

FIELD INVESTIGATIONS OF TWO
SENSITIVE PLANT SPECIES
ON THE SALMON NATIONAL FOREST:

PHACELIA LYALLII AND
PHYSARIA DIDYMOCARPA VAR. LYRATA

by

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ABSTRACT

Field investigations of Phacelia lyallii (Lyall's phacelia) and Physaria didymocarpa var. lyrata (Salmon twin bladderpod) were conducted on the Salmon National Forest by the Idaho Department of Fish and Game's Natural Heritage Program. The investigations were a cooperative Challenge Cost-share project between the Department and the Salmon NF. Lyall's phacelia is endemic to the northern Rocky Mountains, occurring on the southern edge of its range in Idaho, while Salmon twin bladderpod is restricted to the Salmon area. Both plants are on the Intermountain Region's Sensitive Plant Species List.

Previous to 1990, only three populations of Lyall's phacelia were known from the Salmon NF, two in the Beaverhead Mountains east of Salmon and one in the northern Lemhi Range. Inventories this year did not expand on this pattern much, discovering only three new populations in the Beaverhead's; this despite considerable searches in the Beaverhead Mountains, Lemhi Range, and Salmon River Mountains. Less than 2,000 plants are known from Idaho. No clear threats to long-term viability were apparent, but the highly localized nature of the populations make them vulnerable to extirpation from habitat destroying activities, such as mining. Lyall's phacelia still meets Sensitive Species criteria and should remain on the Regional List.

Salmon twin bladderpod is an extremely rare and vulnerable taxon endemic to the Salmon area, known from only four small populations. No populations are known from the Salmon NF, however, despite our searches in 1990, and searches by other agency and university botanists over the last decade. Although all populations of Salmon twin bladderpod occur in drainages that have their headwaters on the Salmon NF, suitable habitat generally occurs below the Forest boundary. It is unlikely that any will be found on Forest Service land. It may be advisable to maintain bladderpod as a Sensitive Species, however, since all populations occur close to the Forest boundary.

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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.

Phacelia lyallii (Lyall's phacelia) is endemic to the northern Rocky Mountains of western Montana and adjacent portions of Idaho, British Columbia, and Alberta. Physaria didymocarpa var. lyrata (Salmon twin bladderpod) is endemic to low elevation foothills around the town of Salmon. Both taxa are on the Intermountain Region Sensitive Species List for the Salmon NF (USDA Forest Service 1988). In addition, Salmon twin bladderpod is a Category 2 candidate for federal listing (U.S. Fish and Wildlife Service 1990). Field investigations of these species were conducted on the Salmon NF by the Idaho Department of Fish and Game's Natural Heritage Program through the Cooperative Challenge Cost-share Program.

The primary objectives of these investigations were as follows:

- 1) Survey known populations of Lyall's phacelia and Salmon twin bladderpod 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 1990, botanists from the Heritage Program surveyed suitable-appearing habitats for Salmon twin bladderpod in the foothills of the Lemhi Range, Beaverhead Mountains, and Salmon River Mountains in the vicinity of Salmon. We searched for Lyall's phacelia during late July and early August in the eastern Salmon River Mountains, northern Beaverhead Mountains and northern Lemhi Range.

We relocated one of the three previously-known populations of Lyall's phacelia from the Salmon NF and discovered three new populations. Most populations are relatively small and restricted to a narrow range of habitat conditions. All Salmon NF populations except one, occur directly on the Continental Divide. We found no populations of Salmon twin bladderpod on the Salmon NF. Following is a detailed discussion of each species, including 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.

Phacelia lyallii (Gray) Rydberg

CURRENT STATUS USFS Region 4 Sensitive Species (Salmon NF)
USFWS - None
Idaho Native Plant Society - Sensitive
Heritage Rank - G3 S1

TAXONOMY

Family: Hydrophyllaceae (Waterleaf)

Common Name: Lyall's phacelia

Citation: Memoirs of the New York Botanical Garden 1:325. 1900.

