

REPORT ON THE CONSERVATION STATUS OF
PENSTEMON IDAHOENSIS, IN IDAHO AND UTAH

by

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Taxon Name: Penstemon idahoensis Atwood & Welsh
Common Name: Idaho penstemon
Family: Scrophulariaceae
States Where Taxon Occurs: U.S.A.; Idaho, Utah, Nevada(?)
Current Federal Status: Category 2 Candidate
Recommended Federal Status: Category 2 Candidate
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ABSTRACT

A field investigation of Penstemon idahoensis (Idaho penstemon) was conducted in Idaho by the Idaho Department of Fish and Game's Conservation Data Center¹. Idaho penstemon is locally endemic to the Goose Creek basin, being known from extreme southern Cassia County, Idaho and an immediately adjacent area in Box Elder County, Utah. It is a Category 2 federal candidate species, and a Forest Service Region 4 sensitive species. It is also a sensitive species on the Bureau of Land Management (BLM) lists for Idaho and Utah.

Currently, Idaho penstemon is known from ten extant populations in Idaho, with three of these occurring on the Twin Falls Ranger District, Sawtooth NF. Five new populations were discovered during our 1991 field investigation, including one on the Forest. Other populations occur on BLM, State of Idaho, and private lands, all within a few miles of the Forest boundary. All populations documented prior to 1991 were revisited and updated information collected during this survey. It is estimated the ten populations support a total of approximately 4000 individuals, ranging in size from 25 to 1000 genets. Plant density was variable, and the area delineating a population varied from a fraction of an acre to over 100 acres.

A single large population is known from Utah and supports approximately 3300 individuals. It is located on BLM and State land.

Likely related to the restricted geographic range of Idaho penstemon, is its edaphic specificity. Idaho penstemon is found only on dry, tuffaceous sediments of the Salt Lake Formation. Soils are fine-textured and can be quite hard. It occurs on gentle to steep slopes of all aspects, most commonly south to southwest. It is most commonly associated with open Utah juniper communities, and is known from 4900 to 5700 feet elevation.

Disturbances and habitat alteration associated with cattle grazing and the invasion of leafy spurge into the Goose Creek basin present the most serious threats to the long-term viability of Idaho penstemon. The presence of these threats and the species very restricted habitat and geographic range combine to keep Idaho penstemon a species of conservation concern. It is recommended that Idaho penstemon remain on the Forest Service and BLM sensitive species lists. It is further recommended that Idaho penstemon be retained as a Category 2 species until a comprehensive status survey is completed in Nevada.

¹Formerly the Idaho Natural Heritage Program

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I. Species Information.

1. Classification and nomenclature.

A. Species.

1. Scientific name.

a. Binomial: Penstemon idahoensis Atwood & Welsh

b. Full bibliographic citation: Atwood, N.D., and S.L. Welsh. 1988. An Erigeron from Nevada and a Penstemon from Idaho. Great Basin Naturalist 48(4):495-498.

c. Type specimen: Atwood & Goodrich 8958, 17 air miles SW of Oakley, 1 mile north of Idaho/Utah line, Goose Creek drainage, near Shoe Spring, T16S R21E S35, Cassia County, Idaho, 22 June 1982.

2. Pertinent synonym(s): None.

3. Common name(s): Idaho penstemon

4. Taxon codes: PDSCR1L7J0 (Idaho Conservation Data Center and Utah Natural Heritage Program).

5. Size of genus: Approximately 250 species, occurring in North America, but mostly in the western United States, reaching its greatest diversity in Utah (Holmgren 1984).

B. Family classification.

1. Family name: Scrophulariaceae

2. Pertinent family synonyms: None.

3. Common name(s) for family: Figwort

C. Major plant group: Dicotyledonea (Class Magnoliopsida)

D. History of knowledge of taxon: This taxon is relatively new to science, first collected in 1982, and described in 1988 (Atwood and Welsh 1988). Botanical exploration in the Goose Creek basin area has apparently been sporadic. Recent collecting in the area has primarily been done by Dr. Duane Atwood of the Forest Service and colleagues. In 1991, the Idaho Conservation Data Center entered into a Challenge Cost-share project with the Sawtooth NF to conduct a status survey of Penstemon idahoensis on the Forest. Concurrently, the

Conservation Data Center contracted with the U.S. Fish and Wildlife Service to conduct field inventories and prepare a status survey report for the taxon throughout the rest of its range.

During our survey work five new populations were discovered. A total of ten extant populations are now documented for Idaho, all in the Goose Creek basin of very southern Cassia County. One population is also known from adjacent Box Elder County, Utah (Baird, Tuhy and Franklin 1991). Idaho penstemon is to be expected in very northeastern Elko County, Nevada, but presently no populations have been documented from Nevada.

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

2. Present legal or other formal status

A. International: None.

B. National.

1. Present designation of proposed legal protection or regulation: Idaho penstemon is a Category 2 candidate species for federal listing (U.S. Fish and Wildlife Service 1990).

2. Other current formal status recommendation: Idaho penstemon is ranked as "critically imperiled throughout its range because of extreme rarity or because of some other factor of its biology making it especially vulnerable to extinction" (global rank = G1) by The Nature Conservancy.

Idaho penstemon is a sensitive plant species for the U.S. Forest Service Region 4 (USDA Forest Service 1991), and the BLM in Idaho (Bureau of Land Management 1991) and Utah (Atwood et al. 1991).

3. Review of past status: Idaho penstemon is a relatively recently described species (Atwood and Welsh 1988). In 1990 it was listed as a Category 2 candidate species for federal listing by the U.S. Fish and Wildlife Service (1990).

1. Idaho.

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

b. Other current formal status recommendation: Idaho

penstemon is currently listed as "critically imperiled in Idaho because of extreme rarity or because of some other factor of its biology making it especially vulnerable to extinction" (state rank = S1) by the Idaho Conservation Data Center (Moseley and Groves 1990).

Since it is a federal candidate species, no Idaho Native Plant Society category applies to Idaho penstemon (Idaho Native Plant Society 1991).

c. Review of Past status: None.

2. Utah

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

b. Other current formal status recommendation:
Idaho penstemon is ranked S1 by the Utah Natural Heritage Program. The definition for the S1 ranking is identical as noted for Idaho. (Utah Natural Heritage Program 1990).

c. Review of past status: None.

3. Description.

A. General nontechnical description: Idaho penstemon is a perennial herb up to 20 cm tall. It has glandular herbage and simple, oblanceolate to linear-shaped leaves that are scabrous to the touch. The leaves are clustered near the base and extend up the stem. Flowers are showy, blue to blue-purple, and displayed on one side of the flowering stem.

