FIELD INVESTIGATION AND STATUS SURVEY OF *PENSTEMON LEMHIENSIS* (LEMHI PENSTEMON) IN IDAHO

by

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ABSTRACT

A field investigation of Penstemon lemhiensis (Lemhi penstemon) was conducted on the Salmon National Forest by the Idaho Department of Fish and Game's Natural Heritage Program. The investigation was a cooperative Challenge Cost-share project between the Department and the Salmon NF. In addition to status information resulting from our inventory in 1990, we have collated data from inventories performed during the 1980's by biologists from the University of Idaho, Salmon NF, and private consulting firms.

Lemhi penstemon is endemic to Lemhi County, Idaho, and Beaverhead and Ravalli counties, Montana. It is a category 2 candidate for federal listing and a Forest Service Sensitive Species in Region 1 and Region 4. Currently, 85 occurrences of Lemhi penstemon are known in Idaho. Each of these occurrences consists of one population, or in many cases a grouping of two to six small populations that can be viewed as a metapopulation. In Idaho, it is restricted to Lemhi County, occurring in an arc around Salmon, from Bannock Pass in the Beaverhead Mountains, north up the Beaverheads, and then west and south in the Salmon River Mountains. The western edge of its distribution is currently unknown due to the relatively inaccessible terrain of the River of No Return Wilderness.

Lemhi penstemon has an elevational amplitude of almost 5000 feet, occurring in grasslands in the Salmon River canyon, woodlands, forest openings, and sagebrush slopes at middle and high elevations. It occurs on all the major geologic substrates of the region.

Numerous and varied human-caused threats to Lemhi penstemon have been recognized throughout its range. These include road building, road maintenance activity, mining, botanical and horticultural collecting, herbicide spraying and livestock grazing. Although not previously recognized by other investigators, we believe that the unnatural rate of vegetative succession due to fire suppression is the greatest threat to the long-term viability of the species in Idaho. Although most surveys have relied on the occurrence of Lemhi penstemon on roadcuts to find populations, these plants from artificial habitats contribute little to the overall viability of the species. Conservation planning for Lemhi penstemon should focus on populations in natural habitats.

TABLE OF CONTENTS

LIST OF APPENDICES

INTRODUCTION

The National Forest Management Act and Forest Service policy require that Forest Service land be managed to maintain populations of all existing native animal and plant species at or above the minimum viable population level. A minimum viable population consists of the number of individuals, adequately distributed throughout their range, necessary to perpetuate the existence of the species in natural, genetically stable, self-sustaining populations.

The Forest Service, along with other Federal and State agencies, has recognized the need for special planning considerations in order to protect the flora and fauna on the lands in public ownership. Species recognized by the Forest Service as needing such considerations are those that (1) are designated under the Endangered Species Act as endangered or threatened, (2) are under consideration for such designation, or (3) appear on a regional Forest Service sensitive species list.

Penstemon lemhiensis (Lemhi penstemon) is a regional endemic to Lemhi County, Idaho, and Beaverhead and Ravalli counties, Montana. Lemhi penstemon is a category 2 candidate for federal listing (U.S. Fish and Wildlife Service 1990), and is a Forest Service Region 1 (Reel et al. 1989) and Region 4 (USDA Forest Service 1988) Sensitive Species. A field investigation of this species was conducted on the Salmon National Forest by the Idaho Department of Fish and Game's Natural Heritage Program through the Cooperative Challenge Cost-share Program.

The primary objectives of this investigation are as follows:

1) Survey known populations of Lemhi penstemon and search potential habitats for new populations on the Salmon NF.

2) Characterize habitat conditions for known populations on the Salmon NF.

3) Assess population trends, if possible, and threats to existing populations and make management recommendations to the forest based on these assessments.

RESULTS

During June and July 1990, botanists from the Heritage Program visited known locations and surveyed suitable-appearing habitats for new populations of Lemhi penstemon in Lemhi County, Idaho. We found many new populations and revisited/relocated many previously known occurrences. Combining information from our survey, with that of biologists from consulting firms, the University of Idaho, and the Salmon NF, 85 occurrences are currently in the Heritage Program data base. All but eight have been visited since 1988. Most populations are small and occur near roads.

Following is a detailed discussion of the current status of Lemhi penstemon in Idaho, and is a compilation of information from many sources. Included is information on its taxonomy and identification, range and habitat, conservation status, and recommendations to the Regional Forester, Salmon NF, and U.S. Fish and Wildlife Service, concerning its status in Idaho.