Technical Description: Dwarf perennial with numerous stems up to 2.5 dm tall from a taproot and branched caudex; plants long-hairy in the short, compact, terminal inflorescence, otherwise green, sparsely hirsute or strigose, and conspicuously to obscurely or scarcely glandular; leaves pinnatilobate or very coarsely few-toothed, the persistent basal or lower ones up to 10 cm long (short petiole included) and 3 cm wide, the others fairly well developed, but smaller and often sessile, sometimes clasping; corolla blue-purple, deciduous, campanulate, 5-9 mm long and wide, shortly (sometimes obscurely) hairy inside as well as out; filament long-exserted, 1.5-2.5 times as long as the corolla; style elongate, cleft less than halfway; seeds presumably as in Phacelia sericea (Cronquist 1959).

Nontechnical Description: Lyall's phacelia has a thick, branching caudex immediately above the taproot, with old leaf bases persistent on these branches. The densely tufted stems each have several coarsely-toothed, dark green leaves that become reduced in size upward on the stem. Flowers have stamens that are nearly twice as long as the blue-purple, deciduous corolla (does not persist long after blooming). The plant is long-hairy in the compact inflorescence, otherwise it is generally sparsely covered with shorter hairs. In addition to the hairs, the herbage is generally glandular throughout. See Appendix 1 for a line drawing Lyall's phacelia and Appendix 5 for slides of its habit and habitat.

Distinguishing Features and Similar Species: Lyall's phacelia is most similar to the widespread Phacelia sericea (silky phacelia); of which it was once considered a variety. Silky phacelia occurs throughout the mountains of east-central Idaho, from the sagebrush-steppe to the alpine zone. On this survey we found no populations of Lyall's phacelia that were sympatric with silky phacelia. The possibility remains, however, that they could occur together. The following key, modified from Cronquist (1959), should help distinguish the two species:

- A. Leaves more or less deeply cut in a pinnate fashion; plants scarcely glandular, generally silvery-hairy; corolla persistent and surrounding the fruit....._P sericea

- A. Leaves pinnatilobate or merely coarsely toothed; plants with green and generally glandular herbage; corolla deciduous..... P. lyallii

DISTRIBUTION

Range: Cronquist (1959) describes the range of Lyall's phacelia as being western Montana and adjacent Alberta, although it is now also known from southeastern British Columbia (Straley et al. 1985) and central Idaho.

Lyall's phacelia was first collected in Idaho in 1885, by Louis F. Henderson, first Director of the University of Idaho Herbarium, during his botanical exploration of central Idaho. He collected it at two sites: (1) "above Darling Camp, Bitterroot Mountains, near Salmon City, alt 10,000 feet" and (2) "Mill Creek, Salmon River Mountains, alt 10,600 feet". The location of Darling Camp has been lost over the intervening years, but he was probably in the Beaverhead Mountains east of Salmon, possibly near occurrence 003 (see below) at the head of Freeman Creek. The location of the Mill Creek site is more problematic. Several Mill Creeks occur in the Salmon River Mountains of Lemhi and Custer counties, but none attain 10,600 feet in elevation. The Mill Creek drainage in the northern Lemhi Range, however, does contain summits over 10,600 feet and is near the site of a more recent collection (004).

Nearly a century later, Douglass Henderson, current Director of the University of Idaho Herbarium, collected Lyall's phacelia in the Lemhi Range in 1974 (occurrence 004, near the Mill Creek - Hayden Creek divide) and on the Continental Divide in the Beaverhead's in 1977 (001). I collected another specimen in the Beaverhead's in 1984, at the head of Freeman Creek (003).

Ongoing floristic and ecological research of east-central Idaho (e.g., Brunfeldt 1983; Moseley 1985) and rare plant inventories of the Challis NF (Henderson et al. 1979), all by scientists at the University of Idaho Herbarium, were unable to locate any populations Lyall's phacelia. A widely disjunct population (002) of Lyall's phacelia is known from the Seven Devils Mountains of west-central Idaho (Bingham 1987).

