

**FIELD INVESTIGATION FOR IDAHO BLM SPECIAL STATUS PLANT SPECIES WITHIN THE  
SNAKE RIVER BIRDS OF PREY NATIONAL CONSERVATION AREA**

By

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## **ABSTRACT**

The Snake River Birds of Prey National Conservation Area (NCA) encompasses over 480,000 acres of public land along 80 miles of the Snake River in southwestern Idaho. Although the NCA is best known for its great density of nesting raptors, other biodiversity values are also present, including a diverse suite and relative abundance of rare plant species. Sixteen Bureau of Land Management (BLM) Special Status plant species are known to occur within the NCA, including seven regional endemics. In 2000, the BLM's Lower Snake River District contracted with the Idaho Conservation Data Center to conduct a systematic field investigation and provide the BLM with an inventory and conservation assessment of Special Status plant resources within the NCA. Approximately 50 different areas and 5,500 acres were surveyed as part of this project. A total of 47 new occurrences were discovered in the NCA. One previously documented occurrence was found to be extirpated. New occurrences were found for 11 of the 16 target species. We also updated records for 39 (34%) of the original 114 known or assumed extant NCA occurrences. A total of 166 BLM Special Status plant occurrences are now known for the NCA, an increase of 40% compared to the start of the field investigation. Of this total, 161 are known or assumed to be extant and 5 are considered extirpated. Taxonomic, identification, distribution, habitat, general biology, and conservation assessment information is discussed for each Special Status plant species. Idaho Conservation Data Center Occurrence Records and maps showing the precise location of all Special Status plant occurrences in the NCA are appended to this report.

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## INTRODUCTION

The Snake River Birds of Prey National Conservation Area (NCA) encompasses over 480,000 acres of public land along 80 miles of the Snake River in southwestern Idaho. Although the NCA is best known for its great density of nesting raptors, other biodiversity values are also present, including a diverse suite and relative abundance of rare plant species. Sixteen Bureau of Land Management (BLM) Special Status plant species are known to occur within the NCA, including seven regional endemics. One of them, *Lepidium papilliferum* (slickspot peppergrass) has been proposed to be listed under the Endangered Species Act (U.S. Fish and Wildlife Service 2002). Several others, such as *Astragalus mulfordiae* (Mulford's milkvetch), *Stanleya confertiflora* (Malheur prince's plume), and *Texosporium sancti-jacobi* (woven-spore lichen), are also priority rare plant conservation concerns for the BLM in Idaho.

BLM resource managers face a diverse set of stewardship responsibilities regarding the NCA. These responsibilities center on preservation of the area's world renowned raptor populations while providing for other compatible land uses. The NCA is a multiple-use area open to widespread livestock grazing and various forms of motorized and non-motorized recreation activities. In addition, military training maneuvers take place within the Orchard Training Area portion of the NCA. Management challenges include assessing the impacts of wildfire on biodiversity, post-fire restoration planning, livestock allotment planning, and managing off-road vehicle and other recreational use.

A limited amount of information regarding Special Status plants in the NCA was available prior to our investigation. A few BLM Special Status plant species were thoroughly inventoried on the NCA (e.g., *Lepidium davisii*, Davis' peppergrass), but most have received little if any systematic survey work in the study area. Similarly, a few segments (e.g., Orchard Training Area) received relatively thorough survey work in the past; but most of the NCA had never been systematically inventoried, and documentation of new populations occurred only opportunistically. Another information gap was the unknown status of many rare plant occurrences discovered 5–25 years ago, but lacking more recent conservation information. Since their discovery, large sections of the NCA landscape were altered by wildfires and subsequent restoration efforts. Acknowledging these information gaps, the BLM identified a need for a field inventory project to help them meet stewardship objectives regarding the NCA's Special Status plant resources.

In light of this need, the BLM's Lower Snake River District contracted with the Idaho Conservation Data Center (CDC) in 2000, to conduct a systematic field investigation for BLM Special Status plant species on the NCA. The purpose of this project was to provide the BLM with an inventory and conservation assessment of rare plant resources within the NCA. Field work was conducted primarily in 2000, and completed during 2001. An earlier, preliminary report summarized our first year inventory results (Mancuso and Murphy 2001). This final, comprehensive report synthesizes results from both field seasons, and provides the BLM with an updated and comprehensive overview of the abundance, distribution, habitats, and threats to Special Status plant species occurring in the NCA.

## STUDY AREA

The NCA encompasses approximately 1,250 square miles in southwestern Idaho, including portions of Ada, Canyon, Elmore, and Owyhee counties. It consists of 81 miles of the Snake River Canyon, and extends onto the adjacent uplands for roughly 5 miles on the south side of the river and 15 miles on the north side (Bureau of Land Management 1980). Climate in the

NCA region is characterized by hot, dry summers and relatively moderate winters. Annual precipitation averages a little less than 8 inches at Bruneau, Grand View, and Swan Falls Dam, among the lowest readings in the state. Precipitation is slightly greater north of the Snake River, averaging about 10 inches/year at Mountain Home and nearly 12 inches near Boise (Western Regional Climate Center 2002). Most precipitation falls during the winter and later spring periods. High winds are common in the area.

Topography within the NCA varies. The Snake River Canyon and its tributaries display steep slopes and cliffs. Scattered, prominent volcanic features such as cinder cones and basaltic buttes dot the otherwise flat to gently rolling landscape north of the river. Dissected rolling hills and badland-like features characterize much of the terrain south of the river. Fine-textured, wind deposited soils overlie the majority of the lava plain north of the Snake River. Sedimentary substrates and associated alluvial and colluvial soils dominate on the south side of the river.

Vegetation within the NCA is a mix of big sagebrush (*Artemisia tridentata*), winterfat (*Eurotia lanata*), and desert shrub (e.g., *Atriplex* spp., *Sarcobatus vermiculatus*, *Chrysothamnus* spp., *Tetradymia* spp.) plant communities in unburned habitats, and early seral *Chrysothamnus* spp. shrubland, annual grassland, or crested wheatgrass (*Agropyron cristatum*) seedlings in burned areas that combine to form mosaic patterns across the landscape. Of special note are the large stands of sagebrush-steppe north of the Snake River. They represent the largest remaining blocks of unburned, relatively intact sagebrush left along the western Snake River Plain. Wildfires have taken a tremendous toll on the regions sagebrush-steppe ecosystem in recent years, including within the NCA.

## METHODS

During the preparatory phase of this project we conferred with BLM and other botanists to identify and prioritize areas for our field investigation. Field investigation priorities were (1) areas of management concern or special interest; (2) areas of sandy habitat and potential habitat for *Astragalus mulfordiae*; (3) blocks of unburned sagebrush vegetation containing potential *Lepidium papilliferum* and *Texosporium sancti-jacobi* habitat; and (4) segments of the NCA that had received minimal or no survey work in the past, especially south of the Snake River and near the canyon corridor. We were also interested in trying to relocate and better document both old occurrence records and more recent occurrences within the NCA that had vague or incomplete location and other conservation information.

Low priority was assigned to several areas or species in recognition of the coverage limitations imposed by an area as large as the NCA. Most of the Orchard Training Area was omitted from our field investigation because large portions of this management area had already been well surveyed by Idaho Army National Guard biologists. Initial Point, Kuna Butte, Murphy, and several other areas of the NCA previously surveyed by BLM botanists (Beisel and Elmore 1994; Carroll et al. 1995) were also largely omitted from consideration. Low priority was given to areas of annual grassland vegetation where no previous reports of rare plants were documented. The same rationale was followed for areas seeded to crested wheatgrass during post-fire restoration efforts. The degraded and altered habitat conditions of these areas did not justify spending much time working in them. Most of the playas in the study area were surveyed for *Lepidium davisii* in the past (Moseley 1995). Low priority was given to searching for additional playas or revisiting known *L. davisii* sites.

This project was designed as a two year field investigation. The majority of field surveys were conducted during May and June 2000. A limited amount was done along the Snake River in

September. Field work was completed during the spring of 2001. Surveys consisted of walking through priority areas with known or potential rare plant habitat. This selective traverse method was not random. It allowed us to spend the greatest amount of time in the most suitable-looking habitats for the highest priority target species.

A rare plant observation form was completed for all new rare plant occurrences discovered during the field investigation. This form documents location, abundance, size, habitat, threat, and other conservation information. In addition, at all rare plant sites a special effort was made to record information related to livestock use, the location of livestock water and salt sites, and off-road/trail motorcycle and ATV use. New occurrence locations were marked on USGS 7.5' topographic maps and coordinates obtained using a navigation grade (Garmin 12XL) GPS unit. We also updated occurrence information, remapped, and obtained GPS data whenever a previously known occurrence was relocated. All of the areas we surveyed were delineated as lines or polygons on topographic maps whether or not rare plants were found.

Some of the field work for this project was conducted in conjunction with surveys targeting *Lepidium papilliferum* in eastern segments of the NCA (Mancuso 2000). Occurrence information for all previously known *Lepidium papilliferum* occurrences in the NCA was updated during annual monitoring work for this species (Mancuso 2001; 2002).

Preparatory research indicated 16 BLM Special Status plant species occurred in the NCA. They are listed in Table 1 along with their conservation ranks. These species formed the target plant list for our field investigation. CDC occurrence records indicated another three BLM Special Status plant species may occur in the NCA. *Cyperus rivularis* (shining flatsedge) was collected somewhere downriver from Swan Falls Dam in the early 1970s. Due to the collection's vague location information, it remains unclear whether it was made on private or BLM land. Vague location information on historical *Epipactis gigantea* (giant helleborine) and *Penstemon janishae* (Janish's penstemon) collections from near Bruneau and Grand View respectively, indicate they were most likely made on private land.

Table 1. BLM Special Status plant species known to occur within the Snake River Birds of Prey National Conservation Area and their conservation ranks.

Scientific name	Common name	Global Rank	State Rank	USFWS status
<i>Astragalus mulfordiae</i>	Mulford's milkvetch	G2	S2	SC
<i>Astragalus purshii</i> var. <i>ophiogenes</i>	Snake River milkvetch	G5T3	S3	
<i>Chaenactis stevioides</i>	Desert pincushion	G4	S2	
<i>Cymopterus acaulis</i> var. <i>greeleyorum</i>	Greeley's wavewing	G5T2	S2	
<i>Eatonella nivea</i>	White eatonella	G4	S3	
<i>Eriogonum shockleyi</i> var. <i>packardiae</i>	Packard's cowpie buckwheat	G5T2	S2	
<i>Eriogonum shockleyi</i> var. <i>shockleyi</i>	Matted cowpie buckwheat	G5T4	S2	
<i>Glyptopleura marginata</i>	White-margined wax plant	G4	S3	
<i>Ipomopsis polycladon</i>	Spreading ipomopsis	G4	S2	
<i>Lepidium davisii</i>	Davis' peppergrass	G3	S3	SC
<i>Lepidium papilliferum</i>	Slick spot peppergrass	G2	S2	PE
<i>Nemacladus rigidus</i>	Rigid threadbush	G4	S2	
<i>Psathyrotes annua</i>	Turtleback	G5	S2	
<i>Stanleya confertiflora</i>	Malheur prince's plume	G1	S1	
<i>Teucrium canadense</i> v. <i>occidentale</i>	American wood sage	G5T5	S2	
<i>Texosporium sancti-jacobi</i>	Woven-spore lichen	G2	S2	SC

The Global (G) and State (S) conservation ranks listed in Table 1 are assigned by NatureServe (formerly the Association for Biodiversity Information) and its network of Heritage Programs and Conservation Data Centers. The Global Rank applies to the species' conservation status rangewide, while the State Rank applies to its conservation status within Idaho. Definitions for the ranks are as follows: 1 = critically imperiled because of extreme rarity or because of some factor of its biology making it especially vulnerable to extinction; 2 = imperiled because of rarity or because of other factors demonstrably making it vulnerable to extinction; 3 = rare or uncommon, but not imperiled; 4 = not rare and apparently secure, but with cause for long-term concern; 5 = demonstrably widespread, abundant, and secure.

Table 1 also lists conservation designations assigned by the U.S. Fish and Wildlife Service (USFWS). In 2002, slickspot peppergrass was proposed for federal listing as Endangered (PE) under the Endangered Species Act (U.S. Fish and Wildlife Service 2002). In addition, the USFWS's Snake River Basin Field Office in Boise has developed a Species of Concern (SC) designation for species it wants to track, but may not warrant federal listing at this time. Conservation criteria for this designation include, but are not limited to, species where negative population trends have been documented, or the habitat is declining, or threats to the habitat are known.

## RESULTS

Approximately 50 different areas and 5,500 acres were surveyed in the NCA as part of this project. Survey areas have been compiled in Appendix 1. Areas omitted from our field investigation are also included in Appendix 1.

An occurrence represents a specific geographic location and is the standard database contrivance used throughout the Natural Heritage/Conservation Data Center network for tracking rare species/elements. The three-digit code labeling each occurrence corresponds to the reference number used by the CDC for tracking purposes.

