

REPORT ON THE CONSERVATION STATUS OF
SILENE SPALDINGII IN IDAHO

by

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February 1991

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Status Survey Report prepared for
Idaho Department of Parks and Recreation
through Section 6 funding from
U.S. Fish and Wildlife Service, Region 1

ABSTRACT

Available data on the abundance, distribution, and conservation status of Silene spaldingii (Spalding's catchfly) is presented in this report. This report will emphasize the status of Spalding's catchfly in Idaho and is based on an inventory survey conducted during the late summer and fall of 1990 by the Idaho Natural Heritage Program. Substantial amounts of recent data have also been accumulated and documented on Silene spaldingii by the Washington, Oregon, and Montana Natural Heritage Programs. In 1988, a comprehensive Status Survey was written by the Montana Natural Heritage Program, which is frequently referred to in this report to eliminate redundancy of known information.

Silene spaldingii currently is a Category 2 candidate and a perennial endemic to the Palouse grassland communities of the interior Pacific Northwest. Significant portions of these grasslands have been altered by extensive cultivation and grazing, undoubtedly resulting in substantial habitat loss and subsequent range reduction of Spalding's catchfly. Current information demonstrates that the species is limited to small, localized populations occurring in remnant patches of Prairie habitat. The species also appears to suffer from pollinator limitations, inbreeding depression, and a large genetic load, which results in a reduction of fitness. Reduced fitness when combined with small population sizes make Spalding's catchfly particularly vulnerable to extinction.

In Idaho, a total of seven extant sites are documented from Latah, Lewis, and Idaho Counties. All Idaho populations are relatively small (<50 plants) with between 100 and 250 individuals observed during the 1990 field season. Known populations are located on privately-owned property or Nez Perce Tribal Reservation lands where few or no regulatory mechanisms presently provide for the species survival. Threats from grazing pressure, invasion of weeds, and small population sizes present long-term viability concerns for the taxon.

Data presented in this report suggests that our knowledge of the distribution and conservation status of this taxon is fairly well known for Idaho, Montana, and Washington. It is recommended, however, that Silene spaldingii be retained as a Category 2 species until a comprehensive status survey is completed in Oregon.

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SILENE SPALDINGII IN IDAHO

Taxon Name: Silene spaldingii Wats.
Common Name: Spalding's catchfly
Family: Caryophyllaceae
(Pink or Carnation)
States Where Taxon Occurs: U.S.A.; Idaho, Montana,
Oregon, and Washington
CANADA; British Columbia
Current Federal Status: Category 2
Recommended Federal Status: Category 2
Author of Report: Christine C. Lorain
Original Date of Report: 20 January 1991
Date of Most recent Revision: N/A
Individual to Whom Further
Information and Comments
Should be Sent: Idaho Natural Heritage Program
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Boise, Idaho 83707

I. Species Information.

1. Classification and nomenclature.

A. Species.

1. Scientific name.

- a. Binomial: Silene spaldingii Wats.
- b. Full bibliographic citation: Watson, S. 1875. Revision of the genus Ceanothus, and descriptions of new plants, with a synopsis of the western species of Silene. Proc. Am. Acad. 10:333-350.
- c. Type specimen: United States, probably from near the Clearwater River in central Idaho, in the then Oregon Territory. Watson (1875) states the type came from "on Clearwater in central Idaho, Spalding." The type itself bears the label "Clearwater, Oregon, Rev. Mr. Spalding." (Gray Herbarium, Harvard University)(Hitchcock and Maguire 1947; Hitchcock 1964).

2. Pertinent synonym(s): None.

3. Common name(s): Spalding's catchfly

4. Taxon codes: PDCAROU1S0 (Idaho, Oregon, and Montana Natural Heritage Programs); JN.L76 (Washington Natural Heritage Program); 5044 SILSPA (U.S. Forest Service Region 1).

5. Size of genus: Over 400 species, mostly of the North Temperate Zone, and especially abundant in Eurasia (Hitchcock 1964).

B. Family classification.

1. Family name: Caryophyllaceae.

2. Pertinent family synonym: None.

3. Common name(s) for family: Pink or Carnation Family.

C. Major plant group: Dicotyledonae (Class Magnoliopsida)

D. History of knowledge of taxon: Silene spaldingii was first collection by Rev. Mr. Spalding, an early missionary to the Oregon Territory between 1836 and 1847 from "Clearwater, Oregon" (Siddall and Chambers 1978). Authorities believe the true origin to be on the

Clearwater River in central Idaho (Hitchcock and Maguire 1947). In the United States populations of Spalding's catchfly are now known from northern Idaho, northwestern Montana, northeastern Oregon, and eastern Washington. In 1988 an additional plant was observed in British Columbia, Canada.

Rev. Spalding's collections are the first known from Idaho. It was not until some 90 years later that the next sightings and collection of Spalding's catchfly were made in Idaho by Rex Daubenmire (1970) while establishing plots for his research on steppe vegetation in Washington. In 1980, two individuals were located during field inventories by Mering Hurd (1980) for the Bureau of Land Management.

In 1990, the Idaho Natural Heritage Program was contracted by the U.S. Fish and Wildlife Service to conduct a status survey of Silene spaldingii in Idaho. During this survey six new sightings were located. A total of seven extant locations are now documented from the state.

E. Comments on current alternative taxonomic treatment(s):
None known.

2. Present legal or other formal status.

A. International: None.

B. National.

1. Present designated or proposed legal protection or regulation: Currently, Silene spaldingii is listed as a Category 2 species (Federal Register 55(35):6225, 21 February 1990).

2. Other current formal status recommendation: Spalding's catchfly is ranked as "imperiled throughout its range because of rarity or because of other factors demonstrably making it very vulnerable to extinction" (global rank = G2) by the Nature Conservancy.

Spalding's catchfly is also listed as a Sensitive Plant Species with the Bureau of Land Management and Region 4 of the Forest Service (USDA Forest Service 1988). The species is listed as "Watch" with Region 1 of the Forest Service.

3. Review of past status: In 1975, Spalding's catchfly was listed as a Candidate Endangered

species (Federal Register 40(127):27855). It was Proposed Endangered in 1976 (Federal Register 41(117):24539). In 1980, it was listed as a Category 1 candidate (Federal Register 45(242):82537) and in 1985 it was listed as a Category 2 candidate (Federal Register 50(188):00051).

