

**A PROJECT TO UPDATE OCCURRENCE INFORMATION AND
ESTABLISH PHOTO POINT MONITOR STATIONS FOR SIX IDAHO RARE PLANT SPECIES**

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ABSTRACT

Goose Creek milkvetch (*Astragalus anserinus*), Idaho penstemon (*Penstemon idahoensis*), Stanley whitlow-grass (*Draba trichocarpa*), guardian buckwheat (*Eriogonum meledonum*), Salmon twin bladderpod (*Physaria didymocarpa* var. *lyrata*), and meadow pussytoes (*Antennaria arcuata*) are six of the rarest plant species in Idaho. Little or no updated conservation information had been obtained for these species since field investigations and status reports were finished in the late 1980s and early 1990s. For the past several years, the lack of current population, habitat condition, and threat information has made it difficult to assess the conservation status and make recommendations for these species with any confidence. Updated information is needed if we are to be more proactive in our approach towards the conservation of rare species. To alleviate this conservation information gap, I revisited most of the known occurrences for the six rare species during the summer of 2000. One of the project's main objectives was to update plant abundance, habitat, threat, and other conservation information for each occurrence. Thirty-eight of the 44 known occurrences were visited and had their records updated. Another objective of the project was to establish photo points to begin monitoring habitat conditions at as many of the occurrences as practical. Photo points were established at 30 occurrences and resulted in a series of approximately 250 photographs. All this information is available to land managers to help them ensure the long-term conservation of these rare plant species.

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INTRODUCTION

Conservation status reports for many of Idaho's rarest plant species were completed for the U.S. Fish and Wildlife Service (USFWS) in the late 1980s and early 1990s. Among those species included in these early field investigations and conservation assessments were Goose Creek milkvetch (*Astragalus anserinus*), Idaho penstemon (*Penstemon idahoensis*), Stanley whitlow-grass (*Draba trichocarpa*), guardian buckwheat (*Eriogonum meledonum*), Salmon twin bladderpod (*Physaria didymocarpa* var. *lyrata*), and meadow pussytoes (*Antennaria arcuata*). In the intervening years little or no updated conservation information was obtained for these six species. This was the result of most occurrences never being revisited or receiving only cursory re-evaluations. For the past several years the lack of current population, habitat condition, and threat information has made it difficult to assess the conservation status and make recommendations for these species with any confidence. Updated information is needed if we are to understand the status of these six rare species and be more proactive towards their conservation. To alleviate the conservation information gap for these six species, I revisited most of the known occurrences of Goose Creek milkvetch, Idaho penstemon, Stanley whitlow-grass, guardian buckwheat, Salmon twin bladderpod, and meadow pussytoes during the summer of 2000. Funds for this project were provided to the Idaho Conservation Data Center (CDC) by the USFWS. The project had two main objectives: (1) to update plant abundance, habitat, threat, and other conservation information for occurrences of the six rare species; and (2) to establish photo points to begin monitoring habitat conditions at as many of the occurrences as practical.

The six species included in this project are among the rarest plant taxa in Idaho. They are all former candidates (C1 or C2) for federal listing under the Endangered Species Act. They were all removed from the candidate category when the USFWS changed their listing process in 1996. They are now considered Species of Concern by the USFWS. All six species are considered Sensitive Species by one or both of the two main federal land management agencies in Idaho, the Bureau of Land Management (BLM) and the U.S. Forest Service (USFS). Each of these species is ranked either G1 or G2 by the Association of Biodiversity Information and The Nature Conservancy (Idaho Conservation Data Center 2000). These conservation ranks are reserved for the rarest and the most vulnerable species. They are also considered to be of important conservation concern by the Idaho Native Plant Society (Idaho Native Plant Society 2000).

RARE PLANT SPECIES

Five of the six species included in this project have very narrow distributions. Three occur only in Idaho, while two are also found in immediately adjacent parts of neighboring states. Edaphic factors appear to play a role in the limited distribution of all five of the narrow endemics. Four of the species are relatively new to science. The two Goose Creek endemics, Goose Creek milkvetch and Idaho penstemon, were not discovered and described until the 1980s. Stanley whitlow-grass and guardian buckwheat, endemic to central Idaho's Stanley Basin, were also not described until the 1980s. A brief synopsis of the six species included in the monitoring and occurrence update project is given below.

Goose Creek milkvetch (*Astragalus anserinus*) – is a low tufted perennial forb with small pink-purple flowers and curved, brownish-red fruit pods. It is a narrow endemic of the Goose Creek drainage located around the area where Idaho, Utah, and Nevada share a common border, south of Oakley, Idaho. Its total range is estimated to be about 10 miles x 10 miles. Seven of the approximately 20 known occurrences rangewide are in Idaho; the others are in adjacent parts of

Utah and Nevada. In Idaho, occurrences range in size from less than ten to perhaps several hundred plants. Plants are more or less confined to outcrops of dry, sandy, light-colored tuffaceous sediments belonging to the Tertiary age Salt Lake Formation. These relatively sparsely vegetated outcrops are surrounded by juniper and sagebrush habitats. Field investigations and a status survey report for this species were completed in Idaho in 1991 (Mancuso and Moseley 1991a). Field studies in Utah were conducted in 1990 (Baird 1991).

