

CONSERVATION STATUS OF
LEAST PHACELIA (PHACELIA MINUTISSIMA)

by

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ABSTRACT

Least phacelia (*Phacelia minutissima*) is a widely distributed, but rarely observed species, known from eight disjunct collection sites in Washington, Oregon, Idaho, and Nevada. Due to the rangewide conservation concern, it was recently added to the list of candidate plants being considered for listing as endangered or threatened under the Endangered Species Act. No systematic survey has been conducted in Idaho. To rectify this paucity of information, I conducted a field survey in the vicinity of all known Idaho sites during 1994, but was unsuccessful in relocating the old collection sites or finding new populations. Recent systematic searches and general floristic inventories in the other three states have also failed to relocate any populations. This report is the status of our knowledge of the distribution and conservation status of least phacelia throughout its range, with an emphasis on Idaho. Because no populations have been seen recently, threats to population and species viability are unknown, although the Oregon population is considered extirpated. Before useful conservation recommendations can be made for least phacelia the eight known collections sites must be relocated. This should be the immediate priority for the land-managing agencies. Once the old sites are found and habitat characteristics are better known, there is a greater chance of discovering new populations and formulating a conservation strategy.

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INTRODUCTION

Least phacelia (*Phacelia minutissima*) is a widely distributed, but rarely observed species, known from eight disjunct collection sites in Washington, Oregon, Idaho, and Nevada. It has been recognized to be of conservation concern in Idaho since the early 1970's (Johnson and Steele 1974), and an Idaho BLM sensitive species for a number of years (e.g., Conservation Data Center 1994). Other states have had similar concerns as Idaho. Due to this rangewide concern, it was recently added to the list of candidate plants being considered for listing as endangered or threatened under the Endangered Species Act (U.S. Fish and Wildlife Service 1993). No systematic survey has been conducted in Idaho. To rectify this paucity of information on the current conservation status of least phacelia in Idaho, the Boise District BLM and the Idaho Department of Fish and Game's Conservation Data Center (CDC) entered into a cooperative project to conduct field inventories in 1994. The primary objectives of this investigation are as follows:

- 1) Survey and delineate known populations of least phacelia in Owyhee County, and search for additional populations.
- 2) Characterize habitat conditions for the populations.
- 3) Assess population data and threats to the species and make management recommendations to the Boise District BLM based on these assessments.

RESULTS

During June and July, 1994, I conducted a field survey of a considerable amount of suitable habitat in the western Owyhee Mountains, from War Eagle Mountain to near the Oregon border. I was unsuccessful in relocating the previously-collected population from that area. In addition I tried to relocate the Bennett Hills site, to no avail, and conducted a cursory survey, also unsuccessful, of the Soldier Mountains, where a vaguely-described collection was made in the late 1800's. In other words, no least phacelia has been observed in Idaho since 1972.

As it turns out, my Idaho experience is typical. Recent systematic searches and general floristic inventories in the other three states have failed to relocate any populations. In an effort to compile all known information on the species throughout its range, I enlisted the help of the following people in preparing this status review of least phacelia:

- Marty Stein, USFS Hells Canyon National Recreation Area,
Enterprise, Oregon.
Wayne Owen, USFS Boise National Forest, Boise, Idaho.

Steve Popovich, BLM, Shoshone District, Shoshone, Idaho.
Doug Clark, USFS Humboldt National Forest, Mountain City
Ranger District, Mountain City, Nevada.
Jim Morefield, Nevada Natural Heritage Program, Carson City,
Nevada.
Sue Viriakakis, Oregon Natural Heritage Program, Portland
Oregon.
John Gamon, Washington Natural Heritage Program, Olympia,
Washington.
Steve Rust, formerly with the USFS Wenatchee National
Forest, Lake Wenatchee Ranger District, currently with
the Idaho Conservation Data Center, Boise, Idaho.
Jerry Tiehm, Reno, Nevada.