C. State.

1. Idaho

a. Present designated or proposed legal protection or regulation: None.

b. Other current formal status recommendation: Spalding's catchfly is currently listed as "critically imperiled in Idaho because of extreme rarity or because of some factor of its biology making it especially vulnerable to extinction" (state rank = S1) by the Idaho Natural Heritage Program (Moseley and Groves 1990).

c. Review of past status: In 1977, Johnson (1977) proposed Spalding's catchfly for Federal Status as Endangered and in 1981 it was recommended as Threatened, mostly because of the species rarity in the state (Johnson 1981).

2. Montana (see Schassberger 1988)

3. Oregon (see Schassberger 1988; Siddall and Chambers 1978; Siddall *et al.* 1979).

4. Washington (see Schassberger 1988; Washington Natural Heritage Program 1981, 1990)

a. Present designated or proposed legal protection or regulation: None.

b. Other current formal status recommendation: The Washington Natural Heritage Program (1990) currently lists Spalding's catchfly as Threatened (state rank = S2), that is "likely to become endangered within the near future in Washington if factors contributing to its population decline or habitat degradation or loss continue.

3. Description.

A. General nontechnical description: (see Schassberger 1988 and line drawing in Appendix 2)

- B. Technical description: (see Schassberger 1988)
- C. Local field characters. Unlike most species in the genus Silene, Spalding's catchfly is unusual in that it blooms quite late (July - August). Plants are extremely glandular and tend to be covered with wind blown fruits (typically of the Aster family) or spiderwebs. The foliage is an unusual, pale (almost lime) green color that tends to stand out against the straw-colored grasses of last summer and early fall (Kagan 1989).
- D. Identifying characteristics of material in interstate or international commerce: (see Schassberger 1988)
- E. Photographs and/or line drawings: Line drawings of Spalding's catchfly appear in Hitchcock (1964) and Hitchcock and Maguire (1947). See Appendix 2 for a reproduction of the line drawing from Hitchcock (1964). Photographs of Spalding's catchfly and its habitat in Montana are located in the slide collection of the Montana Natural Heritage Program.

4. Significance.

- A. Natural: Spalding's catchfly is a regional endemic to the Palouse country of the interior Pacific Northwest. Much of this habitat has been lost due to cultivation and grazing, which has left only small, scattered remnant parcels of native prairie throughout this region.
- B. Human: This species may have horticultural potential given that many members of this family are presently of ornamental value.

5. Geographical distribution.

- A. Geographical range: In the United States populations of Spalding's catchfly are now known from the Palouse Prairie grasslands of northcentral Idaho, northwestern Montana, northeastern Oregon, and eastern Washington (see Appendix 3 for overall distribution map). In 1988 an additional plant was observed in British Columbia, Canada.

In Idaho, Spalding's catchfly occurs in Idaho, Latah, and Lewis Counties on remnant patches of prairie. Eight extant locations occur in northwestern Montana from Lincoln, Lake, Sanders, and Flathead Counties (Schassberger 1988). In Oregon, populations are documented from 11 sites in the far northeastern portion of the state in Wallowa County (Kagan 1989). And, 16

extant locations occur in eastern Washington from Asotin, Spokane, and Whitman Counties (Schassberger 1988, Washington Natural Heritage Program 1990).

B. Precise occurrences. (see also Schassberger 1988, Kagan 1989)

1. Populations currently or recently known extant. In Idaho, Spalding's catchfly is documented from seven extant sites; six of which were located in 1990. The specific localities in Idaho include the Palouse Prairie (Latah County), and the northern portions of Camas Prairie (Lewis and Idaho Counties). Populations from Idaho are listed in Appendix 4 by occurrence record and exact locations are provided on U.S.G.S. quadrangle maps in Appendix 3.

1. Cold Springs Creek (001)
 - a. USA: Idaho, Lewis County
 - d. Winchester East 7.5 minute U.S.G.S. topographic map quadrangle, 1967.
 - e. Probably first observed in 1979 by Bonnie Heidel (1979)
 - f. Most recently observed in 1990 by Christine Lorain.

2. Moscow South/Cameron Prairie (003)
 - a. USA: Idaho, Latah County
 - d. Moscow East 7.5 minute U.S.G.S. topographic map quadrangle, 1960; photorevised 1975.
 - e. First observed in 1990 by Christine Lorain, Maynard Fosberg, and Paul McDaniel (Univ. of Idaho Soils Dept.)
 - f. Most recently observed in 1990 by Christine Lorain, Maynard Fosberg, and Paul McDaniel (Univ. of Idaho, Soil Scientists).

3. Reubens Cemetery (005)
 - a. USA: Idaho, Lewis County
 - d. Reubens 7.5 minute U.S.G.S. topographic map quadrangle, 1984.
 - e. First observed in 1990 by Christine Lorain
 - f. Most recently observed in 1990 by Christine Lorain.

4. Thorn Springs Creek (006)
 - a. USA: Idaho, Idaho County
 - d. Kamiah 7.5 minute U.S.G.S. topographic map quadrangle, 1967; photorevised 1979.
 - e. First observed in 1990 by Christine Lorain and Bob Sandlund (Grangeville SCS).
 - f. Most recently observed in 1990 by Christine

Lorain and Bob Sandlund (Grangeville SCS).

5. Cold Springs Creek South (007)
 - a. USA: Idaho, Lewis County
 - d. Winchester East 7.5 minute U.S.G.S. topographic map quadrangle, 1967.
 - e. First observed in 1990 by Christine Lorain
 - f. Most recently observed in 1990 by Christine Lorain.

6. Lapwai Lake Southeast (008)
 - a. USA: Idaho, Lewis County
 - d. Winchester East 7.5 minute U.S.G.S. topographic map quadrangle, 1967.
 - e. First observed in 1990 by Christine Lorain
 - f. Most recently observed in 1990 by Christine Lorain.

7. Talmaks Campground East (009)
 - a. USA: Idaho, Lewis County
 - d. Winchester East 7.5 minute U.S.G.S. topographic map quadrangle, 1967.
 - e. First observed in 1990 by Christine Lorain
 - f. Most recently observed in 1990 by Christine Lorain.

