipitation at Eureka has also been below average for the years 1999, 2000, and 2001.



Photo by Shyanne J Smith 2003

Figure 5. Roosville area of Tobacco Plains, British Columbia, in the foreground. The highway in the photo is in the U.S.A.

Historically, fire has played an important role in maintaining grasslands by limiting the establishment of woody vegetation (Barrett and Arno 1982, Koterba and Habeck 1971). The current suppression of natural fire, and absence of anthropogenic burning, may contribute to an ongoing loss of habitat.

The Tobacco Plains habitat in Canada appears to have been heavily grazed, with introduced *Bromus tectorum* occurring throughout. It has been noted by researchers in the U.S.A. that *Silene spaldingii* competes very poorly with introduced weedy species (Lorain 1991, WNHP and USDI Bureau of Land Management 1997). In addition, the introduced flowering herb *Hypericum perforatum* competes with *S. spaldingii* for pollinators (Lichthardt and Gray 2002), and was observed by the report writers at the Tobacco Plains site in 2003. *Bombus* species are thought to be the only significant pollinators of *S. spaldingii*, and may be susceptible to agricultural development and fire, since they live near the ground (Lesica 1993, Lichthardt and Gray 2002).

Protection/ownership

The Tobacco Plains *Silene spaldingii* population reported from 1995 was found on rangeland of a ranch near Roosville. There is a possibility that the species may also occur on the adjacent Tobacco Plains Indian Reserve but lack of permission to enter the reserve prevented searching for the species in 2003. Since the population occurs on private property, and the species is not listed under the Wildlife Amendment Act as a threatened or endangered species in British Columbia, it has no legal protection.

BIOLOGY

General

Silene spaldingii is a perennial herb arising from a simple or branched caudex formed above a long, slender taproot. Its shoot tips are buried in the ground during the plant's dormant stage (typical of "geophytes"). Rhizomes or other means of vegetative propagation are lacking.

Reproduction

Silene spaldingii is a perennial. In the plant's first year (if seeds germinate in the spring), only rosettes are formed; aerial shoots are produced in subsequent years. If seeds germinate the previous fall, the new plantlets may only produce vegetative stems in their first summer but flowering stems in subsequent years. Existing plants send up new vegetation in mid-May and become senescent by early September (Lesica 1999).

Silene spaldingii is protandrous, with the anthers maturing and dehiscing pollen before the styles extend and stigmas become receptive. Most plants flower for the first time when two years or older. Flowers are borne in a branched, terminal, inflorescence and, in Montana, bloom in July and set seed in August (Lesica 1999). Each flower persists for two to several days, and two or more flowers may be in bloom on the same plant. This arrangement promotes outcrossing, while also allowing selfing (Lesica 1993, Lichthardt and Gray 2002). Seeds are dispersed by being shaken from an orifice on the top of the mature ovary. Seeds will germinate with as little as four weeks of cold treatment, so germination likely occurs in fall as well as spring (Lesica 1993).

Research by Lesica (1993) indicates that *Silene spaldingii* is dependent on insects for pollination. At Lesica's Montana study site (on Tobacco Plains), only *Bombus nevadensis* appeared to be an important pollinator.

Survival

Silene spaldingii is a moderately long-lived perennial, with at least 72% of plants surviving for at least five years in a study at Dancing Prairie Preserve. Survival of first-year plants is high, indicating that most mortality occurs in early seedling stages. This study also found recruitment of *S. spaldingii* to be sporadic, although the population growth rate remained stable over the seven-year period of the study. Since the plant is long-lived, populations are able to persist many years without recruitment (Lesica 1997).

The maximum and minimum temperatures for survival of *S. spaldingii* plants are unknown, although the maximum recorded summer temperature in the area (around Eureka, Montana) over the last 30 years is about 29°C, and the minimum winter temperature is -9.4°C (Eureka Ranger Station Normals, 2005). Climatic fluctuations are considered a threat to *S. spaldingii* populations, particularly drought conditions (USDI-FWS 2001, Lorain 1991).

Loss of habitat, as a result of heavy grazing, agricultural cultivation, chemical spraying, and invasion of introduced species, is the primary factor affecting survival and recruitment in *S. spaldingii* in the U.S. (Lorain 1991, Lesica 1999). In addition, it has been shown that fire enhances recruitment in *S. spaldingii*. Reduction of the litter layer, increased available nutrients and/or warmer soil temperatures, as a result of fire, increase seedling germination and/or establishment (Lesica 1999). Predation does not appear to be a significant factor affecting the survival of *S. spaldingii*, although insect predation has been observed in Oregon (seed weevils) and Montana (caterpillars) (Lorain 1991).