The CDC database had 118 Special Status plant occurrence records for the NCA prior to initiating this project. Of this total, 114 occurrences were known or assumed to be extant, and 4 extirpated. Field surveys in 2000 and 2001 discovered a total of 47 new occurrences within the NCA. One previously documented occurrence was found to be extirpated. In addition, five other occurrences were found on BLM or State Park land in very close proximity to the NCA. New occurrences were found for 11 of the 16 target species. We also updated records for 39 (34%) of the original 114 previously known occurrences. Of the 75 original extant occurrences not updated, 38 (50%) were for *Lepidium davisii*, a low priority species during our investigation. Fifty (67%) of the extant NCA occurrences we did not update have been observed since 1995, while 25 (33%) have not been observed since sometime prior to 1995. It is unclear if any of these occurrences have been extirpated over the years. We were responsible for most of the discoveries or updates, but a few were due to work conducted concurrently by BLM or other botanists working in the NCA. Table 2 lists the new and updated occurrences resulting from our field inventory. Table 3 lists the previously known occurrences not revisited during the project.

At the end of 2001, a total of 168 BLM Special Status plant occurrences were documented for the NCA, an increase of 40% compared to the start of the field investigation. Of this total, 162 are known or assumed to be extant. The six NCA occurrences believed to be extirpated are listed in Table 4. The *Lepidium papilliferum* occurrence for Rattlesnake Creek (046) is the only occurrence in the NCA whose last observation pre-dates 1970. As such, it is considered a Historical occurrence in the CDC database. A number of other occurrences not observed for

many years (but since 1970) are considered extant, although their actual disposition is unclear. Table 5 provides a statewide conservation perspective for the 16 BLM Special Status plant species occurring in the NCA. It compares the number of occurrences in the NCA to the number of occurrences statewide. Element Occurrence Records for all BLM Special Status plant occurrences within the NCA are provided in Appendix 2. All occurrences were digitized as part of this project. Maps displaying the distribution and precise location of each Special Status plant species within the NCA are in Appendix 3.

Table 2. List of Special Status plant occurrences discovered or updated within the Snake River Birds of Prey National Conservation Area, 2000/2001.

Species	EOR	Name of Occurrence	EOR New	EOR Update or Revision	USGS Quadrangle
<i>Astragalus mulfordiae</i>	013	Con Shea Basin		X	Initial Point
<i>Astragalus mulfordiae</i>	014	Noble Island		X	Walters Butte
<i>Astragalus mulfordiae</i>	022	Con Shea Basin/SE Guffey	X		Walters Butte
<i>A. purshii ophiogenes</i>	002	West of Bruneau Dunes		X	Bruneau Dunes
<i>A. purshii ophiogenes</i>	007	WSW of Priest Ranch		X	Initial Point
<i>A. purshii ophiogenes</i>	008	Con Shea Basin		X	Initial Point
<i>A. purshii ophiogenes</i>	011	Down. Swan Fall Dam		X	Initial Point
<i>A. purshii ophiogenes</i>	016	Fossil Butte		X	Oreana
<i>A. purshii ophiogenes</i>	040	Crane Falls Lake	X		Bruneau
<i>A. purshii ophiogenes</i>	042	SE of Cinder Cone Butte	X		Cinder Cone Butte
<i>A. purshii ophiogenes</i>	043	Swan Falls	X		Wild Horse Butte
<i>A. purshii ophiogenes</i>	044	Swan Falls	X		Wild Horse Butte
<i>A. purshii ophiogenes</i>	045	South of Swan Falls	X		Wild Horse Butte
<i>A. purshii ophiogenes</i>	046	Thomas Flats	X		Wild Horse Butte
<i>A. purshii ophiogenes</i>	047	South of Montini Ranch	X		Sinker Butte
<i>A. purshii ophiogenes</i>	048	Sinker Creek Butte	X		Sinker Butte
<i>A. purshii ophiogenes</i>	049	Murphy Flat	X		Murphy
<i>A. purshii ophiogenes</i>	050	Rye Patch	X		Castle Butte+
<i>A. purshii ophiogenes</i>	051	SW of Castle Butte	X		Castle Butte
<i>Chaenactis stevioides</i>	001	West of Dorsey Butte		X	Dorsey Butte
<i>Chaenactis stevioides</i>	010	Lower Castle Creek	X		Castle Butte
<i>Chaenactis stevioides</i>	011	Lower Castle Creek	X		Castle Butte
<i>Chaenactis stevioides</i>	012	Southeast of Rye Patch	X		Castle Butte
<i>Chaenactis stevioides</i>	013	Southeast of Rye Patch	X		Castle Butte
<i>Chaenactis stevioides</i>	014	Cloudburst Gulch	X		Castle Butte
<i>Chaenactis stevioides</i>	015	Lower Fossil Creek	X		Castle Butte
<i>Chaenactis stevioides</i>	016	Dorsey Butte	X		Dorsey Butte
<i>Chaenactis stevioides</i>	017	Wild Horse Butte	X		Wild Horse Butte
<i>Chaenactis stevioides</i>	018	Thomas Flat Springs	X		Wild Horse Butte
<i>Chaenactis stevioides</i>	019	Lower Sinker Creek	X		Sinker Butte
<i>Chaenactis stevioides</i>	020	South of Montini Ranch	X		Sinker Butte
<i>Cym. acaulis greeleyorum</i>	006	West of Chalk Gulch		X	Indian Cove
<i>Cym. acaulis greeleyorum</i>	008	Loveridge Gulch North		X	Hot Spring
<i>Eatonella nivea</i>	003	Waterhouse Gulch		X	Bruneau Dunes
<i>Eatonella nivea</i>	016	Lower Squaw Creek		X	Crater Rings SW

Species	EOR	Name of Occurrence	EOR New	EOR Update or Revision	USGS Quadrangle
<i>Eatonella nivea</i>	026	East of Wild Horse Butte	X		Wild Horse Butte
<i>Eriogonum shockleyi</i> pack.	001	Swan Falls		X	Wild Horse Butte
<i>Eriogonum shockleyi</i> pack.	010	Bruneau Valley Rim		X	Bruneau
* <i>E. shockleyi shockleyi</i>	005	Bruneau Dunes		X	Bruneau Dunes
* <i>E. shockleyi shockleyi</i>	013	Bruneau Dunes SE		X	Hot Spring
<i>Glyptopleura marginata</i>	014	Con Shea Basin		X	Initial Point
* <i>Glyptopleura marginata</i>	032	West Rabbit Creek		X	Walters Butte
<i>Glyptopleura marginata</i>	037	Loveridge Gulch		X	Hot Spring
<i>Glyptopleura marginata</i>	044	South of Castle Butte	X		Castle Butte
<i>Glyptopleura marginata</i>	045	South of Castle Butte	X		Castle Butte
<i>Glyptopleura marginata</i>	046	Southeast of Rye Patch	X		Castle Butte
<i>Glyptopleura marginata</i>	047	E. of Sinker Creek Butte	X		Wild Horse Butte
<i>Glyptopleura marginata</i>	048	West of Wild Horse Butte	X		Wild Horse Butte
<i>Glyptopleura marginata</i>	049	Wild Horse Butte	X		Wild Horse Butte
<i>Glyptopleura marginata</i>	050	Wild Horse Butte	X		Wild Horse Butte
<i>Glyptopleura marginata</i>	051	East of Wild Horse Butte	X		Wild Horse Butte
<i>Glyptopleura marginata</i>	052	South of Montini Ranch	X		Sinker Butte
<i>Glyptopleura marginata</i>	053	Lower Sinker Creek	X		Sinker Butte
<i>Ipomopsis polycladon</i>	020	South of Castle Butte	X		Castle Butte
* <i>Ipomopsis polycladon</i>	022	Rim Above Swan Falls	X		Wild Horse Butte
<i>Lepidium davisii</i>	033	Mtn. Home AFB SW		X	Crater Rings SW
<i>Lepidium davisii</i>	046	Line Triangulation Point		X	Crater Rings SW
* <i>Lepidium papilliferum</i>	002	Crater Rings	X		Crater Rings
<i>Lepidium papilliferum</i>	008	Bennett Road		X	Hammett+
<i>Lepidium papilliferum</i>	010	Chalk Flat		X	Indian Cove
<i>Lepidium papilliferum</i>	018	Kuna Butte Southwest		X	Kuna
<i>Lepidium papilliferum</i>	019	Initial Point		X	Initial Point+
<i>Lepidium papilliferum</i>	024	Kuna Butte		X	Kuna
<i>Lepidium papilliferum</i>	025	Melba Butte		X	Kuna
<i>Lepidium papilliferum</i>	027	Orchard Training Area		X	Orchard+
<i>Lepidium papilliferum</i>	028	Christmas Mountain North		X	Christmas Mtn.
<i>Lepidium papilliferum</i>	029	Mountain Home Southeast		X	Mountain Home S
<i>Lepidium papilliferum</i>	035	Orchard Southwest		X	Orchard
<i>Lepidium papilliferum</i>	041	Orchard SSW		X	Orchard
<i>Lepidium papilliferum</i>	051	Hot Creek Road	X		Teapot Dome
<i>Lepidium papilliferum</i>	053	Christmas Mountain		X	Christmas Mtn.
* <i>Lepidium papilliferum</i>	059	Fake Raptor Rock	X		Orchard
<i>Lepidium papilliferum</i>	061	SE of Reverse		X	Reverse
<i>Lepidium papilliferum</i>	062	SW of Eureka Cave	X		Reverse
<i>Lepidium papilliferum</i>	063	Bennett Creek		X	Hot Springs Ck. Res.
<i>Nemacladus rigidus</i>	016	West of Wild Horse Butte	X		Wild Horse Butte
<i>Nemacladus rigidus</i>	017	Wild Horse Butte	X		Wild Horse Butte
<i>Psathyrotes annua</i>	001	Wild Horse Butte		X	Wild Horse Butte
<i>Psathyrotes annua</i>	008	Southeast of Rye Patch	X		Castle Butte
<i>Psathyrotes annua</i>	009	Lower Sinker Creek	X		Sinker Butte
<i>Psathyrotes annua</i>	010	South of Montini Ranch	X		Sinker Butte

Species	EOR	Name of Occurrence	EOR New	EOR Update or Revision	USGS Quadrangle
<i>Stanleya confertiflora</i>	007	Rye Patch	X		Oreana
<i>Teucrium canadense</i>	002	Halverson Lake		X	Initial Point
<i>Teucrium canadense</i>	008	TNC Tract – Birds of Prey		X	Sinker Butte
* <i>Texosporium sancti-jacobi</i>	010	Owyhee Southwest		X	Owyhee+
<i>Texosporium sancti-jacobi</i>	018	East of Wild Horse Butte	X		Wild Horse Butte
<i>Texosporium sancti-jacobi</i>	019	North of Christmas Mtn.	X		Christmas Mtn.+

\* = Occurrence discovery or update not by CDC personnel.

+ = Occurrence located on more than one topographic quadrangle.

Table 3. List of previously known and assumed extant Special Status plant occurrences within the Snake River Birds of Prey National Conservation Area not revisited during 2000/2001.

Species	EOR	Name of Occurrence	Year Last Observed	USGS Quadrangle
<i>Astragalus purshii ophiogenes</i>	006	NW of Fossil Butte	1980	Oreana
<i>Astragalus purshii ophiogenes</i>	009	West Guffey Butte	unknown	Walters Butte
<i>Astragalus purshii ophiogenes</i>	010	Weises Bar	1980	Initial Point
<i>Astragalus purshii ophiogenes</i>	012	Halverson Lakes	1975	Initial Point
<i>Astragalus purshii ophiogenes</i>	018	Unnamed Butte	1980	Indian Cove
<i>Astragalus purshii ophiogenes</i>	019	Eagle Cove West	1980	Bruneau Dunes
<i>Astragalus purshii ophiogenes</i>	034	Priest Ranch NW	1994	Initial Point
<i>Astragalus purshii ophiogenes</i>	035	Wilkins Gulch SE	1996	Bruneau
<i>Astragalus purshii ophiogenes</i>	037	C.J. Strike Dam	1997	C.J. Strike Dam
<i>Astragalus purshii ophiogenes</i>	038	Rye Patch	1997	Oreana
<i>Chaenactis stevioides</i>	003	Murphy NW	1994	Murphy
<i>Chaenactis stevioides</i>	005	Chattin Flat	1995	Dorsey Butte
<i>Chaenactis stevioides</i>	008	Orchard Training Area	1995	Dorsey Butte+
<i>Cymopterus acaulis greeleyorum</i>	001	Bruneau Sand Dunes W	1983	Bruneau Dunes
<i>Eatonella nivea</i>	002	Lower Sinker Creek	1974	Sinker Butte
<i>Eatonella nivea</i>	021	Fossil Butte NW	1996	Sinker Butte
<i>Eriogonum shockleyi packardiae</i>	002	E of Halverson Lakes	1995	Initial Point
<i>Eriogonum shockleyi packardiae</i>	003	N of Priest Ranch	1995	Initial Point
<i>Eriogonum shockleyi packardiae</i>	012	Halverson Lakes	1995	Initial Point
<i>Glyptopleura marginata</i>	022	Fossil Butte NW	1996	Sinker Butte
<i>Glyptopleura marginata</i>	028	SW of Noble Island	1993	Walters Butte
<i>Glyptopleura marginata</i>	031	Big Foot Bar	1993	Jackass Butte
<i>Glyptopleura marginata</i>	034	Murphy	1998	Murphy
<i>Glyptopleura marginata</i>	036	Chattin Flat	1997	Dorsey Butte
<i>Glyptopleura marginata</i>	038	N of Jackass Butte	1995	Jackass Butte
<i>Ipomopsis polycladon</i>	010	Chattin Hill	1993	Dorsey Butte
<i>Ipomopsis polycladon</i>	011	Big Foot Bar	1993	Jackass Butte
<i>Ipomopsis polycladon</i>	015	C.J. Strike Dam East	1995	C.J. Strike Dam
<i>Ipomopsis polycladon</i>	018	Wilkins Gulch SW	1996	Bruneau
<i>Lepidium davisii</i>	022	Dorsey Butte North	1995	Dorsey Butte
<i>Lepidium davisii</i>	024	Line NNW	1995	Crater Ring SW
<i>Lepidium davisii</i>	025	Canyon Creek Playa	1995	Crater Rings SW