2. Populations known or assumed extirpated. In Idaho, one site, Daubenmire's Stand 161 (see occurrence #002) was not relocated and may possibly be extirpated due to heavy grazing. Additionally, one site collected in 1980 from Lawyers Canyon (see occurrence #004), was not revisited due to extensive road construction in the vicinity. Potential habitat still exists in the area, however, construction may possibly have extirpated this population also.

1. Daubenmire's Stand 161/Craigmont West (002)
 - a. USA: Idaho, Lewis County
 - d. Winchester East 15 minute U.S.G.S. topographic map quadrangle, 1967.
 - e. First observed by R. Daubenmire in 1964
 - f. Most recently observed in 1964 by R. Daubenmire (not relocated).

2. Lawyers Creek (004)
 - a. USA: Idaho, Lewis County
 - d. Craigmont 7.5 minute U.S.G.S. topographic map quadrangle, 1967.
 - e. First observed in 1980 by Mering Hurd (BLM)
 - f. Most recently observed in 1980 by M. Hurd.

3. Historically known populations where current status

not known. The first collection of Spalding's catchfly by Rev. Mr. Spalding, an early missionary to the Oregon Territory between 1836 and 1847 from "Clearwater, Oregon" (Siddall and Chambers 1978). Authorities believe the true origin to be on the Clearwater River in central Idaho (Hitchcock and Maguire 1947).

4. Locations not yet investigated believed likely to support additional natural populations. A majority of the appropriate habitat for Spalding's catchfly in Idaho has been surveyed. Once roadwork is completed in the Lawyer's Canyon vicinity this area should be revisited.

5. Reports having ambiguous or incomplete locality information. None.

6. Locations known or suspected to be erroneous reports. While compiling data for "Endangered and Threatened Plants of Idaho", Johnson (1977) found a Silene spaldingii collection at Washington State University (R.G. Jeffery s.n. 6/24/46) from "deep grass, 2 miles north of McCall, Adams County, Washington". Since the small prairie community of McCall, Washington, is not on many maps (although it is on the USGS topography maps) Johnson assumed that the label information was incorrect and that the collector was actually in Adams County, Idaho, about two miles west of McCall. Consequently, Silene spaldingii was listed as occurring in Adams County, Idaho in the review of rare plant taxa for the Idaho Natural Areas Council (Johnson 1977, 1981). Based on this information, Region 4 of the Forest Service listed Silene spaldingii as a Sensitive Species for the Payette National Forest (USDA Forest Service 1988). Coordination between the Washington and Idaho Natural Heritage Programs cleared up the problem in 1988, and Spalding's catchfly has been removed from the Idaho Natural Heritage Program's data base for Adams County, and from the Forest Service's Sensitive Species List for Region 4 (Atwood 1989).

C. Biogeographical and phylogenetic history: In Idaho, Spalding's catchfly is an element of the Palouse Prairie grassland. The wind-blown soils (loess) that supports these communities was carried via the prevailing westerly winds off the Columbia Basin and deposited some 1500 years ago. It is possible that this species evolved or migrated into these areas after the soils were deposited.

6. General environment and habitat description.

A. Concise statement of general environment and habitat:

In Idaho, Spalding's catchfly occupies Palouse Prairie grassland communities. Within these communities in Idaho, Spalding's catchfly grows on undisturbed slopes or flats in swales and drainages and in small, undisturbed vegetation strips surrounded by cultivated fields. These sites often occur along the lower treeline or near scattered Pinus ponderosa trees. Vegetation is dominated by Idaho fescue (Festuca idahoensis) with numerous perennial herbs and scattered shrubs (Nootka rose (Rosa nutkana) and snowberry (Symphoricarpos albus)). Such habitats have open or partially open exposures with variable slopes (flat to 45%) and occur on mid- to upper slope position on all aspects. Elevations range between 2800 and 4200 feet, though this does not result from the species occurring in various habitats, but rather variation in elevation of the areas that support Palouse grasslands. The substrates are almost exclusively productive silt/loams (loess) that are moderately deep and sometimes gravelly.

B. Physical characteristics.

1. Climate.

- a. Koppen climate classification: Habitat for Spalding's catchfly is classified as Koppen's unit Dfb: cold climate with humid winters. The average temperature of the warmest month is under 22^o C (17^o F)(Trewartha and Horn 1980).
- b. Regional macroclimate: The regional macroclimates for areas that support Spalding's catchfly in Idaho are extrapolated from the Moscow (Palouse Prairie) and Winchester (Camas Prairie and crest of canyons) weather stations. Moscow is 2750 ft (838 m) in elevation and Winchester is 3968 ft (1209 m) in elevation (see also Schassberger 1988 for details in Montana).

At Winchester, the mean annual temperature is 42.5^o F (5.8^o C) and the mean annual precipitation is 26.11 inches (663.2 mm). The annual temperature range averages between 24.9^o F (-4.0^o C) to 61.2^o F (16.2^o C), with the highest temperatures occurring in July and the lowest occurring in January. Mean annual precipitation peaks in the spring months (March, April, and especially May) with 33.8% of the total annual precipitation. July and August mark the dry season when an average of 1.3 inches of precipitation occurs.

At Moscow, the mean annual temperature is 47.9° F (8.6° C) and the mean annual precipitation is 23.37 inches (593.7 mm). The annual temperature range averages between 27.8° F (-2.3° C) to 66.6° F (19.3° C), with highest temperatures occurring in July and the lowest occurring in January. Mean annual precipitation peaks in the winter months (November, December, and January) with 38.7% of the total annual precipitation. July and August mark the dry season when an average of less than 1 inch of precipitation occurs.

c. Local microclimate: Spalding's catchfly appears to occur on slopes and in swales in areas where snow deposition is likely. These sites may hold moisture longer into the spring and create a slightly more mesic microclimate than found in the surrounding "typical" Palouse Prairie community. Such sites support much higher numbers and percent cover of shrubs.