Penstemon lemhiensis (Keck) Keck and Cronquist

CURRENT STATUS USFS Sensitive Species
Region 1 - Beaverhead and Bitterroot NFs
Region 4 - Salmon NF
USFWS - C2 candidate
Idaho Native Plant Society - None
Heritage Rank - G3 S3

TAXONOMY

Family: Scrophulariaceae (Figwort)

Common Name: Lemhi penstemon, Lemhi beardtongue

Citation: Brittonia 8:248. 1957.

Synonymy: P. speciosus ssp. lemhiensis Keck, American Midland Naturalist 23:612. 1940.

Technical Description: Perennial herb, 3-7 dm tall, with one to several stout stems from a branched caudex; herbage often finely hirtellous-puberulent at least in part; leaves entire, the basal ones clustered, up to 15-20 cm long and 1-2.5 cm wide, with petiolate, oblanceolate to narrowly elliptic blades; cauline leaves sessile, opposite, mostly lanceolate, up to ca 10-12 cm long and 1-2 cm wide; inflorescence glabrous, of several to many loose verticillasters, more or less secund in life; calyx 7-11 mm long, the segments lanceolate to narrowly ovate, evidently but not strongly scarious-margined below, tapering to a long-acuminate or subcaudate tip; corolla bright blue to purplish, 40-55 mm long, ca 1.5 cm wide at the mouth; pollen sacs 1-3 mm long, divaricate, evidently dentate ciliate along the sutures, pubescent near the connective and on side away from dehiscence; staminode glabrous; capsules ca 10-15 mm long; seeds ca 2-3 mm long (Shelly 1987).

Nontechnical Description: Lemhi penstemon is a stout herb with stems which are mostly about 15-30 inches tall. The flowers are bright blue to purple in color, and about 1.5-2 inches long. The basal leaves are entire, with no teeth or lobes, and are large, being about 3-6 inches long. The stem leaves are shorter, about 1-4 inches long, and are opposite. The plants are in flower from early June to July, depending on weather conditions and elevation. See Appendix 1 for a line drawing Lemhi penstemon and Appendix 5 for color slides of its habit and habitat.

Distinguishing Features and Similar Species:Lemhi penstemon is a very striking, tall, conspicuous species which, when in full bloom, is easy to see. The most reliable, easily observed distinguishing features include (Shelly 1987):

1. the large, bright blue, tubular flowers,
2. the sharp, narrow, elongated tips of the calyx lobes, and
3. the lack of hairs on the staminode (a sterile filament within the flower tube).

Keck originally described this taxon as a subspecies of P. speciosus (Keck 1940), based on three collections. Keck and Cronquist (1957) reevaluated it in light of the accumulation of additional specimens and decided that Lemhi penstemon is a distinctive species that is morphologically as well as geographically discrete from its nearest relatives. Our investigation in 1990, and Henderson's inventory in 1980 (D. Henderson, University of Idaho Herbarium, pers. comm. 1990), bear this out. We found that Lemhi penstemon is geographically discrete from its close relatives, but that two of those relatives come very close to the limits of its distribution. Penstemon payettensis is distributed as far east as Morgan Creek, on the southwestern western edge of Lemhi penstemon distribution. Penstemon cyaneus, a species generally distributed south of Lemhi penstemon, ranges as far north as the Lemhi Range and in the Salmon River Mountains in the Iron Creek drainage, also very close to the southwest edge of Lemhi penstemon distribution.

The following key, adapted from Cronquist (1959) and Hitchcock and Cronquist (1973), can be used to distinguish these three species:

A. Pollen sacs 1.1-1.9 mm, straight or arcuate, becoming opposite or upwardly divaricate after dehiscence, obscurely short-hairy toward the connective, wholly dehiscent, calyx segments more or less elongate, acuminate at the tip, corolla 18-28 mm long, staminode short-bearded ..... P. payettensis

A. Pollen sacs 1.8-3.0 mm, tending to be sigmoidally twisted, downwardly divaricate (rarely opposite in P. cyaneus), their proximal portions remaining indehiscent, corolla 25-38 mm long.

  B. Calyx 4-7 mm long, the segments very broad and with prominently erose-scarious margins, inconspicuously or scarcely pointed; staminode bearded ..... P. cyaneus

  B. Calyx 7-11 mm long, the segments long-acuminate, less prominently scarious; staminode glabrous ... . P. lemhiensis

Dick Wenger (Salmon NF, pers. comm., 1989) observed P. cyaneus, and what he considered hybrids between Lemhi penstemon and P. cyaneus, in the Iron Creek drainage. During our survey, we found only P. cyaneus in the area (Mancuso 222, at ID), which is the only area west of the Salmon River in Lemhi County that we observed this species.