Results of our field inventory in 1990, did not expand on this pattern much. We found three new populations in the Beaverhead Mountains, but were unable to find any new populations in the Lemhi Range or Salmon River Mountains. Below is a summary of the six known populations on the Salmon NF (the number in parenthesis

refers to the occurrence number of this species in the Heritage Program data base; note that 002 is in the Seven Devils):

Skytop Lake (001) - Beaverhead Mountains; on the Continental Divide; elevation 10,000 feet; first collected by D. Henderson in 1977; only three plants seen in 1990.

Peak 9992 (003) - Beaverhead Mountains; on the Continental Divide; first collected by Moseley in 1984, when it was noted as "common"; not revisited in 1990. Possibly vicinity of L.F. Henderson collection in 1885.

East Fork Hayden Creek (004) - Lemhi Range; collected by D. Henderson in 1974 and possibly in the area by L.F. Henderson in 1885; not revisited in 1990.

Berry Lake (005) - Beaverhead Mountains; on the Continental Divide; discovered in 1990; 15 plants observed.

Timberline Lake (006) - Beaverhead Mountains; on the Continental Divide, discovered in 1990; ca. 100 plants observed.

Pyramid Peak (007) - Beaverhead Mountains; on the Continental Divide elevation ca. 8,900 to 9,400 feet; discovered in 1990; several hundred plants observed.

Extrapolating our survey data to other areas of the Salmon NF, it appears that Lyall's phacelia is sporadically distributed along the Continental Divide in the Beaverhead Mountains from Sheep Mountain (ca. two miles north of 007), on the north, to Skytop Lake (001), on the south. The Lemhi Range population (004) appears isolated, being disjunct by nearly 40 miles from populations in the Beaverhead's. See Appendix 2 for the mapped locations of known Lyall's phacelia populations on the Salmon NF and Appendix 3 for a list of areas searched unsuccessfully.

All populations except East Fork Hayden Creek (004) occur on the Salmon Ranger District. East Fork Hayden Creek is on the Leadore Ranger District.

Habitat and Associated Species: Cronquist's (1959) short habitat description for Lyall's phacelia aptly summarizes our observations on the Salmon NF: "Talus slopes and rock crevices at high elevations in the mountains, often above timberline". Without exception, the Salmon NF populations occur on quartzitic substrates that are loose and unstable. Predominant slope aspects were east and north. Lackschewitz (1986) found Lyall's phacelia to be locally common in west-central Montana, where it occurred in mesic to meso-xeric habitats in timberline and alpine habitats.

The community in which Lyall's phacelia is found is unclassified and has low species richness. The few associated species include

Hulsea algida, Saxifraga bronchialis, Polemonium viscosum, Sedum lanceolatum, Oxyria digyna, Claytonia megarhiza, Festuca ovina, Douglasia montana, Draba crassifolia, and Synthyris pinnatifida.

CONSERVATION STATUS

Conservation Status - Idaho: Although it was known to be relatively rare in Idaho, Henderson (1981) placed Lyall's phacelia on the State Watch List due to its relative isolation from clear threats.

The Idaho Native Plant Society considers Lyall's phacelia to be a Sensitive species in Idaho (Idaho Native Plant Society 1990). The Sensitive category of the Idaho Native Plant Society list refers to species with small populations or localized distributions within Idaho that presently do not meet the criteria for classifications Priority 1 or 2, but whose populations and habitats may be jeopardized without active management or removal of threats (Moseley and Groves 1990).

The Idaho Natural Heritage Program currently ranks Lyall's phacelia as G3 S2 (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, S2 = Imperiled in Idaho because of rarity or because of other factors demonstrably making it vulnerable to extirpation; Moseley and Groves 1990).

Conservation Status - Elsewhere:

BRITISH COLUMBIA - Straley et al. (1985) list Lyall's phacelia as a R3 rare species in British Columbia. R3 refers to taxa that have no distinct geographical range or distribution in the province, but are usually scattered in isolated populations consisting of small numbers of plants.

ALBERTA - Straley et al. (1985) state that Lyall's phacelia is considered rare in Alberta, but give no details.

Ownership: All populations of Lyall's phacelia known from Idaho occur on land administered by the Forest Service. The Seven Devils population occurs in the Hells Canyon National Recreation Area, administered by the Wallowa-Whitman NF. The six east-central Idaho populations are all administered by the Salmon NF. The one population from the Lemhi Range (004) occurs within one mile of the Challis NF boundary.