2. Air and water quality requirements: Unknown.

3. Physiographic provinces: In Idaho, populations of Spalding's catchfly lie within the Palouse Hills section and the Tri-State Uplands section of the Northern Rocky Mountain Province (Ross and Savage 1967). The Palouse Hills section is mostly found in eastern Washington and projects into western Idaho. The Tri-State Uplands section, as the name implies, includes parts of Idaho, Oregon and Washington (Ross and Savage 1967).

4. Physiographic and topographic characteristics: The Palouse Hills region consists of rolling, asymmetrical hills that commonly rise 20-80 feet. These hills are actually dunes of loess (wind blown material), which overlies basalts. Hills are constantly reshaped by winds, snow, mass wasting, and runoff. The Tri-State section consists of a large, gently undulating plateau or rolling plain at a rather high elevation (averaging some 3000-4000 feet in elevation) and underlain by Columbia River basalts. At the edge of these two productive grasslands, the topography abruptly changes near the canyon edges to steeper slopes that support slightly wetter forested communities (Ross and Savage 1967).

5. Edaphic factors: Soil substrates that support Spalding's catchfly are almost exclusively productive silt/loams (loess) with occasional loams and skeletal silt/loams. The fertile soils and relatively moist climate have resulted in an almost complete conversion

of the original prairie into cultivated fields or grazing lands.

6. Dependence of this taxon on natural disturbance: The past role of fire in the Palouse grasslands is well known and documented. Fire suppression over the last 100 years has altered the natural community structure and composition. It is suggested that a duff layer build-up due to fire suppression may be impacting populations sizes in some sites in Montana (Kagan 1989). Moreover, fire resistance of Spalding's catchfly is unknown, although it blooms late in the summer during peak fire season. The altered role of fire may be another factor responsible for reducing the range and habitat of this taxon.

7. Other unusual physical features: None known.

C. Biological characteristics.

1. Vegetation physiognomy and community structure: Habitats that support Spalding's catchfly in Idaho fall into four classified communities based on the dominant or characteristic species in the climax community (Cooper et al. 1987, Daubenmire 1970):

Festuca idahoensis/Rosa nutkana habitat type
(Idaho fescue/Nootka rose)

Festuca idahoensis/Symphoricarpos albus h.t.
(Idaho fescue/snowberry)

Crataegus douglasii/Symphoricarpos albus h.t.
(black hawthorn/snowberry)

Pinus ponderosa/Symphoricarpos albus
(ponderosa pine/snowberry)

2. Regional vegetation type: Kuchler (1964) places this portion of Idaho into the potential vegetation types of Fescue-wheatgrass (Festuca-Agropyron) and Ponderosa Shrub Forest (Pinus).

3. Frequently associated species: In Idaho, Spalding's catchfly occupies habitats of Palouse Prairie vegetation. Typical species associated with this community in order of importance are:

Festuca idahoensis Torrey ex Hook.

Rosa nutkana Presl.

Symphoricarpos albus (L.)Blake

Geum triflorum Pursh

Gentiana affinis Griseb.

Achillea millefolium L.
Hieracium albertinum Farr
Potentilla gracilis Dougl.
Calamagrostis rubescens Buckl.

Often times these communities occurred on undisturbed slopes or flats in swales and drainages and in small, undisturbed vegetation strips surrounded by cultivated fields.

4. Dominance and frequency: Idaho populations of Spalding's catchfly populations are rather small in size and tend to occur as scattered individuals. Known populations support from two to 50 individuals and average 2 plants per 5 meter².
5. Successional phenomena: In Idaho, Spalding's catchfly most frequently occurs in undisturbed climax or successional advanced Festuca/Rosa and Festuca/Symphoricarpos communities. This indicates that the taxon is rather intolerant of certain disturbances. The species can be extirpated by heavy grazing, but appears to tolerate light to moderate grazing in Montana and Oregon (Schassberger 1988, Kagan 1989).
6. Dependence on dynamic biotic features: None known.
7. Other endangered species: In Idaho and Washington, the Palouse Prairie communities that support Spalding's catchfly often support two other Category 2 Candidate taxa, Haplopappus liatririformis and Aster jessicae. Since all three of these species occur in similar habitats and flower during the late summer and early fall, they can be surveyed for simultaneously. Some sites discovered in 1990 supported all three taxa.

7. Population biology.

- A. General summary: Nine small and localized populations of Spalding's catchfly are now documented from north-central Idaho in Palouse Prairie communities. Two of these sites (#002 and #004) were not relocated and may possibly be extirpated due to heavy grazing and road construction in the vicinity. In 1990, six new populations were located with most of these supporting less than 20 scattered individuals. The largest populations (Moscow South #003, Thorn Springs Creek #006, and Talmaks Campground East #009), consist of 30-50 plants each. Spalding's catchfly blooms in late summer and is thought to be an obligate or near-obligate outcrossing species (Lesica 1988a, Schassberger 1988). Bumblebees (Bombus sp.) are among the known pollinators

(Lesica 1988a). Spalding's catchfly produces no rhizomes and reproduces only sexually by seeds.

B. Demography.

1. Known populations: Nine documented Idaho populations, occurring in Lewis, Latah, and Idaho Counties. Populations range in size from as few as 2 to approximately 50 individuals.

2. Demographic details (Idaho).

1. Cold Spring Creek (#001)
 - a. Location:
 - b. Area: 10-100 yd²
 - c. Number and size of plants: more than three dozen individuals in 1985; same in 1990
 - d. Density: Moderate
 - e. Presence of dispersed seeds: immature and mature fruit present in 1990
 - f. Evidence of reproduction: No evidence
 - g. Evidence of expansion/contraction: None
2. Daubenmire's Stand 161/Craigmont West (#002)
 - a. Location:
 - b. Area: unknown
 - c. Number and size of plants: Survey plot data (Daubenmire 1970) indicates a 2% frequency (exact # unknown); not relocated in 1990.
 - d. Density: unknown
 - e. Presence of dispersed seeds: Unknown
 - f. Evidence of reproduction: No evidence
 - g. Evidence of expansion/contraction: vicinity is grazed.
3. Moscow South/Cameron Prairie (#003)
 - a. Location:
 - b. Area: 10-100 yds²
 - c. Number and size of plants: 11-50 plants in 1990
 - d. Density: Low
 - e. Presence of dispersed seeds: Unknown
 - f. Evidence of reproduction: immature and mature fruit present in 1990
 - g. Evidence of expansion/contraction: small "eyebrow" of grass/shrubs surrounded by cultivated field.
4. Lawyers Creek (#004)
 - a. Location:
 - b. Area: 10 yds²
 - c. Number and size of plants: 2 plants in 1980;