Following is the status of our knowledge of the distribution and conservation status of least phacelia (with emphasis on the Idaho portion of its range), including information on taxonomy, habitat, distribution, conservation status, and management and conservation recommendations. Sections containing line drawings, occurrence records, and distribution maps are appended to the end of the report.

Phacelia minutissima L.F. Henderson

TAXONOMY

Bibliographic citation: Henderson, L.F. 1900. New plants from Idaho and from other localities of the Northwest. Bulletin of the Torrey Botanical Club 27:342-359.

Type specimen: Henderson 3386 (US, G). "Dry, gravelly or rocky ground, at 8000 feet elevation, Soldier Mountain, Blaine [now Camas] County [Idaho], July 16, 1895" (Henderson 1900).

Pertinent synonym(s): Phacelia foliosepala Nels. & Macbr.

Common name: Least phacelia

Size of genus: A large and polymorphic genus, of at least 150 species, native to the New World, best developed in the western U.S. and northern Mexico (Cronquist 1984)

Family name: Hydrophyllaceae

Common name for family: Warterleaf

History of knowledge of taxon in Idaho: Louis Henderson, the first curator of the University of Idaho Herbarium, took an extended plant exploration trip through central Idaho during the summer of 1895, sponsored by the U.S. Department of Agriculture (Henderson 1900). During this trip he collected the type specimen on "Soldier Mountain" in what was then Blaine County, now Camas County. Only two other collections of least phacelia are known from Idaho. Barneby and Ripley collected the second specimen, also in Camas County, along the Fairfield - Gooding Highway in the Bennett Hills on June 10, 1951. Bratz collected the next specimen on July 15, 1972, in the Reynolds Creek drainage in the Owyhee Mountains, Owyhee County. To my knowledge, this species has not been collected or seen in Idaho since then.

Alternative taxonomic treatments: None

LEGAL OR OTHER FORMAL STATUS

National:

U.S. Fish and Wildlife Service: Least phacelia was only recently classified as a category 2 candidate for listing under the Endangered Species Act in the most recent Notice of Review (U.S. Fish and Wildlife Service 1993). Category 2 includes taxa for which information now in the possession of the U.S. Fish and Wildlife Service indicates that proposing

to list as endangered or threatened is possibly appropriate, but for which sufficient data on biological vulnerability and threat are not currently available to support proposed rules to list as endangered or threatened (U.S. Fish and Wildlife Service 1993).

Bureau of Land Management: Least phacelia is currently an Idaho BLM Sensitive Species (Conservation Data Center 1994) and has been for many years (Rosentreter 1980; 1986; DeBolt and Rosentreter 1988).

Forest Service: Least phacelia is a Forest Service Sensitive Species for National Forests in all states in which it occurs. In Region 6, including the Washington and Oregon portion of its range, it is sensitive on the Wallowa-Whitman and Wenatchee national forests (Brooks et al. 1991; USDA Forest Service 1993). In Region 4, which includes the Nevada and Idaho portion of its range, it is sensitive on the Boise, Humboldt, and Sawtooth national forests (Conservation Data Center 1994; USDA Forest Service 1994).

Other current formal status recommendations: The Nature Conservancy and the Association for Biodiversity Information (the International Association of Natural Heritage Programs and Conservation Data Centres) give least phacelia a global (G) conservation rank of 1, on a scale of 1 to 5 (Conservation Data Center 1994). The G1 ranking indicates that it is critically imperiled globally because of extreme rarity or because it is particularly vulnerable to extinction or extirpation. This rank is typically given to species typically with five or fewer extant occurrences (Conservation Data Center 1994).

[NOTE: Recent state rare plant lists have listed the global rank as either G2 (Washington Natural Heritage Program 1994) or G4 (Morefield and Knight 1992; Conservation Data Center 1994). More recent discussions among the four state heritage botanists have revised this rank to G1.]

State:

IDAHO:

Idaho Native Plant Society: The Idaho Native Plant Society does not assign state categories to federal candidate species (Idaho Native Plant Society 1994).