B. Technical Description: Perennial herbs, 8-20 cm tall; stems several from a semiwoody caudex, ascending to erect, glandular; leaves entire, superficially glandular, glistening, bearing adherent soil particles, the margins revolute, thickened, sessile, the basal and lower cauline ones oblanceolate, 3.5-7 cm long, 1.4-4.2(8) mm wide, the upper cauline ones linear to elliptic, 3.4-5.5 cm long, 2.4-5.3 mm wide; inflorescence glandular, congested, 3-9 cm long, secund, the cymes 1- to 5-flowered; calyx 5.4-8.5 mm long, glandular, the lobes 3-5 mm long, acuminate, inconspicuously scarious margined; corolla 1.7-2.1 cm long, ventricose-ampliate, blue to blue-purple, glabrous externally, the palate glabrous, the lobes rounded, 2.6-4.5 mm long, undulate; fertile stamens included to slightly exserted, the anthers purplish,

the sacs 1.5-2 mm long, divaricate, moderately white-bearded with slender flexuous hairs about equal to or surpassing the sac width, opening across the distal ends but not across the connective; staminode glabrous, included, bluish (Atwood and Welsh 1988).

- C. Local field characters: Idaho penstemon has a low stature (up to 20 cm tall). It is very glandular and soil particles cling to the herbage, but not enough to obscure the dark green surface. Leaves are scabrous (rough) to the touch. Flowers are showy and arranged on one side of the flowering stem (secund). Its habitat on mostly fine-textured, hard, white to grey-colored tuffaceous sediments is distinctive, even from a distance.

We encountered the congeners Penstemon humilis (low penstemon) and Penstemon perpulcher in areas near, but never directly sympatric with Idaho penstemon. Neither should be readily confused with Idaho penstemon. Penstemon humilis has much smaller flowers and is not glandular, while Penstemon perpulcher is much taller (1-3 ft.) and is also not glandular.

- D. Identifying characteristics of material which is in interstate or international commerce or trade: No interstate or international trade is known. See above section for differences with closely related genera/species.
- E. Photographs and/or line drawings: A line drawing of Idaho penstemon appears in Atwood and Welsh (1988). Reduced versions of the Atwood and Welsh drawing can also be found in: (1) Utah endangered, threatened and sensitive plant field guide (Atwood et al. 1991), and (2) Idaho and Wyoming endangered and sensitive plant field guide (USDA Forest Service n. d.). See Appendix II for a reproduction of the line drawing from Atwood and Welsh (1988). Photographs (35 mm slides) of Idaho penstemon and its habitat in Idaho are in the slide collection of the Idaho Conservation Data Center. Several have been reproduced in Appendix VII.

4. Significance.

- A. Natural: None known.
B. Human: None known.

5. Geographical distribution.

- A. Geographical range: Idaho penstemon is locally endemic

to the Goose Creek drainage, from T16N, R20E, S2, in very southern Cassia County, Idaho, and extending south for approximately 6.5 miles to T15N, R19W, S26, in extreme northwestern Box Elder County, Utah. It is presently unknown from adjacent areas in Nevada (Morefield pers. comm.).

Ten extant populations of Idaho penstemon have been documented in Idaho, and one in Utah.

B. Precise occurrences. (see also Baird, Tuhy and Franklin 1991; Appendix VI).

1. Populations currently or recently known extant: Ten extant populations of Idaho penstemon have been documented for Idaho, five of these discovered in 1991. Three populations occur on the Twin Falls District of the Sawtooth National Forest. The remaining sites are on BLM, State, and private lands (see Appendix IV for a list of areas searched in Idaho during our 1991 field investigation). One rather extensive population has been documented in Utah (Baird, Tuhy and Franklin 1991). Note that the number in parentheses refers to the occurrence number for Penstemon idahoensis in the Conservation Data Center's data base.

Idaho

1. Whitley Ranch Gulch (001)
 - a. USA: Idaho, Cassia County
 - d. Blue Hill 7.5' U.S.G.S. topographic map quadrangle, 1968.
 - e. Type location for taxon. First observed in 1982 by Duane Atwood and Sherel Goodrich.
 - f. Most recently observed by Bob Moseley and Michael Mancuso in 1991.

2. Beaverdam Creek (002)
 - a. USA: Idaho, Cassia County
 - d. Ibex Peak 7.5' U.S.G.S. topographic map quadrangle, 1977.
 - e. First observed and collected by Duane Atwood and Roger Rosentreter in 1985.
 - f. Most recently observed by Bob Moseley and Michael Mancuso in 1991.

3. Devine Canyon (003)
 - a. USA: Idaho, Cassia County
 - d. Blue Hill 7.5' U.S.G.S. topographic map quadrangle, 1968.
 - e. First observed and collected by Duane Atwood and Sherel Goodrich in 1982.

- f. Most recently observed by Bob Moseley and Michael Mancuso in 1991.
- 4. Right Hand Fork Beaverdam Creek (004)
 - a. USA: Idaho, Cassia County
 - d. Ibex Peak 7.5' U.S.G.S. topographic map quadrangle, 1977.
 - e. First observed and collected by Duane Atwood in 1989.
 - f. Most recently observed by Bob Moseley and Michael Mancuso in 1991.
- 5. Orangeburg Spring (005)
 - a. USA: Idaho, Cassia County
 - d. Ibex Peak 7.5' U.S.G.S. topographic map quadrangle, 1977.
 - e. First observed and collected by Duane Atwood in 1989.
 - f. Most recently observed by Bob Moseley and Michael Mancuso in 1991.
- 6. Water Trough (006)
 - a. USA: Idaho, Cassia County
 - d. Ibex Peak 7.5' U.S.G.S. topographic map quadrangle, 1977.
 - e. First observed by Bob Moseley and Michael Mancuso in 1991.
 - f. Most recently observed by Bob Moseley and Michael Mancuso in 1991.
- 7. Nearly Nevada - Almost Utah (007)
 - a. USA: Idaho, Cassia County
 - d. Ibex Peak 7.5' U.S.G.S. topographic map quadrangle, 1977.
 - e. First observed by Bob Moseley and Michael Mancuso in 1991.
 - f. Most recently observed by Bob Moseley and Michael Mancuso in 1991.
- 8. Lower Beaverdam Creek (008)
 - a. USA: Idaho, Cassia County
 - d. Blue Hill 7.5' U.S.G.S. topographic map quadrangle, 1968.
 - e. First observed by Bob Moseley and Michael Mancuso in 1991.
 - f. Most recently observed by Bob Moseley and Michael Mancuso in 1991.
- 9. Goose Creek Cliff Bands (009)
 - a. USA: Idaho, Cassia County

- d. Blue Hill 7.5' U.S.G.S. topographic map quadrangle, 1968.
 - e. First observed by Bob Moseley and Michael Mancuso in 1991.
 - f. Most recently observed by Bob Moseley and Michael Mancuso in 1991.
10. Border Gulch (010)
- a. USA: Idaho, Cassia County
 - d. Cotton Thomas Basin 15' U.S.G.S. topographic map quadrangle, 1959.
 - e. First observed by Bob Moseley and Michael Mancuso in 1991.
 - f. Most recently observed by Bob Moseley and Michael Mancuso in 1991.