- not relocated in 1990
- d. Density: Low
 - e. Presence of dispersed seeds: Unknown
 - f. Evidence of reproduction: No evidence
 - g. Evidence of expansion/contraction: area undergoing extensive road construction, which may have extirpated population.
5. Reubens Cemetery (#005)
 - a. Location:
 - b. Area: 10-100 yds²
 - c. Number and size of plants: 1-10 plants in 1990, past flowering, so plants may have been missed.
 - d. Density: Low
 - e. Presence of dispersed seeds: Unknown
 - f. Evidence of reproduction: Plants in mature fruit in 1990.
 - g. Evidence of expansion/contraction: old overgrown cemetery, which could be threatened if begins to be maintained.
 6. Thorn Springs Creek (#006)
 - a. Location:
 - b. Area: 10-100 yd²
 - c. Number and size of plants: 2 patches totaling 11-50 plants in 1990
 - d. Density: Low
 - e. Presence of dispersed seeds: Unknown
 - f. Evidence of reproduction: mature fruit present in 1990
 - g. Evidence of expansion/contraction: area beside cultivated field and not fenced.
 7. Cold Spring Creek South (#007)
 - a. Location:
 - b. Area: 100 yds² - 2 acres
 - c. Number and size of plants: scattered in 2 patches totaling 11-50 plants in 1990
 - d. Density: Low
 - e. Presence of dispersed seeds: Unknown
 - f. Evidence of reproduction: mature fruit present in 1990
 - g. Evidence of expansion/contraction: next to cultivated field along old section of Highway.
 8. Lapwai Lake Southeast (#008)
 - a. Location:
 - b. Area: 10-100 yds²
 - c. Number and size of plants: 3 plants in 1990.
 - d. Density: Low
 - e. Presence of dispersed seeds: Evident in 1990

- f. Evidence of reproduction: mature fruits in 1990
- g. Evidence of expansion/contraction: Fenced and possibly grazed, but vegetation in very good shape.

- 9. Talmaks Campground East (#009)
 - a. Location:
 - b. Area: 10 yds² - 2 acres
 - c. Number and size of plants: at least 50 plants in 1990; past flowering so hard to see plants
 - d. Density: Moderate
 - e. Presence of dispersed seeds: Unknown
 - f. Evidence of reproduction: immature and mature fruits present in 1990
 - g. Evidence of expansion/contraction: nice Palouse remnant, but grazing is possible and perhaps some competition from exotic weeds.

C. Phenology.

- 1. Patterns: Spalding's catchfly produces small seeds that require stratification and germinate mainly in the spring (Lesica 1991, Appendix 5). Rosettes are formed in the first year and flowers appear any time during or after the second season (Lesica 1991, Appendix 5). Flowering of Spalding's catchfly in Idaho occurs in late summer and peaks during the third and fourth weeks of July. Plants on exposed southerly slopes flower first, while sites on north and east aspects generally begin flowering in mid-August. Fruit and seed maturation occurs in August, with seed dispersal occurring in last August or early September (Hitchcock 1964).
- 2. Relation to climate and microclimate: In Idaho, Spalding's catchfly occurs on undisturbed slopes or flats in swales and drainages where snow accumulations remain later in the year. This species is believed to be dependant on the increased soil moisture present at these microsites. Additionally, severe drought may likely effect the overall plant vigor and reduce flowering (Schassberger 1988).

D. Reproductive ecology. (see Schassberger 1988; Lesica 1988a, 1988b, 1988c, 1988d, 1991)

- 1. Type of reproduction: Spalding's catchfly reproduces by seeds.
- 2. Pollination.
 - a. Mechanisms: Spalding's catchfly appears to be protandrous, a mechanism that promotes

outcrossing while allowing the possibility of selfing (Lesica 1991, Appendix 5). It appears that the taxon is dependent on insects for pollination and that a single species of bumblebee is the only significant pollinator of Spalding's catchfly in portions of Montana (Lesica 1991, Appendix 5).

- b. Specific known pollinators: Bumblebees (Bombus) are the principal pollinators in Montana and likely throughout the species range.
 - c. Other suspected pollinators: Unknown.
 - d. Vulnerability of pollinators: Low numbers of developed fruits and mature seeds in Montana have been partially attributed to pollinator limitation (Lesica 1991, Appendix 5). Overgrazing, burning, and herbicide sprays may be damaging local populations of these pollinators, since they nest at or just beneath the ground surface (Lesica 1991, Appendix 5).
3. Seed dispersal. (see Schassberger 1988; Lesica 1988a, 1988b, 1988c, 1988d, 1991)
 - a. General mechanisms:
 - b. Specific agents:
 - c. Vulnerability of dispersal agents and mechanisms:
 - d. Dispersal patterns:
 4. Seed biology. (see Schassberger 1988; Lesica 1988a, 1988b, 1988c, 1988d, 1991)
 - a. Amount and variation of seed production: In Montana, Lesica (1991, Appendix 5) found that pollinator limitation was partially responsible for a reduction in fruit development and mature seeds per fruit. Ovule abortion can also be attributed to genetic load; a common situation in outcrossing species. In Idaho, immature and mature fruits were present in 1990.
 - b. Seed viability and longevity:
 - c. Dormancy requirements:
 - d. Germination requirement: Seeds have been found to require a period of cold stratification for germination (Lesica 1991, Appendix 5).

e. Percent germination:

5. Seedling ecology: Lesica (1991) found that seedlings grow very slowly in Montana. He suspects that dense litter accumulations occurring in unburned and ungrazed grassland communities may be limiting seedling survival and growth (Lesica 1991, Appendix 5). No seedlings were observed in 1990 for Idaho populations.

6. Survival and mortality: Reduction in fitness during juvenile growth may be due in part to inbreeding depression in plants denied access to pollinators (Lesica 1991, Appendix 5).