Threats: I concur with Henderson (1981) that no clear threats are apparent to the long-term viability of Lyall's phacelia on the Salmon NF. Considerable mining activity has taken place in the vicinity of populations in the Beaverhead Mountains, however.

Although no status survey has been conducted in the Seven Devils

Mountains, the one population known from there is very close to a major recreational site and could easily be impacted by such activity.

Management Implications: Although no threats to the Salmon NF populations are evident at present, they are all small and localized in a narrow set of habitat conditions. Expansion of mining activity in the area could inadvertently destroy a population if the species is not given careful consideration in land-management planning.

ASSESSMENT AND RECOMMENDATIONS

Summary: Results of our field investigation in 1990, revealed that the Lyall's phacelia is indeed rare in Idaho. Six populations are now known from the Salmon NF, three of which were discovered in 1990. This despite considerable searches in the Beaverhead Mountains, Lemhi Range, and Salmon River Mountains. Less than 2,000 plants are known from Idaho. No clear threats to long-term viability were apparent, but the highly localized nature of the populations make them vulnerable to extirpation from habitat destroying activities, such as mining.

Recommendations to the Regional Forester: Based on data discussed in this report, Lyall's phacelia still meets Sensitive Species criteria and should remain on the Regional List for the Salmon NF. The East Fork Hayden Creek (004) population occurs within one mile of the Challis NF boundary, where suitable-appearing habitat exists. It, therefore, should be added to the Challis NF list.

Recommendation to Salmon National Forest: Lyall's phacelia remains a rare and localized species in Idaho. Although no threats to the Salmon NF populations are evident at present, it should be given careful consideration in land-management planning on the Salmon and Leadore Ranger Districts. No monitoring or special management actions are recommended at this time.

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 for entry into their permanent data base on sensitive species.

Recommendation to Challis National Forest: Although no populations are known from the Challis NF, the East Fork Hayden Creek (004) population occurs very close to the boundary in the northern Lemhi Range. Suitable habitat exists on the Challis side of the range.

A status inventory should be conducted as soon as practicable.

Recommendation to Wallowa-Whitman National Forest:The disjunct population of Lyall's phacelia in the Seven Devils Mountains occurs near a major recreation site in the Hells Canyon National Recreation Area. The status of this population is unknown. It should be added to the Wallowa-Whitman Sensitive Species List and a status inventory should be conducted as soon as practicable.

Physaria didymocarpa (Hooker) Gray var. lyrata Hitchcock

CURRENT STATUS USFS Region 4 Sensitive Species (Salmon NF)
USFWS - C2
BLM - Sensitive
Idaho Native Plant Society - None
Heritage Rank - G5T1 S1

TAXONOMY

Family: Brassicaceae [Cruciferae (Mustard)]

Common Name: Salmon twin bladderpod

Citation: Vascular Plants of the Pacific Northwest 2:530. 1964.

Synonym: P. alpestris Suksdorf var. lyrata Hitchcock

Technical Description: Heavy-rooted perennial, often with a branched caudex, silvery-stellate, the hairs not closely appressed; stems usually many, somewhat decumbent-based, 2-17 cm long; basal leaves numerous, rosulate, marcescent, 2-8 cm long, the blades obovate or broadly oblanceolate to somewhat rhombic or even ovate, mostly obtuse, usually with a few inconspicuous to prominent teeth or entire, narrowed rather gradually to broad, winged, mostly lyrate, petiole-like bases about as long as the blades; cauline leaves several, reduced, mostly oblanceolate and entire; racemes somewhat closely flowered; pedicels slender to rather stout, 7-18 mm long, ascending, straight or somewhat curved but not sigmoid; lateral sepals not saccate at the base; petals yellow, broadly spatulate-obovate, 9-12 mm long; silicles much-inflated, 15-20 mm long and at least as broad, didymous, the base very slightly cordate, the apical sinus narrow, nearly closed, 2-4 mm deep; replum obovate to oblanceolate, more nearly obtuse than acute at the apex, 3-6 mm long, 2-3 mm broad; style 6-9 mm long; seeds 2-3 per locule (Hitchcock 1964).