Idaho penstemon (*Penstemon idahoensis*) – is an erect, but short perennial forb with glandular herbage and a showy display of bluish flowers. It is also narrowly endemic to the Goose Creek basin. Fewer than 15 occurrences are known, one in Utah, the remainder in Idaho. Occurrences range in size from less than 100 to over 1000 individuals. It is also edaphically restricted to sparsely vegetated outcrops of Salt Lake Formation sediments. The light-colored, often rocky and steep outcrops tend to have a hard, fine texture with bedrock near the surface. It does not occur where the outcrops erode to a deep, sandy texture. As a result, it may occur in close proximity to Goose Creek milkvetch, but the two species are rarely directly sympatric. Field investigations and a status survey report for Idaho penstemon were completed in Idaho in 1991 (Mancuso and Moseley 1991b). Field studies were conducted for Utah in 1990 (Baird 1991). Several occurrences were included in a research project by a Brian Cheney, a graduate student at Brigham Young University (BYU). The results of this project are still being compiled.

Stanley whitlow-grass (*Draba trichocarpa*) – is a perennial forb with a low, dense, cushion growth form. It has small, but conspicuous yellow flowers and is among the first species in the Sawtooth Valley to bloom in the spring. It is restricted to a series of granite outcrops surrounding the floor of the Stanley Basin in central Idaho. The southerly-facing, moderately steep outcrops have bedrock close to the surface and open, low-growing vegetation. The outcrops are typically surrounded by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) habitat. It is known from 12 occurrences occupying a total of less than 50 acres. Occurrences contain from a few hundred to several thousand plants each. The majority of occurrences are located within the Sawtooth National Recreation Area, but a few are at least partly on private land. Field surveys were conducted for this species in the late 1980s (Moseley 1988) and a number of occurrences were selected for a demographic monitoring study in the early 1990s (Moseley and Mancuso 1990; 1992; 1993).

Guardian buckwheat (*Eriogonum meledonum*) – is a grayish-woolly subshrub that forms low, moderately dense mats. Plants produce round, tight clusters of small bright-yellow flowers at the end of a short leafless stem. It occurs in habitats around the Stanley Basin similar to Stanley whitlow-grass, although its distribution extends farther south, into the south end of the Sawtooth Valley. The two species are sympatric at a number of sites. It is known from eight occurrences ranging in size from less than 200 to about 1000 individuals, and covering a total of about 30 acres. Most occurrences are located within the Sawtooth National Recreation Area within view of the town of Stanley. Field surveys for this species were conducted concurrently with surveys for Stanley whitlow-grass (Moseley 1988). Several occurrences were included in the demographic monitoring study that looked at the two Stanley Basin endemics in the early 1990's (Moseley and Mancuso 1990; 1992; 1993).

Salmon twin bladderpod (*Physaria didymocarpa* var. *lyrata*) - is a low-growing plant with a large, thick taproot surmounted by a tight rosette of green-silvery spatula-shaped leaves. The yellow flowers occur on a thin, generally curving stem, and produce large inflated, bilocular fruits. Until the early 1980s Salmon twin bladderpod was known only from the type locality west of the town of Salmon. The few additional populations found since then are all in the Lemhi Valley area. Most are located on BLM land. This Idaho endemic is presently known from six

occurrences, ranging from about two to perhaps 20 acres in extent. It generally occurs on steep, southerly-facing, rocky slopes of volcanic substrate. The substrate material is often loose, but fairly stable. These rocky, relatively sparsely vegetated openings are surrounded by sagebrush habitat. The BLM has conducted field surveys intermittently for Salmon twin bladderpod for many years. Other entities have also looked for this species over the years (Moseley et al. 1990). A population trend study was conducted during the first half of the 1990s (Craig 1992; Craig and Craig 1996). An early status report and recovery plan was prepared by the BLM when this species was known from only three populations (Rosentreter 1982).

Meadow pussytoes (*Antennaria arcuata*) - is a dioecious, loosely white-woolly perennial forb with conspicuous arching stolons. It has a range that spans three disjunct areas in the western United States - the southern Wind River range area in west-central Wyoming, the Independence Mountains in northeastern Nevada, and near Carey in south-central Idaho. Meadow pussytoes occurs in moist meadow habitats surrounded by sagebrush steppe vegetation. Rangelwide, fewer than 30 populations have been documented (Fertig 1996). The population at Huff Creek meadows near Carey is on private land and the only known location for Idaho. This population contains several thousand plants scattered over about 100 acres. A preserve design package was prepared for Huff Creek in the 1980s (Caicco 1986), but no conservation actions were ever undertaken for the meadow. In Idaho, only a limited amount of field work has targeted this species. Conservation status reports have been prepared for Idaho (Lorain 1990), Wyoming (Fertig 1996), and rangelwide (Marriot 1986).