Species	EOR	Name of Occurrence	Year Last Observed	USGS Quadrangle
<i>Lepidium davisii</i>	028	Rattlesnake Creek	1993	Bruneau
<i>Lepidium davisii</i>	034	Extra SE	1995	Crater Rings SE
<i>Lepidium davisii</i>	035	South of Tadpole Lake	1995	Big Foot Butte
<i>Lepidium davisii</i>	036	Extra NNE	1995	Crater Rings SE
<i>Lepidium davisii</i>	037	Extra North	1995	Crater Rings SE
<i>Lepidium davisii</i>	039	Mtn. Home AFB North	1987	Crater Rings SW+
<i>Lepidium davisii</i>	042	Lower Squaw Creek W	1995	Crater Rings SW
<i>Lepidium davisii</i>	043	SE Corner of OTA	1995	Crater Rings SW
<i>Lepidium davisii</i>	044	Ada/Elmore South	1995	Crater Rings SW
<i>Lepidium davisii</i>	045	Canyon Creek East	1995	Crater Rings SW
<i>Lepidium davisii</i>	047	Simco Junction	1994	Crater Rings SW
<i>Lepidium davisii</i>	048	IANG Firing Area South	1988	Crater Rings SW
<i>Lepidium davisii</i>	049	Dorsey Butte ENE	1995	Dorsey Butte
<i>Lepidium davisii</i>	050	Dorsey Butte NE #2	1995	Dorsey Butte
<i>Lepidium davisii</i>	051	Dorsey Butte NE #1	1995	Dorsey Butte
<i>Lepidium davisii</i>	052	Dorsey Butte East	1995	Crater Rings SW
<i>Lepidium davisii</i>	053	Dorsey Butte ESE	1995	Dorsey Butte
<i>Lepidium davisii</i>	054	Dorsey Butte Southeast	1995	Dorsey Butte
<i>Lepidium davisii</i>	055	Dorsey Butte North	1995	Dorsey Butte
<i>Lepidium davisii</i>	056	Ada/Elmore Line	1995	Dorsey Butte
<i>Lepidium davisii</i>	057	Fraser Reservoir	1995	Cinder Cone Butte
<i>Lepidium davisii</i>	058	IANG Firing Area SE	1995	Cinder Cone Butte
<i>Lepidium davisii</i>	059	Mtn. Home AFB Gun NE	1987	Crater Rings
<i>Lepidium davisii</i>	060	Orchard Training Area	1995	Crater Rings SW
<i>Lepidium davisii</i>	061	Corder Creek	1995	Little Joe Butte
<i>Lepidium davisii</i>	062	Big Foot Butte South	1994	Big Foot Butte
<i>Lepidium davisii</i>	064	Mtn. Home AFB West	1995	Crater Rings SW
<i>Lepidium davisii</i>	084	Mtn. Home AFB SAR	1995	Crater Rings SE
<i>Lepidium davisii</i>	085	Mtn. Home AFB SAR E	1990	Crater Rings SE
<i>Lepidium davisii</i>	089	North of Dorsey Butte	1995	Dorsey Butte
<i>Lepidium davisii</i>	106	Line Triangulation Pt. S	1995	Crater Rings SW
<i>Lepidium davisii</i>	125	E of Dorsey Butte	1995	Dorsey Butte
<i>Lepidium davisii</i>	126	Dorsey Butte ENE	1995	Dorsey Butte
<i>Lepidium papilliferum</i>	046	Rattlesnake Creek	1964	Bruneau
<i>Nemacladus rigidus</i>	008	Fossil Butte NW	1996	Sinker Butte
<i>Psathyrotes annua</i>	002	NW of Wild Horse Butte	1992	Wild Horse Butte
<i>Psathyrotes annua</i>	007	Sinker Creek Butte	1998	Sinker Butte
<i>Stanleya confertiflora</i>	003	Rye Patch North	1997	Sinker Butte+
<i>Teucrium canadense</i>	003	Guffey Butte	1971	Walters Butte
<i>Texosporium sancti-jacobi</i>	002	Cinder Cone Butte	1998	Cinder Cone Butte
<i>Texosporium sancti-jacobi</i>	006	Orchard Southwest	1994	Orchard
<i>Texosporium sancti-jacobi</i>	007	Higby Cave E – Red Tie	1996	Orchard

+ = Occurrence located on more than one topographic quadrangle.

Table 4. List of extirpated Special Status plant occurrences from the Snake River Birds of Prey National Conservation Area.

Species	EOR	Name of Occurrence	Topographic Quadrangle
<i>Eatonella nivea</i>	003	Waterhouse Gulch	Bruneau Dunes
<i>Lepidium davisii</i>	029	Tadpole Lake	Big Foot Butte
<i>Lepidium papilliferum</i>	044	Ada County-Elmore County Line	Crater Rings SW
<i>Texosporium sancti-jacobi</i>	005	Kuna Butte East	Kuna
<i>Texosporium sancti-jacobi</i>	013	N of Initial Point	Initial Point

Table 5. Element Occurrence tally information for BLM Special Status plants for Idaho and for the Snake River Birds of Prey National Conservation Area.

Name	Total # of Occurrences in Idaho	Total # of Occurrences in NCA (% of state total)
<i>Astragalus mulfordiae</i>	32 (14, plus 18 comprising the Boise Foothills metapopulation; plus 4 Extirpated occurrences)	3 (9)
<i>Astragalus purshii ophiogenes</i>	51	27 (53)
<i>Chaenactis stevioides</i>	21	17 (81)
<i>Cymopterus acaulis greeleyorum</i>	11	5 (45)
<i>Eatonella nivea</i>	24 (plus 1 Historical and 1 Extirpated occurrences)	5 (21)
<i>Eriogonum shockleyi packardiae</i>	18	5 (28)
<i>Eriogonum shockleyi shockleyi</i>	11	2 (18)
<i>Glyptopleura marginata</i>	48 (plus 6 Historical occurrences)	19 (40)
<i>Ipomopsis polycladon</i>	22	7 (32)
<i>Lepidium davisii</i>	170 (plus 2 Extirpated occurrences)	39 (23)
<i>Lepidium papilliferum</i>	70 (48, plus 22 comprising the Juniper Butte metapopulation; plus 5 Historical and 13 Extirpated)	21 (30)
<i>Nemacladus rigidus</i>	16 (plus 2 Historical occurrences)	3 (19)
<i>Psathyrotes annua</i>	12	6 (50)
<i>Stanleya confertiflora</i>	7	2 (29)
<i>Teucrium canadense occidentale</i>	6 (plus 2 Historical occurrences)	3 (50)
<i>Texosporium sancti-jacobi</i>	18 (plus 3 Extirpated occurrences)	8 (42)

## RARE PLANT SPECIES INFORMATION

This next section summarizes taxonomic, identification, distribution, habitat, general biology, and conservation assessment information for each of the 16 BLM Special Status plant species occurring within the NCA. Detailed location and other species occurrence account information is found in the Element Occurrence Records in Appendix 2.

We assigned EO Ranks to all occurrences in the NCA containing sufficient abundance, size, and habitat condition information to assess their conservation status. EO Ranks provide an assessment of the likelihood of an occurrence persisting for a defined period of time (20-100 years) if current conditions prevail. EO Ranks represent the relative value of an occurrence with respect to other occurrences for the species. EO Ranks are defined as follows: A = excellent

estimated viability; B = good estimated viability; C = fair estimated viability; D = poor estimated viability; H = historical; F = failed to find; X = extirpated (NatureServe 2002). EO Rank information is included in the "occurrence information for NCA" section for each species.

### ***ASTRAGALUS MULFORDIAE***

Scientific name: *Astragalus mulfordiae* M.E. Jones

Common name: Mulford's milkvetch

Pertinent synonyms: *Onix mulfordiae* (Jones) Rydb.

General nontechnical description: Mulford's milkvetch is a low, slender, taprooted perennial with few to numerous diffuse, ascending stems up to about 2.5 dm long. Leaves are pinnately divided into 11-25 small, linear leaflets that tend to be well-spaced along the stiff leaf rachis. The inflorescence is a loosely-flowered raceme of small white- or cream-colored "pea-like" flowers that are also generally lined or tinged with blue. The small, pendulous, pale green, somewhat lustrous, three-angled, thin-walled fruit pods range in size from 10-16 mm long.

Technical description: Slender, diffuse, perennial herbs 1-3 dm tall, the stems arising from a superficial root-crown or suffruticulose caudex, the green or yellow-green foliage thinly strigulose with basifixed hairs, the leaflets glabrous above; stipules 1.5-6 mm long, dimorphic, the lowest connate into a papery-scarious sheath, the upper ones free or nearly so, with triangular-lanceolate, green blades; leaves (2.5) 4.5-10.5 cm long, the slender rachis often becoming stiff and persistent; leaflets of all but a few early leaves 15-25 distant, linear-oblong, oblanceolate often scattered, linear-oblong, oblanceolate, or subfiliform, obtuse or acutish, the longer ones 4-11 mm long, the terminal ones sometimes, but not consistently decurrent into the rachis; peduncles 1-7 cm long; racemes loosely or remotely 5-20 flowered, the flowers early declined, the axis becoming 2-10 cm long; calyx 2.5-5 mm long, either white- or black-strigulose, the campanulate tube (1.5) 1.8-3 mm long, the subulate teeth 0.8-2 mm long; petals commonly white, drying yellowish, the banner striate, or less commonly lilac-tinged, the abruptly recurved banner 6-8 mm long, the wings nearly as long, the keel 4.5-5.5 mm long, strongly incurved to the deltate apex; ovary strigulose; ovules 10-16; pod pendulous, stipitate, the stipe 3-5 mm long, the lunately ellipsoid body (9) 10-16 mm x 3-4.5 mm, cuneately contracted at both ends, triquetrously compressed, carinate ventrally by the straight or shallowly convex suture, the lateral angles narrow but obtuse, the lateral faces nearly plane, the dorsal face depressed, the thin green valves becoming papery, lustrous, stramineous, inflexed as a complete septum 1.3-2 mm wide; dehiscence primarily through the ventral suture (Barneby 1989).

Local field characters: Many other milkvetch species occur in southwestern Idaho. Mulford's milkvetch is recognized by its small, whitish to yellowish flowers; small, diffusely arranged leaflets on a stiff rachis; connate lower stipules that form a scarious sheath; small, pendulous, trigonous, papery fruit pods, and dry, sandy habitat.

Photos and line drawings: Original or reproductions of line drawings can be found in Hitchcock (1961), Meinke (1982), Barneby (1989), Moseley (1989), and (Atwood et al. 2000).

Global distribution: Mulford's milkvetch is endemic to the western Snake River Plain in southwestern Idaho and adjacent eastern Oregon, an area approximately 100 by 100 miles in extent. In Idaho, it is known from Ada, Owyhee, Payette, and Washington counties. In Oregon, Mulford's milkvetch occurs in three separate population centers in northeastern Malheur County.

The northernmost occurrences are found north of the Malheur River at the South Alkali metapopulation. The Adrian metapopulation encompasses the southernmost group of occurrences, and is located east of the Owyhee River, south and southwest of the town of Adrian. The North Harper metapopulation is located south of Vale, between the Owyhee and Malheur rivers and the other two metapopulations.

Idaho distribution: Within the Idaho portion of its range, Mulford's milkvetch occurs in three distinct geographic areas – the Boise Foothills, the Owyhee Front, and the Weiser area. Its distribution in the Boise area extends as an arc approximately seven miles long along the lower foothills. Occurrences east and southeast of Weiser are clustered in an area approximately nine miles long by seven miles wide and include the largest populations known in Idaho. South of the Snake River in the Owyhee Front, widely scattered occurrences extend along about a 40 mile transect from near the towns of Bruneau in the east, to Murphy in the west. Most Owyhee County occurrences are located south of the NCA boundary.

General habitat description: Mulford's milkvetch habitat is characterized by loose, sandy substrates derived from lacustrine and alluvial sediments, and includes unconsolidated sands, decomposed sandstone, and calcareous oolitic deposits. It occurs predominantly on southerly to west-facing aspects. Slopes vary from gentle to often moderately or very steep. In many cases these slopes are prone to relatively high rates of erosion. Populations are often associated with shrub-steppe communities dominated by *Purshia tridentata* that represent late to early seral versions of the *Purshia tridentata/Stipa comata* (antelope bitterbrush/needle-and-thread grass) habitat type. In Owyhee County, Mulford's milkvetch is more often associated with an open mix of desert shrub species such as *Atriplex canescens* (fourwing saltbrush), *Tetradymia* species (horsebrush), *Chrysothamnus nauseosus* (gray rabbitbrush), and *Artemisia tridentata* (big sagebrush). Populations occur between about 2,200 and 3,600 feet elevation. Additional habitat information is provided in Moseley (1989).