Nontechnical Description: Salmon twin bladderpod has a large, thick taproot, surmounted by a tight rosette of silvery leaves. The leaves are spatulate, the blade gradually tapering to a winged petiole that is often lyrate (pinnately lobed, with the terminal lobe the largest and rounded). The few-flowered inflorescence occurs on a long, thin, generally curving stem. The yellow flowers produce large, inflated fruits that are obviously bilocular. See Appendix 1 for line drawing of Salmon twin bladderpod and Appendix 5 for slides of its habit and habitat.

Distinguishing Features and Similar Species: No other Physaria taxa are known to be sympatric with Salmon twin bladderpod. Two taxa do, however, occur elsewhere in east-central Idaho, and may cause some confusion: Physaria geyeri and Physaria didymocarpa var. didymocarpa.

Physaria geyeri is represented in central Idaho by two varieties, the widespread var. geyeri and the Lemhi and Custer county endemic var. purpurea. Since var. purpurea was once considered a rare plant, surveys were conducted by botanists from the University of Idaho Herbarium (Brunsfeld et al. 1980; Henderson 1982; 1983). They found that it did not occur east of the Challis Creek and Camas Creek drainages. It occurs on the Salmon NF along Silver and Camas creeks. We saw no P. geyeri in the Lemhi and Salmon River valleys round Salmon.

Physaria didymocarpa var. didymocarpa occurs at high elevations, largely alpine, in the southern Beaverhead Mountains and on the east slope of the southern Lemhi Range. These high elevation sites are all on the Targhee NF. We found one small population of var. didymocarpa on the Salmon NF, approximately eight miles northwest of Leadore, above the Maryland Mine in the West Fork Little Eightmile Creek canyon. At 7,000 feet, this population is the lowest I know of for this taxon in Idaho, by at least 2,000 feet. The substrate is carbonate. The length of mature silicles approaches the upper limit of those for var. didymocarpa (see below), but are significantly smaller than the average for the var. lyrata populations. This population is near the upper elevational limit of known populations of var. lyrata, but occurs on a totally different substrate (see Habitat and Associated Species section below).

Although the varietal epithet refers to the lyrate petioles, this character is not a constant feature that can be used definitively to distinguish between P. didymocarpa taxa. As reported by Rosentreter (1982) and used by Hitchcock (1964) in his keys, the most distinguishing feature is mature fruit size, where var. didymocarpa has valves 8-12 (15) mm long as compared with var. lyrata that has valves (12) 15-20 mm long.

Because three of the four populations were only discovered in the 1980's, data on valve size were collected in 1986 from four sites to assure that they were indeed var. lyrata (Appendix 4): Williams Creek, Agency Creek, and the upper and the lower ends of the Pattee Creek population. The Basin Creek population was not sampled. Two types of data were collected: (1) intrapopulation distribution of valve size and (2) the range of fruit sizes for individual plants at each population. Analysis of the former data indicates that valve lengths exceed 15 mm in all four sites sampled. The percentage of large fruits (>15 mm) ranged from 16.1% in the Williams Creek population, 11.8% at the IER pit (= upper portion Pattee Creek population), 7.1% at Agency Creek, to 0.5% at Pattee Creek (= lower portion of Pattee Creek population) (paired graphs 1 - 4, Appendix 4). Analysis of the latter data indicates that between 40-60% of the plants in any population had fruits with valve lengths in excess of 15 mm (graphs 5 - 8, Appendix 4).

Chromosomal studies by Mulligan (1968), who apparently was unaware of Hitchcock's then recent description of var. lyrata, found that Physaria didymocarpa from low elevations near Salmon represented a different chromosome race than other P. didymocarpa taxa. The two counts he made from Salmon plants were hexaploid ($2n = 24$) while all other P. didymocarpa taxa were diploid or tetraploid. The higher ploidy level of var. lyrata found by Mulligan is consistent with the morphological data and observations, where var. lyrata is consistently larger in size than var. didymocarpa. Giganticism is a characteristic of higher ploidy levels within groups of closely related species.