Physiology

Silene spaldingii plants exhibit prolonged summer dormancy and may not produce above-ground vegetation for 50% of their growing season (Lesica and Steele 1994, Lesica 1997). In Montana's Tobacco Plains population, Lesica (1997) found that 41% of *S. spaldingii* plants exhibited prolonged dormancy each year between 1989-1994. In essence, this means that in a given population of *S. spaldingii*, there may be only about 40-50% of the population with above-ground shoots visible in a particular season. The causes of dormancy in *S. spaldingii* are unknown, although it can be theorized that it is a physiological response to environmental stresses such as drought or flooding (Lesica 1999).

Movements/dispersal

Due to the close proximity (approximately 1.3 km) of the Canadian *Silene spaldingii* population to a population in Montana, it is possible that some genetic dispersal could occur between the two populations, at least over longer periods of time. It is unknown, however, whether seed dispersal between populations actually occurs. The British Columbia and Montana populations are separated by a distance of 190 km from other *S. spaldingii* populations in Idaho and Washington (USDI-FWS 2001). Considering the localized means of seed dispersal from capsules, spread of invasive weeds that reduce habitat quality, and the relatively dry conditions within the region in the last few years, it is unlikely that seed dispersal and seedling establishment from nearby US sub-populations would occur. At best, the rescue effect would have a very low probability.

Nutrition and interspecific interactions

Nonnative plants compete with *Silene spaldingii* for water, nutrients and light (USDI-FWS 2001). In addition, nonnative flowering species such as *Hypericum perforatum* can compete with *S. spaldingii* for pollinators (Lichthardt and Gray 2002).

Research by Lesica (1993) indicates that *S. spaldingii* is dependant upon insect pollination, most likely by one species of *Bombus*. Without adequate pollinators, enforced selfing would result in inbreeding depression, which in turn could lead to extirpation of *S. spaldingii* populations after only a few generations (Lesica 1993).

Although there is evidence of predation/pests on *S. spaldingii*, it is unknown whether these have a significant direct impact on the plant in British Columbia. Grazing

of *S. spaldingii* inflorescences by livestock or native herbivores is considered a serious threat in U.S. populations. In eastern Washington, rodent activity is affecting the persistence of *S. spaldingii*. Insect predation of seeds also reduces the reproductive success of the species (USDI-FWS 2001).

Behaviour/adaptability

The specialized habitat requirements of *Silene spaldingii* suggest that the species is poorly adapted to forest invasion (resulting from fire suppression), and is adapted to moderate disturbance. Forest invasion is not presently a threat at the British Columbia site. The species is a poor competitor with nonnative vegetation. Although *S. spaldingii* can be found in disturbed grasslands, such as the British Columbia population, it has disappeared in many degraded sites in the United States. The species tolerates, and may benefit from, moderate periodic disturbance such as fire or moderate grazing but not heavy grazing or trampling, which encourages growth of nonnative species (Lesica 1999).

POPULATION SIZES AND TRENDS

In 1995, a survey of the Canadian population of *Silene spaldingii* estimated that it consisted of approximately 100 plants, although the number of mature individuals was not surveyed (Miller and Allen 1997). It is likely that the population is larger than this number, perhaps double in size to the original estimate, in view of the observations that perhaps as many as 50% of plants may not have above-ground shoots present in a particular year due to dormancy characteristics of this species (Lesica and Steele 1994, Lesica 1997). Recent drought conditions may also be causing an increased amount of summer dormancy in the plant. Since no plants were found during the 2003 survey, probably due to dormancy of remaining plants, it is not currently possible to assess the population trend. Of the approximately 52 known *S. spaldingii* populations in North America, only 18, including Canada's population, are larger than 50 plants (USDI-FWS 2001), indicating that the Canadian population is comparatively large.

LIMITING FACTORS AND THREATS

Habitat loss has historically presented the greatest threat to *Silene spaldingii* and most of the Palouse prairie habitat suitable for agricultural or urban development has already been lost. The British Columbia population is located on private property near a small town, and future development could destroy some, or all, of its present area of occupancy. Habitat loss has also resulted in a fragmented distribution in the U.S.A., making loss of genetic variation a concern for the British Columbia population.