Conservation Data Center: The Idaho Conservation Data Center considers least phacelia to be of historical occurrence in Idaho, and has recently assigned a state rank of H. This SH rank means that we consider it to be formally part of the native biota, with the implied expectation that it may be rediscovered (Conservation

Data Center 1994).

Review of past status: Johnson and Steele (1974) and Steele (1975) were the first to recognize the rarity of least phacelia in Idaho. In her review of this taxon for the Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Council, Packard (1981) recommended a status of State Threatened.

NEVADA:

Northern Nevada Native Plant Society: Least phacelia is given a Threatened status in Nevada (Morefield and Knight 1992).

Nevada Natural Heritage Program: The Heritage Program gives least phacelia a state rank of S1, meaning it is critically imperiled in Nevada due to extreme rarity, imminent threats, or biological factors (Morefield and Knight 1992).

OREGON:

Oregon Department of Agriculture: The Oregon Department of Agriculture administers the Oregon Endangered Species Act, and classifies least phacelia as a candidate for listing as endangered or threatened in Oregon (Oregon Natural Heritage Program 1993).

Oregon Natural Heritage Program: Least phacelia is on List 1-ex, indicating that this species is thought to be extinct throughout its range (Oregon Natural Heritage Program 1993).

Review of past status: Least phacelia has been considered extirpated in Oregon for many years (Meinke 1980; Oregon Natural Heritage Data Base 1983; 1985; 1989; Oregon Natural Heritage Program 1991).

WASHINGTON:

Washington Natural Heritage Program: The Heritage Program gives least phacelia a state rank of S1?, meaning it may be critically imperiled in Washington due to extreme rarity, imminent threats, or biological factors (Washington Natural Heritage Program 1994).

DESCRIPTION

General nontechnical description: Least phacelia is a dwarf, branching annual to 10 cm tall, with hairs on the herbage that are stipitate and glandular. The inflorescence is a helicoid cyme, meaning it uncurls like a fiddle neck. The small flowers are lavender, 2.4 to 4 mm long, surrounded by calyx segments that elongate unequally in fruit. The leaves are linear-oblong to oblanceolate, 10 mm long by up to 4 mm wide (Brooks et al. 1991).

Technical description: Dwarf, simple or branching annual up to 1

dm tall, shortly spreading-hairy and stipitate-glandular throughout; leaves mostly cauline, oblanceolate or linear-oblong, the blade up to about 1 cm long and 4 mm wide, tapering to the short petiole or subpetiolar base up to 4 mm long; inflorescence short and few-flowered, tending to be leafy-bracteate below, or terminating the stem and making up most of the height of the plant; pedicels short, only 1-2 mm long, or the lower more elongate and up to nearly 1 cm; calyx 2.5-4 mm long at early anthesis, the narrow, linear or oblanceolate segments markedly accrescent in fruit and becoming distinctly unequal in length and width, one or more of them sometimes foliaceous and 1 cm long or more; corolla inconspicuous, lavender, tubular-campanulate, 2.5-4 mm long; stamens included; style 1.5 mm long or less, cleft up to half its length; ovules about a dozen, the finely reticulate-pitted seeds of similar number and scarcely 1 mm long, or fewer and up to 1.5 mm long (Cronquist 1984).

Local field characters: Jerry Tiehm (personal communication 1995) indicates that the unequal calyx segments are the most distinctive feature of this plant. Brooks et al. (1991) indicate that least phacelia most closely resembles *Phacelia incana* and *Nama* spp. *Phacelia incana* differs by having calyx segments that are more or less equal in fruit. The *Nama* species differ by having inflorescence that are not helicoid cymes (Brooks et al. 1991).

Photos and line drawings: Reproductions of a line drawing of least phacelia by Jeanne Janish appear in Cronquist (1959; 1984), Hitchcock and Cronquist (1973), Brooks et al. (1991), and Appendix 1. A photograph by Elroy Burnett appears in Brooks et al. (1991).