Associated species: In addition to those noted above, commonly associated species include *Aristida longiseta* (red threeawn), *Oryzopsis hymenoides* (Indian ricegrass), *Agropyron spicatum* (bluebunch wheatgrass), *Brodiaea douglasii* (Douglas' brodiaea), *Leptodactylon pungens* (prickly phlox), *Chaenactis douglasii* (hoary chaenactis), *Machaeranthera canescens* (hoary aster), and *Oenothera pallida* (pale evening primrose). Introduced species such as *Bromus tectorum* (cheatgrass) and *Erodium cicutarium* (storksbill) can also be common at some sites. In Oregon, *Chrysothamnus viscidiflorus* (green rabbitbrush), *Balsamorhiza sagittata* (arrowleaf balsamroot), and *Penstemon acuminatus* (sand dune penstemon) are constant associates.

Other rare plant species: Mulford's milkvetch and *Astragalus purshii* var. *ophiogenes* are sympatric at Con Shea Basin (013). Sandy habitats with Mulford's milkvetch support other Idaho BLM Special Status plant species in several places outside the NCA. It co-occurs with *Allium aaseae* (Aase's onion) at a few occurrences in the Boise Foothills, and is sympatric with *Hackelia cronquistii* (Cronquist's stickseed) at occurrences near Weiser and in Oregon.

Biology: Seed germination appears to take place during the spring. Established plants generally begin their regrowth in early to mid-March, with peak flowering in later April and May, and sometimes extending into June. Fruits mature during late spring to the middle of summer. Plants can remain green through the summer, or may begin to senesce shortly after the fruits mature. Research regarding the life history and ecology of Mulford's milkvetch is limited. Mulford's milkvetch reproduces strictly by seed that is likely dispersed by gravity and wind. Seed viability and longevity are not known. However, the recovery of a population in Oregon after years of dwindling plant numbers highlights the importance of the seed bank (J. Findley, BLM Vale

District botanist, pers. comm.). Demographic research has found seedling survival rates to vary (Pyke 1996). It is common to find various size plants, including seedlings, at larger populations. This suggests larger populations are typically represented by multiple age classes. Several species of solitary bees have been observed visiting flowers and appear to be the primary pollinator group (Stephens 2001).

Mulford's milkvetch is a perennial, but preliminary research and recent observations indicate plants may be relatively short-lived and that population numbers can fluctuate substantially over time (BLM 1998; Pyke 1996; J. Findley, BLM botanist, pers. comm.). Short-term data at study plots in Oregon indicate an annual population turnover rate of about 10% (Pyke 1996; J. Findley, BLM Vale District botanist, pers. comm.). Although maybe short-lived on average, there are individual large, multi-branched plants that appear to get relatively old. A study in Oregon suggested small mammals and insects were the main cause of Mulford's milkvetch herbivory. The study also indicated cattle herbivory was not a major cause of plant mortality (Findley 1998). However, preliminary monitoring information from another grazing study in Oregon found a significant reduction in seed production in an area seeded with crested wheatgrass versus an unseeded area. It was unclear if the higher grazing pressure on Mulford's milkvetch was related to cattle being attracted to the seeded area (Pyke 1996).

Occurrence information for NCA: Mulford's milkvetch is known from three occurrences in the very western segment of the NCA.

EO #	Name	Legal description	County	USGS quad	First Obs.	Last Obs.
013	Con Shea Basin	T2S R1W S5, 6	Owyhee	Initial Point	1980	2000
014	Noble Island	T1S R2W S28, 29,32 T2S R2W S4	Owyhee	Walters Butte	1994	2000
022	SE Guffey Butte	T2S R2W sec 12	Owyhee	Walters Butte	2001	2001

EO #	Fire history and disturbance/threat factors	Population information	Size (acres)	EO Rank
013	unburned; ORV; cattle	3 subpops; ca 400 genets	6	B
014	unburned; ORV	6 subpops in NCA, plus 2 subpops outside NCA boundaries; ca 450 genets	12	C
022	unburned; ORV nearby	ca 65 genets	1	C

Conservation assessment: The main long-term conservation threats to Mulford's milkvetch in Idaho include habitat destruction due to urbanization, and habitat degradation, especially weed invasion related to wildfires, livestock grazing, mining (sand and oolite), and off-road vehicles (ORVs). The imminence and severity of these threats varies by geographic area. For example, habitat loss due to urban development is limited to the Boise Foothills area, while habitat degradation from ORVs is most acute in the Owyhee Front. From a historical perspective, the most widespread modification of Mulford's milkvetch habitat has been from livestock grazing. In recent years the most widespread threat is probably habitat degradation from wildfires. In Oregon, identified threats include weed invasion, ORV use, road maintenance, livestock grazing, and crested wheatgrass seedings (Mancuso 1999).

ORV use occurs at two (013, 014) of the three Mulford's milkvetch occurrences within the NCA. Direct damage to Mulford's milkvetch plants or damage to its immediate habitat has been documented at both occurrences. Cheatgrass is well established within or immediately adjacent to all the NCA occurrences and increases their wildfire risk. This was highlighted in the summer of 2002, when the SE Guffey Butte (022) occurrence apparently burned (A. DeBolt, BLM botanist, pers. comm.). Other weedy species (e.g., *Chondrilla juncea*, rush skeletonweed) are not known to be an immediate conservation concern at this time in the NCA, but quickly could become one in the wake of a fire. Disturbances related to livestock grazing and equestrian trails are a regular feature of the landscape at the Con Shea Basin (013) occurrence. Livestock and non-motorized recreation impacts are considerably less of a threat at the other two occurrences.

Mulford's milkvetch has been a high priority conservation concern for the BLM for many years, and occurrences within the NCA are important contributors to the long-term conservation of this species in the Owyhee Front area. Occurrences in the NCA are relatively large. Post-fire habitat conditions at the recently burned occurrence are unknown, but the vegetation is relatively intact at the other two sites. The NCA designation may provide resource managers with pro-active site protection options less readily available outside the NCA. Site specific actions to limit or discourage current levels or increases in ORV use at both Con Shea Basin (013) and Noble Island (014) would help ensure the long-term persistence of these occurrences. A monitoring program for these two and several other Mulford's milkvetch sites in Owyhee County would be helpful to assess BLM stewardship of this Special Status species south of the Snake River.

### ***ASTRAGALUS PURSHI VAR. OPHIOGENES***

Scientific name: *Astragalus purshii* Douglas ex Hook. var. *ophiogenes* (Barneby) Barneby

Common name: Snake River milkvetch

Pertinent synonyms: *Astragalus ophiogenes* Barneby

General nontechnical description: A small, low growing, more or less stemless, tufted perennial. The foliage has a dense covering of fine whitish-colored hairs. Larger leaves have 9-17 leaflets, which can vary in shape, but often are more or less oblong in outline. The inflorescence is a raceme with 5-11 relatively small, pinkish-purple flowers. The calyx is also relatively small, usually less than 9 mm long. The pod is 8-13 mm in size, strongly incurved toward the beak, and more or less densely covered with soft hairs.

Technical description: Low, sometimes diminutive, subcaulescent or shortly caulescent, the stems 0-5(8) cm long; leaves 1.5-11 cm long, with (7)9-15(17) elliptic-oblongate or obovate-cuneate, acute, obtuse, or rarely truncate-emarginate leaflets 4-12 mm long; racemes (3)5-11-flowered, the axis 1-3(4) cm long in fruit; calyx 6.5-10.1 mm long, the shortly cylindrical tube 5.5-7.5 mm long, 2.6-3.3 mm in diameter, the teeth 1-2.6 mm long; petals pink-purple, drying violet; banner 11.5-16.3 mm long, 6.5-8.7 mm wide; wings 11.4-14.6 mm long, the claws 5.8-7.8 mm, the blades 6.4-7.6 mm long, 1.9-2.6 mm wide; keel 10.2-13 mm long, the claws 5.8-7.7 mm, the blades 5.1-5.8 mm long, 2.3-2.6 mm wide; pod very obliquely ovoid-acuminate, 8-13 mm long, 5-5 mm in diameter, rounded or subcordate at base, strongly obcompressed and openly depressed-sulcate along both or at least along the ventral suture in the proximal 1/3-1/2, thence abruptly incurved through 90-180° into the laterally compressed, triangular-acuminate, cuspidate beak, the valves densely tomentose and villous-hirsute with shorter curly and longer straighter, lustrous hairs up to 3-5 mm long, but the short, tomentose vestiture sometimes sparse or almost wanting; ovules about 22; seeds 2.1-2.5 mm long (Barneby 1964).

Local field characters: The tufted habit and wooly pods readily separates this species from most other milkvetches found in southwestern Idaho. However, it does look similar and can be confused with several species in its range. *Astragalus nudisiliquus* (cobblestone milkvetch) can be distinguished by its larger flowers, obtuse leaflets, and thinly hairy fruit pods. *A. purshii* var. *purshii* (Pursh's milkvetch) can be distinguished by its larger, whitish- to yellowish-colored flowers with a purple-tipped keel, and more or less straight pods. *A. purshii* var. *glareosus* (Pursh's milkvetch) has larger, vivid purple flowers and pods hardly incurved. It is difficult to positively identify Snake River milkvetch without flowers and fruits.

Photos and line drawings: Original or reproductions of line drawings can be found in Barneby (1989), McClain (1998), and (Atwood et al. 2000).

Global distribution: Snake River milkvetch is endemic to the corridor of the Snake River and tributaries entering from the south and to a lesser degree, the north, in southwestern Idaho and adjacent eastern Oregon.

Idaho distribution: Snake River milkvetch is known in Idaho from Gooding and Twin Falls counties, westward through northern Owyhee County and adjacent portions of southern Elmore, Ada, and Canyon counties. It has also been reported from Lincoln County.

General habitat description: Snake River milkvetch occurs in a variety of dry, upland habitats such as bluffs, rocky canyon rims, gravelly benches, talus, dunes, and volcanic ash beds. Soils often have a sand component intermixed with varying amounts of silt, clay, gravel, and/or cobble. Sites are often relatively sparsely vegetated with high bare ground or rock cover. It occurs on all aspects and on flat sites to fairly steep slopes. In the NCA, Snake River milkvetch typically occurs within open desert shrub-dominated communities.

Associated species: Commonly associated species in the NCA include *Artemisia tridentata*, *Chrysothamnus* spp., *Tetradymia glabrata* (little horsebrush), *Atriplex confertifolia* (shadscale), *A. canescens*, *Grayia spinosa* (spiny hopsage), *Poa secunda*, *Stipa comata*, *Oryzopsis hymenoides*, *Bromus tectorum*, *Phlox* spp., *Castilleja chromosa* (desert paintbrush), and *Penstemon acuminatus*.

Other rare plant species: Snake River milkvetch and *Astragalus mulfordiae* are sympatric at Con Shea Basin. Snake River milkvetch co-occurs with *Glyptopleura marginata* at Rye Flat (050); with *Eatonella nivea* at West of Bruneau Dunes (002); and with *Ipomopsis polycladon* at Wilkens Gulch SE (035).

Biology: Snake River milkvetch flowers during the spring, from late April to June. It reproduces by seed that is likely dispersed by gravity and wind. Nothing is known about seed viability, longevity, or other seed bank characteristics. It is common to find plants of various sizes at larger occurrences. Reproductive plants seem to be uncommon some years in some places. This may be linked to unfavorable precipitation patterns or other environmental conditions. Pollinators have not been studied for this species. However, bees are common pollinators for many *Astragalus* species, and probably important for Snake River milkvetch too.

Life history or ecological studies targeting Snake River milkvetch have not been conducted. I have observed Snake River milkvetch in burned habitats, suggesting it can survive wildfires, at least in some cases. It is my impression that abundance is reduced in degraded, weedy habitats compared to areas in better ecological condition. Although plants can be relatively widespread

and common in some places, many occurrences seem to be very local and comprised of relatively few individuals.

Occurrence information for NCA: Snake River milkvetch has been documented from 26 occurrences in the NCA. The majority of occurrences are concentrated in the western part of the NCA in the Murphy area, near and on the south side of the Snake River.