METHODS

Between June 26 and August 3, 2000, I updated information records, established photo point monitor stations, and sampled the vegetation at a subset of occurrences for six of Idaho's rarest plant species (Table 1). A total of 44 Idaho occurrences are known for these six species. I was able to visit and update records for 38 of them. In addition, photo points were established at 30 occurrences and vegetation plots sampled at 25 of them. Six occurrences were not visited, due to their location on private land, or in a few cases, a lack of time. However, I was able to view some of the occurrences from a distance, record general habitat notes, and take photographs.

Occurrence Record Updates

An occurrence represents a specific geographic location and is a standard data base contrivance used throughout the Natural Heritage/Conservation Data Center network for tracking rare species/elements. Delineation and segregation of occurrences are based on biological information as much as possible, but may also take into account land ownership, topographic features, or other factors. For this reason an occurrence is often not equivalent to the biological definition of a "population".

All the rare plant occurrences I visited for this project were relocated using maps, directions, and other field accounts found in various reports and in files at the CDC office in Boise. In many cases I was able to walk around the entire occurrence to count or estimate plant numbers, assess habitat conditions, and evaluate threats or other information needed to update the occurrence record. For some of the large occurrences only a portion of the occurrence area was visited. A special occurrence update field form was completed at all occurrences where I established a photo point (Appendix 1). For the eight occurrences that were visited, but did not get a photo point, update information was recorded directly into a field notebook.

Table 1. List of occurrences and record of work for year 2000. EOR is the CDC's Element Occurrence Record, a three digit data base identification code.

Species	EOR	Name of occurrence	Record updated	Photo point	Vegetation plot
<i>Astragalus anserinus</i>	001	Lower Beaverdam Creek	yes	yes	yes
<i>Astragalus anserinus</i>	002	Horseshoe Spring	no	no	no
<i>Astragalus anserinus</i>	003	Beaverdam Creek	yes	no	no
<i>Astragalus anserinus</i>	004	Coal Banks Creek	yes	yes	yes
<i>Astragalus anserinus</i>	005	Goose Creek Cliff Bands	no	no	no
<i>Astragalus anserinus</i>	006	Goose Creek, Idaho/Utah Border	yes	yes	yes
<i>Astragalus anserinus</i>	007	Border Gulch	yes	no	no
<i>Penstemon idahoensis</i>	001	Whitley Ranch Gulch	yes	yes	yes
<i>Penstemon idahoensis</i>	002	Beaverdam Creek	yes	yes	yes
<i>Penstemon idahoensis</i>	003	Devine Canyon	yes	no	no
<i>Penstemon idahoensis</i>	004	Right Hand Fork Beaverdam Creek	yes	yes	yes
<i>Penstemon idahoensis</i>	005	Orangeburg Spring	yes	yes	yes
<i>Penstemon idahoensis</i>	006	North of Worthington Mine	yes	yes	yes
<i>Penstemon idahoensis</i>	007	Nearly Nevada - Almost Utah	yes	yes	yes
<i>Penstemon idahoensis</i>	008	Lower Beaverdam Creek	yes	yes	yes
<i>Penstemon idahoensis</i>	009	Goose Creek Cliff Bands	no	no	no
<i>Penstemon idahoensis</i>	010	Border Gulch	yes	yes	yes
<i>Penstemon idahoensis</i>	011	East of Coal Banks Spring	no	no	no
<i>Draba trichocarpa</i>	001	Stanley Creek	yes	yes	yes
<i>Draba trichocarpa</i>	002	Lower Stanley	no	no	no
<i>Draba trichocarpa</i>	003	Stanley #4	yes	yes	yes
<i>Draba trichocarpa</i>	004	Middle Stanley	yes	yes	yes
<i>Draba trichocarpa</i>	005	Sportsman Access #1	yes	yes	no
<i>Draba trichocarpa</i>	006	Sportsman Access #2	yes	yes	yes
<i>Draba trichocarpa</i>	007	Mile 377.5 Gulch	yes	yes	yes
<i>Draba trichocarpa</i>	008	Lower Stanley East	yes	yes	yes
<i>Draba trichocarpa</i>	009	Arrow A Ranch North	yes	yes	yes
<i>Draba trichocarpa</i>	010	Arrow A Ranch South	yes	no	no
<i>Draba trichocarpa</i>	011	Stanley Bluffs	no	no	no
<i>Draba trichocarpa</i>	012	Nip and Tuck Creek North	yes	no	no
<i>Eriogonum meledonum</i>	001	Lower Gold Creek	yes	yes	no
<i>Eriogonum meledonum</i>	002	Stanley Creek	yes	yes	yes
<i>Eriogonum meledonum</i>	003	Sportsman Access #1	yes	yes	no
<i>Eriogonum meledonum</i>	004	Sportsman Access #2	yes	yes	yes
<i>Eriogonum meledonum</i>	005	Sportsman Access #3	yes	yes	yes
<i>Eriogonum meledonum</i>	006	Arrow A Ranch North	yes	yes	yes
<i>Eriogonum meledonum</i>	007	Arrow A Ranch South	yes	no	no
<i>Eriogonum meledonum</i>	008	Stanley #4	yes	yes	yes
<i>Physaria didymocarpa lyrata</i>	001	Pattee Creek	yes	no	no
<i>Physaria didymocarpa lyrata</i>	002	Williams Creek	yes	yes	no
<i>Physaria didymocarpa lyrata</i>	003	Agency Creek	yes	yes	yes
<i>Physaria didymocarpa lyrata</i>	004	Basin Creek	yes	no	no
<i>Physaria didymocarpa lyrata</i>	005	Bear Valley Creek	yes	yes	no
<i>Physaria didymocarpa lyrata</i>	006	Dry Creek	no	no	no
<i>Antennaria arcuata</i>	001	Huff Creek	yes	yes	yes