DISTRIBUTION

Global distribution: Although for many years least phacelia was thought to occur in Idaho, Nevada, and Oregon, it was recently discovered in Washington. Eight, widely scattered occurrences are known from these four states (Appendix 2). Its distribution within each state is described below. Also see Appendix 3 for occurrence records for least phacelia provided by the Idaho Conservation Data Center, Nevada Natural Heritage Program, and Washington Natural Heritage Program for their respective states (the extirpated site from Oregon has not been entered into the Oregon Natural Heritage Program data base). These occurrence records provide detailed information on location, population data, habitat, ownership, and etc. for each known site.

IDAHO

Extant Occurrences: None.

Extirpated occurrences: None.

Historical occurrences: Two occurrences are considered to be historical, that is, there is a possibility that they may be found in the future. The location of the two occurrences are described below. The three digit code preceding the site name is the occurrence number assigned to that Idaho occurrence by the Conservation Data Center.

- 001 Slacks Corner
Collection: R.D. Bratz B353-157 (CIC)
County: Owyhee
Quad Name: Silver City 7.5'
First Observed: 7-15-72
Last Observed: 7-15-72
I relocated this Owyhee Mountains site, including the appropriate habitat indicated on the collection label (described below), but did not find any phacelia.
- 002 Hash Spring
Collection: H.D. Ripley and R.C. Barneby 10667 (IDS, NY)
County: Camas
Quad Name: McHan Reservoir 7.5'
First Observed: 6-10-1951
Last Observed: 6-10-1951
Narrative Location: "14 mi. SE of Fairfield, 5500 p.s.m." This site is presumably along Highway 46, between Fairfield and Gooding, in the Bennett Hills.

Unverified/undocumented reports: Idaho occurrence 003 is the type locality (Henderson 3386) and the location information associated with this collection is too vague to relocate. Henderson (1900) gives the location as "8000 feet elevation, Soldier Mountain, Blaine County." During his 1895 botanical excursion, Henderson spent several days collecting on and around the Camas Prairie in what is now Camas County. He collected the types of several species from this area (Henderson 1900). Henderson's "Soldier Mountain" probably refers to the massif bordering the northwestern portion of the Camas Prairie, west of Soldier Creek, now known as the Soldier Mountains. This range consists of several summits, several of which are named. The highest summit is Smoky Dome, elevation 10,095 feet, and it is on or around this mountain that I believe Henderson probably collected the type. In addition to least phacelia, he collected the types of three other species on "Soldier Mountain," *Castilleja covilleana*, *Aplopappus laceratus* (=Haplopappus lyallii), and *Nemophila inconspicua* (=N. parviflora). He states that the first two species were collected between 10,000 and 11,000 feet, making Smoky Dome the probable location. Smoky Dome is also the closest summit to Fairfield and the old town of Soldier, the probable base of Henderson's exploration around the Camas Prairie.

Synopsis of past and needed inventories: Eidemiller (1977) was

the first to conduct a search in the Soldier Mountains. I conducted a cursory search of the Soldier Mountains in 1994, and found that the upper Lime Creek area, southwest of Smoky Dome, contained the most likely looking area of potential habitat. I also looked for the Slacks Corner occurrence several times in June and July 1994. I am certain that I located where Bratz collected the specimen, but no phacelia was present. I also searched potential-looking habitat throughout the western Owyhee Mountains, from War Eagle Mountain to the Oregon border (see Appendix 4 for maps of areas searched). Several people have tried to relocate the Hash Spring site, including Steve Popovich, Shoshone BLM, in 1993, and Wayne Owen, Boise NF, and myself in 1994.

Forest Service (Sawtooth and Boise NFs) and BLM botanists (Shoshone and Boise Districts) should be on the lookout for this species in their area during project clearances and floristic inventories. The two historical occurrences should be revisited periodically, given the possibility that the species may not emerge from the seed bank during certain climatic patterns.

Because of the Buckhorn Spring site in Oregon (see below) is on the other side of Hells Canyon from Idaho, least phacelia was a target species during the ecosystem analysis of the Craig Mountain Wildlife Mitigation Area (Mancuso and Moseley 1994). Despite two-years of effort, no populations were found.