EO #	Name	Legal description	County	USGS quad	First Obs.	Last Obs.
002	West of Bruneau Dunes	T6S R6E S16, 21,22	Owyhee	Bruneau Dunes	1996	2000
006	NW of Fossil Butte	T3S R1W S32	Owyhee	Oreana	1980	1980
007	WSW of Priest Ranch	T2S R1W S4,8,9 T1S R1W S33	Owyhee	Initial Point	1980	2000
008	Con Shea Basin	T2S R1W S6	Owyhee	Initial Point	1996	2000
009	West Guffey Butte	T1S R2W S35	Owyhee	Walters Butte	?	?
010	Weises Bar	T2S R1W S12	Owyhee	Initial Point	1980	1980
011	Downstream from Swan Falls Dam	T2S R1E S7,18	Ada Owyhee	Initial Point	1980	2000
012	Halverson Lakes	T1S R1W S31,32	Ada	Initial Point	1975	1975
016	Fossil Butte	T3S R1W S34 T4S R1W S3	Owyhee	Oreana	1980	2000
018	Unnamed Butte	T5S R7E S33	Owyhee	Indian Cove	1980	1980
019	Eagle Cove West	T6S R6E S1,10	Owyhee	Sand Dunes	1980	2001
034	Priest Ranch NW	T1S R1W S35	Owyhee	Initial Point	1994	1994
035	Wilkins Gulch SE	T6S R5E S13 T6S R6E S18	Owyhee	Bruneau	1996	1996
037	C.J. Strike Dam	T5S R4E S21	Elmore	C.J. Strike Dam	1997	1997
038	Rye Patch	T3S R1W S36	Owyhee	Oreana	1997	1997
040	Crane Falls Lake	T5S R5E S27,28	Owyhee	Bruneau	2000	2000
042	SE of Cinder Cone Butte	T3S R4E S10	Elmore	Cinder Cone Butte	2000	2000
043	Swan Falls	T2S R1E S19,20	Ada	Wild Horse Butte	2000	2000
044	Swan Falls	T2S R1E S17	Ada	Wild Horse Butte	2000	2000
045	South of Swan Falls	T2S R1E S32	Ada	Wild Horse Butte	2000	2000
046	Thomas Flats	T3S R1E S16 (State land)	Owyhee	Wild Horse Butte	2000	2000
047	South of Montini Ranch	T3S R1E S18, T3S R1W S13	Owyhee	Sinker Butte	2000	2000
048	Sinker Creek Butte	T3S R1E S6,7 T3S R1W S12	Owyhee	Sinker Butte	2000	2000
049	Murphy Flat	T3S R2W S24	Owyhee	Murphy	2000	2000
050	Rye Flat	T4S R1E S5,7	Owyhee	Castle Butte Oreana	2000	2000
051	SW of Castle Butte	T4S R1E S9,10,16	Owyhee	Castle Butte	2000	2000

EO #	Fire history and disturbance/threat factors	Population information	Size (acres)	EO Rank
002	weedy in burned portions	20+ genets	unknown	D
006	unknown	unknown	unknown	not ranked
007	burned landscape nearby	8 subpops; ca 360 genets	2+	B
008	unburned; ORV use and cattle use	3 subpops; ca 150 genets	1+	C
009	unknown	unknown	unknown	not ranked
010	unknown	unknown	unknown	not ranked
011	portions degraded/weedy; ORV and other recreation use	ca 30 genets; a portion may be extirpated	unknown	D
012	unknown	unknown	unknown	not ranked
016	unburned; ORVs	8 subpops; 30+ genets	1+	B
018	uncertain	unknown	unknown	not ranked
019	portion on BLM land mostly burned	2 subpops (1 in NCA); ca 100 genets	3	C
034	unburned (1994)	50-100 genets	1	C
035	uncertain; burned landscape in area	2 subpops; ca 120 genets	2	BC
037	isolated BLM tract	200-400 genets	unknown	C
038	unburned (1997)	100+	2	B
040	partly burned; near weedy landscape	3 subpops; ca 125 genets	1	C
042	unburned; some ORVs; cattle	ca 60+ genets	10	C
043	unburned; lots of cheatgrass; ORVs	100+	35	C
044	partly burned and weedy	2 subpops; ca 15 genets	0.3	C
045	unburned	2 subpops; ca 5 genets	<0.1	C
046	unburned; cattle	4 subpops; 65+ genets	5	C
047	unburned; cattle	2 subpops; ca 100 genets	2	C
048	partly burned	2 subpops; ca 100 genets	2	B
049	unburned; ORVs and cattle nearby	ca 6 genets	0.1	C
050	unburned; cattle	3 subpops; ca 30 genets	1	B
051	unburned	4 subpops; 25+ genets	2	B

Conservation assessment: A number of threats have been identified for Snake River milkvetch occurrences within the NCA. The majority of occurrences are unburned; but burned, annual grassland vegetation dominates the landscape surrounding some of them and increases their vulnerability to future wildfires. Snake River milkvetch apparently can persist after wildfire under some conditions or in some habitats. Cheatgrass is well established at many occurrences, although it is often less abundant where Snake River milkvetch occurs compared to adjacent areas. Most occurrences are located in areas subject to livestock grazing, and related ground disturbances levels are high in some cases. Several occurrences that currently have minimal or no ORV use are located near areas receiving considerable use. ORV-related impacts loom as a potential threat at these occurrences.

About half of all known Snake River milkvetch occurrences in Idaho are located within the NCA. This distribution pattern implicates the NCA as an important area for overall Snake River milkvetch conservation in Idaho. The full extent of most occurrences is not known and the number of reported genets has likely been underestimated at many sites. Nonetheless, some occurrences appear to be fairly local and/or with relatively few plants. Recent discoveries of additional populations in the NCA and areas further south suggests Snake River milkvetch is not as rare in Idaho as previously thought.

## **CHAENACTIS STEVIODES**

Scientific name: *Chaenactis stevioides* Hook. and Arn.

Common name: Desert pincushion

Pertinent synonyms: *Chaenactis brachycarpa* A. Gray; *Chaenactis floribunda* Greene

General nontechnical description: Desert pincushion is a desert annual that varies in height from a few inches up to about one foot. Small plants tend to be unbranched, while larger ones are often openly branched. Basal and stem leaves are deeply cut in a pinnate fashion. Heads are comprised of white disc flowers with exerted anthers. Below the heads are 13 to 25 green involucre bracts 5-9 mm tall and evidently or minutely glandular. The pappus is comprised of four equal or unequal scales mostly 2-4 mm long.

Technical description: Annual or often winter-annual, up to 3 dm tall, simple when small, freely branched when well developed, the heads tending to be loosely clustered toward the ends of the stem and main branches; herbage tending to be thinly and unevenly tomentulose (at least in part) at anthesis, becoming more glandular on the peduncles and upper parts of the stem, the glands often stipate; leaves basal and cauline, the larger (lower) ones mostly 2-8 cm long overall, pinnatifid or in well developed plants usually more or less distinctly bipinnatifid, the ultimate segments rather thick but scarcely succulent, tending to be broadly sulcate or somewhat cupped on the upper side, blunt or broadly rounded distally, sometimes with a suggestion of the callosity that is better developed in *C. fremontii*; involucre of ca 13 to ca 21(25) acute or obtuse green bracts, 5-9 mm high, glandular or glandular-puberulent; receptacle naked; disk corollas white, mostly 4-6 mm long, the marginal ones commonly enlarged and shortly sub-ligulate; anthers evidently exerted; pappus of 4 equal or unequal scales mostly 2-4 mm long, or sometimes the scales of the outer or all of the flowers notably shorter, only 0.5-1.5 mm long (Cronquist 1994).

Local field characters: The genus *Chaenactis* is readily distinguished from other composites in southwestern Idaho. However, *C. douglasii* (false-yarrow) and *C. macrantha* (bighead dustymaiden) are two superficially similar-looking species that occur within the range of *C. stevioides*. *C. douglasii* is a biennial/perennial that tends to have a white woolly, more glandular appearance, curled leaves that do not look flat, and heads often arranged in a rather flat-topped inflorescence. It also has more pappus scales (10-16) and longer involucre bracts (8-12 mm high) than *C. stevioides*. *C. macrantha* can be identified by its larger flowers (9-15 mm long) that are not white, but rather a dull white or cream color, and often pink-tinged. In addition, its pappus is comprised of four long inner and four short outer scales.

Photos and line drawings: An original line drawing can be found in Cronquist (1994). Atwood et al. (2000) contains a reproduction of this drawing and photos. A photograph also appears in Eastman (1990).

Global distribution: Southern California and adjacent Baja California, to northern Sonora, Arizona, western New Mexico; northward through Nevada and Utah, to southeastern Oregon, southwestern Idaho, western Colorado, and southwestern Wyoming.

Idaho distribution: In Idaho, it is known from around the Snake River corridor in Ada, Elmore, and Owyhee counties.

General habitat description: Sandy, silt-loam, or somewhat clayey, often relatively deep soils in dry, open desert shrub communities. Sites tend to be flat to gently sloping, but aspect is variable. Idaho occurrences are known from between approximately 2,500-3,000 feet elevation.

Associated species: *Artemisia tridentata*, *A. spinosa* (bud sage), *Tetradymia* spp., *Chrysothamnus* spp., *Atriplex canescens*, *A. confertifolia*, *Grayia spinosa*, *Sarcobatus vermiculatus* (greasewood), *Eurotia lanata* (winterfat), *Oryzopsis hymenoides*, *Sitanion hystrix* (squirreltail), *Bromus tectorum*, *Mentzelia albicaulis* (whitestem blazingstar), *Chaenactis macrantha*, and weedy forbs such as *Halogeton glomerata* (halogeton), *Salsola iberica* (tumbleweed), and *Descurainia* spp. (tansymustard).

Other rare plant species: Desert pincushion co-occurs with *Glyptopleura marginata* at Chattin Flat (005), Lower Castle Butte (010 and 011), Wild Horse Butte (017), and Lower Sinker Creek (019). It also co-occurs with *Nemacladus rigidus* at Lower Castle Butte (010), and with *Psathyrotes annua* at the Lower Sinker Creek (019) occurrence.

Biology: Desert pincushion flowers during the spring, from late April through June. It is an annual and reproduces strictly by seed. No information is available concerning its seed bank. It can apparently persist in fairly degraded habitats in southwestern Idaho. It is unknown to what degree these conditions affect population abundance and long term viability. In disturbed habitats, plants may be more or less restricted to protected microsites beneath the protection of shrubs.

Occurrence information for NCA: Fifteen occurrences have been documented from the southwestern and south-central portions of the NCA.

EO #	Name	Legal description	County	USGS quad	First Obs.	Last Obs.
001	West of Dorsey Butte	T4S R3E S10	Elmore	Dorsey Butte	1993	2000
003	Murphy NW	T2S R2W S22,27	Owyhee	Murphy	1994	1994
005	Chattin Flat	T4S R3E S28	Elmore	Dorsey Butte	1995	1995
008	Orchard Training Area	T3S R2E S11-15, 21-27,35,36 T3S R3E S26-36 T4S R3E S1-6	Ada	Jackass Butte Little Joe Butte Big Foot Butte	1993	1995
010	Lower Castle Butte	T4S R2E S18	Owyhee	Castle Butte	2000	2000
011	Lower Castle Butte	T4S R2E S30	Owyhee	Castle Butte	2000	2000
012	Southeast of Rye Patch	T4S R1E S8	Owyhee	Castle Butte	2000	2000
013	Southeast of Rye Patch	T4S R1E S16 (State land)	Owyhee	Castle Butte	2000	2000
014	Cloudburst Gulch	T4S R2E S30,31	Owyhee	Castle Butte	2000	2000
015	Lower Fossil Creek	T3S R1E S33	Owyhee	Castle Butte	2000	2000
016	Dorsey Butte	T4S R3E S14,23	Elmore	Dorsey Butte	2000	2000
017	Wild Horse Butte	T3S R1E S27	Owyhee	Wild Horse Butte	2000	2000
018	Thomas Flat Springs	T3S R1E S10	Ada	Wild Horse Butte	2000	2000
019	Lower Sinker Creek	T3S R1W S12 T3S R1E S7	Owyhee	Sinker Butte	2000	2000
020	S. of Montini Ranch	T3S R1E S19	Owyhee	Sinker Butte	2000	2000

EO #	Fire history and disturbance/ threat factors	Population information	Size (acres)	EO Rank
001	burned; weedy	50+	5	D
003	unburned	2 subpops; ca 800 genets	0.2	B
005	burned; weedy	ca 150 genets	65	D
008	portions burned; military training;	large metapopulation; >100,000 genets	1000s	A
010	unburned; some ORV; possible land transfer	ca 20 genets	<0.1	C
011	unburned; some ORV	1 genet	<0.1	C
012	unburned; degraded herb layer; cattle; some ORV	100+ genets	<0.1	C
013	unburned; degraded herb layer	1 genet	<0.1	D
014	unburned; degraded herb layer; cattle; ORV	multiple subpops; 1,000+ genets	7	B
015	unburned; some ORV	2,000+ genets	0.2	B
016	unburned; near burned landscape	ca 10 genets	25	C
017	unburned	3,000+ genets	5	A
018	unburned; degraded herb layer	30+ genets	0.1	C
019	unburned	3 subpops; ca 230 genets	0.3	B
020	unburned	300+ genets	0.3	B

Conservation assessment: A number of threats have been identified at desert pincushion occurrences within the NCA. Habitat degradation, especially cheatgrass invasion following wildfires or other disturbances is the most widespread problem. Desert pincushion can persist in areas with a degraded or depauperate herbaceous layer. However, it is unclear if this persistence is long term. It is also unclear to what degree occurrence size and abundance are reduced compared to pre-disturbance conditions.

Approximately 80% of all documented desert pincushion occurrences in Idaho are located within the NCA. This distribution pattern implicates the NCA as an important area for conservation of this species in the state. Abundance information and the full extent of some occurrences may be underestimated because population size of this annual species fluctuates with annual precipitation patterns. Nonetheless, a few occurrences (e.g., 011, 013) appear to be very small in size and their long-term persistence is questionable. The occurrence in the Orchard Training Area (008) is probably the largest in Idaho and its conservation should be addressed in management actions planned for the area. The NCA represents the northern geographic range of desert pincushion, adding further impetus to ensure its conservation in the area.

### ***CYMOPTERUS ACAULIS* VAR. *GREELEYORUM***

Scientific name: *Cymopterus acaulis* (Pursh) Raf. var. *greeleyorum* Grimes and Packard

Common name: Greeley's wavewing

Family: Apiaceae (Carrot)

Pertinent synonyms: Based on information from the Utah Natural Heritage Program, I am not considering *Cymopterus acaulis* var. *parvus* Goodrich to be synonymous with var. *greeleyorum*

at this time. Variety *parvus* is a Utah endemic considered synonymous with var. *greeleyorum* by Cronquist (1997). This is an interpretation not universally agreed upon by Utah botanists. Cronquist lists Utah in the range of var. *greeleyorum* as a result of his interpretation. It is unclear if var. *parvus* will be maintained as a distinct entity in the new edition of Utah Flora currently under revision.