DISTRIBUTION

Range: Lemhi penstemon is endemic to Lemhi County, Idaho, and adjacent portions of Beaverhead and Ravalli counties, Montana. Prior to 1973, it was known from very few occurrences in either state. Beginning in 1973, Dr. Douglass Henderson, and other botanists associated with the University of Idaho Herbarium, began their floristic exploration of east-central Idaho. During the 1970's they discovered several more populations, mostly in the Bannock Pass area of the Beaverhead Mountains. In 1980, Henderson searched for Lemhi penstemon in the higher elevations of the North Fork Salmon River and Panther Creek drainages and in the vicinity of Salmon, discovering 10 new populations (Henderson 1981). Dick Wenger, Salmon NF Biologist, discovered many new sites during informal surveys in 1988 and 1989. In 1989, Kent Crofts, a biological consultant for the Beartrack Gold Project, did a survey for rare plants in the proposed mine area and along possible transportation routes between the mine and Salmon. He documented 56 populations in his study area, many of them newly discovered (ACZ Inc. 1990; USDA Forest Service 1990). Heritage Program botanists conducted a status survey for Lemhi penstemon on the Salmon NF during June 1990, at lower elevations in the Panther Creek drainage and main Salmon River canyon, and in July, at higher elevations throughout the Forest. We revisited/relocated many of the previously known sites and discovered numerous new sites, especially at the lower elevations.

Based on the results of the above mentioned inventories and numerous other sources, the Idaho Natural Heritage Program currently has 85 "element occurrences" of Lemhi penstemon in its data base. Each of these occurrences can be made up of one population or a grouping of from two to six populations that can be viewed as a metapopulation (= a system of multiple separate populations, interconnected by a small amount of dispersal; see Murphy et al. 1990). All except eight occurrences have been visited since 1988. See Appendix 2 for the mapped locations of known Lemhi penstemon populations in Idaho, Appendix 3 for the element occurrence records for the 85 known occurrences in the state, and Appendix 4 for areas searched by the Idaho Natural Heritage Program in 1990.

All Idaho populations of Lemhi penstemon are known from Lemhi County, although it is known to occur within a couple of miles of the Idaho County line along the Salmon River. To date most of the surveys have taken place on the Salmon National Forest, especially the north-central part of the forest. Although less is known of its distribution at lower elevations in the Lemhi Valley, several sites are known from the foothills of the Beaverhead Mountains and one site in the foothills of the northern Lemhi Range. So, Lemhi penstemon appears to occur in an arc around the town of Salmon, from Bannock Pass on the southeast, north and then west along the Beaverhead Mountains and Lemhi Valley, to the North Fork Salmon River, main Salmon River canyon, and Panther Creek.

Almost nothing is known about the western limits of its distribution, which lies in the relatively inaccessible Frank Church - River of No Return Wilderness. We found populations as far downstream on the Salmon River as Wheat Creek, almost to the Bitterroot NF. Because of time and access constraints, we were unable to inventory farther down the Salmon River canyon or in the Middle Fork Salmon River drainage. Neither Henderson et al. (1979), Brunsfeld et al. (1980), and Henderson (1982), working on the Challis NF, were able to find any Lemhi penstemon populations. In viewing the maps in Appendix 2, it should become apparent that almost all survey work has been done along roads; very few populations were discovered by people on foot. Undoubtedly, other occurrences of Lemhi penstemon will be found in the Wilderness and other unroaded areas of the Panther Creek, North Fork Salmon River, and main Salmon River canyon.

Lemhi penstemon populations span almost 5000 feet in elevation, from 3200 feet on the Salmon River to 8100 feet in the Phelan Mountain area. For the most part, elevation appeared to have no affect on population size, with small and large populations occurring throughout the elevational range of the species. Populations ranged in size from a single plant to over 600 plants, although limits of many of the populations were not fully mapped. For instance, the largest and densest population known (occurrence 039) probably extends for approximately seven miles from Colson Creek, across the 1986 Long Tom Complex Fire in the Salmon River canyon, to the East Fork Owl Creek and consists of many thousands of individuals. Most populations are small, however, consisting of less than 50 individuals.

A comparison of several populations (occurrences 002, 003, 006, 007, 008, 012, 013, Appendix 3; ACZ Inc. 1990), counted variously by Henderson in 1980, Wenger in 1988, Crofts in 1989, and by us in 1990, reveals that trends are variable, but have mostly been downward.