NEVADA

Extant Occurrences:

- 001 Independence Mountains
Collection: Tiehm 5389 (RENO)
County: Elko
Quad Name: Mahala Creek West
First Observed: 7-18-1979
Last Observed: 7-18-79

- 003 Roberts Mountains
Collection: Tiehm 8180 (NY)
County: Eureka
Quad Name: Roberts Creek Mountain
First Observed: 7-18-83
Last Observed: 7-18-83

Extirpated occurrences: None.

Historical occurrences:

- 002 Sunflower Flat
Collection: Nelson and Macbride 2232 (RM)
County: Elko

Quad Name: Cornwall Mountain
First Observed: 7-27-1912
Last Observed: 7-27-1912
Narrative Location: "Gold Creek."

Unverified/undocumented reports: None.

Synopsis of past and needed inventories: Mitchel White and Doug Clark, Humboldt National Forest, searched for the Independence Mountains population during mid-July, 1994, but were unable able to find any least phacelia along Stump Creek or adjoining drainages (Doug Clark, personnel communication, 1994). Jerry Tiehm, an experienced plant collector from northern Nevada, has looked for least phacelia in many locations while conducting general surveys for various projects at various sites in the state, although he has never conducted systematic surveys for this species. He has specifically spent time looking for it in the Jarbidge area near Gold Creek (the site of Nelson and Macbride's historical collection) and the Independence Mountains (Tiehm, personal communication , 1995).

OREGON

Extant Occurrences: None.

Extirpated occurrences: The only Oregon population, discovered by Morton Peck in 1934, is considered extirpated (Oregon Natural Heritage Program 1993).

Buckhorn Spring

Collection: Peck 18310 (WILLU)
County: Wallowa
Quad Name: Grangeville 1:100,000
First Observed: 6-29-1934
Last Observed: 6-29-1934
Narrative Location: "Near Buckhorn Springs." Buckhorn Spring is on the edge of the Imnaha River canyon in the Hells Canyon National Recreation Area, northeast of Enterprise.

Historical occurrences: None.

Unverified/undocumented reports: None.

Synopsis of past and needed inventories: Marty Stein, botanist for the Hells Canyon National Recreation Area, Wallowa-Whitman National Forest, has searched for least phacelia at Buckhorn Spring during late June and early July for three years (personal communication, 1995). The area near Buckhorn Spring is a riparian meadow adjacent to a campground, that has been fenced for about ten years. It was highly altered by cattle grazing prior to fencing. His description of the site is similar to others, with

ephemerally moist, bare-soil sites in the meadow that dry through the summer.

WASHINGTON

Extant Occurrences: The only known Washington population was discovered by Elroy Burnett in 1986, as follows:

Naneum Creek

Collection: Burnett ?# (WYU) (verified by Lincoln Constance)

County: Kittitas

Quad Name: Swauk Pass

First Observed: 7-12-1986

Last Observed: 7-12-1986

Extirpated occurrences: None.

Historical occurrences: None.

Unverified/undocumented reports: None.

Synopsis of past and needed inventories: Steve Rust and Elroy Burnett attempted to relocate the population in 1994, but they may have been too early. No other specific surveys have been conducted for least phacelia in Washington (Steve Rust, Idaho CDC, Boise, personal communication, 1995).

HABITAT

General habitat description: The habitat of least phacelia is not well understood because no populations have been seen recently, however, the habitat theme common to most collections is its association with ephemerally moist, bare-soil areas of riparian zones and meadows in sagebrush-steppe and lower montane forest. Below are the habitat characteristics as they were reported on the collection label:

IDAHO

001 Slacks Corner

Habitat Description: "Dried mud of a drainage through an aspen grove."

Vegetation Zone: Riparian aspen grove within sagebrush-steppe matrix.

Elevation: 6400'

Geologic Substrate: Miocene basalt (Ekren et al. 1981).