The following key from Hitchcock (1964) will help distinguish the taxa described above:

- A. Valves of the silicle strongly obcompressed, only slightly if at all inflated P. geyeri
- A. Valves of the silicle strongly inflated, not obcompressed P. didymocarpa
 - B. Valve of the silicles (12) 15-20 mm long; leaves generally lyrate var. lyrata
 - B. Valve of the silicles 8-12 (15) mm long; leaves entire or toothed var. didymocarpa

DISTRIBUTION

Range: Until the early 1980's Salmon twin bladderpod was known only from the type locality on BLM land at the Williams Creek gravel pit (Hitchcock 1964; Steele 1977; Steele 1981). Thorough surveys over the past decade by botanists from the University of Idaho Herbarium, Idaho Natural Heritage Program, and especially the Bureau of Land Management have discovered only three other populations. All of these are on BLM and/or private land in the Lemhi Valley area.

During our survey in 1990, we found no populations of Salmon twin bladderpod on the Salmon NF. Physaria geyeri was observed in the Silver Creek valley near Meyers Cove and a population of P. didymocarpa var. didymocarpa as found north of Leadore on carbonate substrate. Otherwise, no other Physaria populations were observed on the Forest. See Appendix 3 for a list of areas searched unsuccessfully. Although all populations of Salmon twin bladderpod occur in drainages that have their headwaters on the Salmon NF, suitable habitat generally occurs below the Forest boundary.

The four sites of Salmon twin bladderpod are as follows [see Anonymous (1990) for detailed description of the habitat and size of four of these populations]:

Agency Creek - fruit sizes sampled in 1986 (Appendix 4).

Williams Creek - fruit sizes sampled in 1986 (Appendix 4).

Pattee Creek - fruit sizes sampled in 1986 (in Appendix 4 "IER Pit" = upper portion of this population, while "Pattee Creek" = lower portion of population).

Basin and Trail Creeks

See Appendix 2 for mapped locations of these populations.

Habitat and Associated Species: The following information is from Anonymous (1990):

Salmon twin bladderpod grows on steep south-facing slopes at elevations of 4050 to 6800 feet. Natural substrate is loose but fairly stable. Salmon twin bladderpod can be found in road cuts and on sites with some disturbance, but it is unknown if disturbance actually benefits the plant, or if what is observed is a relict of a much larger population that existed before the disturbance.

Salmon twin bladderpod is found within the Artemisia tridentata ssp. tridentata/Agropyron spicatum habitat type, although slopes supporting the bladderpod often have low vegetative cover. Associates include Phacelia hastata, Oenothera caespitosa, Chaenactis douglasii, and Agropyron spicatum. It is likely that the four populations of Salmon twin bladderpod are reproductively isolated by distance. At least one site, the Agency Creek site, is experiencing cheatgrass invasion.

CONSERVATION STATUS

Conservation Status - Idaho: For many years after its description in 1964, Salmon twin bladderpod was known only from the type locality on Williams Creek. Because of this, it was made a Category 2 candidate for listing as endangered or threatened (Steele 1977; Steele 1981; Steele 1983). In his evaluation of Salmon twin bladderpod for the Idaho rare plant project of the Idaho Natural Areas Council, Steele (1981) recommended a status of threatened, due to its rarity. He later changed his recommendation (Steele 1983) to endangered due to the habitat destruction taking place at the Williams Creek site. Salmon twin bladderpod was later added to the Idaho State BLM Sensitive Species list because of its occurrence on BLM land. Although not known from Forest Service land, it was also added to the Forest Service Region 4 Sensitive Species list due to its proximity to

the Salmon NF (USDA Forest Service 1988). Salmon twin bladderpod appears in the most recent Federal Register notice of review as a category 2 candidate (U.S. Fish and Wildlife Service 1990). The conservation of Salmon twin bladderpod is currently covered by a prelisting Conservation Agreement between the U.S. Fish and Wildlife Service and the BLM (Anonymous 1990).

Since it is a federal candidate, Salmon twin bladderpod is not included in a state-rare category by the Idaho Native Plant Society (1990).