Photo Points

A photo point was established for at least one occurrence of each species included in this project. The location of the photo point was chosen after completing a survey of all or most of the occurrence area. Most photo points were monumented using a red-painted rebar stake hammered into the ground, but a few used small rock outcrops or other features to mark their location. I used a pre-existing rebar (and in one case, wood) stake to mark the photo point location at many of the Stanley whitlow-grass and guardian buckwheat occurrences. These stakes were originally used for a demographic monitoring study conducted during the early 1990s. They were still firmly in place and in good condition. In addition, photo points for several Idaho penstemon occurrences were set up to overlap the location of transects established several years ago by BYU graduate student Brian Cheney for his research project involving this species. Rebar stakes were hammered into the ground adjacent to the fiberglass wands Brian used to mark his transects. In all cases, photo points were established in a representative segment of the occurrence. For various reasons, some occurrences were not conducive to a photo point monitoring protocol. At some of these I took general photographs of the occurrence area.

The location of all photo points were mapped (Appendix 2). In addition, a location form was filled out for each photo point to help relocate them in the future (Appendix 3). With two exceptions, coordinates were obtained for all photo points using a navigation grade (Garmin 12XL) GPS unit. The coordinates were recorded on the photo point location form.

A minimum of eight photographs were taken for each photo point – 0°, 45°, 90°, 135°, 180°, 225°, 270°, and 315°. A declination of 17° was used for these compass bearings. The first frame in the series included an occurrence identification record sheet. This array of photos provides a panoramic view of the surrounding landscape and general habitat characteristics. Additional photographs were taken when needed to show specific habitat, threat, or other occurrence details. Photographs were taken to help relocate the photo point taken at some occurrences. Photographs were taken using an SLR camera, ASA 100 slide film, and wide angle (28°) lens unless otherwise noted on the field form. The original set of photographs are on file at the CDC office in Boise. The entire photo point set has been scanned to produce digital reproductions. These digital copies are being distributed to the USFWS and appropriate BLM and Forest Service offices.

Vegetation Plots

Vegetation plots were sampled at about half of the occurrences to document plant community information. Plots were not established at several occurrences located on steep, loose, easily disturbed slopes to minimize disturbances caused by sampling. Plant community information was collected using methods outlined in Bourgeron et al. (1992). A 1/10th acre circular plot was established overlapping the photo point area. In most cases the photo point marker stake served as the plot center point. If this was not the case, instructions were recorded on the vegetation plot field form. An Ocular Plant Species Data form was complete for each plot (Appendix 4). This form lists the estimated percent cover for every vascular plant species occurring within the plot. Cover class estimates were also made for several ground cover categories (litter, rock, soil, etc.) Cover classes were as follows.

1 = <1%	30 = 25 – 34.9%	70 = 65 – 74.9%
3 = 1 - 4.9%	40 = 35 – 44.9%	80 = 75 – 84.9%
10 = 5 – 14.9%	50 = 45 – 54.9%	90 = 85 – 94.9%
20 = 15 – 24.9%	60 = 55 – 64.9%	98 = 95 – 100%

RESULTS AND DISCUSSION

Occurrence Record Updates

Goose Creek milkvetch, Idaho penstemon, Stanley whitlow-grass, guardian buckwheat, Salmon twin bladderpod, and meadow pussytoes are six of the rarest plant taxa in Idaho. Prior to 2000, conservation information for most occurrences averaged about ten years old for these species. One of the main objectives of this project was to bring occurrence information about these species up to date. Copies of the 38 updated CDC occurrence records are in Appendix 5. Records for the six occurrences I did not visit are also included in this appendix to provide a complete set for these species. The occurrence records summarize location, population, habitat, ownership, threat, and other conservation-related information. A count or estimate of plant abundance was one of the attributes updated in 2000. A history of plant abundance information for each occurrence is summarized in Table 2.

Goose Creek milkvetch (*Astragalus anserinus*)

Little is known about the autecology of this species, including its response and vulnerability to various disturbances. Substantial declines in plant number have apparently taken place since earlier estimates for several occurrences (Table 2). Long-term monitoring data are needed to determine if these declines are natural fluctuations related more to poor growing conditions (e.g., drought), or are a downward trend related to habitat degradation, disease, or other factors. Livestock grazing is the predominant land use in areas supporting Goose Creek milkvetch, and related disturbances have adversely affected habitat quality at the Beaverdam Creek (003), Coal Banks Creek (004), and Idaho/Utah Border (006) occurrences. The noxious weed leafy spurge (*Euphorbia esula*) has established within or in very close proximity to the Lower Beaverdam Creek (001), Goose Creek Cliff Bands (005), and Border Gulch (007) occurrences. None of the occurrences were directly affected by the 1999 wildfire that burned portions of the Goose Creek drainage. However, several of the occurrences are located within the perimeter of the wildfire that swept through the Goose Creek area in 2000.