7. Overall assessment of reproductive success:

Spalding's catchfly appears to suffer from pollinator limitations, inbreeding depression, and a large genetic load (Lesica 1991, Appendix 5). These factors are partially responsible for a reduction in plant fitness. Reduced fitness when combined with small population sizes make Spalding's catchfly particularly vulnerable. Small populations may not have the ability to recover even if stable native habitats were present (Lesica 1991, Appendix 5).

In Idaho, almost all plants observed in 1990 were flowering or producing seed. Additionally, no juvenile plants or seedlings were seen.

8. Population ecology of the taxon.

A. General summary: All known Idaho populations of Spalding's catchfly are small and localized. Plants inhabit relatively undisturbed Palouse Prairie remnants dominated by Idaho fescue (*Festuca idahoensis*) and shrubs. A significant portion of the original prairie grassland has been altered by land conversion to extensive cultivation and grazing. This activity has undoubtedly resulted in a drastic decline in the overall distribution of Spalding's catchfly in Idaho and throughout its range.

In Idaho, Spalding's catchfly was only located in areas of relatively undisturbed native vegetation, indicating an apparent inability to compete with introduced weeds. However, these communities tend to support a high coverage of native grasses and perennial herbs, indicating an apparent tolerance by Spalding's catchfly to some competition. No apparent hybridization or damage from disease/herbivores was apparent in Idaho in 1990.

- B. Positive and neutral interactions: None known.
- C. Negative interactions. (see Schassberger 1988, Lesica 1988a, 1988c, 1988d)
 - 1. Herbivores, predators, pests, parasites and diseases: None apparent in Idaho in 1990, however, insect parasites (seed weevils) are known to destroy seed heads in Oregon and caterpillars occasionally feed on the flowers in Montana (Kagan 1989, Lesica 1988a). Additionally, some plants in Oregon have had flowers and seed heads removed due in part to grazing by domestic livestock (Kagan 1989).
 - 2. Competition.
 - a. Intraspecific: None apparent.
 - b. Interspecific: Appears significant for introduced weedy taxa. In Idaho, Spalding's catchfly was only located in areas of relatively undisturbed native vegetation, indicating an apparent inability to compete with introduced weeds. Aggressive weedy species have likely extirpated some populations of Spalding's catchfly.
 - 3. Toxic and allelopathic interactions with other organisms: None known.
- D. Hybridization. (see Schassberger 1988)
 - 1. Naturally occurring: None evident in Idaho populations.
 - 2. Artificially induced: None known.
 - 3. Potential in cultivation: Plants are currently being maintained in a greenhouse at the University of Montana, Missoula (Lesica 1990).
- E. Other factors of population ecology: None known.
- 9. Current land ownership and management responsibility.
 - A. General nature of ownership: In Idaho, populations of Spalding's catchfly are located on privately-owned and Tribal Reservation land.
 - B. Specific landowners (Idaho):
 - 1. Of the 9 known populations in Idaho, 7 are on privately-owned land (#001, 002, 003, 004, 005, 007,

008) and 2 are on tribally-owned land (#006, 009) within the Nez Perce Indian Reservation.

C. Management responsibility: Same as above.

D. Easements, conservation restrictions, etc.: Spalding's catchfly in Idaho is listed presently as "Sensitive" for the Coeur d'Alene District of the Bureau of Land Management (Moseley & Groves 1990) and Region 4 of the Forest Service (USDA Forest Service 1988). Land administered by the BLM or Forest Service that supports Spalding's catchfly populations would be managed according to the agencies regulations for sensitive species. At present, no populations are known from BLM or Forest Service lands in Idaho.

10. Management practices and experience.

A. Habitat management.

1. Review of past management and land-use experiences.

a. This taxon: Habitats that support Spalding's catchfly have been and are being managed for crop cultivation and/or livestock grazing. Substantial habitat loss and subsequent range reduction of Spalding's catchfly can be attributed to these activities, particularly agricultural conversion. Losses have also resulted from applications of chemical sprays and invasion of exotic weeds.

b. Related taxa: None known.

c. Other ecologically similar taxa: Other Palouse Prairie endemic taxa, such as Haplopappus liatrisiformis and Aster jessicae are also suffering from habitat loss and are considered rare.

2. Performance under changed conditions: In Idaho, Spalding's catchfly has likely been extirpated from sites that have undergone extensive grazing and/or any cultivation. The species appears to tolerate light to moderate grazing and some human disturbance. A number of sites near cultivated fields undoubtedly receive direct or drifting chemical sprays early in the year, which seems to have no observable effect on this late summer perennial. Despite this, Spalding's catchfly only persists today in small remnant populations, which presents several long-term viability concerns for the taxon.

Fire has long played a role in grassland ecology and

community development. Dense litter accumulations, due to artificial fire suppression, may be limiting seedling survival and growth (Lesica 1991, Appendix 5).

3. Current management policies and actions: Current management is the same as outlined under past management.
4. Future land use: Specifics unknown, however, future land use is likely to remain the same throughout most of the species range in Idaho. All the land that can reasonably be cultivated has been.

B. Cultivation. (see Schassberger 1988, Lesica 1988b, 1991)

1. Controlled propagation techniques:
2. Ease of transplanting:
3. Pertinent horticultural knowledge:
4. Status and location of presently cultivated material:

11. Evidence of threats to survival.

A. Present or threatened destruction, modification, or curtailment of habitat or range.

1. Past threats: Cultivation and grazing were the principle threats to Spalding's catchfly in the past. The habitat that this species prefers tends to be the Palouse Prairie communities. These sites possess very rich soils that are highly desirable for cultivation. Much habitat has undoubtedly been lost due to cultivation, which apparently eliminates the species from an area.
2. Existing threats: Most of the land which could be converted to agricultural uses has already been converted. The only remaining sites are those areas not suitable or inaccessible for agriculture. However, grazing pressure is present at several sites and the proximity to fields and roads subjects some sites to threats from chemical spray and invasion of weedy species.
3. Potential threats: Continued grazing and herbicide application pose the most significant threats. Most of the habitat that supports Spalding's catchfly in Idaho is privately-owned, and thus without use restrictions. Populations in these areas may be in danger of

extirpation.