Note that the number in parentheses refers to the occurrence number for Penstemon idahoensis in the Utah Natural Heritage Program's data base.

Utah

- 1. Goose Creek NE (001)
 - a. USA: Utah, Box Elder County
 - d. Pole Creek 7.5' U.S.G.S. topographic map quadrangle.
 - e. First observed by M.A. 'Ben' Franklin in 1989.
 - f. Most recently observed by Gary Baird in 1990.
 - 2. Populations known or assumed extirpated: None.
 - 3. Historically known populations where current status not known: None.
 - 4. Locations not yet investigated believed likely to support additional natural populations: Additional potential habitat for Idaho penstemon is located on BLM land, on slopes east of the very upper reaches of Lower Goose Creek Reservoir (T15N, R21E, secs. 12 and 13 E2).
 - 5. Reports having ambiguous or incomplete locality information: None.
 - 6. Locations known or suspected to be erroneous reports: None.
- C. Biogeographical and phylogenetic history: Penstemon is one of the largest genera in the Intermountain West and

reaches its greatest diversity there. A number of Intermountain penstemons have a localized distribution, with some, like Idaho penstemon, restricted to specific substrates. Idaho penstemon is restricted to Tertiary age sediments that support very open communities with low plant diversity. These sites apparently present ecological conditions unsuitable for most taxa found in the area. Within Penstemon, the relationship of Idaho penstemon is apparently with members of section Glabri.

6. General environment and habitat description.

A. Concise statement of general environment: Idaho penstemon is found only on dry, white to grey-colored, tuffaceous sediments of the Salt Lake Formation (Rember and Bennett 1979a; Rember and Bennett 1979b). Soils are fine-textured and generally hard. It occurs on gentle to steep slopes of all aspects, although most commonly on south to southwest exposures. It has been documented between 4900 and 5700 feet elevation and from lower to upper slope positions. Idaho penstemon is most commonly associated with open, Utah juniper communities. Overall plant diversity is low. In at least one instance, a few plants were observed beneath the juniper canopy, while at some other sites it is devoid of any associates.

B. Physical characteristics.

1. Climate.

- a. Koppen climate classification: Habitat for Idaho penstemon is classified as Koppen's unit Bsk: middle latitude steppe, with average annual temperature under 64.4°F (Trewartha 1968).
- b. Regional macroclimate: The regional macroclimate for the Goose Creek basin area supporting Idaho penstemon is extrapolated from the Strevell, Idaho, weather station. Strevell is located at T16S, R28E, which is the same latitude as, but approximately 45 miles east of the Goose Creek basin. Strevell is at 5290 feet, similar to elevations Idaho penstemon is found. Mean annual temperature for Strevell is 45.5°F (7.6°C) and the mean annual precipitation is 10.9 inches (276.4 mm). The annual temperature range for Strevell averages between 22.2°F (-4.7°C) to 70.6°F (20.7°C), with highest temperatures occurring in July and the lowest occurring in January. Mean annual precipitation peaks in the spring months (April, May, June) with approximately 40% of the total annual precipitation. The winter

months, November to February, mark the driest part of the year with an average of less than 0.66 inch of precipitation per month (Johnson 1978).

- c. Local microclimate: The slopes and knolls where Idaho penstemon occur are likely dry much of the year. Snow probably does not linger long on the south to southwest aspects where the majority of Idaho penstemon occurs.

2. Air and water quality requirements: Unknown

3. Physiographic provinces: Populations of Idaho penstemon lie within the northern portion of the Basin and Range Province (Ross and Savage 1967).

4. Physiographic and topographic characteristics: Idaho penstemon occur on dry slopes and knolls of all aspects, but south to southwest are the most common. It is known from elevations ranging between 4900 and 5700 feet. It is locally endemic to a portion of the Goose Creek basin near where the borders of Idaho, Nevada and Utah join. The fine-textured Salt Lake Formation, tuffaceous soil to which Idaho penstemon is restricted is typically hard and very sparsely vegetated.

5. Edaphic factors: Idaho penstemon is apparently restricted to tuffaceous outcrops of the Salt Lake Formation in the Goose Creek drainage of southern Cassia County, Idaho and adjacent Box Elder County, Utah. Soils supporting Idaho penstemon tend to be dry, white to buff-colored, have a fine texture, and are fairly hard, but erodible. Salt Lake Formation outcrops that weather to very sandy sites or fractured rock larger than stone size are apparently unsuitable for Idaho penstemon.

6. Dependence of this taxon on natural disturbance: Unknown, but natural erosion processes are likely important in maintaining the soil attributes that Idaho penstemon, but few other species are well adapted. These attributes contribute to a more open community structure compared to stabilized sites. Stabilized sites support more abundant vegetation from which Idaho penstemon is absent.

7. Other unusual physical features: Idaho penstemon is often absent from sites supporting what appears to be suitable habitat. Furthermore, it often occupies only a small fraction of the suitable-looking habitat encompassing a given population.