Another significant threat is agricultural activities, including grazing. The habitat of the British Columbia population appears to be suffering from prior overgrazing. The remaining *S. spaldingii* habitat is increasingly affected by invasion of non-native species. The plants in the British Columbia population occur in a disturbed grassland,

with a significant cover of *Bromus tectorum*, as well as *Hypericum perforatum*. Both of these invasive species compete directly with *S. spaldingii*.

Fire suppression is likely occurring on the Tobacco Plains, resulting in reduced recruitment of *S. spaldingii*, and allowing in-growth of woody vegetation. In addition, drought conditions over the past few years is likely increasing stress on the plants, intensifying anthropogenic pressures.

SPECIAL SIGNIFICANCE OF THE SPECIES

The Canadian population of *Silene spaldingii* is at the northern extent of the species' range and, along with the Montana populations, may represent a genetically distinct element important for the long-term survival and evolution of the species, but this research has yet to be conducted. In addition, *S. spaldingii* may function as an indicator of Palouse prairie integrity.

The species has no commercial value and is not known in cultivation. It is not known to have cultural, medicinal or spiritual uses.

EXISTING PROTECTION OR OTHER STATUS DESIGNATIONS

Silene spaldingii is not covered under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), or the IUCN Red Data Book. It is listed as threatened under the Endangered Species Act (U.S.A.), providing protection for the species on U.S. federal lands.

The species is globally ranked by NatureServe (2003) as G2 indicating that it is "imperiled because of rarity (typically six to 20 extant occurrences or very few remaining individuals) or because of some factor(s) making it very susceptible to extirpation or extinction". In the U.S.A., *S. spaldingii* is ranked as S1 in Idaho, Montana and Oregon. This rank indicates that it is "critically imperiled because of extreme rarity (5 or fewer extant occurrences or very few remaining individuals) or because of some factor(s) making it especially vulnerable to extirpation or extinction" (NatureServe 2003). In Washington, the species is ranked as S2.

In British Columbia, the species is ranked as S1 and has been placed on the British Columbia Ministry of Sustainable Resource Management Red List (Douglas *et al.* 2002). This list indicates the species is extirpated, endangered, or threatened in British Columbia. Since *S. spaldingii* is restricted to British Columbia, it is ranked as N1 in Canada.

The *S. spaldingii* population in British Columbia occurs on a privately owned ranch, on the edge of the Tobacco Plains Indian Reserve. Its inclusion on the British Columbia Red List does not currently provide legal protection in British Columbia for the plant, or its critical habitat.

TECHNICAL SUMMARY

Silene spaldingii

Spalding's campion

Range of Occurrence in Canada: British Columbia

silène de Spalding

Extent and Area Information	
• <i>Extent of occurrence (EO)(km²)</i> [area of single site known]	<1 km ²
• <i>Specify trend in EO</i>	Unknown
• <i>Are there extreme fluctuations in EO?</i>	Unknown
• <i>Area of occupancy (AO) (km²)</i> [approximate area occupied by plants]	<1 km ² (300 m ²)
• <i>Specify trend in AO</i>	Unknown
• <i>Are there extreme fluctuations in AO?</i>	Unknown
• <i>Number of known or inferred current locations</i>	1
• <i>Specify trend in #</i>	Stable
• <i>Are there extreme fluctuations in number of locations?</i>	No
• <i>Specify trend in area, extent or quality of habitat</i>	Decline
Population Information	
• <i>Generation time (average age of parents in the population)</i>	Unknown (perhaps several years)
• <i>Number of mature individuals</i>	Unknown but perhaps <100 to perhaps 200?
• <i>Total population trend:</i>	Unknown
• <i>% decline over the last/next 10 years or 3 generations.</i>	N/A
• <i>Are there extreme fluctuations in number of mature individuals?</i>	Unknown
• <i>Is the total population severely fragmented?</i>	Yes
• <i>Specify trend in number of populations</i>	Stable
• <i>Are there extreme fluctuations in number of populations?</i>	Unknown
• List populations with number of mature individuals in each: <100 to perhaps 200?	
Threats (actual or imminent threats to populations or habitats)	
<p>- Current threats most directly affecting the species are likely the invasion of non-native species reducing available habitat and several years of drought forcing extended periods of dormancy that could reduce viability and cause plant deaths.</p> <p>- Potential and historic threats pertain primarily to habitat loss, habitat degradation, habitat fragmentation, and agricultural practices such as chemical spraying (herbicides), livestock grazing and trampling, and fire suppression.</p>	
Rescue Effect (immigration from an outside source)	
• <i>Status of outside population(s)?</i> USA: Declining	
• <i>Is immigration known or possible?</i>	Possible
• <i>Would immigrants be adapted to survive in Canada?</i>	Yes
• <i>Is there sufficient habitat for immigrants in Canada?</i>	Unknown