In Montana, status reviews by the Montana Natural Heritage Program, beginning in 1986, have elucidated the distribution and abundance of Lemhi penstemon there (Shelly 1987; 1990a; 1990b). Thirty-nine populations are known from Montana, and, similar to Idaho, most are small and widely scattered and subject to a variety of threats.

Habitat and Associated Species: Lemhi penstemon occurs in a wide array of habitats, which is not unexpected for a species with an elevational amplitude of 5000 feet. At the lower elevations along Panther Creek and in the Salmon River canyon, Lemhi penstemon occurs in open grassland communities dominated by either Festuca idahoensis, Agropyron spicatum, or Stipa comata. In a few cases these grasslands intermingle with tall shrubs such as Prunus virginiana and Amelanchier alnifolia. These habitats occur on alluvial fans near the valley bottom or on the lower canyon slopes. Several populations along Panther Creek occur on alluvial fans dominated by the Artemisia tripartita/Festuca idahoensis and Artemisia tridentata ssp. ?/Stipa comata habitat types (Hironaka et al. 1983). Lemhi penstemon also occurs in the open coniferous woodlands that cover the lower slopes of the Panther Creek and Salmon River canyons. Habitat types of these woodlands include Pinus ponderosa/Agropyron spicatum, P. ponderosa/Festuca idahoensis, Pseudotsuga menziesii/Agropyron spicatum, and P. menziesii/Festuca idahoensis (Steele et al. 1981), and an undescribed type occurring on alluvial fans along Panther Creek, Pinus ponderosa/Stipa comata.

At the higher elevations, habitats are less variable with most Lemhi penstemon populations occurring in the Artemisia tridentata ssp. vaseyana/Agropyron spicatum or A. tridentata spp. vaseyana/Festuca idahoensis habitat types (Hironaka et al. 1983) or at the sagebrush-steppe/forest ecotone. Occasionally it occurs in forest openings within several Douglas-fir habitat types, such as Pseudotsuga menziesii/Calamagrostis rubescens, P. menziesii/Symphoricarpos oreophilus, and P. menziesii/Physocarpus malvaceus.

See the habitat data of the element occurrence records in Appendix 3 for additional information on the wide variety of associated species that occur with Lemhi penstemon.

Lemhi penstemon populations occur on all major geologic substrates that occur in Lemhi County, including volcanic, granitic, and sedimentary, where both quartzite and carbonate rocks are represented. Although all sites are relatively xeric, it can occur on all aspects, except at the highest elevations where its Artemisia tridentata/Festuca idahoensis habitat generally occurs on southerly slopes.

The wide array of Lemhi penstemon habitats listed above have at least two characteristics in common, however. First, all sites are open to sunlight. A clear trend was observed in woodland and forest opening habitats: penstemon populations decreased in density as canopy closure increased.

Secondly, all these habitats are subject to a wide array of natural disturbances, including chronic downslope soil movement on steeper slopes, occasional debris flows onto alluvial fans, native ungulate grazing and trampling, wildfire, and others. It was obvious to us that Lemhi penstemon populations respond favorably to disturbance regimes that leave bare soil and decline in undisturbed communities that begin to close and leave very little bare-soil microhabitats as vegetative succession proceeds toward advanced stages. Ramstetter (1983) observed a similar processes in Montana.

Several examples of this were seen in 1990. The grassland and woodland habitat of the upper Colson Creek population (039), which extends from the Colson Creek - Ebenezer Creek divide, east to the East Fork Owl Creek, was burned by the Long Tom Complex Fire in 1986. Although pre-fire population levels are unknown, it was the densest and most vigorous population observed in 1990. Adjacent stands that did not burn in 1986, had very small populations of low density. A second example, although more speculative, is also worthy of note. The Trapper Flat (027) and Fitzer Flat (026) populations, occurring in Artemisia tripartita/ Festuca idahoensis habitats on alluvial fans, are very small, with just a few widely scattered plants. There is low plant species diversity at these sites, possibly due to the nearly 100% cover of "old-growth" Festuca idahoensis. Fire may someday open these stands of Idaho fescue and allow the long-persisting, but small, Lemhi penstemon populations to increase as the post-fire bare-soil microhabitats become available.

Fire history studies in ponderosa pine/Douglas-fir stands in lower Colson Creek and adjacent portions of the River of No Return Wilderness (Barrett and Kilgore 1985; Barrett 1988) reveal that frequent surface fires predominated prior to 1935. Their Master Fire Chronology for the 3000 acre Colson Creek study site covers 213 years, between 1707 and 1919. An estimated 59 fires occurred during this period, thus a fire occurred somewhere in the 3000 acre area on the average of about every four years. These data are probably similar to other lower elevation habitats of Lemhi penstemon on the Salmon NF.