C. Biological characteristics.

1. Vegetation physiognomy and community structure: Idaho penstemon is most commonly associated with open Juniperis osteosperma communities. One population, on a north to northwest-facing slope occurs within portions of a Artemisia tridentata ssp. wyomingensis - Festuca idahoensis community. Sites tend to be sparsely vegetated and with low species diversity.
2. Regional vegetation type: Kuchler (1964) places the Goose Creek basin area of Idaho into the potential vegetation type of juniper-pinyon woodland (Juniperis-Pinus).
3. Frequently associated species: Associate species include: Juniperis osteosperma, Artemisia tridentata ssp. wyomingensis, A. nova, Chrysothamnus viscidiflorus, Eriophyllum lanatum, Chaenactis douglasii, Senecio canus, Purshia tridentata, Oryzopsis hymenoides, Agropyron spicatum, Physaria geyeri, Cymopterus terebinthinus, Gilia congesta, Eriogonum sp., E. ovalifolium and Lupinus lepidus. On one occasion the rare plant Astragalus anserinus (Goose Creek milkvetch) was growing in close proximity to Idaho penstemon, but on more sandy microsites (Mancuso and Moseley 1991). The exotic species Euphorbia esula (leafy spurge) was also observed invading Idaho penstemon habitat in several places.
4. Dominance and frequency: At several locations, Idaho penstemon dominates a small area where associated vegetation is very sparse or even absent. Within and between populations, Idaho penstemon can vary from very widely scattered individuals to relatively dense clusters of plants.
5. Successional phenomena: Ecological conditions at sites supporting Idaho penstemon are beyond the range of most plant species found in the Goose Creek basin area. This results in sites that are sparsely vegetated and with interesting, but low plant diversity. Scattered, large Utah juniper trees and other woody vegetation may be present, with such sites likely representing a sort of edaphic climax.
6. Dependence on dynamic biotic features: None known.
7. Other endangered species: The rare plant Astragalus anserinus (Category 2 candidate for federal listing) is similarly endemic to the Goose Creek basin area and restricted to particular tuffaceous outcrops. It has

been found in close proximity to Idaho penstemon, but probably due to its preference for more sandy sites, was never found sympatric (Mancuso and Moseley 1991).

7. Population biology.

- A. General summary: There are ten populations of Idaho penstemon known from Idaho, all located in the Goose Creek basin of very southern Cassia County. Five of these populations were discovered during field inventory work in 1991. One large population is also known from adjacent Box Elder County, Utah. All are restricted to tuffaceous substrates of the Salt Lake Formation that are relatively sparsely vegetated. It is estimated the ten Idaho populations support a total of approximately 4000 individuals, ranging in size from 25 to 1000 genets. The Utah population is comprised of five subpopulations, supporting a total of approximately 3300 genets. Subpopulations ranged in size from 150 to 1800 genets (Baird, Tuhy and Franklin 1991).

For the Idaho populations, plant density was variable, and the area delineating a population varied from a fraction of an acre to over 100 acres. One population (001) showed an apparent decline from 100-1000 individuals in 1989, to only 25 seen in 1991. One population (005) showed an apparent increase between 1989 and 1991, from less than 50 to approximately 300 individuals. It is uncertain how big a difference the intensity of searching was between years.

For the Utah population, site size also varied greatly, with the smallest about one acre and the largest between five and ten acres. Age structure was not determined in any Utah or Idaho populations, but most if not all sites supported a full range of plant sizes (Baird, Tuhy and Franklin 1991). Specific population biology information is unknown for Idaho penstemon.

B. Demography.

1. Known populations: Ten known populations in Idaho, all occurring in very southern Cassia County, near the state lines with Utah and Nevada. Populations range in size range from as few as 25 to approximately 1000 genets and support a total of about 4000 individuals. A single population is known from Utah and is comprised of five subpopulations supporting a total of approximately 3300 individuals. Subpopulations range in size from 150 to 1800 genets (Baird, Tuhy and

Franklin 1991).

2. Demographic details (Idaho): (see also Appendix V)

1. Whitley Ranch Gulch (001)
 - a. Location:
 - b. Area: 5 acres
 - c. Number and size of plants: ca 1000 plants in 1991; all age classes apparently represented.
 - d. Density: low to medium
 - e. Presence of dispersed seeds: Unknown
 - f. Evidence of reproduction: No evidence
 - g. Evidence of expansion/contraction: Unknown

2. Beaverdam Creek (002)
 - a. Location:
 - b. Area: 1 acre or less
 - c. Number and size of plants: ca 500 in 1991; all size classes represented
 - d. Density: widely scattered, usually in small clusters
 - e. Presence of dispersed seeds: Unknown
 - f. Evidence of reproduction: No evidence
 - g. Evidence of expansion/contraction: Unknown

3. Devine Canyon (003)
 - a. Location:
 - b. Area: 1 acre
 - c. Number and size of plants: ca 200 in 1989, same number in 1991; all age classes appear to be represented
 - d. Density: low
 - e. Presence of dispersed seeds: Unknown
 - f. Evidence of reproduction: Unknown
 - g. Evidence of expansion/contraction: A stable number of plants between 1989 and 1991

4. Right Hand Fork Beaverdam Creek (004)
 - a. Location:
 - b. Area: 10-100 m²
 - c. Number and size of plants: 100-1000 plants in 1989, and ca 25 in 1991
 - d. Density: low
 - e. Presence of dispersed seeds: Unknown
 - f. Evidence of reproduction: Unknown
 - g. Evidence of expansion/contraction: An apparent decline in number between 1989 and 1991

5. Orangeburg Spring (005)
 - a. Location:

- b. Area: Unknown
 - c. Number and size of plants: 11-50 plants in 1989, and ca 300 in 1991; all age classes present
 - d. Density: Low
 - e. Presence of dispersed seeds: Unknown
 - f. Evidence of reproduction: Unknown
 - g. Evidence of expansion/contraction: An apparent increase in number from 1989 to 1991
6. Water Trough (006)
- a. Location:
 - b. Area: 1 acre
 - c. Number and size of plants: 250-300 plants in 1991
 - d. Density: Low
 - e. Presence of dispersed seeds: Unknown
 - f. Evidence of reproduction: Unknown
 - g. Evidence of expansion/contraction: None
7. Nearly Nevada - Almost Utah (007)
- a. Location:
 - b. Area: 25-50 yd²
 - c. Number and size of plants: ca 150 in 1991
 - d. Density: Low
 - e. Presence of dispersed seeds: Unknown
 - f. Evidence of reproduction: No evidence
 - g. Evidence of expansion/contraction: None
8. Lower Beaverdam Creek (008)
- a. Location:
 - b. Area: 10-50 yd²
 - c. Number and size of plants: ca 150 in 1991
 - d. Density: Low
 - e. Presence of dispersed seeds: Unknown
 - f. Evidence of reproduction: No evidence
 - g. Evidence of expansion/contraction: None
9. Goose Creek Cliff Bands (009)
- a. Location:
 - b. Area: 2+ acres
 - c. Number and size of plants: 500 in 1991
 - d. Density: Low
 - e. Presence of dispersed seeds: Unknown
 - f. Evidence of reproduction: No evidence
 - g. Evidence of expansion/contraction: None
10. Border Gulch (010)
- a. Location:
 - b. Area: 2+ acres
 - c. Number and size of plants: 500-1000 in 1991