Associated Species: Unknown

002 Hash Spring

Habitat Description: "Moist bank of brook in shelter of sagebrush."

Vegetation Zone: Sagebrush-steppe

Elevation: 5500'

Geologic Substrate: Miocene Banbury Basalt (Worl et al. 1991).

Associated Species: Unknown

003 Soldier Mountains

Habitat Description: "Dry, gravelly or rocky ground" (Henderson 1900).

Vegetation Zone: Either sagebrush-steppe or possibly Douglas-fir forest.

Elevation: 8000'

Geologic Substrate: The Soldier Mountains are predominantly Eocene granite and quartz monzonite (Worl et al. 1991).

Associated Species: Unknown

NEVADA

001 Independence Mountains

Habitat Description: "Along a dry creek bed, dark soil, seepage near spring."

Vegetation Zone: Sagebrush-steppe with scattered aspen groves (Tiehm, personal communication, 1995)

Elevation: 7700'

Geologic Substrate: crystalline metamorphic or intrusive.

Associated Species: Unknown

002 Sunflower Flat

Habitat Description: "Moist sunny flats."

Vegetation Zone: Sagebrush-steppe

Elevation: Mapped at 6300' by Nevada Natural Heritage Program.

Geologic Substrate: Unknown

Associated Species: Unknown

003 Roberts Mountains

Habitat Description: "Mud banks of small gullies through a drying, seasonally wet meadow."

Vegetation Zone: Sagebrush-steppe (Tiehm, personal communication, 1995)

Elevation: 8100'

Geologic Substrate: Probably limestone (Tiehm, personal communication, 1995)

Associated Species: Camissonia andina, Penstemon pratensis, Oenothera flava.

OREGON

Buckhorn Spring

Habitat Description: Riparian meadow.
Vegetation Zone: Montane forest (Douglas-fir and ponderosa pine).
Elevation: 5300'
Geologic Substrate: Columbia River basalts
Associated Species: Unknown

WASHINGTON

001 Naneum Creek

Habitat Description: "Below alder and *Veratrum californicum* at lower edge of meadow. Fairly dry rocky soil." Steve Rust reports (personal communication, 1995) that the site is in a seepy meadow on a basalt plateau, several hundred feet above Naneum Creek.
Vegetation Zone: Montane forest (Douglas-fir and ponderosa pine).
Elevation: ca. 4000'
Geologic Substrate: Columbia River basalts
Associated Species: *Alnus incana?*, *Veratrum californicum*.

POPULATION BIOLOGY

Phenology: Flowering has been reported from July (Cronquist 1959; 1984) and June and July (Brooks et al. 1991). Six of the eight known specimens of least phacelia were collected during mid- to late July. The two others, Idaho 002 and the Oregon site, were collected during mid- to late June. There does not appear to be a significant correlation of the collection date to elevation, as some of the lower elevation sites were collected the latest. Assuming the collections were made while it was flowering, the phenology of least phacelia may be more dependent on spring and early summer weather patterns (especially temperature) than on absolute elevation. In referring to the Independence Mountains site in Nevada (001), Jerry Tiehm recommended looking for least phacelia beginning July 4, and he estimated that the plant could flower for several weeks (Tiehm, personal communication to Mitchel White, Humboldt National Forest, 1994).

Unlike most desert annuals, least phacelia occurs in ephemerally moist habitats and may not be as dependent on abundant spring and early summer moisture for flowering. For instance, the spring and summer of 1994 were relatively dry, yet soil in the ephemeral channel where Bratz probably collected Idaho 001 was moist at least into early August and populations of annual species of *Mimulus*, *Polygonum*, and *Plagiobothrys* appeared vigorous.

Population size and condition: Only one collection had an assessment of abundance, Nevada occurrence 001 from the Independence Mountains, where least phacelia was "locally common" when it was collected in 1979 (botanists were unable to relocate this population in 1994). No other population data are available for any of the other collection sites. The Roberts Mountains site in Nevada (occurrence 003) was abundant enough to for Tiehm to collect several sheets worth of specimens (Tiehm, personal communication, 1995).