A review of recent ecological studies of the Bay checkerspot butterfly (Murphy et al. 1990; Anonymous 1990) is insightful and analogous to the Lemhi penstemon situation; both species occur in small, isolated populations that are subjected to widely fluctuating environmental conditions over time. Stanford University biologists have been studying the process by which

small populations of the checkerspot are able to repeatedly flirt with extinction, but persist for years. In the case of Lemhi penstemon, it may persist for years in very small, isolated populations, possibly even as a seed bank, until a particular disturbance regime recurs on the landscape.

This is why the easiest way to survey for Lemhi penstemon is to drive roads and use the occurrence of plants on a roadcut as an indicator of a more extensive population in the vicinity (e.g., ACZ INC. 1990). Road construction through a population creates bare-soil habitat that becomes available for occupation by dispersing penstemon seeds.

CONSERVATION STATUS

Conservation Status - Idaho: Lemhi penstemon was proposed as a threatened species by the Smithsonian Institution in 1975, soon after the Endangered Species Act was passed (Atwood and Charlesworth 1987; Watson n.d.). In his evaluation of Lemhi penstemon for the Idaho Natural Areas Council rare plant project, Henderson (1977) agreed with the Smithsonian assessment and recommended that it be retained as threatened because of its limited distribution and small population size. Henderson (1981) later reevaluated the conservation status of the species, with new data on hand, and again recommended that it be recommended for listing as threatened. He reasoned that the species was still vulnerable because of the small number of populations known, with most being precariously located close to roads, and the documented extirpation of one population from herbicide spraying on the Salmon NF (Henderson 1981).

The U.S. Fish and Wildlife Service listed Lemhi penstemon as a category 1 candidate in the 1980, and a category 2 candidate in the 1983 and 1985 Federal Register lists of candidate plants (Atwood and Charlesworth 1987). It is currently a category 2 candidate (U.S. Fish and Wildlife Service 1990).

Lemhi penstemon is currently an Idaho Bureau of Land Management Sensitive Species (Moseley and Groves 1990), and a U.S. Forest Service, Region 4 Sensitive Species for the Salmon NF (USDA Forest Service 1988) and Region 1 Sensitive Species for the Beaverhead and Bitterroot NFs (Reel et al. 1989)

The Idaho Native Plant Society does not classify federal candidates in its assessment of Idaho's rare flora (Moseley and Groves 1990).

The Idaho Natural Heritage Program currently ranks Lemhi penstemon as G3 S3 (G3 = either very rare and local throughout its range or found locally in a restricted range or because of other factors making it vulnerable to extinction, S3 = either very rare and

local in Idaho or found locally in a restricted range or because of other factors making it vulnerable to extinction; Moseley and Groves 1990).

Conservation Status - Elsewhere:

MONTANA - Lesica et al. (1984) recommended threatened status for Lemhi penstemon due its small population size and threats from livestock grazing and road maintenance activity. The Montana Natural Heritage Program has conducted several status inventories for Lemhi penstemon in Montana, beginning in 1986 (Shelly 1987; 1990a; 1990b). They found a similar situation in Montana as we did in Idaho, that is it occurs in relatively small populations distributed over a wide area. Many of the Montana populations are threatened by a wide variety of land-management activities. Shelly (1990b) recommended retaining Lemhi penstemon as a category 2 candidate until its status in Idaho was determined.

Lemhi penstemon is currently a U.S. Forest Service, Region 1 Sensitive Species for the Beaverhead and Bitterroot NFs (Reel et al. 1989; USDA Forest Service n.d.).

Ownership: Seventy six of the 85 occurrences of Lemhi penstemon in the Idaho Natural Heritage Program data base occur fully on the Salmon NF, with another four on or near the private/Salmon NF boundary. It occurs on all Ranger Districts of the Salmon NF.

Three occurrences of Lemhi penstemon are on land administered by the Salmon District, BLM, one on State of Idaho, Department of Lands-administered land, and one is fully on private land.

Threats: The threats to individual populations of Lemhi penstemon in Idaho are numerous and varied. All of the human-caused threats to population viability listed previously by Henderson (1977, 1981), Lesica et al. (1984), Watson (no date), Ramstetter (1983), and Shelly (1987; 1990a; 1990b) are still valid. These include road building, road maintenance activity, mining, botanical and horticultural collecting, and herbicide spraying.

With numerous roads traversing Lemhi penstemon populations, road building has certainly destroyed much Lemhi penstemon habitat in Idaho. The associated road maintenance activities have probably destroyed plants on roadcuts at many sites, although this is undocumented. At least one population has been destroyed by herbicide applications on the Salmon NF (Henderson 1981). The plants that are most vulnerable to this are probably ones on roadcuts.