- d. Density: Scattered
- e. Presence of dispersed seeds: Unknown
- f. Evidence of reproduction: No evidence
- g. Evidence of expansion/contraction: None

3. Demographic details (Utah): (see also Appendix VI)

- 1. Goose Creek NE (001)
 - a. Location:
 - b. Area: 25 acres
 - c. Number and size of plants: ca 3300 in 1991
 - d. Density: 5 subpopulations, variable density
 - e. Presence of dispersed seeds: Unknown
 - f. Evidence of reproduction: No evidence
 - g. Evidence of expansion/contraction: None

C. Phenology.

1. Patterns: Following an unusually cool and wet spring, flowering in 1991 was later than reported from previous accounts. Allowing for site and year to year climatic variability, most populations flower sometime in June. Although not documented, fruits are likely mature by August with seed dispersal occurring shortly afterwards.

2. Relation to climate and microclimate: Specific details are unknown. Idaho penstemon can occur on slopes of any aspect, but is most common on south to southwest exposures. The one population found on north to northwest-facing slopes in Idaho occurs at 4900 feet elevation, which is about 100 feet lower than any other population. Flowering apparently begins earlier at the lower, warmer, south-facing sites.

1. Type of reproduction: Apparently by seed only, as no evidence of asexual reproduction has been documented.

2. Pollination.

- a. Mechanisms: Unknown, but probably flying insects.
- b. Specific known pollinators: Unknown.
- c. Other suspected pollinators: None known.
- d. Vulnerability of pollinators: Unknown.

3. Seed dispersal.

- a. General mechanisms: Details of the seeds are unknown. It may be that seeds fall directly on the ground, where wind, sheets of rain or animal vectors may move them.
 - b. Specific agents: Unknown.
 - c. Vulnerability of dispersal agents and mechanisms: Unknown.
 - d. Dispersal patterns: Unknown.
4. Seed biology.
- a. Amount and variation of seed production: Unknown.
 - b. Seed viability and longevity: Unknown.
 - c. Dormancy requirements: Unknown.
 - d. Germination requirements: Unknown.
 - e. Percent germination: Unknown.
5. Seedling ecology: Unknown.
6. Survival and mortality: Unknown.
7. Overall assessment of reproductive success: Specific details are unknown. A number of populations were noted to have basal leaf clusters of various sizes, and interpreted to represent different age classes. At some populations plants occur in widely scattered clusters. This hints establishment is occurring, but is limited to near parental plants.
8. Population ecology of the taxon.
- A. General summary: In Idaho, all populations of Idaho penstemon are relatively small, with the largest supporting approximately 1000 individuals. The single Utah occurrence is larger with approximately 3300 individuals dispersed between five subpopulations. Its occurrence on sparsely vegetated sites suggests a low tolerance to interspecific competition. The apparent ability of leafy spurge to invade or encroach Idaho penstemon habitat is cause for concern considering this likely intolerance. Cattle graze throughout the range of Idaho penstemon, but impacts are mostly light at the sparsely vegetated sites supporting this taxon. Idaho penstemon's restricted geographic range and absence from many suitable-appearing sites in the Goose Creek

area suggest a limited dispersal capability and/or an extremely narrow ecological amplitude. Studies on the population biology of Idaho penstemon and the effects of threats are needed to answer many of these ecological questions.

B. Positive and neutral interactions: None known.

C. Negative interactions.

1. Herbivores, predators, pests, parasites and diseases: Several plants were eaten at one population (006) in an area of concentrated livestock use.

2. Competition.

a. Intraspecific: None of our field observations suggest intraspecific competition to be significant in determining population size or structure.

b. Interspecific: Idaho penstemon occurs in open portions of the surrounding vegetation, or knolls and outcrops mostly devoid of other vegetation. This limitation to sparsely vegetated sites suggests a low tolerance to interspecific competition. It therefore appears that interspecific competition is an important ecological factor in the establishment and persistence of Idaho penstemon.

3. Toxic and allelopathic interactions with other organisms: None known.

D. Hybridization.

1. Naturally occurring: Unknown. A number of other penstemons occur in the Goose Creek area, but no evidence of hybridization was observed.

2. Artificially induced: Unknown.

3. Potential in cultivation: Unknown.

E. Other factors of population ecology: None known.

9. Current land ownership and management responsibility:

A. General nature of ownership: U.S. Forest Service, Bureau of Land Management, Idaho Department of State Lands, Utah State Trust Land and private.

- B. Specific landowners: In Idaho, three populations (004,005,006) occur on the Twin Falls Ranger District of the Sawtooth NF. Five populations (001,002,008, 009,010) occur at least partly on land administered by the Snake River Resource Area of the Burley District, BLM. One population occurs on State land (007) and one on private land (003). The single Utah population (001) occurs on land administered by the BLM's Bear River Resource Area of the Salt Lake District, and extends onto adjacent State land.
- C. Management responsibility: Same as above.
- D. Easements, conservation restrictions, etc.: Idaho penstemon is presently listed as "Sensitive" for Region 4 of the Forest Service (USDA Forest Service 1991) and the BLM in Idaho (Bureau of Land Management 1991) and Utah (Atwood et al. 1991). Land supporting Idaho penstemon populations would be managed according to the agencies respective regulations for sensitive species.
10. Management practices and experience.
- A. Habitat management.
1. Review of past management and land-use experiences.
- a. This taxon: Livestock grazing occurs throughout the range of Idaho penstemon. Although usually minor, all sites are directly or indirectly impacted to some degree. One population (003) occurs along Goose Creek Road where the Oakley Highway District has sprayed herbicide for leafy spurge control.
- b. Related taxa: Unknown
- c. Other ecologically similar taxa: Another federal C2 candidate species for federal listing, Astragalus anserinus (Goose Creek milkvetch), is similarly endemic to the Goose Creek basin area and restricted to Salt Lake Formation sediments. Goose Creek milkvetch is restricted to more sandy sites and has not been found directly sympatric with Idaho penstemon (Mancuso and Moseley 1991).
2. Performance under changed conditions: Idaho penstemon could possibly be eliminated from a site if the open community structure of its habitat were to develop a more closed or denser vegetative cover. The apparent ability of the exotic species leafy spurge to invade or encroach Idaho penstemon habitat is cause for concern in this regard. Idaho penstemon can occur on fragile

slopes that are easily impacted by cattle. These impacts may pose localized threats to the species long-term viability at a specific site.