Idaho penstemon (*Penstemon idahoensis*)

For all occurrences visited in 2000, plant numbers were stable or somewhat higher compared to previous years (Table 2). Good condition habitat prevailed at all occurrences, although the surrounding sagebrush or juniper habitats were frequently disturbed to one degree or another by livestock grazing activities. At most occurrences there was evidence of light livestock use, but impacts to Idaho penstemon and its habitat appeared minimal. Disturbances associated with livestock grazing activities appear to be less of a threat than for Goose Creek milkvetch. Leafy spurge has the potential to threaten the ecological integrity of several occurrences where it has established, most notably at Border Gulch (010). Off-road vehicle use was observed in and around portions of the Lower Beaverdam Creek (008) occurrence and could be a conservation concern if it increases. The 1999 Goose Creek fire burned to the edge of the Whitley Ranch Gulch occurrence (001), but no direct effects to Idaho penstemon were observed in 2000. It is unclear if any of the occurrences located within the perimeter of the 2000 Goose Creek wildfire were adversely affected by the burn.

Stanley whitlow-grass (*Draba trichocarpa*)

Earlier plant number estimates for this species were usually given as a range. Estimates in 2000 were within or close to these previous ranges for all occurrences (Table 2). A more thorough survey of the Nip and Tuck Creek North occurrence (012) resulted in an increase in the number of plants known for this area compared to a previous estimate. Some degree of elk trampling disturbance was found at most occurrences in 2000. It was the prevalent disturbance at many sites and appears to have increased compared to my previous recollection. It is not known

Table 2. Occurrence plant abundance information by year.

Species	EOR	Year							
		1986	1987	1988	1989	1990	1991	other	2000
Astans	001						2		12
Astans	002				ca 1000		ca 200		no visit
Astans	003						ca 325		2
Astans	004				1000-10,000		ca 30		24
Astans	005						unknown		no visit
Astans	006						300 - 400		32
Astans	007						7		5
Penida	001						ca 1000		ca 1000
Penida	002						ca 500	ca 650 ⁹⁶	1000-2000
Penida	003				ca 200		ca 200		ca 250
Penida	004				100 - 1000		ca 25		60
Penida	005				11 - 50		ca 300		500 - 1000
Penida	006						250 - 300		400 - 500
Penida	007						ca 150		ca 500
Penida	008						ca 150	ca 300 ⁹⁶	ca 325
Penida	009						ca 500		no visit
Penida	010						500 - 1000		ca 1000
Penida	011							9 ⁹⁴	no visit
Dratri	001			several 100					200 - 250
Dratri	002	few 100	100 - 1000						no visit
Dratri	003		100 - 1000						1000 - 2500
Dratri	004		100 - 1000						ca 150
Dratri	005		100 - 1000						500 - 1000
Dratri	006		11 - 50	100 - 1000					500 - 1000
Dratri	007			ca 100					ca 500
Dratri	008			ca 1000					ca 1000
Dratri	009			100 - 1000					ca 1000
Dratri	010			several 100					150 - 250
Dratri	011			ca 1000					no visit
Dratri	012						1 - 10		250 - 500
Erimel	001			several 100					500 - 1000
Erimel	002			dozens					250 - 300
Erimel	003			100 - 1000					ca 500
Erimel	004			several 100					ca 500
Erimel	005			100 - 1000					750 - 1000
Erimel	006			100-1000					ca 1000
Erimel	007			ca 100					ca 150
Erimel	008					common			300 - 500
Phydidlyr	001	ca 3000				75			ca 65
Phydidlyr	002	ca 100							26
Phydidlyr	003				100 - 200	150 - 200			ca 150
Phydidlyr	004	500 - 1000							ca 250
Phydidlyr	005							100 - 1000 ⁹²	500 - 700
Phydidlyr	006							2 ⁹⁴	no visit
Antarc	001				3000 - 4000			1000s ⁹⁶	several 1000

EOR = Element Occurrence Record
⁹⁶ = 1996; ⁹⁴ = 1994; ⁹² = 1992

whether long-term habitat impacts will follow this increased elk disturbance. Cheatgrass (*Bromus tectorum*) was not previously reported for any occurrences prior to 2000. At several occurrences, patches of this weedy annual were associated with gopher digging disturbances. Spotted knapweed (*Centaurea maculosa*) is becoming common along the Salmon River and some accessory roads in the Stanley area. This noxious weed was not observed in any occurrences, but is a potential threat if it can invade the nearby outcrops supporting the two rare Stanley Basin endemics. Livestock grazing does not occur at most occurrences and is a minor conservation issue for this species. Off-road vehicle use at the Stanley Creek (001) and Stanley #4 (003) occurrences is an issue that management needs to address soon to prevent potential habitat degradation problems.