General nontechnical description: Greeley's wavewing is a low-growing, taprooted perennial that flowers early in the spring. The rosette of 2-3 times pinnately dissected leaves lie in a more or less flat plane at ground level. Leaves are 1 to 3.5 inches long and bright green early in the season, but typically turn a shiny reddish color later on. They are hairless or nearly so. The inflorescence is a tight umbel of small yellow flowers that sits atop the leaves. The relatively large fruits are prominently wavy winged.

Technical description: Glabrous or obscurely viscid perennial with 1 or 2 slender pseudoscapae arising to the ground level from the subterranean crown of an elongate, thickened, often upwardly tapering taproot; peduncles usually several; leaves forming a rosette at ground level, bright green, not glaucous, petiolate, the blade mostly 2-8 cm long and somewhat longer than wide, pinnately (or ternate-pinnate) 2-3 times dissected into rather small and narrow, scarcely crowded ultimate segments all nearly in the same plane, sometimes some of the leaves arising directly from the buried root-crown; inflorescence compact and subcapitate in flower, only 1-3 cm wide, the central umbel sessile or nearly so, the lateral ones on short but definite rays, the fruiting umbel compact and head-like; involucre wanting or poorly developed, the involucre well developed, somewhat dimidiate, of prominent green or somewhat anthocyanic bractlets that are more or less connate towards the base; flowers yellow, the pedicels obsolete or very short; carpophore wanting; fruit 5-10 mm long, its lateral wings prominent, 1-2 mm wide, merely wavy or strongly corrugate, the dorsal wings 1-3, similar to the lateral or somewhat narrower, the oil-tubes small, 3-17 in the intervals, 5-13 on the commissure (Cronquist 1997).

Local field characters: The yellow flowers and stamens are the only sure way to distinguish var. *greeleyorum* from the much more common and widespread white-flowered var. *acaulis* (plains wavewing). This requires being in the field early in the spring before all the flowers fall off and blow away. *Lomatium cous* (cous) is another low-growing, yellow-flowered, early spring-flowering umbel. It looks superficially similar to Greeley's wavewing, but can be distinguished by several characteristics. It has a tuberous, not slender elongate root; it has more numerous and crowded ultimate leaf segments; its inflorescence stems are much longer; and has leaves tending to wither away rather than turn reddish and persist as the fruits mature.

Photos and line drawings: An original line drawing of var. *acaulis* can be found in Cronquist (1997). Atwood et al. (2000) contains a reproduction of this drawing and photos.

Global distribution: Endemic to southwestern Idaho and Malheur County in adjacent eastern Oregon.

Idaho distribution: Mostly in Owyhee County, but one population also reported for Elmore County, west of Hammett. Owyhee County populations are clustered in two distinct areas. One is in and around Bruneau Dunes State Park; the other is near the Oregon/Idaho border from south of Homedale to the McBride and Dry creek areas.

General habitat description: Volcanic ash, clay, and sandy substrates in the Wyoming sagebrush and desert shrub zones. Substrates with a sand component characterize occurrences around the NCA, except for the putative West of Chalk Gulch site (006), which is a

sparsely vegetated clay exposure. Sites vary from nearly barren exposures to small microsite openings surrounded by robust vegetation. Greeley's wavewing occurs on various aspects, slope positions, and flat to steep areas, between about 2,600 and 4,300 feet elevation.

Associated species: Associates recorded at multiple Idaho occurrences include *Artemisia tridentata*, *Chrysothamnus* spp., *Leptodactylon pungens*, *Grayia spinosa*, *Oryzopsis hymenoides*, *Poa secunda*, *Bromus tectorum*, *Mentzelia albicaulis*, and *Astragalus* spp. (milkvetch species).

Other rare plant species: Greeley's wavewing occurs near or with several other Special Status species in the western portion of its Idaho distribution. At McBride Creek in Owyhee County, it occurs near or with several Succor Creek ash endemics, including *Chaenactis cusickii* (Cusick's false-yarrow), *Mentzelia mollis* (smooth stickleaf), and *Phacelia lutea* var. *calva* (Malheur yellow phacelia). It is also known to occur with Cusick's false-yarrow and smooth stickleaf in the Succor Creek area, Oregon (Grimes and Packard 1981).

Biology: Plants flower early in the spring, during March and April. Fruits can be observed into mid-June. Greeley's wavewing reproduces by seed. I am unaware of any studies for this species regarding its seed bank, pollinators, or other life history attributes.

Occurrence information for NCA: Three occurrences have been reported for the eastern end of the NCA. Information is provided here for two others known from Bruneau Dunes State Park in close proximity to the NCA. One of them (011) was discovered during our field inventory.

EO #	Name	Legal description	County	USGS quad	First Obs.	Last Obs.
001	Bruneau Sand Dunes West	T6S R6E S22	Owyhee	Bruneau Dunes	1983	1983
004	Bruneau Dunes State Park	T6S R6E S22 (State Park land)	Owyhee	Bruneau Dunes	1983	1983
006	West of Chalk Gulch	T5S R7E S35	Elmore	Indian Cove	1993	1993
008	Loveridge Gulch North	T6S R6E S35	Owyhee	Hot Spring	1995	2001
011	Bruneau Dunes State Park	T6S R6E S10 (State Park land)	Owyhee	Bruneau Dunes	2001	2001

EO #	Fire history and disturbance/threat factors	Population information	Size (acres)	EO Rank
001	uncertain	unknown	Unknown	not ranked
004	uncertain, but probably not burned	unknown	Unknown	not ranked
006	burned	unknown	Unknown	not ranked
008	unburned; near burned landscape	ca 100-200 genets	20	B
011	unburned; near burned landscape	1 genet	<0.1	D

Conservation assessment: Flowering material is needed to positively identify this species and separate it from the more common and widespread plains wavewing. However, Greeley's wavewing flowers early in the spring, prior to the time botanists are in the field on a regular basis. As a result, this species may be more common than the dozen or so occurrences documented for Idaho. Plants were not found at one previously reported occurrence (006) in the NCA during our survey. Verification of whether this occurrence is extant or not (or based on a

misidentification) will require another visit to the site early in the spring. Population, habitat condition, and other conservation information is unknown or incomplete for several occurrences, both within and outside the NCA. These factors combine to make a conservation assessment for Greeley's wavewing problematic.

Nearly all known Idaho occurrences are small. Occurrences in the NCA around Bruneau represent one of two population centers for this species. They are found in sandy habitats, contrary to those in very western Idaho and adjacent Oregon, which typically occur on clay substrates. The significance of this, if any, is unclear at this time. However, it may be indicative of different ecotypes (genotypes) between the two split population centers.

The Loveridge Gulch North occurrence (008) appears to be the highest quality occurrence in the NCA and worthy of conservation attention. This presents a special challenge because the occurrence is surrounded by a vast expanse of burned, annual grassland-dominated vegetation. Additional surveys at the right time of year are needed before a more comprehensive conservation assessment can be made for this species in Idaho.

### ***EATONELLA NIVEA***

Scientific name: *Eatonella nivea* (D.C. Eaton) A. Gray

Common name: White eatonella; white false tickhead

Family: Asteraceae (Aster; Composite; Sunflower)

Pertinent synonyms: *Burriella nivea* D.C. Eaton in King

General nontechnical description: White eatonella is a tiny, white-wooly annual forming small tufts of crowded and numerous, narrow to spatula-shaped leaves up to about 1.5 inches long, although often shorter. Flower heads are small and either sessile or slightly protrude above the tuft of leaves. Ray flowers are inconspicuous and barely surpass the disk flowers. Both types of flowers are yellowish in color. The pappus is comprised of two irregular-margined, short, awn-tipped scales.

Technical description: Depressed, white-wooly annual, branching from the base and often forming small tufts; leaves numerous, crowded, entire, linear-oblongate to spatulate, up to 4 cm long; heads sessile or on filiform axillary peduncles up to 4 cm long; involucre campanulate, 5-6 mm high, of 8-13 bracts; rays 8-13, the yellowish to somewhat anthocyanic ligule mostly 2-2.5 mm long, inconspicuous and scarcely surpassing the disk; disk flowers 7-13, the small, 5-toothed, yellow corolla only 1.5-2.5 mm long; achenes 2.5-3.5 mm long, all radially compressed; pappus of two lacerate, awned scales 1.5-2.5 mm long set at the margins of the achene, the body folded down the back (in conformity with the shape of the achene) and about as long as the awn (Cronquist 1994).

Local field characters: The very small, white-wooly, tufted, annual habit does not make the plant easy to see, but it is distinctive.

Photos and line drawings: An original line drawing can be found in Cronquist (1994). Atwood et al. (2000) contains a reproduction of this drawing and photos. Photographs can also be found in a field guide to rare plants in Washington State (Washington Natural Heritage Program 2001).

Global distribution: Southeastern Oregon and adjacent southwestern Idaho, across central and western Nevada, and in adjacent Inyo County, California. Disjunct populations occur in south-central Washington and along the Salmon River in east-central Idaho.

Idaho distribution: Occurrences are known from Ada, Elmore, and Owyhee counties in southwestern Idaho; and Custer and Lemhi counties in the east-central part of the state. It has also been reported from west-central Idaho in Adams County. The majority of occurrences are located in north-central and northwestern Owyhee County.

General habitat description: In southwestern Idaho, white eatonella occurs on dry, open, sandy to cindery substrates with sparse desert shrub vegetation. Microsites typically do not have a noticeable microbiotic crust layer. It occurs in flat wash bottoms to steep slope positions and on various aspects.

Associated species: *Salvia dorrii* (purple sage), *Grayia spinosa*, *Atriplex canescens*, *Tetradymia glabrata*, *Chrysothamnus* spp., *Artemisia tridentata*, *A. spinosa*, *Oryzopsis hymenoides*, *Bromus tectorum*, *Cryptantha circumscissa* (matted cryptantha), *Mentzelia albicaulis*, *Lygodesmia spinosa* (spiny skeletonplant), and annual *Camissonia* (evening-primrose) spp.

Other rare plant species: White eatonella co-occurs with *Glyptopleura marginata* at East of Wild Horse Butte (026) and Fossil Butte NW (021). It also co-occurs with *Nemacladus rigidus* at the Fossil Butte NW occurrence.

Biology: Plants flower during late April, May, and June. White eatonella is an ephemeral annual and reproduces by seed. The number of individuals that successfully flower and the number of flowers produced fluctuates widely from year to year, presumably in response to annual weather patterns. Its apparent restriction to sparsely vegetated microsites may suggest it is a poor competitor with other vegetation (Washington Natural Heritage Program 2001). I am unaware of seed bank, pollination, or other life history studies for this species.

Occurrence information for NCA: Five widely scattered occurrences have been reported for the NCA.

EO #	Name	Legal description	County	USGS quad	First Obs.	Last Obs.
002	Lower Sinker Creek	T3S R1E S7	Owyhee	Sinker Butte	1974	1974
003	Waterhouse Gulch	T6S R6E S16	Owyhee	Sand Dunes	?	?
016	Lower Squaw Creek	T4S R4E S2,11	Elmore	Crater Rings SW	1995	2000
021	Fossil Butte NW	T3S R1W S29,30	Owyhee	Sinker Butte	1996	1996
026	East of Wild Horse Butte	T3S R1E S24	Ada	Wild Horse Butte	2000	2000

EO #	Fire history and disturbance/threat factors	Population information	Size (acres)	EO Rank
002	unknown	unknown	unknown	not ranked
003	burned	-	-	X
016	unburned; ORV; tumbleweed litter	500+	large	B
021	unburned (1996)	multiple subpops; 300-400 genets	0.2	B
026	unburned	5+ genets	0.1	B

Conservation assessment: Our attempt to relocate the occurrence reported for Waterhouse Gulch (003) were unsuccessful. Potential habitat for white eatonella was minimal in the area, and all of it was burned and in poor ecological condition. We consider this occurrence to be extirpated. Very little information is known about the Lower Sinker Creek occurrence (002), but we assume it is still extant. The three other occurrences documented for the NCA should persist in the absence of major habitat alterations. The occurrence East of Wild Horse Butte (026) is likely more extensive than reported. White eatonella is a small easily overlooked plant and additional populations within the NCA will probably be discovered in the future. It is apparently absent from many suitable appearing sites. The large Lower Squaw Creek occurrence (016) is disturbed by ORVs and cattle grazing and may be a good candidate for monitoring.

### ***ERIOGONUM SHOCKLEYI* VAR. *PACKARDAE***

Scientific name: *Eriogonum shockleyi* Wats. var. *packardiae* Reveal

Common name: Packard's buckwheat

Family: Polygonaceae (Buckwheat family)

Pertinent synonyms: None

General nontechnical description: Packard's buckwheat forms low, tight, mounded cushions of compact leaf rosettes that spread from a woody caudex. The cushions are roughly 2 inches tall and can spread to over 15 inches in diameter. The small, narrow leaves are hairy on both surfaces, and wider at the base than at the tip. Flowering stems are leafless and very short, with the small head of yellow flowers appearing to sit directly on, or to barely protrude above, the matted cushion of leaves.