The Idaho Natural Heritage Program currently ranks Salmon twin bladderpod as G5T1 S1 [G5 = Physaria didymocarpa is demonstrably secure; T1 = var. lyrata is critically imperiled throughout its range because of extreme rarity or because of some other factor of its biology making it vulnerable to extinction; S1 = since var. lyrata is endemic to Idaho, the state (S) rank equals the global rank for the taxon (T); Moseley and Groves 1990].

Conservation Status - Elsewhere: Salmon twin bladderpod is endemic to Idaho.

Ownership: All known populations of Salmon twin bladderpod occur on Salmon District BLM lands. In addition, part of the Basin Creek population also occurs on private land.

Threats: All populations have been disturbed to some degree in the past, and all face some level of ongoing disturbance. The BLM and Fish and Wildlife Service have recently entered into a Conservation Agreement for Salmon twin bladderpod (Anonymous 1990). Refer to that document for further information on threats to the taxon.

Management Implications: Since no Salmon twin bladderpod is known from the Salmon NF, no direct management implications exist for Forest managers.

ASSESSMENT AND RECOMMENDATIONS

Summary: Salmon twin bladderpod is an extremely rare and vulnerable taxon endemic to the Salmon area. No populations are known from the Salmon NF, however, despite our searches in 1990, and searches by other agency and university botanists over the last decade. Although all populations of Salmon twin bladderpod occur in drainages that have their headwaters on the Salmon NF, suitable habitat generally occurs below the Forest boundary. It is unlikely that any will be found on Forest Service land.

Recommendations to U.S. Fish and Wildlife Service: After a decade of thorough surveys for Salmon twin bladderpod by agency and university botanists, it appears that sufficient distribution, abundance and threat data are available to reclassify it from a category 2 candidate to a category 1. Listing as Threatened also appears appropriate.

Recommendation to the Regional Forester: Available data, compiled over the last decade, indicate that it is unlikely that Salmon twin bladderpod occurs on Forest Service-administered land. All populations, however, occur close to the Forest boundary, and it is possible that management decisions made on adjacent Forest Service land could have an adverse affect on bladderpod populations. For this reason, it may be advisable to maintain Salmon twin bladderpod on the Region's Sensitive Species List for the Salmon NF.

Also, the recently released endangered and sensitive plant field guide for Idaho and Wyoming (USDA Forest Service n.d.) indicates that Salmon twin bladderpod occurs in Custer County. To the best of our knowledge, this is probably an error, as it is known only from Lemhi County.

Recommendation to Salmon National Forest: As mentioned above, all populations of Salmon twin bladderpod occur close to the Salmon NF boundary, and it is possible that management decisions made on adjacent Forest Service land could have and adverse affect on bladderpod populations.

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 for entry into their permanent data base on sensitive species.

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Appendix 1

Line drawings of Phacelia lyallii
and Physaria didymocarpa var. lyrata

1. Phacelia lyallii (from Cronquist 1959)
2. Physaria didymocarpa var. lyrata (from Hitchcock 1964)

Appendix 2

Locations of Phacelia lyallii and Physaria didymocarpa var. lyrata in east-central Idaho

- Map 1. Phacelia lyallii - overview of distribution on the Salmon NF.
- Map 2. Phacelia lyallii - population near Skytop Lake (001).
Portion of Goldstone Mountain NE 7.5' orthophoto quadrangle.
- Map 3. Phacelia lyallii - population on Peak 9992 (003).
Portion of Homer Youngs Peak 7.5' quadrangle.
- Map 4. Phacelia lyallii - population on East Fork Hayden Creek -
Mill Creek divide (004). Portion of preliminary Mogg
Mountain 7.5' quadrangle.
- Map 5. Phacelia lyallii - population near Berry Lake (005) and
Timberline Lake (006). Portion of Goldstone Mountain NW
7.5' orthophoto quadrangle.
- Map 6. Phacelia lyallii - population on Pyramid Peak (007).
Portion of Shewag Lake 7.5' quadrangle.
- Map 7. Physaria didymocarpa var. lyrata - overview of
distribution.
- Map 8. Physaria didymocarpa var. lyrata - Agency Creek and Pattee
Creek populations. Portion of Lemhi 15' quadrangle.
- Map 9. Physaria didymocarpa var. lyrata - Williams Creek
population. Portion of Salmon 15' quadrangle.
- Map 10. Physaria didymocarpa var. lyrata - Basin Creek-Trail
Creek population. Portion of Lem Peak 7.5' quadrangle.