The past effect of mining on Lemhi penstemon is undocumented, but could have been substantial in the Panther Creek drainage. A large new mining project, known as the Beartrack Gold Project, is currently being planned for the Leesburg area, with a major

transportation corridor between Leesburg and Salmon. The recently released draft Environmental Impact Statement (USDA Forest Service 1990) states that four populations would be affected in Alternatives 3 and 5, and 23 populations in Alternatives 1 and 4. The difference in these alternatives reflect alternative access routes between Salmon and Leesburg, with most of the impacts to Lemhi penstemon coming from upgrading existing roads.

The Montana references all list cattle grazing as a major threat to populations viability. We did not observe domestic livestock grazing to be a threat during our investigation. This activity may pose a threat to populations in the Bannock Pass area and in the Lemhi Valley, however, we did not survey that part if its range as thoroughly as elsewhere in Lemhi County.

The invasion of spotted knapweed presents a serious problem in Idaho, in a couple of different ways. First, knapweed is invading natural communities on steep slopes in the Salmon River canyon. It usually establishes in the bare-soil areas between bunchgrass clumps, the same habitat as Lemhi penstemon. Secondly, knapweed is the focus of intensive control efforts with herbicides and nearby Lemhi penstemon plants may be incidental casualties of this activity.

Although several authors have alluded to the fact that Lemhi penstemon appears to prefer disturbed sites, none has mentioned vegetative succession as a potential long-term threat to Lemhi penstemon. It is our belief that this may constitute the greatest overall threat to the species in Idaho. We feel that many of the small populations have declined, or some may have already gone extinct, due to unnatural vegetative succession resulting from wildfire suppression. Negative correlations between Lemhi penstemon density and such factors as grass cover, lack of fire, and tree canopy closure were noted in the habitat section. The species is probably adapted to localized declines resulting from lack of wildfire, and may be able to persist for long time periods in small populations. But the unnaturally long fire intervals it currently experiences may be outside of its adaptive ability. For instance, seed dispersal distance is probably very short. It may, therefore, be very limited in its ability to colonized suitable habitat that is newly-created or currently unoccupied.

Management Implications: Several implications for land management arise from the above discussion. First, the suppression of natural wildfires may be causing a decline in Lemhi penstemon in Idaho. Permanent monitoring and controlled-burn experiments can be used to determine if this is in fact happening.

Second, many populations of Lemhi penstemon at least partly occur in roadcuts or in other similarly-disturbed habitats. The roads obviously destroyed the natural habitat of Lemhi penstemon during construction. The plants are never abundant in these artificial situations and it probably represents an ephemeral response to sites that mimic its native habitat. Because the plants that occur on roadcuts are highly vulnerable to destruction, they contribute little to the overall viability of the species.

Third, the invasion of spotted knapweed in the area presents a major dilemma for Lemhi penstemon management. On the one hand, we believe that there is a need to open communities to create bare-soil microenvironments for penstemon establishment. But, these are the very sites that spotted knapweed may use to invade a previously natural community. Also, while spotted knapweed needs to be controlled efficiently, especially along road corridors that are the major vectors of spread, care must be taken not of spray Lemhi penstemon in adjacent areas; hand control should be used on these sites.

Lastly, TES plant clearances (USDA Forest Service 1988) should be conducted for all habitat-destroying activities within the range of Lemhi penstemon to assure that its natural habitat is left intact. The populations are generally small and the protection of populations in natural habitats should not be a large burden on or conflict with land management activities on the Forest.

ASSESSMENT AND RECOMMENDATIONS

Summary: As a result of intensive field surveys since 1980, by biologists from the University of Idaho, the Salmon NF, private consulting firms, and the Idaho Natural Heritage Program, 85 occurrences of Lemhi penstemon are known in Idaho. Each of these occurrences consists of one population, or in many cases a grouping of from two to six small populations that can be viewed as a metapopulation. In Idaho, it is restricted to Lemhi County, occurring in an arc around Salmon, from Bannock Pass in the Beaverhead Mountains, north up the Beaverheads, and then west and south in the Salmon River Mountains. The western edge of its distribution is currently unknown due to the relatively inaccessible terrain of the River of No Return Wilderness.

Lemhi penstemon has an elevational amplitude of almost 5000 feet, occurring in grasslands in the Salmon River canyon, and woodlands, forest openings, and sagebrush slopes at middle and high elevations. It occurs on all the major geologic substrates of the region.