Technical description: Low caespitose herbaceous perennials forming mats 0.5-4 dm across; leaves in dense compact rosettes, the leaf blades elliptic, 1-3 (3-5) mm long, 1-1.5 mm wide, densely tomentose on both surfaces, the petioles 0.5-1 mm long; flowering stems lacking, or if present than scapose and less than 5 mm long, tomentose; inflorescences capitate and terminal; bracts scalelike, ternate, lanceolate, 0.5-1 mm long, tomentose; involucre congested, 2-4 per head, broadly campanulate, +/- membranous, 2.5-3 mm long, tomentose, the 4-5(6) lanceolate teeth 0.8-1 mm long, the pedicels 0.3-0.5 mm long, glabrous; flowers 2-5 per involucre, pale yellow, 2.5-3 mm long, densely tomentose, the tepals monomorphic, united about a third of their length; stamens exserted, the filaments 3-4 mm long, glabrous, the anthers yellow 0.3 mm long, oval; achenes light brown, 2.5-3 mm long, densely tomentose, the subglobose base tapering to a short, 3-angled beak (Reveal 1989).

Local field characters: Packard's buckwheat can usually be distinguished from other species of buckwheat (*Eriogonum*) in southwestern Idaho by its low, spreading, cushion habit of tightly compacted, bluish-green colored, narrow obovate- to elliptic-shaped leaves, and inflorescences on leafless, very short stems up to about 5 mm high. It often occurs in sparsely-vegetated habitats which make the scattered, well-spaced arrangement of mounded cushions seem quite conspicuous. Packard's buckwheat is most readily distinguished from the closely related *E. shockleyi* var. *shockleyi* by its very short flowering stem. In the field, flowering stems appear to be absent, with the inflorescences positioned within or perched directly atop the tightly matted cushion of leaves.

Global distribution: Packard's buckwheat is endemic to the vicinity of the Snake River and several confluent tributaries in southwestern Idaho.

Idaho distribution: Occurrences are known from southern Ada and north-central Owyhee counties in the southwestern part of the state.

General habitat description: All populations of Packard's buckwheat occur within the sagebrush-steppe zone of the western Snake River Plain. It occurs in azonal microhabitats that have open vegetation and low plant species diversity, patterns largely related to unique substrate conditions. Substrates supporting Packard's buckwheat include oolitic limestone outcrops, sandy loess over basalt, and lacustrine deposits of cobbly desert pavement at the surface (Moseley and Reveal 1995).

Associated species: Associated species often occur as widely scattered individuals in the open habitats supporting Packard's buckwheat. Associates include *Tetradymia glabrata*, *Chrysothamnus* spp., *Artemisia arbuscula* (low sagebrush), *Artemisia tridentata* ssp. *wyomingensis*, *Eurotia lanata*, *Atriplex confertifolia*, *Salvia dorrii*, *Eriogonum microthecum* (slenderbush buckwheat), *Oryzopsis hymenoides*, *Poa secunda*, *Bromus tectorum*, *Stipa comata*, *Castilleja chromosa*, *Langloisia punctata* (langloisia), *Stanleya pinnata* (bushy stanleya), *Enceliopsis nudicaulis* (nakedstem sunray), *Penstemon acuminatus*, and *Astragalus lentiginosus* (freckled milkvetch).

Other rare plant species: *Astragalus purshii* var. *ophiogenes* occurs near Packard's buckwheat at the Bruneau Valley Rim occurrence (010). Packard's buckwheat apparently co-occurs with var. *shockleyi* in the Horse Hill area south of Bruneau.

Biology: Seed germination probably occurs early in the spring. Flowering begins in late May and early June most years, but peak anthesis is not until late June. Fruits mature through July, with most likely dehiscent sometime during July or early August (Moseley and Reveal 1995). *E. shockleyi* is a long-live perennial that reproduces by seed, but otherwise little is known concerning its reproductive biology.

*E. shockleyi* occurs in open, relatively sparsely vegetated habitats, usually with high bare ground cover. Edaphic, and perhaps other conditions related to these habitats seem to make them unsuitable for the majority of, or only sparse colonization by, common species found in nearby areas with zonal soil development. No herbivory was observed on plants during an earlier rangewide survey (Moseley and Reveal 1995).

Occurrence information for NCA: Five occurrences are known from the NCA.

EO #	Name	Legal description	County	USGS quad	First Obs.	Last Obs.
001	Swan Falls	T2S R1E S17	Ada	Wild Horse Butte	1971	1971
002	E of Halverson Lakes	T1S R1W S28	Ada	Initial Point	1980s	1995
003	N of Priest Ranch	T1S R1W S35,36	Ada	Initial Point	1980s	1995
010	Bruneau Valley Rim	T6S R6E S18,19	Owyhee	Bruneau	1955	2000
012	Halverson Lakes	T1S R1W S32	Ada	Initial Point	1974	1995

EO #	Fire history and disturbance/threat factors	Population information	Size (acres)	EO Rank
001	unknown	unknown	unknown	F
002	unburned (1995)	ca 1,500 genets	unknown	A
003	unburned (1995); irrigation pipeline development	ca 500 genets	unknown	C
010	unburned, but surrounded by burned landscape; fire rehab.; ORV	10,000+	3+	B
012	unburned (1995); cattle	2 subpops; ca 150 genets	unknown	C

Conservation assessment: All known Packard's buckwheat occurrences in the world are located on Idaho BLM land. This highlights the BLM's role in the long-term conservation of this species. Twenty-eight percent of all known occurrences are located within the NCA. The Bruneau Valley Rim occurrence (010) is one of only two occurrences reported to have more than 5,000 individuals. It is obviously an important population regarding long-term Packard's buckwheat conservation, but has been impacted by several disturbances. The occurrence is surrounded by a burned landscape seeded with crested wheatgrass, and firebreak lines destroyed swaths of the population and also made the area more accessible to ORV traffic. Monitoring this occurrence should be considered. Although smaller, other occurrences within the NCA are also important conservation targets for this narrowly distributed taxon. Repeated attempts by several botanists in recent years, including us, have failed to relocate the Swan Falls occurrence (001). It is unclear if this failure is due to the population being extirpated, or to the vague original location information.

Mining of oolitic limestone has been identified as the greatest potential threat to the long-term conservation of Packard's buckwheat (Moseley and Reveal 1995). This is not a threat factor within the NCA, however. Indirect factors, such as weed invasion associated with wildfire and other disturbances does not appear to affect habitats occupied by Packard's buckwheat as much as on adjacent zonal soil areas. The paucity of forage within these habitats seems to preclude all but minimal livestock disturbance. Impacts from ORV have the potential to be locally serious and may represent the biggest concern for occurrences within the NCA.

### ***ERIOGONUM SHOCKLEYI* VAR. *SHOCKLEYI***

Scientific name: *Eriogonum shockleyi* Wats. var. *shockleyi*

Common name: Cowpie buckwheat; matted cowpie buckwheat; Shockley's buckwheat

Family: Polygonaceae (Buckwheat family)

Pertinent synonyms: *Eriogonum pulvinatum* Small; *E. longilobum* Jones

General nontechnical description: Cowpie buckwheat forms low, tight, mounded cushions of compact leaf rosettes that spread from a woody caudex. The cushions are roughly 2 inches tall and can spread to over 15 inches in diameter. Leaves are small, hairy on both surfaces, and wider at the base than at the tip. The inflorescence is a tight round head of small yellow flowers atop a leafless stalk that clearly protrudes up to about 2 inches above the cushion.

Technical description: Pulvinate-caespitose, scapose, mound-forming perennials, mainly 2-5 cm tall, 5-40 cm across or more, from a woody pluricipital caudex, the branches clothed with marcescent leaf bases and terminated by rosettes; leaf blades 2-12 mm long, 1-6 mm wide, obovate, oblanceolate, elliptic, or spatulate; tomentose on one or both sides; petioles 1-10 mm long or lacking; inflorescence capitate; involucre sessile, campanulate, 2-6 mm long, tomentose, with 5 (or more) ovate to lanceolate lobes; flowers white, cream, yellow, or suffused with red, 2.5-4.5 mm long, pilose, the segments oblong to obovate; achenes 2.5-3 mm long (Welsh et al. 1987)

Local field characters: Cowpie buckwheat can usually be distinguished from other species of buckwheat in southwestern Idaho by its low, spreading, cushion habit of tightly compacted, bluish-green colored, obovate- to elliptic-shaped leaves, and inflorescences on leafless, short stems protruding up to about 2 inches above the cushion. Cowpie buckwheat often occurs in sparsely-vegetated habitats which make the scattered, well-spaced arrangement of mounded cushions seem quite conspicuous. Its longer flowering stems and typically somewhat larger leaves are field characteristics that most readily distinguish it from the closely related *E. shockleyi* var. *packardiae*.

Photos and line drawings: A small drawing can be found in Hickman (1993).

Global distribution: Cowpie buckwheat ranges throughout the Intermountain Region from east-central California, east across Nevada and Utah, to western Colorado, and south to northern Arizona and New Mexico. It is disjunct in southwestern Idaho along the Snake River area.

Idaho distribution: Occurrences are known from southeastern Elmore, northeastern Owyhee, and adjacent portions of Gooding and Twin Falls counties, in a band following the Snake River.

General habitat description: In Idaho, cowpie buckwheat occurs within the sagebrush and desert shrub zones of the Snake River Plain. Similar to Packard's buckwheat, it occurs in azonal microhabitats with edaphic characteristics unsuitable for most other plant species. Habitats typically support open vegetation, low vascular plant species diversity, and high bare ground/rock cover. Soils in the Bruneau Valley area are lacustrine deposits consisting of a cobbly desert pavement on the surface over a deep sandy-loam substrate. Upstream populations occur on thin, gravelly calcium carbonate deposits (calcrete) overlying basalt (Moseley and Reveal 1995).

Associated species: Associated species often occur as widely scattered individuals in the open habitats of cowpie buckwheat, and include *Atriplex confertifolia*, *Artemisia arbuscula*, *A. tridentata* ssp. *wyomingensis*, *Chrysothamnus* spp., *Eriogonum microthecum*, *Tetradymia glabrata*, *Poa secunda*, *Bromus tectorum*, *Oryzopsis hymenoides*, *Phlox* spp., *Stanleya pinnata*, *Langloisia punctata*, and *Astragalus* spp.

Other rare plant species: *E. shockleyi* var. *shockleyi* and var. *packardiae* apparently co-occur in the Horse Hill area south of Bruneau. Janish's penstemon occurs near cowpie buckwheat at Sugar Valley Badlands, in Owyhee County, outside the NCA.

Biology: Similar to Packard's buckwheat.

Occurrence information for NCA: One occurrence is known from the southeastern corner of NCA, east of Bruneau. Another is known to occur immediately adjacent to the NCA in Bruneau Dunes State Park and likely extends onto the NCA.

EO #	Name	Legal description	County	USGS quad	First Obs.	Last Obs.
005	Bruneau Dunes	T6S R6E S27 (State Park land)	Owyhee	Bruneau Dunes Hot Spring	pre-1986	2000
013	Bruneau Dunes SE	T6S R6E S25 T6S R7E S29,30,31	Owyhee	Hot Spring	1996	2000

EO #	Fire history and disturbance/threat factors	Population information	Size (acres)	EO Rank
005	unburned; weedy nearby; cattle	ca 440 genets	1	C
013	partly burned	ca 30,000 genets	1+	B

Conservation assessment: The NCA contains one cowpie buckwheat occurrence, but it is the largest one known in Idaho. Part of the occurrence burned in the past and would make a good study area to study the effects of wildfire on this species. The bulk of another occurrence (005) is located in Bruneau State Park, but very likely extends onto the adjacent NCA. The majority of other known cowpie buckwheat occurrences in Idaho are on BLM land outside the NCA, thereby linking the long-term conservation of this species to BLM management.

### ***GLYPTOPLEURA MARGINATA***

Scientific name: *Glyptopleura marginata* D.C. Eaton

Common name: White-margined wax plant

Family: Asteraceae (Aster; Composite; Sunflower)

Pertinent synonyms: None

General nontechnical description: White-margined waxplant is a small, tufted, taprooted annual. The leaves form a crowded basal cluster close to the ground, and are toothed to deeply lobed and have prominent white, frosty-looking margins. Most plants range between 1 to 6 inches in diameter. The relatively inconspicuous white flower heads dry to a pinkish color and barely surpass the surrounding series of involucre bracts.

Technical description: Leaves mostly 2-6 cm long and 7-15 mm wide, varying from merely toothed to fairly deeply pinnatifid and again toothed with prominent crustose white margins; involucre 10-14 mm high; heads opening in the morning and closing in mid-afternoon, relatively inconspicuous, the 9-18 white to eventually pink or reddish ligules not surpassing the involucre by more than about 5 mm; achenes 4-5 mm long (Cronquist 1994).

Local field characters: The more or less prostrate, crowded basal cluster of leaves having a glaucous cast and prominent white margins distinguish this species in the field.

Photos and line drawings: An original line drawing can be found in Cronquist (1994). Atwood et al. (2000) contains a reproduction of this drawing and photos.

Global distribution: Southeastern Oregon, southward through western Nevada to San Bernardino County and the White Mountains of California, and eastward irregularly through eastern Nevada, southwestern Idaho, and scattered locations in Utah.

Idaho distribution: Occurrences are known from northern Owyhee and southern Twin Falls counties.