Appendix 3

List of areas searched unsuccessfully for
Phacelia lyallii and Physaria didymocarpa var. lyrata
on the Salmon National Forest in 1990.

PHACELIA LYALLII

Salmon River Mountains

1. Big Horn Crags between Dome Mountain and Wilson Mountain
2. Taylor Mountain area
3. Lake Mountain

Lemhi Range

1. Buck Lakes - Lem Peak - Bear Valley Lakes area
2. Mill Creek drainage

** Previous floristic inventories have been made in selected areas of the Salmon NF-portion of the Lemhi Range, including Big Eightmile Creek and Big Timber Creek drainages, Portland Mountain, Meadow Lake area, and Sheep Mountain.

Beaverhead Mountains

1. Stein Mountain
2. upper Fourth of July Creek area
3. Goldstone Pass - Goldstone Mountain area
4. Continental Divide south of Center Mountain

** Previous floristic inventories have been made in selected areas of the Salmon NF-portion of the Beaverhead Mountains, including Kenney Creek, Horse Prairie-Elk Mountain area, Baldy Mountain area, and the Clear Creek-Poison Creek area.

PHYSARIA DIDYMOCARPA VAR. LYRATA

Lemhi Range

1. Hayden Creek - Bear Valley Creek
2. Basin Creek
3. Haynes Creek
4. Withington Creek
5. Twelevemile Creek
6. Warm Springs Creek
7. McKim Creek
8. McDevitt Creek

Beaverhead Mountains

1. Little Eightmile - West Fork Little Eightmile Creeks
2. Agency Creek
3. Carmen Creek
4. Fourth of July Creek

Salmon River Mountains

1. Iron Creek
2. Lake Creek
3. Williams Creek
4. Moose Creek Road
5. Diamond Creek Road
6. lower Panther Creek drainage, including Napias Creek, Trail Creek, Beaver Creek, and Hot Springs Creek
7. Silver Creek
8. Camas Creek between Meyers Cove and Woodtick Creek
9. major tributaries of the main Salmon River
10. North Fork Salmon River valley and tributaries, including Hull Creek, Highs Creek, Sheep Creek, Lick Creek, and Volter Creek.

Appendix 4

Graphs displaying fruit size data for
Physaria didymocarpa var. lyrata from four populations.

NOTE: The "IER Pit" sample site is from the upper portion of the Pattee Creek population, while the "Pattee Creek" sample site is from the lower portion of the Pattee Creek population.

PAIRED GRAPHS 1 - 4

These paired graphs show the size distribution and cumulative percentage of fruit sizes based on silicle valve length for each of the four sample sites.

GRAPHS 5 - 8

These graphs are box charts showing the range of fruit sizes for individual plants at each of the four sample sites. Outliers are shown by asterisks. The hatched areas represent confidence intervals about the median fruit size for each plant. If the hatched areas about any two medians do not overlap, the medians are (roughly) significantly different at about a 95% confidence level.

Appendix 5

Slides of
Phacelia lyallii and Physaria didymocarpa var. lyrata
and their habitats on or near the Salmon National Forest.

1. Phacelia lyallii - close-up of flowers and leaves; note green, pinnatilobate leaves and blue-purple flowers with exerted stamens.
2. Phacelia lyallii - close-up of plant; note densely tufted stems.
3. Phacelia lyallii - quartzite talus habitat at Timberline Lake (006); note Lyall's phacelia in bottom center.
4. Phacelia lyallii - overview of habitat (foreground) at Skytop Lake (001).
5. Physaria didymocarpa var. lyrata - close-up of plant in flower.
6. Physaria didymocarpa var. lyrata - close-up of mature fruits and seedlings.
7. Physaria didymocarpa var. lyrata - overview of habitat at Williams Creek gravel pit.