B. Overutilization for commercial, sporting, scientific, or educational use.

1. Past threats: Minimal to no past threats.
2. Existing threats: Minimal to no existing threats.
3. Potential threats: Minimal to no potential threats.

C. Disease, predation, or grazing.

1. Past threats: No direct past threats to population viability of Spalding's catchfly due to disease or predation are known in Idaho. Light to heavy grazing has occurred on many of these sites at one time or another. Although, Spalding's catchfly is extremely glandular and not a preferred forage species, significant and serious damage from cattle has been observed (Kagan 1989). Heavy grazing had been documented to destroy individuals and populations of Spalding's catchfly (Kagan 1989). Lightly grazed areas, or sites grazed very early in the spring, appears to have a negligible effect on the species. Moreover, heavy grazing tends to alter the species composition, resulting in the invasion of weeds and the extirpation of Spalding's catchfly.
2. Existing threats: No direct existing threats to population viability of Spalding's catchfly due to disease or predation are known in Idaho. Insect parasites (seed weevils) are known to destroy seed heads in Oregon and caterpillars occasionally feed on the flowers in Montana (Kagan 1989, Lesica 1988a). Some populations appear to received light spring grazing, which may be slightly affecting the plants.
3. Potential threats: No direct potential threats to population viability of Spalding's catchfly are due to disease or predation are known in Idaho. Heavy grazing, however, continues to be a potential threat.

D. Inadequacy of existing regulatory mechanisms.

1. Past threats: None known.
2. Existing threats: All the known populations of Spalding's catchfly in Idaho occur on privately-owned or Tribal Reservation land. At present no regulatory mechanisms exist to provide any protection or insure the survival of this taxon in Idaho.

3. Potential threats: Same as above.

E. Other natural or manmade factors.

1. Past threats: Coincident with cultivation is the application of chemical sprays and invasion of exotic weeds. Many sites are located near cultivated fields and undoubtedly received annual applications of chemical spray, or at least drift. It is unknown how many populations may have been lost due to these factors.

2. Existing threats: Chemical sprays and invasion of aggressive weeds continue to pose threats to populations of Spalding's catchfly throughout its range in Idaho. The altered role of fire due to artificial suppression may be another factor responsible for reducing population size and modifying natural community structure. Dense litter accumulations resulting from fire suppression could be limiting seedling survival and growth (Lesica 1991, Appendix 5). Additionally, Spalding's catchfly appears to suffer from pollinator limitations, inbreeding depression, and a large genetic load (Lesica 1991, Appendix 5). These factors are partially responsible for a reduction in plant fitness. Reduced fitness when combined with small population sizes make Spalding's catchfly particularly vulnerable to extinction (Lesica 1991, Appendix 5).

3. Potential threats: Same as above.

II. Assessment and Recommendations.

12. General assessment of vigor, trends and status: As of 1990, 7 extant populations of Spalding's catchfly are documented from Idaho in Latah, Lewis, and Idaho Counties. The majority of these sites consist of less than 20 plants within a relatively small area. Two previously documented locations were not relocated in a 1990 survey and may possibly be extirpated due to grazing and road construction in the vicinity.

Suitable habitat for Spalding's catchfly in Idaho occurs in a few remnant areas of relatively undisturbed Palouse Prairie grasslands. Land conversion due to extensive cultivation and grazing has undoubtedly resulted in substantial habitat loss and subsequent range reduction of Spalding's catchfly over the last 100-150 years. Fire suppression over this same period may also be responsible for population reduction and habitat loss.

Six new populations of Spalding's catchfly were located in

1990. The majority of these consist of small, localized populations of less than 20 plants scattered on slopes or flats. Population numbers are low principally due to limited habitat and low plant densities. A total estimate of the number of individuals seen in Idaho during the 1990 field season ranges between 100 and 250. It appears that this species is intolerant of cultivation and heavy livestock grazing. However, light grazing and spring application of chemical sprays seems to have a negligible effect on the species.

Demographic studies concerning the population dynamics and ecology of Silene spaldingii are being carried out by the Montana Field Office of The Nature Conservancy (Lesica 1988c, 1988d, 1991). Recent data indicates that Spalding's catchfly suffers from pollinator limitations, inbreeding depression, and a large genetic load, which results in a reduction of fitness (Lesica 1991, Appendix 5). Reduced fitness when combined with small population sizes make Spalding's catchfly particularly vulnerable to extinction (Lesica 1991, Appendix 5). Small populations may not have the ability to recover even if the habitat were present.

13. Recommendations for listing or status change.

A. Recommendation to U.S. Fish and Wildlife Service:

Spalding's catchfly is listed presently with the U.S. Fish and Wildlife Service (1990) as a Category 2 species with a priority listing of 5 (High magnitude of threat, but non-imminent). Information regarding the distribution, ecology, and conservation status of Silene spaldingii throughout its range has been collected during surveys conducted in 1988, 1989, and 1990 by the Idaho, Montana, Oregon, and Washington Natural Heritage Programs (Schassberger 1988, Kagan 1989, Washington Natural Heritage Program 1990).

Data presented here suggests that our knowledge of the distribution and conservation status of Spalding's catchfly is relatively well-known for Idaho, Montana, and Washington. Oregon documents 11 small populations, however, a comprehensive status survey still needs to be completed for the state. In Idaho, seven extant and relatively small populations (< 20 individuals) are documented with a total of between 100-250 plants observed in the state. In Montana, Spalding's catchfly is documented from one large population (>10,000 plants) and seven small populations (ranging from 1 to 250 plants). Washington documents 16 small populations.

In Idaho, Spalding's catchfly occurs on small remnant areas of relatively undisturbed Palouse Prairie

grasslands. Most populations are located on privately-owned or Tribal Reservation property that has no or little regulatory mechanisms by which to provide for the species survival. Spalding's catchfly is a relatively rare species, with populations or groups of populations from widely separated areas. Since most of them are small and localized, the species as a whole remains vulnerable in Idaho. Until a comprehensive status survey is conducted for the Oregon portion of its range, it is recommended that Silene spaldingii be maintained as a Category 2 species, but reclassified to a priority listing of 2 (High magnitude of threat, imminent).