<ul style="list-style-type: none"> • <i>Is rescue from outside populations likely?</i> 	Perhaps possible over a longer period of time but unlikely over the course of several generations and under drought conditions presently experienced in the region.
Quantitative Analysis [provide details on calculation, source(s) of data, models, etc]	N/A
Current Status COSEWIC: Endangered (May 2005)	

Status and Reasons for Designation

Status: Endangered	Alpha-numeric code: B1ab (iii)+ ab (iii); C2a (i, ii); D1
Reasons for Designation: This long-lived perennial herb is a globally imperiled species restricted to two small areas west of the Rockies with only a single population in southern British Columbia. The Canadian population is one of the largest populations known but may contain fewer than 250 mature plants. These are at risk from ongoing habitat loss and degradation especially by introduced weeds.	
Applicability of Criteria	
Criterion A (Declining Total Population): Insufficient data Criterion B (Small Distribution, and Decline or Fluctuation): Meets Endangered B1ab (iii)+ 2ab (iii) with extent of occurrence and area of occupancy well below critical levels and continuing decline in quality of habitat due to alien weed invasions. This perennial herb does not undergo extreme fluctuations in number of plants but does exhibit a high degree of dormancy during unsuitable growing seasons giving the impression that plants are completely absent or highly reduced in number during some growing seasons. The probability of a rescue effect from nearby US sub-populations is likely very low. Criterion C (Small Total Population Size and Decline): Meets Endangered C2a (i, ii) with a continuing decline inferred based on alien weed expansion; the number of mature individuals are well below the critical level of 2500 and likely <250 plants, all at a single location. Criterion D (Very Small Population or Restricted Distribution): Meets Endangered D1 with likely fewer than 250 plants. Criterion E (Quantitative Analysis): Insufficient data.	

ACKNOWLEDGEMENTS AND AUTHORITIES CONTACTED

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- Cooke, S. Botany Information Manager, Idaho Conservation Data Center, Idaho Department of Fish and Game, PO Box 25, Boise, ID 83707.
- Miller, M. Graduate student, University of Victoria, Victoria, British Columbia.
- Vrilakas, S. Botanist/Data Manager, Oregon Natural Heritage Information Center – OSU, 1322 SE Morrison St., Portland, OR 97214.

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BIOGRAPHICAL SUMMARY OF REPORT WRITERS

Dr. George Wayne Douglas (1938-2005), well-known and respected British Columbia botanist, whose contribution to COSEWIC has included over 30 status reports, died in Duncan, BC, on 10 February 2005, after a short battle with cancer.

George W. Douglas held an M.Sci. (Forestry) from the University of Washington and a Ph.D. (Botany) from the University of Alberta, Edmonton. George worked with rare plants for over 20 years. He was senior author of *The Rare Plants of the Yukon*

(1981), *The Rare Plants of British Columbia* (1985) and *Rare Native Plants of British Columbia* (1998, 2002). He was also the senior editor for the *Illustrated Flora of British Columbia* (1998-2002) and was the program botanist for the British Columbia Conservation Data Centre from 1991 until 2003. George wrote or co-wrote 33 COSEWIC status reports and three update status reports during this period.

Shyanne J. Smith has a B.Sc. (Geography) from the University of Victoria. She has conducted botanical inventory, research, and mapping projects in British Columbia since 2001. Shyanne co-authored the COSEWIC National Recovery Plan for southern maidenhair fern (2003) and four recently submitted COSEWIC status reports (2003). She is also the co-author of three stewardship accounts for rare plants.

COLLECTIONS EXAMINED

The only Canadian collection, stored in the University of Victoria Vascular Plant Herbarium (UVIC), was examined. Canadian collections of the species were not present in the University of British Columbia or Royal British Columbia Museum herbaria.