3. Current management policies and actions: Penstemon idahoensis is included on the U.S. Forest Service list of sensitive species in Region 4 (USDA Forest Service 1991). As such, it receives protection under Forest Service management policies (USDA Forest Service 1988). It is also listed as a sensitive species for the BLM in Idaho (Bureau of Land Management 1991) and Utah (Atwood et al. 1991), and as such is warranted special management considerations.

4. Future land use: Livestock grazing occurs throughout the range of Idaho penstemon, and this land use is expected to continue. Any other specific future land use plans are unknown.

B. Cultivation.

1. Controlled propagation techniques: None known.

2. Ease of transplanting: Unknown.

3. Pertinent horticultural knowledge: None known.

4. Status and location of presently cultivated material: None known to be in cultivation.

11. Evidence of threats to survival.

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

1. Past threats: It is unlikely that much if any Idaho penstemon habitat was lost in converting the bottomlands along Goose Creek for agricultural purposes. Some habitat and associated plants at the Devine Canyon population (003) were likely lost when the Goose Creek county road was originally constructed. Some additional habitat has probably been destroyed during construction of the network of secondary roads that criss-cross much of the Goose Creek basin. Livestock grazing has been ongoing in the area for many years and indirectly affects such as cattle trails and increased erosion, especially on fragile slopes, has likely impacted some habitat too.

2. Existing threats: Several threats to Idaho penstemon have been identified. Leafy spurge (Euphorbia esula) is invading or encroaching at least four Idaho

penstemon populations. The invasion by such an aggressive species could have serious consequences to a species with apparently low competitive ability, like Idaho penstemon. Control methods for leafy spurge, such as the use of herbicides, also pose a potential threat to Idaho penstemon. During our 1991 investigation, it was noted that the county was doing some roadside spraying for weeds, including at the Devine Canyon population (003) along the main Goose Creek Road.

Indirect impacts, such as increased erosion of fragile slopes, trampling and trailing, and the construction of access roads and water tank facilities are the principle existing threats due to cattle grazing. At one population (006), in an area of concentrated cattle use, it was noted that several Idaho penstemon plants were eaten. Road widening or other maintenance projects on the Goose Creek Road in the vicinity of the Devine Canyon population (003) would likely destroy some Idaho penstemon plants.

In Utah, threats posed by cattle grazing are apparently not adversely affecting the overall distribution or vitality of Idaho penstemon, nor is leafy spurge noted as a threat (Baird, Tuhy and Franklin 1991).

3. Potential threats: Potential threats are a continuation or possible worsening of threats outlined above. Although not foreseen at this time, if mining of the Salt Lake Formation sediments for any purpose was to ever be initiated, at least local negative impacts to Idaho penstemon and its habitat could be expected. Baird, Tuhy and Franklin (1991) comment that natural predation and disease may have a greater impact on Idaho penstemon populations than man-induced factors such as cattle grazing.

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

1. Past threats: Minimal to no past threats in Idaho.

2. Existing threats: Minimal to no existing threats in Idaho.

3. Potential threats: Like many other penstemons, Idaho penstemon might be considered a choice ornamental. Commercial collecting for ornamental purposes is currently not a problem, but should be considered a potential threat. Several populations are small enough that even collecting for scientific purposes could cause adverse impacts and should be discouraged in such

cases.

C. Disease, predation, or grazing.

1. Past threats: No past threats to the population viability of Idaho penstemon due to disease or predation are known. Several indirect effects of grazing, already noted, have been ongoing for many years. It appears these threats can have localized impacts, but presently do not seem to be adversely effecting the overall distribution and vitality of Idaho penstemon.
2. Existing threats: No direct threats to the viability of Idaho penstemon due to disease or predation have been documented. Baird, Tuhy and Franklin (1991) suggest that natural predation and disease may have greater impacts on Idaho penstemon than livestock. Threats posed by livestock are a continuation of impacts already noted.
3. Potential threats: No direct potential threats to the population viability of Idaho penstemon due to disease or predation are known. Impacts associated with heavy grazing, already noted, will continue to be a potential threat, however.

D. Inadequacy of existing regulatory mechanisms.

1. Past threats: None.
2. Existing threats: In Idaho, one population (007) of Idaho penstemon occurs solely on State land and another (003) solely on private land. Part of one population (009) extends from BLM land onto private land. The remaining Idaho populations are found on Sawtooth NF and BLM land. The one Utah population (001) is mostly on BLM land, but overlaps onto adjacent State land. Presently, there are no statutes directing the protection of rare plant species on State or private lands in either Idaho or Utah. Because of its sensitive species status for the two federal agencies, the conservation of Idaho penstemon must be considered in land use decisions where it occurs.
3. Potential threats: Same as above.

E. Other natural or manmade factors.

1. Past threats: None known.
2. Existing threats: None known.

3. Potential threats: None known.

II. Assessment and Recommendations.

12. General assessment or vigor, trends, and status: As of 1991, ten extant populations of Idaho penstemon are known in Idaho, all from the Goose Creek basin in very southern Cassia County. One population is also known from an adjacent area in Utah. The ten Idaho populations support a total of approximately 4000 individuals, ranging in size from 25 to 1000 genets. Several populations were noted to have what appeared to be good age class representation. Density was variable, with plants often occurring in scattered, small clusters. The area delineating a population varied from a fraction of an acre to over 100 acres. Idaho penstemon tends to occupy only a small fraction of the suitable-looking habitat encompassing a given population, and it is often absent from sites supporting what appears to be suitable habitat. In 1991, one population showed an apparent decrease in the number of plants, and one an increase, compared to previous reports.

The single Utah population is comprised of five subpopulations supporting a total of approximately 3300 individuals. Subpopulations range in size from 150 to 1800 individuals, and vary in area from one to perhaps as large as ten acres (Baird, Tuhy and Franklin 1991). Idaho penstemon faces a number of threats to its long-term viability. The combination of these threats and the restricted distribution, both geographically and edaphically of this very uncommon species mandate it remain a conservation concern.

13. Recommendations for listing or status change.

A. Recommendations to the U.S. Fish and Wildlife Service: Idaho penstemon is listed presently as a Category 2 species with the U.S. Fish and Wildlife Service (1990). Idaho penstemon has only recently been described (Atwood and Welsh 1988), and survey work in Idaho and Utah only recently undertaken. Status survey work has yet to be initiated in Nevada.