Guardian buckwheat (*Eriogonum meledonum*)

Earlier plant number estimates for this species were also usually given as a range. Estimates for 2000 were similar to these previous numbers (Table 2). Because the two species are often sympatric, comments regarding elk disturbance, weeds, and livestock grazing made for Stanley whitlow-grass also applies to guardian buckwheat. Beside the Stanley Creek (002) and Stanley #4 (008) occurrences, off-road vehicle impacts were observed at the Sportsman Access #3 occurrence in 2000. Again, this is an issue that management needs to address soon to prevent potential habitat degradation problems.

Salmon twin bladderpod (*Physaria didymocarpa* var. *lyrata*)

Several occurrences were reported to have 1000 or more plants in the late 1980s; however, more recent surveys have estimated many fewer plants at these sites. The Williams Creek (002) occurrence has shown a dramatic decline in the number of plants compared to estimates made about 15 years ago. This decline may be attributable to large-scale slumping along the slope in the early 1990s (Craig and Craig 1996). Spotted knapweed has invaded this site in recent years as well. It is unclear if this weed is playing a role in the observed decline of plant numbers. There were also substantially fewer plants observed at the Pattee Creek (001) occurrence compared to estimates made in the past. Even though only segments of the occurrence were visited in 2000, few or no plants were found in areas known to contain more plants in previous years. Reasons for this apparent decline in plant numbers are unknown as the habitat has changed little over the years. Livestock-related disturbances may be threatening portions of the Basin Creek (004) occurrence. Otherwise, no major livestock impacts were observed in 2000. The occurrence at Bear Valley Creek (005) is the least disturbed occurrence and should be a priority conservation area for the Salmon-Challis National Forest. From a rangewide perspective, Salmon twin bladderpod is the rarest of the six species considered in this project.

Meadow pussytoes (*Antennaria arcuata*)

The number of plants observed in 2000 were similar to previous accounts (Table 2). Competition from several weedy species may be a threat in Huff Creek meadow. The meadow has been grazed for many years, but the population has persisted and the effects of livestock grazing on this plant remain unknown.

Photo Points

Another major objective of this project was to establish a photo point monitoring station within a representative segment of as many occurrences as possible. This was done for 30 occurrences overall and resulted in a series of approximately 250 photographs. Photo point photographs are meant to provide a visual, time-lapse record of the vegetation and other habitat conditions for each occurrence. The photos taken in 2000 are the baseline against which information portrayed in future photographs can be evaluated. Over time, the photographs may prove useful to document events and impacts related to wildfire, weed invasion, off-road vehicle use,

livestock use, road or other construction projects, and natural disturbances such as landslides. They may also prove helpful to document site stability or improving habitat conditions. The value of these photo points will likely increase over time.

Vegetation Plots

Plant community data collected in 2000 serves as a baseline to compare future results and help document plant composition and/or abundance changes in the vegetation. The vegetation data will also help with the interpretation of photo point photographs. Cover class data for all plots were entered into an EXCEL spreadsheet (Appendix 6). Constancy values were calculated for the series of plots sampled in the Stanley Basin and Goose Creek areas.

Vegetation at the eight Stanley whitlow-grass and guardian buckwheat plots in the Stanley Basin area were characterized by open shrub cover, low cover of a mix of several graminoid species, and low cover by a diverse suite of associated perennial forbs. Introduced weedy forb species were absent in all but one plot, but cheatgrass occurred in three plots. In the Goose Creek area, vegetation for the 11 Goose Creek milkvetch and Idaho penstemon plots were characterized by open juniper cover, low cover by several shrub and grass species, and sparse cover by a fairly diverse suite of perennial, and to a lesser extent annual forb species. Introduced weedy forbs were rare, but crested wheatgrass was found in more the half of the plots. The single plot for Salmon twin bladderpod was characterized by open sagebrush/ bunchgrass vegetation and low forb cover evenly split between perennial and annual species, some of which are introduced. Vegetation at the lone meadow pussytoes plot was dominated by a few graminoid and forb species.

RECOMMENDATIONS

Based on this study and observations made in 2000, I have the following recommendations:

- 1) Ten years is too long a time to let pass between visits to update conservation information for some of the rarest plant species in the state. Visits in 2000 verified that some occurrences are vulnerable to existing or potential threats, or reveal a substantial decline in plant numbers compared to a decade ago. Occurrences of the six species considered in this project that appear stable and face little or no threats should be checked at least once every five years. More vulnerable occurrences need to be revisited on a more regular basis. I suggest that BLM and USFS biologists conduct or sponsor annual or biannual revisits to vulnerable or declining occurrences. This will help the agencies be proactive and adjust management activities or take other actions needed to protect high priority Sensitive species they are responsible for. Updated occurrence information should be forwarded to the CDC to ensure records distributed throughout the state contain the most current information known.
- 2) Photo points and vegetation plot sampling are relatively easy and quick monitoring tools. I suggest photographs be retaken every five years. They should be retaken sooner, and on a more regular basis (preferably for several consecutive years) after a wildfire or other disturbance takes place at an occurrence. Photographs should be retaken about the same time of year to ensure a consistent plant phenology pattern and photo interpretation.
- 3) More intensive monitoring plans are needed to address the questionable long-term conservation status of Goose Creek milkvetch and Salmon twin bladderpod. Periodic occurrence revisits and simple photo points are not sufficient. For Goose Creek milkvetch, I suggest the BLM institute a more thorough monitoring plan that specifically looks at livestock

grazing impacts and some demographic attributes. For Salmon twin bladderpod, I suggest the BLM initiate a more thorough monitoring plan that addresses weed invasion problems and other existing or potential threats.