Numerous and varied human-caused threats to Lemhi penstemon have been recognized throughout its range. These include road building, road maintenance activity, mining, botanical and

horticultural collecting, herbicide spraying and livestock grazing. Although not previously recognized by others, we believe that unnatural rates of vegetative succession due to fire suppression is the greatest threat to the long-term viability of the species in Idaho. Although most surveys have relied on the occurrence of Lemhi penstemon on roadcuts to find populations, these plants from artificial habitats contribute little to the overall viability of the species. Conservation planning for Lemhi penstemon should focus on populations in natural habitats.

Recommendation to the U.S. Fish and Wildlife Service: Nearly all occurrences of Lemhi penstemon known in Idaho are small and occur in areas that are intensively managed for commodity production, generally near roads. Also, we believe that unnatural rates of vegetative succession, due to fire suppression, represents a real threat to the long-term viability of the species. For these reason, we recommend that Lemhi penstemon remain a category 2 candidate.

The western edge of its distribution is currently unknown, but occurs somewhere in the River of No Return Wilderness. If further studies reveal that Lemhi penstemon is well distributed in the Wilderness, and management of this large protected area is compatible with long-term ecosystem maintenance, especially with regard to natural fire frequencies, then reclassification to category 3c may be warranted. If further studies reveal the opposite, then it should be reclassified as a category 1 candidate, with listing as Threatened possibly being appropriate.

Recommendation to the Regional Forester: Based on data discussed in this report, Lemhi penstemon still meets Sensitive Species criteria and should remain on the Regional Sensitive Species List for the Salmon NF.

Recommendation to Salmon National Forest:

1) Permanent monitoring plots should be established at the upper Colson Creek occurrence (039) to monitor the response of Lemhi penstemon to community development after fire. Adjacent unburned populations would serve as an excellent control.

2) Although the above project can give a partial view of Lemhi penstemon response to wildfire, at least a couple of populations should be chosen for prescribe burning. This project will determine the degree to which management intervention can help recover populations. Permanent monitoring plots should be established to determine pre- and post-fire populations levels. Care should be taken to locate study populations away from concentrations of spotted knapweed.

3) Surveys in the River of No Return Wilderness should be conducted as soon as practicable to determine the western edge of Lemhi penstemon distribution. The occurrence of penstemon within the Wilderness will help determine the degree to which populations elsewhere on the Forest need to be protected.

4) A rare plant clearance should be done at the proper time of year for all herbicide spraying projects. If Lemhi penstemon plants occur near target weeds and are within the drift zone, the weeds in that area should be hand treated instead of sprayed.

5) Populations that are currently in range allotments should be quantitatively monitored for population trend.

6) A rare plant clearance should be done, at the proper time of year and in the early stages of project development, for all road building projects. If Lemhi penstemon populations are found in the project area, every effort should be made to locate the road away from the population.

7) Land managers and field personnel on the Salmon NF should be informed of the occurrence of this species in their area. Possible sightings of this plant should be documented by specimens (if the size of the population warrants collecting), and should be sent to the University of Idaho Herbarium (Department of Biological Sciences, University of Idaho, Moscow 83843) for verification of their identity. Confirmed sightings of this species should be reported to the Idaho Natural Heritage Program, using Region 4 TES reporting forms, for entry into their permanent data base on sensitive species.

Recommendation to the Bureau of Land Management: Lemhi penstemon should remain a BLM Sensitive Species in Idaho. Surveys should be conducted as soon as practicable in the Lemhi Valley area to determine its status at the lower elevations there.

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Appendix 1

Line drawings of Penstemon lemhiensis
(from Cronquist 1959).

Appendix 2

Locations of Penstemon lemhiensis populations in Idaho.

Map 1. Overview of distribution in Idaho. Portion of 1966 Salmon National Forest map.

Map 2. Occurrences 001 and 009. Portion of 1965 Bannock Pass 7.5' quadrangle.

Map 3. Occurrences 020 and 083. Portion of 1966 Bird Creek 7.5' quadrangle.

Map 4. Occurrences 024, 025, 026, 027 and 028. Portion of 1950 Blackbird 15' quadrangle.

Map 5. Occurrences 037 and 060. Portion of 1950 Blackbird 15' quadrangle.

Map 6. Occurrence 045. Portion of 1962 Butts Creek Point 7.5' quadrangle.

Map 7. Occurrences 018 and 019. Portion of 1965 Deadman Pass 7.5' quadrangle.

Map 8. Occurrences 063, 064, 065, 066, and 067. Portion of 1962 Degan Mountain 7.5' quadrangle.

Map 9. Occurrences 015 and 051. Portion of 1966 Gibbonsville 7.5' quadrangle.