As summarized in this report, Idaho penstemon is very locally distributed and restricted to a particular tuffaceous substrate. It is known from only ten populations in Idaho, supporting a total of approximately 4000 individuals. It faces several threats, with the invasion or encroachment of leafy spurge onto sites supporting Idaho penstemon probably the most serious.

Results of the Utah investigation report one large population, comprised of several subpopulations, and in total supporting about 3300 individuals. No obvious threats to the survival of Idaho penstemon in Utah are reported (Baird, Tuhy and Franklin 1991).

Idaho penstemon would be expected to occur in very northeastern Elko County, Nevada, but it has never been documented from there. It is recommended a status survey for Idaho penstemon be completed as soon as practicable in Nevada. Pending completion of survey work in Nevada, it is recommended that Idaho penstemon be retained in Category 2.

It is further recommended that the Fish and Wildlife Service draft a Conservation Agreement with the Oakley Highway District in Cassia County, Idaho, to protect the Devine Canyon (003) population of Idaho penstemon. This population occurs adjacent to the Goose Creek road near Devine Canyon. This population is potentially threatened by road maintenance projects and roadside weed spraying for leafy spurge by the county.

B. Recommendations to other U.S. Federal Agencies.

1. Bureau of Land Management: In Idaho, five populations of Idaho penstemon occur on land administered by the Snake River Resource Area of the Burley District. One of these populations extends onto adjacent private land. The one Utah population is located on Bear River Resource Area, Salt Lake District land. Part of this population overlaps onto adjacent private land. Based on information contained in this report Idaho penstemon still meets sensitive species criteria and should remain on the BLM sensitive species list for Idaho. Based on information contained in Baird, Tuhy and Franklin (1991) and this report, it should also remain on the BLM sensitive species list for Utah.

2. U.S. Forest Service: Three populations of Idaho penstemon are now know from land administered by the Twin Falls Ranger District of the Sawtooth NF. Based on information contained in this report Idaho penstemon still meets sensitive species criteria and should remain on the Forest Service Region 4 sensitive species list for the Sawtooth NF.

C. Other status recommendations.

1. Counties and local areas: Cassia County should be made aware of the Idaho penstemon population (003)

located along the Goose Creek Road near Devine Canyon. The Oakley Highway District in Cassia County should enter into a Conservation Agreement with the Fish and Wildlife Service to ensure the long-term persistence of this particular population. Roadside herbicide spraying for weeds such as leafy spurge or maintenance projects such as widening are potential threats to this population. It is recommended that only spot herbicide application by hand be practiced in this area, and any road maintenance projects be adjusted to protect the integrity of this population.

2. State: Currently, Goose Creek milkvetch is ranked S1 by the Idaho Conservation Data Center. Based on data collected in 1991, this ranking still seems appropriate. The present S1 ranking seems appropriate for Utah too, however, the Utah Natural Heritage Program is ultimately responsible for deciding on the appropriate state rank in Utah.

3. Other Nations: No recommendations.

4. International: No recommendations.

14. Recommended critical habitat:

A. Concise statement of recommended critical habitat.

Because the status of Idaho penstemon in the Nevada portion of its potential range is presently unknown, establishment of critical habitat may be premature at this time. If survey work in Nevada does little to improve the conservation status for Idaho penstemon there are at least two areas in Idaho and one in Utah recommended for critical habitat designation.

One area is the type location for the taxon at the Whitley Ranch Gulch population (001). This population is located on Idaho BLM land and is one of the largest known. Cattle trail through the area, but its sparse vegetation precludes anything but light use. Of serious concern is the well established population of leafy spurge in the adjacent bottomlands that is beginning to encroach on the Idaho penstemon. This site presents a good opportunity to study the response of Idaho penstemon to leafy spurge invasion, including the effects of various control methods. The legal description for this population is T16S, R21E, secs. 35 and 26.

A second recommended area supports the Beaverdam Creek population (002) of Idaho penstemon plus another Category 2 candidate, Astragalus anserinus (Goose Creek

milkvetch). The Idaho penstemon occurs as scattered, small clusters of plants. The milkvetch occurs as even more widely scattered small clusters or individuals. The vegetation is mostly in good ecological condition and cattle use of the area is restricted to some flatter sites and trails. Leafy spurge is beginning to invade the area, but none was seen in the immediate vicinity of either rare plant. This area, in portions of T16S, R21E, secs. 28, 29 and 33, is geologically very interesting. The multi-colored bands of sediments eroded into strange shapes are also of high scenic value.

The single Utah population (Goose Creek NE - 001) also warrants designation. It is comprised of five subpopulations and supports the greatest number of Idaho penstemon plants known. For this population, section 35 of T15N, R19W, especially the southeast quarter, is recognized as very important habitat (Baird, Tuhy and Franklin 1991).

B. Legal Description of boundaries:

See Appendices V and VI for legal description of the occurrence records listed above.

C. Latitude and longitude: See Appendix V and VI for latitude and longitude of the occurrence records listed above.

D. Publicity/sensitivity of critical habitat area:

All of the above areas recommended for potential critical habitat are located solely on BLM land. This should make these areas and any monitoring studies easier to establish. If any further protective measures are needed at a later date, BLM ownership will allow more efficient implementation.

15. Conservation/recovery recommendations.

A. General conservation recommendations.

1. Recommendations regarding present or anticipated activities: The response of Idaho penstemon to herbicide spraying is currently unknown. With the invasion of leafy spurge in the Goose Creek basin the potential for control methods to impact Idaho penstemon populations is real and warrants further study. Any future projects along the Goose Creek Road near Devine Canyon should consider impacts to the Idaho penstemon population which occurs near there. Any landscape-altering projects in areas of Idaho penstemon habitat on Forest Service or BLM land should include a rare

plant clearance.

2. Areas recommended for protection: Three sites, two in Idaho and one in Utah are recommended as areas for potential protection (see "Concise Statement of recommended critical habitat"). In addition, a site on Sawtooth NF land (population 006) is within an area of concentrated cattle use. Several plants were noted to be eaten during our 1991 field survey. Excluding cattle from portions of this population may be warranted. Any exclosures could be designed to have a very minimal affect on cattle movement.

3. Habitat management recommendations: Habitats should be managed to reduce excessive impacts from man-caused land use 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: Very little is presently known about the life history of Idaho penstemon. Inferences from other, better studied penstemons can be made, but have limitations. Studies on seed biology and basic demographic attributes would help better assess the conservation status of Idaho penstemon. Monitoring the effects of invading leafy spurge into Idaho penstemon populations is recommended. Monitoring the effects of habitat disturbance by livestock can be simultaneously studied for both Idaho penstemon and Goose Creek milkvetch (another C2 candidate species). If an exclosure is built at the Water Trough population (006) as suggested above, this would provide another opportunity to study the effects of grazing.