4) Additional field surveys are recommended for the two Stanley Basin endemics in the Joes Gulch and upper Nip and Tuck Creek areas; perhaps also the ridge complex between the Salmon River and Four Aces Creek east of Stanley. A few areas of unsurveyed potential habitat also exist for the two Goose Creek endemics.

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Appendix 1.

Rare Plant Species Element Occurrence Update Forms for 2000.

Appendix 2.

Map locations for *Astragalus anserinus*, *Penstemon idahoensis*, *Draba trichocarpa*, *Eriogonum meledonum*, *Physaria didymocarpa* var. *lyrata*, and *Antennaria arcuata* photo points established in 2000.

- Map 1. Photo points for *Astragalus anserinus* 001, 004 and *Penstemon idahoensis* 001, 008, 010. Portion of USGS 7.5' Blue Hill quadrangle.
- Map 2. Photo point for *Astragalus anserinus* 006. Portion of USGS 7.5' Pole Creek quadrangle.
- Map 3. Photo points for *Penstemon idahoensis* 005, 006, 007. Portion of USGS 7.5' Ibex Peak quadrangle.
- Map 4. Photo point for *Penstemon idahoensis* 002. Portion of USGS 7.5' Ibex Peak quadrangle.
- Map 5. Photo point for *Penstemon idahoensis* 004. Portion of USGS 7.5' Ibex Peak quadrangle.
- Map 6. Photo point for *Eriogonum meledonum* 001. Portion of USGS 7.5' Obsidian quadrangle.
- Map 7. Photo points for *Draba trichocarpa* 001 and *Eriogonum meledonum* 002. Portion of USGS 7.5' Basin Butte quadrangle.
- Map 8. Photo points for *Draba trichocarpa* 003, 005, 006 and *Eriogonum meledonum* 003, 004, 005, 008. Portion of USGS 7.5' Stanley quadrangle.
- Map 9. Photo points for *Draba trichocarpa* 004, 007, 008, 009 and *Eriogonum meledonum* 006. Portion of USGS 7.5' Stanley quadrangle.
- Map 10. Photo point for *Physaria didymocarpa* var. *lyrata* 002. Portion of USGS 7.5' Williams Lake quadrangle.
- Map 11. Photo point for *Physaria didymocarpa* var. *lyrata* 003. Portion of USGS 7.5' Agency Creek quadrangle.
- Map 12. Photo point for *Physaria didymocarpa* var. *lyrata* 005. Portion of USGS 7.5' Hayden Creek quadrangle.
- Map 13. Photo point for *Antennaria arcuata* 001. Portion of USGS 7.5' Paddelford Flat quadrangle.

Appendix 3.

Rare Plant Species Element Occurrence Photo Point Monitoring Forms for 2000.

Appendix 4.

Ocular Plant Species Data Forms for 2000.

Appendix 5.

Updated Element Occurrence Records for *Astragalus anserinus*, *Penstemon idahoensis*, *Draba trichocarpa*, *Eriogonum meledonum*, *Physaria didymocarpa* var. *lyrata*, and *Antennaria arcuata*.

Appendix 6.

Summary of rare plant occurrence vegetation plot data.

Vegetation plot cover class data for *Draba trichocarpa* and *Eriogonum meledonum* occurrences - 2000

	Plot Identification Code								Constancy
	ERME-2	ERME-4	ERME-5	ERME-6	ERME-8	DRTR-4	DRTR-7	DRTR-8	
TREES									
Pinus ponderosa		3							1
SHRUBS									
Artemisia arbuscula	3			1	3	3		10	6
Artemisia tridentata vasey.		20	3				3		4
Chrysothamnus nauseosus				1	1	1	3	1	6
Chrysothamnus viscidiflorus	1	1	1	1	1		1		8
Potentilla fruticosa					1				1
Purshia tridentata		10					3	1	4
GRAMINOIDS									
Agropyron spicatum		3				1	1	1	5
Bromus tectorum				3		1		3	4
Carex douglasii	1			1					3
Carex rossii	1			3	3				4
Festuca idahoensis	1	1	3		1	1	1		8
Koeleria cristata	1			1	1		1		5
Oryzopsis exigua	3				1	1	1	1	6
Poa secunda			3	1	1		20	3	6
Sitanion hystrix	1		3	3	1	1	1		8
Stipa comata		1							1
Stipa occidentalis		3							1
FORBS									
Allium sp.								1	1
Antennaria dimorpha							1	1	3
Antennaria microphylla	3		1	1	1	1	3	1	9
Arabis hoelbellii	1		1				1		4
Arabis sp.							1		1
Arenaria congesta				1					1
Astragalus whitneyi			1	1			1		4
Chaenactis douglasii		1		1		1		1	5
Crepis sp.							1		1
Cryptantha ambigua		1		1		1		1	5
Draba trichocarpa	1	1		1	1	1	1	1	9
Epilobium brachycarpum								1	1
Erigeron compositus	1	1	10	1	1			3	8
Erigeron linearis	1	1					1	1	5
Eriogonum flavum	1		1		1	1	1		6
Eriogonum meledonum	1	1	3	1	1				6
Eriogonum ovalifolium		1				1		1	4
Eriogonum umbellatum		1	1	1		1		1	6
Gayophytum diffusum						1			1