Map 10. Occurrence 052. Portion of 1966 Gibbonsville 7.5' quadrangle.

Map 11. Occurrence 068. Portion of 1962 Goldbug Ridge 7.5' quadrangle.

Map 12. Occurrences 010 and 012. Portion of 1956 Goldstone Mountain 15' quadrangle.

Map 13. Occurrence 017. Portion of 1966 Homer Youngs Peak 7.5' quadrangle.

Map 14. Occurrences 003, 005, 053, 054, 055, 071, 073, and 074. Portion of 1950 Leesburg 15' quadrangle.

Map 15. Occurrences 004, 006, 007, 008, 056, 057, 058, 059, 062, 069, 075, 076, 077, 078, 079, and 080. Portion of 1950

Leesburg 15' quadrangle.

Map 16. Occurrences 002 and 039. Portion of 1962 Long Tom Mountain 7.5' quadrangle.

Map 17. Occurrence 047. Portion of 1966 North Fork 7.5' quadrangle.

Map 18. Occurrences 060, 061, and 085. Portion of 1963 Opal Lake 7.5' quadrangle.

Map 19. Occurrence 023. Portion of 1963 Opal Lake 7.5' quadrangle.

Map 20. Occurrences 048, 049, and 050. Portion of Piquett Mountain SE 7.5' orthophoto quadrangle.

Map 21. Occurrence 016. Portion of 1962 Poison Peak 7.5' quadrangle.

Map 22. Occurrences 011, 070, 072, 081 and 082. Portion of 1950 Salmon 15' quadrangle.

Map 23. Occurrences 013, 032, 033, and 046. Portion of 1960 Shoup 15' quadrangle.

Map 24. Occurrences 029, 030, 031, 034, 035, and 036. Portion of 1960 Shoup 15' quadrangle.

Map 25. Occurrence 038. Portion of 1962 Square Top 7.5' quadrangle.

Map 26. Occurrences 021, 022, and 084. Portion of 1960 Ulysses Mountain 15' quadrangle.

Map 27. Occurrences 014, 040, 041, 042, 043, and 044. Portion of 1960 Ulysses Mountain 15' quadrangle.

Appendix 3

Element occurrence records for
Penstemon lemhiensis in Idaho.

NOT INCLUDED IN HOME PAGE VERSION OF THIS REPORT

Appendix 4

List of areas searched for
Penstemon lemhiensis in 1990.

Beaverhead Mountains

Lemhi Pass and upper Agency Creek
Goldstone Pass/upper Pratt Creek Road
crest bet. WF Whimpey Creek and Pratt Creek S of Center Mountain
Big Hole Pass
Lemhi Pass to upper Pratt Creek
Fourth of July Creek to Stein Mountain lookout.

Lemhi Valley/Mountains

Twelevemile Creek
McDevitt Creek
Hayden Creek
Basin Creek
lower Agency Creek
Pattee Creek
Warm Springs Creek

Salmon River Mountains

Porphyry Creek
Moccasin Creek
Napias Creek
Deep Creek
lower Panther Creek (below Deep Creek)
Trail Creek
Beaver Creek
Williams Creek
Wallace Creek (Stormy Peak Road)
Rattlesnake Creek
Iron Creek
Lake Creek
Wheat Creek
Corn Creek
Cache Bar area
Colson Creek
Spring Creek
Squaw Creek
Indian Creek
Sage Creek
mainstem Salmon River corridor
Big Horn Crags

North Fork Salmon River Drainage

Highway 93 corridor from Gibbonsville to Lost Trail Pass
Chief Joseph Pass to Anderson Mountain
lower Sheep Creek
Gibbonsville to Big Hole Pass (Dahlonega Creek)
Twin Creek
Hughes Creek
Hull Creek
Volter Creek
Granite Mountain

Appendix 5

Slides of *Penstemon lemhiensis* and its habitats in Idaho.

1. Close-up of large, clear blue flowers.

2. View of whole plant.

3. Plant in *Artemisia tridentata*/*Stipa comata* community on alluvial fan at mouth of Pretty Gulch (029), Panther Creek drainage.

4. Plant in *Artemisia tripartita*/*Festuca idahoensis* community on Fitzer Flat.

5. Plant in unburned *Pinus ponderosa*/*Agropyron spicatum* community in Colson Creek (039).

6. Plant in dense stand of young *Pseudotsuga menziesii* invading Fitzer Flat.

7. Robust, vegetative plant in burned *Pinus ponderosa*/*Agropyron spicatum* community above Colson Creek (039). The site burned in 1986.