16. Interested parties:

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III. Information Sources.

17. Sources of information.

A. Publications.

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

B. Herbaria consulted: Specimens of Idaho penstemon from Idaho are known to be deposited at Brigham Young University (BRY), and the University of Idaho (ID). The following is a list of known herbarium specimens, indexed by population:

- 001 - D. Atwood and S. Goodrich 8958 (BRY)
- 002 - D. Atwood and R. Rosentreter 11163 (BRY)
- 003 - D. Atwood and S. Goodrich 8954 (BRY);
R. Moseley 1437 (ID)
- 004 - D. Atwood 15647 (BRY)
- 005 - D. Atwood 15649 (BRY)
- 010 - M. Mancuso 536 (ID)

As noted in Atwood and Welsh (1988), 13 isotypes from collection number 8958 (D. Atwood with S. Goodrich) were distributed previously as Penstemon.

C. Fieldwork: In June, 1991, the Idaho Conservation Data Center conducted a field investigation for Idaho penstemon in Idaho (see Appendix IV for a list of areas surveyed during our 1991 survey). The objectives of this investigation were to relocate known populations and search potential habitat for new populations, delineate the overall distribution of the taxon in Idaho, characterize habitat conditions, collect population data, assess threats and submit a report summarizing its status.

Status survey work in Utah was conducted in June and July of 1990, under the auspices of the Utah Natural Heritage Program. A report summarizing the status of Idaho penstemon in the Utah portion of its range was finished in March, 1991 (Baird, Tuhy and Franklin 1991).

D. Knowledgeable individuals:

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E. Other information sources: None known.

18. Summary of material on file: Color slides, field forms, maps, and all published and unpublished references pertaining to Idaho penstemon in Idaho are on file at the Idaho Conservation Data Center office in Boise, Idaho. All photographs, field forms, maps and other references pertaining to Idaho penstemon in Utah are on file at the Utah Natural Heritage Program office in Salt Lake City, Utah.

IV. Authorship.

19. Initial authorship:

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20. Maintenance of status report: The Idaho Conservation Data Center and Utah Natural Heritage Programs will maintain current information for their respective states and update the status reports as needed. The Nevada Natural Heritage Program will likewise be responsible for maintenance of Nevada's information once status work is done there.

V. New information.

21. Record of revisions: Not applicable.

APPENDIX I

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Appendix II

Line drawing of Penstemon idahoensis
(From Atwood and Welsh 1988)

Appendix III

Maps showing locations of Penstemon idahoensis
in Idaho and Utah.

- Map 1. Overall distribution of known populations in Idaho and Utah. Portion of Sawtooth National Forest (Twin Falls and Burley Ranger Districts) Visitor Map (1970).
- Map 2. Devine Canyon (003) population. Portion of Blue Hill 7.5' USGS quadrangle.
- Map 3. Whitley Ranch Gulch (001), Lower Beaverdam Creek (008) and Goose Creek Cliff Bands (009) populations. Portion of Blue Hill 7.5' USGS quadrangle.
- Map 4. Right Hand Fork Beaverdam Creek (004) population. Portion of Ibex Peak 7.5' USGS quadrangle.
- Map 5. Beaverdam Creek population (002). Portion of Ibex Peak 7.5' USGS quadrangle.
- Map 6. Orangeburg Spring (005), Water Trough (006) and Nearly Nevada - Almost Utah (007) populations. Portion of Ibex Peak 7.5' USGS quadrangle.
- Map 7. Border Gulch (010) population, Idaho, and the Goose Creek NE (001) population in Utah. Portion of Cotton Thomas Basin 15' USGS quadrangle.

Note, that for the Idaho populations, the number in parentheses refers to the occurrence number for Penstemon idahoensis in the Conservation Data Center's data base. For the Utah population, the number in parentheses refers to the occurrence number for this species in the Utah Natural Heritage Program's data base.

A portion of the Pole Creek 7.5' USGS topographic map showing the precise location of Idaho penstemon in Utah can be found in Baird, Tuhy and Franklin (1991).

Appendix IV

List of areas searched for Penstemon idahoensis in Idaho.

East of Goose Creek (predominately BLM land with portions along Goose Creek under private ownership).

1. Wilson Gulch, and north to upper portions of Lower Goose Creek Reservoir.
2. Day Canyon.
3. Cold Creek.
4. Spring Creek (and draws between Cold and Spring Creeks).
5. Coyote Creek.
6. Emery Creek.
7. Blue Hill Creek.
8. Devine Canyon.
9. Birch Creek.
10. Several gulches between Birch and Pole Creek.
11. Pole Creek.

West of Goose Creek (Sawtooth NF land; most areas searched extend onto contiguous BLM, State and/or private lands).

1. Lone Cedar Creek.
2. Cave Gulch (including Daves Pass area).
3. Owen Corral Creek.
4. Coal Banks Creek.
5. Cliffs and gullies between Beaverdam and Coal Banks Creeks (BLM and private lands).
6. Gulches in lower Beaverdam Creek south of Emery Ranch (BLM and private lands).
7. NE Canyon and NE Creek.
8. Carlson Creek.
9. Left Hand Fork.
10. Right Hand Fork.
11. Dry Gulch.

Upper Goose Creek drainage (Sawtooth NF).

1. upper Goose Creek.
2. Thoroughbred Creek.
3. Trout Creek.

Trapper Creek drainage (Sawtooth NF and some BLM and/or private lands).

1. Trapper Creek.
2. Violets Hollow.
3. Squaw Creek and Little Squaw Creek.
4. Trapper Creek Demonstration Project Area.

A number of areas extending east from Salmon Falls Creek Reservoir to Shoshone Basin were also searched. Most of this area is BLM land, but some State and private land is also present.

Appendix V

Occurrence records for Penstemon idahoensis populations in Idaho.

Appendix VI

Occurrence record for Penstemon idahoensis populations in Utah.

(From Baird, Tuhy and Franklin 1991)

Appendix VII

Slides of Penstemon idahoensis and its habitat.

- Slide 1. Close-up of Penstemon idahoensis flowers; note flowers all on one side of rachis.
- Slide 2. Close-up of a Penstemon idahoensis plant; note low stature and barren, grey-colored tuffaceous substrate (001).
- Slide 3. Habitat for Penstemon idahoensis on grey-colored knolls in background (001).