B. Recommendations to other U.S. Federal Agencies: No populations of Spalding's catchfly were located on lands administered by any federal agency. However, there exists a very good possibility that suitable habitat and populations of Spalding's catchfly may occur on lands within Bureau of Land Management jurisdiction. Therefore, it is recommended that Silene spaldingii be maintained on the Sensitive species list for the Coeur d'Alene District of the BLM. It should, however, be removed from the Forest Service Region 4 Sensitive list because the Adams County report has proved to be erroneous.

C. Other status recommendations.

1. Counties and local areas: No recommendations.

2. State. (Idaho): Currently, Spalding's catchfly is ranked S2 by the Idaho Natural Heritage Program (Moseley and Groves 1990); based on our current knowledge, it is recommended that Silene spaldingii be reclassified to a S1 status ranking.

3. Other Nations: It is recommended that the Nez Perce Indian Tribe in Idaho monitor the status of Spalding's catchfly populations on tribal reservation lands.

4. International: No recommendations.

14. Recommended critical habitat.

A. Concise statement of recommended critical habitat: The conservation strategy for Silene spaldingii should be to preserve as much genetic variation (although currently unmeasured) as possible in the minimum number of protected populations. Until further information on the genetic architecture of Spalding's catchfly is available, the best populations (largest and most viable) should be protected across the range of the

species. It is recommended that The Nature Conservancy pursue the possibility of acquisition and/or registry of these areas. Populations in Idaho that are recommended for critical habitat include:

- 003 - Moscow South/Cameron Prairie
- 006 - Thorn Springs Creek
- 009 - Talmaks Campground East

These sites were selected based on population size and quality of habitat. Sites 006 and 009 are the largest, most viable populations and each has high quality habitat. Site 003 has a lower quality habitat, but is quite removed from the other eight locations. This combination of sites appears to represent the overall distribution and genetic diversity of Spalding's catchfly in Idaho.

- B. Legal description of boundaries: See Appendices 3 and 4 for legal description of the occurrence records listed above.
- C. Latitude and longitude: See Appendices 4 for latitude and longitude of the occurrence records listed above.
- D. Publicity/sensitivity of critical habitat area: Since all of the recommended sites are located on privately-owned or Nez Perce tribal property, cooperative agreements will need to be arranged with these land owners towards preserving critical habitat for Spalding's catchfly.

15. Conservation/recovery recommendations.

A. General conservation recommendations.

- 1. Recommendations regarding present or anticipated activities: None at present.
- 2. Areas recommended for protection: In Idaho, three sites are recommended for protection (see "Concise Statement of Recommended Critical Habitat"). The Nature Conservancy should pursue the possibility of acquisition and/or registry of these areas.
- 3. Habitat management recommendations: Habitats should be managed to reduce impacts from man-caused disturbances that may destroy habitat, reduce population size/numbers, or extirpate populations.
- 4. Publicity sensitivity: Low.

5. Other recommendations: None.

- B. Monitoring activities and further studies recommended:
No monitoring studies are presently underway in Idaho, however, ongoing demographic research and population monitoring is taking place in Montana. See Schassberger (1988) and Lesica (1988a, 1988b, 1988c, 1988d, 1991) regarding this research. Collection of further biological data are necessary to correctly assess the conservation status of Spalding's catchfly. Fruitful topics for investigation may include reproductive biology, population dynamics, role of the seed bank, seed dispersal mechanisms, determination of genetic variation, and the effect of exotic weeds, fire suppression, and chemical sprays on population levels.

16. Interested parties:

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III. Information Sources.

17. Sources of information.

A. Publications.

1. References cited in report: See Appendix 1.
2. Other pertinent publications.
 - a. Technical: None known.
 - b. Popular: None known.

B. Herbaria consulted: Specimens of Silene spaldingii from Idaho are known to be deposited at the University of Idaho (ID), University of Montana (MONTU), and Washington State University (WS). The following is a list of known herbarium specimens, organized by occurrence number:

001 - Mering Hurd 524 (Cottonwood BLM)
002 - R.F. Daubenmire 6429 (WS)
003 - C.C. Lorain 2144 (ID)
009 - C.C. Lorain 2149 (ID)

C. Fieldwork: (Idaho)

1979 - Bonnie Heidel (BLM)
1980 - M. Hurd (BLM)
1990 - Christine Lorain
(Idaho Natural Heritage Program)

During the late summer and fall of 1990, the Idaho Natural Heritage Program conducted surveys for Spalding's catchfly in Idaho. This survey focused on relocating historical and extant sites, documenting potential habitats and new populations, delineating the overall distribution of the taxon in Idaho, characterizing habitat conditions, gathering population data, and assessing population threats. The areas of focus included the Prairie communities within Latah, Nez Perce, Lewis, and Idaho Counties.

D. Knowledgeable individuals:

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E. Other information sources:

18. Summary of materials on file: Color slides, field forms, maps, and all published and unpublished references pertaining to Silene spaldingii in Idaho are on file at the Idaho Natural Heritage Program Office, Boise, ID.

IV. Authorship.

19. Initial authorship:

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20. Maintenance of status report: The Idaho, Montana, Oregon, and Washington Natural Programs will maintain current information for their respective states and update the status reports as needed.

V. New Information.

21. Record of revisions: Not currently applicable.

APPENDIX 1

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APPENDIX 2

Line drawings of Silene spaldingii
(from Hitchcock 1964)

APPENDIX 3

Precise map location of Silene spaldingii
populations in Idaho.

Map A.	Overall distribution of known populations of <u>Silene spaldingii</u> in Idaho.	
Map B.	Portion of Winchester East 7.5' quad	(001, 002 007)
Map C.	Portion of Moscow East 7.5' quad	(003)
Map D.	Portion of Craigmont 7.5' quad	(004)
Map E.	Portion of Reubens 7.5' quad	(005)
Map F.	Portion of Kamiah 7.5' quad	(006)
Map G.	Portion of Winchester East 7.5' quad	(008)
Map H.	Portion of Winchester East 7.5' quad	(009)

APPENDIX 4

Occurrence records for populations of
Silene spaldingii in Idaho.

APPENDIX 5

Lesica (1991) - Report on Inbreeding Depression
and Pollinators of Silene spaldingii