Reproductive Biology: Least phacelia reproduces by seed, but other than that, little else is known.

Biological Interactions: Unknown.

Competition: Unknown.

Herbivory: Unknown.

Land ownership:

IDAHO 001 - State of Idaho, Department of Lands (1/2-section inholding surrounded by BLM, Boise District, Owyhee Resource Area).
 002 - BLM, Shoshone District, Bennett Hills Resource Area and/or private.

003 - U.S. Forest Service, Sawtooth National Forest, and/or possibly Boise National Forest.

NEVADA

001 - U.S. Forest Service, Humboldt National Forest, Mountain City Ranger District.
002 - Unknown. Either Humboldt National Forest, Mountain City Ranger District, Elko District, BLM, and/or private.
003 - Battle Mountain District, BLM.

OREGON

001 - U.S. Forest Service, Wallowa-Whitman National Forest, Hells Canyon National Recreation Area.

WASHINGTON

001 - U.S. Forest Service, Wenatchee National Forest, Cle Elum Ranger District.

Land use:

IDAHO - Cattle grazing has been an historic and ongoing land use in the vicinity of all known Idaho sites. The effects of livestock grazing on least phacelia habitat is not known, but grazing levels at occurrence 001 did not appear to have degraded the site significantly since Bratz collected it in 1972.

NEVADA - Cattle grazing also is an historic and ongoing land use at all the Nevada sites. In addition, the California Mountain Mine was encroaching on the Independence Mountains site (001) in 1994.

OREGON - The meadow near Buckhorn Spring, has been fenced from livestock grazing for about ten years. The site is adjacent to a Forest Service campground.

WASHINGTON - Cattle grazing is also the predominant land-use in the vicinity of the Washington site (Steve Rust, personal communication, 1995).

ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

Threats to currently known populations: The Oregon population at Buckhorn Spring on the Wallowa-Whitman National Forest is considered extirpated. Because we don't know the precise location and population levels of the other seven occurrences, it's difficult to ascertain the threats of current land use to population and species viability. The effects of livestock grazing, the most extensive land-use practice in least phacelia habitat, is largely unknown. The Independence Mountains site in Nevada (occurrence 001) is being encroached upon by the California Mountain Mine.

Recommendations: Before useful conservation recommendations can be made for least phacelia the eight known collections sites must be relocated. This should be the immediate priority for the land-managing agencies. Once the old sites are found, and habitat characteristics are better known, there is a greater chance of discovering new populations. With this in mind, I make the following recommendations:

- > U.S. Fish and Wildlife Service - Retain least phacelia as a category 2 candidate species; initiate status surveys in Oregon, Nevada, and Washington to determine its conservation status in these states.
- > Natural Heritage/Conservation Data Center Network - The global (G) rank for least phacelia should be G1, with state (S) ranks of S1 for Idaho, Nevada, and Washington, and SX for Oregon.
- > Bureau of Land Management - Retain as a sensitive species in Idaho and Nevada. Personnel from the Boise and Shoshone Districts, Idaho, and Battle Mountain and Elko Districts, Nevada, should be made aware of known populations and the potential for discovering additional populations in their respective areas.
- > U.S. Forest Service - Retain least phacelia as a sensitive species in Region 4 (Boise and Sawtooth National Forests, Idaho, and Humboldt National Forest, Nevada) and Region 6 (Wenatchee National Forest, Washington, and Wallowa-Whitman National Forest, Oregon). Forest Service personnel should be made aware of known populations and the potential for discovering additional populations in their respective areas.

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Appendix 1

Line drawings of *Phacelia minutissima*
(from Cronquist 1984).

Appendix 2

Map of the general distribution of *Phacelia minutissima*.

Appendix 3

Occurrence records for Idaho (001, 002, 003), Nevada (001, 002, 003), and Washington (001) (provided by the Idaho Conservation Data Center, Nevada Natural Heritage Program, and Washington Natural Heritage Program).