	ERME-2	ERME-4	ERME-5	ERME-6	ERME-8	DRTR-4	DRTR-7	DRTR-8	Constancy
Geum triflorum					1				1
Gilia aggregata		1							1
Lesquerella occidentalis	1		1			1	1	1	6
Lomatium sp.		1							1
Lupinus sericeus	1	1	1			1	1	1	8
Machaeranthera canescens		1		1				1	4
Penstemon humilus	1	1	1	1	1	1			8
Phacelia hastata		1							1
Phlox austromontana	3	1	3				3		5
Phlox hoodii				1	1	1		1	5
Polemonium viscosum		1	1	1	1	1		1	8
Potentilla glandulosa				1	1	1		1	5
Sedum lanceolatum	1	1	1	1	1	1	1	1	10
Silene sp.							1		1
Taraxacum officinale			1						1
Thlaspi idahoensis aileeniae				1	1		1	1	5
Tragopogon dubius				1		1		1	4
Zigadenus venenosus							1		1
Bryophyte/Lichen	10	1	3	1	3	1	3	1	10

	PEID-1	PEID-2	PEID-4	PEID-5	PEID-6	PEID-7	PEID-8	PEID-10	ANAN-1	ASAN-4	ASAN-6	Constancy
<i>Cymopterus terebinthinus</i>	3	3		1		1		1				5
<i>Delphinium</i> sp.									1			1
<i>Descurrania richardsonii</i>	1	1										2
<i>Eriogonum brevicaulis</i> lax.	1	1						1				3
<i>Eriogonum ovalifolium</i>	1	1	1	1	1	1	1		1	1	1	9
<i>Eriogonum</i> sp. (annual)	1				1				1	1		4
<i>Eriogonum umbellatum</i>				1	1							2
<i>Eriophyllum lanatum</i>	1					1		1				3
<i>Erysimum</i> sp.	1											1
<i>Gayophytum diffusum</i>					1					1		2
<i>Gila aggregata</i>			1							1		2
<i>Gilia congesta</i>	1						1		1		1	4
<i>Linum perenne</i>	1	1	1	1		1		1				5
<i>Lupinus lepidus</i>	1			1	1			1	1	1	1	6
<i>Lygodesmia grandiflora</i>										1		1
<i>Lygodesmia spinosa</i>		1					1		1	1	1	5
<i>Mentzelia albicaulis</i>			1				1		1		1	4
<i>Oenothera caespitosa</i>	1	1					1	1			1	5
<i>Oenothera pallida</i>									1			1
<i>Opuntia polyacantha</i>					1					1		2
<i>Penstemon idahoensis</i>	1	1	1	1	1	1	1	1				7
<i>Phacelia hastata</i>			1			1		1			1	4
<i>Phlox hoodii</i>	1	1	1	1	1		1		1			6
<i>Physaria geyeri</i>	1				1							2
<i>Polygonum sawatchense</i>			1			1						2
<i>Senecio canus</i>	1		1					1				3
<i>Senecio multilobatus</i>			1	1		1						3
<i>Taraxacum officinale</i>		1						1				2
<i>Tragopogon dubius</i>	1	1										2
												2
Bryophyte/Lichen	1	0	0	0	1	0	0	0	0	1	0	3

Vegetation plot cover class data for <i>Physaria didymocarpa</i> var. <i>lyrata</i> occurrences - 2000	
	Plot Identification Code
	PHDI-3
SHRUBS	
Artemisia tridentata	20
Chrysothamnus nauseosus	1
Eriogonum microthecum	1
Prunus virginiana	1
Ribes cereum	1
Symphoricarpos oreophilus	3
GRAMINOIDS	
Agropyron spicatum	20
Bromus tectorum	3
FORBS	
Artemisia biennis	3
Artemisia frigida	1
Chaenactis douglasii	1
Collomia sp.	1
Cryptantha sp.	1
Epilobium brachycarpum	1
Oenothera caespitosa	1
Physaria didymocarpa lyrata	1
Tragopogon dubius	1
Verbascum thaspus	1
Bryophyte/Lichen	0

Vegetation plot cover class data for <i>Antennaria arcuata</i> occurrences - 2000	
	Plot Identification Code
	ANAR-1
SHRUBS	
Salix geyeriana	1
GRAMINOIDS	
Agropyron sp.	1
Carex praegracilis	50
Carex simulata	1
Distichlis stricta	1
Juncus balticus	1
Phleum pratense	1
Poa sp.	50
FORBS	
Antennaria arcuata	10
Aster adscendens	1
Castilleja sp.	1
Cirsium scariosum	1
Dodecatheon sp.	1
Iris missouriensis	1
Lactuca serriola	3
Madia glomerata	1
Potentilla gracilis	30
Wyethia sp.	1
Unknown spp.	3
Bryophyte/Lichen	1