General habitat description: In Idaho, white-margined wax plant occurs in dry, barren to sparsely vegetated openings within desert shrub and sagebrush communities. Substrates vary from sandy and sandy-gravelly soils, to dark cinder exposures, and occasionally desert pavement or old ant mounds. It occurs on a variety of topographic positions, including often in bottomlands or toe slope areas. Sites vary from flat to moderately steep, and aspect is variable. Southwestern Idaho sites occur between approximately 2,300 and 3,200 feet elevation.

Associated species: *Grayia spinosa*, *Atriplex canescens*, *Sarcobatus vermiculatus*, *Tetradymia* spp., *Artemisia tridentata*, *A. spinescens*, *Oryzopsis hymenoides*, *Bromus tectorum*, *Mentzelia albicaulis*, *Chaenactis macrantha*, *Cryptantha circumscissa*, *Astragalus geyeri* (Geyer's milkvetch), and annual *Comissonia* spp.

Other rare plant species: White-margined wax plant is sympatric with several other Special Status plant species in the NCA. It co-occurs with *Astragalus purshii* var. *ophiogenes* at Southeast of Rye Patch (046); with *Chaenactis stevioides* at Chittin Flat (036), South of Castle Butte (044 and 045), Wild Horse Butte (050), and Lower Sinker Creek (053); with *Eatonella nivea* at Fossil Butte NW (022), West Rabbit Creek (032), and East of Wild Horse Butte (051); with *Nemacladus rigidus* at Fossil Butte NW (022), South of Castle Butte (044), and Wild Horse Butte (049 and 050); with *Psathyrotes annua* at Southeast of Rye Patch (046), Wild Horse Butte (049), and Lower Sinker Creek (053). It is also co-occurs with *Nemacladus rigidus* and *Ipomopsis polycladon* at the EnviroSAFE site, just outside the NCA.

Biology: White-margined wax plant is an annual and reproduces by seed. Germination probably occurs early in the spring and flowering begins in late May and early June most years. Like other desert annuals, the number of above ground plants can fluctuate from year to year.

Occurrence information for NCA: Nineteen occurrences are known from the NCA. The majority are located in the western half of the NCA, south of the Snake River between Grand View and Walters Ferry.

EO #	Name	Legal description	County	USGS quad	First Obs.	Last Obs.
014	Con Shea Basin	T2S R1W S4	Owyhee	Initial Point	1980	2000
022	Fossil Butte NW	T3S R1W S29,30	Owyhee	Sinker Butte	1996	1996
028	S.R. 45-SW of Noble Island	T1S R2W S29	Owyhee	Walters Butte	1993	1993
031	Big Foot Bar	T4S R2E S5	Elmore	Jackass Butte	1993	1993
032	West Rabbit Creek	T2S R2W S4,8,9 (extends beyond NCA)	Owyhee	Walters Butte Wilson Peak Murphy	1994	2000
034	Murphy	T2S R2W S21 (extends beyond NCA)	Owyhee	Murphy	1953	1998
036	Chittin Flat	T4S R3E S27,28	Elmore	Dorsey Butte	1995	1997
037	Loveridge Gulch	T7S R6E S2	Owyhee	Hot Spring	1995	1995

EO #	Name	Legal description	County	USGS quad	First Obs.	Last Obs.
038	N of Jackass Butte	T4S R2E S3,10	Elmore	Jackass Butte	1995	1995
044	South of Castle Butte	T4S R1E S13 T4S R2E S18	Owyhee	Castle Butte	2000	2000
045	South of Castle Butte	T4S R2E S30	Owyhee	Castle Butte	2000	2000
046	Southeast of Rye Patch	T4S R1E S5	Owyhee	Castle Butte	2000	2000
047	East of Sinker Creek Butte	T2S R1E S32	Owyhee	Wild Horse Butte	2000	2000
048	West of Wild Horse Butte	T3S R1E S29	Owyhee	Wild Horse Butte	2000	2000
049	Wild Horse Butte	T3S R1E S33	Owyhee	Wild Horse Butte	2000	2000
050	Wild Horse Butte	T3S R1E S27	Owyhee	Wild Horse Butte	2000	2000
051	East of Wild Horse Butte	T3S R1E S24	Owyhee	Wild Horse Butte	2000	2000
052	South of Montini Ranch	T3S R1E S19	Owyhee	Sinker Butte	2000	2000
053	Lower Sinker Creek	T3S R1E S7	Owyhee	Sinker Butte	2000	2000

EO #	Fire history and disturbance/threat factors	Population information	Size (acres)	EO Rank
014	unburned; weedy nearby; farmland nearby	2 subpops; ca 12 genets	0.1	C
022	unburned (1996)	2 subpops; ca 6 genets	0.2	B
028	unknown	ca 6 genets	<0.1	D
031	unburned (1993)	10-100 genets	1	B
032	unburned; ORV; cattle	multiple subpops; 2,000+ genets	175	B
034	unburned; ORV; cattle	multiple subpops; 5,000+ genets	2,000+	B
036	burned; land transfer	2 subpops; ca 30 genets	unknown	D
037	burned	ca 17 genets; not relocated in 2000	1	D
038	unknown	40-60 genets	2	B
044	unburned; land transfer	400+ genets	140	B
045	unburned	multiple subpops; 55+ genets	40	B
046	unburned; ORV nearby	ca 3 genets	0.1	C
047	unburned	ca 7 genets	0.1	C
048	unburned	ca 4 genets	0.1	C
049	unburned; ORV	ca 8 genets	0.2	C
050	unburned; portions weedy	4 subpops; 20 genets	0.1	C
051	unburned	ca 3 genets	<0.1	C
052	unburned	3 subpops; ca 20 genets	<0.1	C
053	unburned	ca 20 genets	0.1	C

Conservation assessment: White-margined wax plant is known from over 50 extant occurrences in Idaho. However, many are very localized and often have a small number of plants. The NCA is important for the conservation of this species for several reasons: (1) several of the largest known occurrences in Idaho are located wholly or partly within the NCA; (2) the area supports approximately 40% of the all known white-margined wax plant occurrences in the state; and (3) most occurrences in the NCA are in unburned, often relatively good condition habitat. The extent of several occurrences in the NCA (e.g., 046, 047, 051, 053) are likely larger than currently reported, but further surveys will be required to fully delineate them. It is very likely additional occurrences will be discovered over time within the NCA, especially if searches are

conducted in a wet year prompting a high germination rate for this small, annual species. Habitat disturbance from ORVs and/or high cheatgrass cover that increases fire risk at several occurrences appear to be the main threats to white-margined wax plant within the NCA. At least two occurrences (036, 044) are located in areas that have been proposed for exchange out of public ownership. The long-term conservation prospects for both occurrences would almost certainly be reduced if this happens.

### ***IPOMOPSIS POLYCLADON***

Scientific name: *Ipomopsis polycladon* (Torr.) V. Grant

Common name: Spreading ipomopsis

Family: Polemoniaceae (Phlox)

Pertinent synonyms: *Gilia polycladon* Torr.; *Navarretia polycladon* Kuntze

General nontechnical description: Spreading ipomopsis is a taprooted annual up to about 6 inches tall. It has several slender, rigid, ascending to spreading, subnaked branches from the base. The herbage is glandular and hairy. Leaves are clustered at the base of the stems and also around each flower head. Those subtending the flower heads are similar or smaller and less lobed or cleft than the basal leaves. The heads terminate each branch and are comprised of up to 20 small white flowers. Anthers and filaments are very small, and positioned just below the corolla lobes. Each sepal lobe has a tiny spiny tip.

Technical description: Taprooted annual or winter annual with several slender, rigid, widely ascending-spreading (but not prostrate) to seldom more narrowly ascending-spreading, subnaked branches from the base, stipate-glandular and crisp-hairy with flattened, multicellular white hairs, the stem more glandular, the leaves more hairy; leaves clustered at the base, few or virtually none on the slender branches, and more or less clustered at the base of the flower heads, tending to form a sort of involucre beneath each head, sometimes well developed within the heads as well; basal leaves mostly 1-3 cm long and 2-10 mm wide, with a few crowded, pinnately disposed, rather broad lobes (or coarse teeth), sometimes drying up before anthesis; cauline leaves few, similar to the basal, or a little smaller and less cleft; flowers in dense, head-like cymose clusters (up to ca 20 per cluster) terminating the branches; calyx 2-6 mm long at anthesis, with thickened, broad, green, spinulose-pointed lobes equaling or a little shorter than the tube, somewhat accrescent in fruit, longer than the capsule and only tardily (if at all) rupturing; corolla small, white or reputedly sometimes pinkish, 3-6 mm long, its small, spreading lobes mostly 1-1.5 (1.8) mm long; filaments short, inserted at or just beneath the sinuses; anthers very small, ca 0.25 mm long, barely exerted; style ca 1-2 mm long, subpersistent; capsule 3-4.5 mm long; seeds few, mostly 2-3(4) per locule, relatively large, 1.5-2.5 mm long, smooth or developing a few coarse, transverse ridges and folds, becoming mucilaginous when wet (Cronquist 1984).

Local field characters: Spreading ipomopsis is readily identified by its slender, rigid, subnaked ascending-spreading stems branching from the base, and terminal, leafy-bracted flower heads. Additional characteristics include the lobed or toothed basal cluster of leaves, the glandular and hairy herbage, and dense head of small white flowers.

Photos and line drawings: An original line drawing can be found in Cronquist (1984). Atwood et al. (2000) contains a reproduction of this drawing and photos.

Global distribution: Mexico, northward to California, west Texas, New Mexico, Arizona, western Colorado and Wyoming, most of Utah and Nevada, southern Idaho, and adjacent Oregon.

Idaho distribution: Idaho is at the northern edge of the species' range. Occurrences are known from Ada, Elmore, and Owyhee counties in the southwestern part of the state, and Butte and Power counties in eastern Idaho.

General habitat description: Spreading ipomopsis occurs in sparsely vegetated openings within open Wyoming sagebrush and desert shrub vegetation in southwestern Idaho. Sites tend to be flat to gently sloping, with silt, sand, or clay soils; also cinders, and gravels. In the eastern part of the state, spreading ipomopsis is usually associated with rocky *Artemisia nova* (black sagebrush) slopes on volcanic substrates.

Associated species: Associated species in southwestern Idaho include *Artemisia tridentata* ssp. *wyomingensis*, *Chrysothamnus* spp., *Tetradymia glabrata*, *Atriplex confertifolia*, *Grayia spinosa*, *Oryzopsis hymenoides*, *Bromus tectorum*, *Stanleya pinnata*, *Mentzelia albicaulis*, and *Phlox* spp. In eastern Idaho they include *Artemisia nova*, *Elymus ambiguus*, and *Agropyron spicatum*.

Other rare plant species: Spreading ipomopsis and *Glyptopleura marginata* are sympatric at the South of Castle Butte occurrence (020). It also co-occurs with *Nemacladus rigidus* at the Envirosafe site, just outside the NCA boundary.

Biology: Spreading ipomopsis is an annual and reproduces by seed. Plants flower between April and June. The number of above ground individuals can fluctuate from year to year.

Occurrence information for NCA: Six scattered occurrences are known from the NCA. One of them (011) may be largely on adjacent private land.

EO #	Name	Legal description	County	USGS quad	First Obs.	Last Obs.
010	Chattin Hill	T5S R3E S1	Elmore	Dorsey Butte	1993	1993
011	Big Foot Bar	T4S R2E S5	Elmore	Jackass Butte	1993	1993
015	C.J. Strike Dam East	T5S R4E S35	Owyhee	C.J. Strike Dam	1995	1995
018	Wilkins Gulch SW	T6S R5E S13 T6S R6E S18	Owyhee	Bruneau	1996	1996
020	South of Castle Butte	T4S R2E S30	Owyhee	Castle Butte	2000	2000
022	Rim Above Swan Falls	T2S R1E S20	Ada	Wild Horse Butte	2001	2001

EO #	Fire history and disturbance/threat factors	Population information	Size (acres)	EO Rank
010	unburned (1993)	10-20 genets	unknown	C
011	unburned (1993)	10-20 genets	unknown	C
015	unburned (1995)	ca 30 genets	unknown	B
018	unburned (1996); ORV nearby	2 subpops; ca 60 genets	0.2	B
020	unburned	2 subpops; 400-600 genets	5	A
022	unburned	ca 20 genets	unknown	B

Conservation assessment: Spreading ipomopsis is known from fewer than 25 occurrences in Idaho. Many are localized and not known to have very many plants, although in some cases this may be an artifact of incomplete survey work. The majority (ca 75%) of occurrences are located in southwestern Idaho, the others in the east-central part of the state. The NCA contains approximately 25% of the known Idaho occurrences. Spreading ipomopsis is a difficult plant to see in the field and it is likely additional occurrences will be found over time within the NCA. Most sites in the NCA are in relatively good ecological condition and a few (e.g., 022) are probably more extensive than presently known. The dry, open, sparsely vegetated habitats occupied by spreading ipomopsis do not typically receive much cattle use. Habitat disturbance from ORVs in open, sandy habitat is a potential threat almost anywhere in the Owyhee Front. All occurrences in the NCA are unburned as far as we know. The vulnerability of spreading ipomopsis sites to weed invasion following wildfire may be less compared to nearby more vegetated habitats. However, some level of habitat degradation could be expected.

### ***LEPIDIUM DAVISII***

Scientific name: *Lepidium davisii* Rollins

Common name: Davis' peppergrass; Davis peppergrass

Family: Brassicaceae (Mustard)

Pertinent synonyms: *Lepidium montanum* Nutt. ssp. *davisii* (Rollins) C.L. Hitchcock

General nontechnical description: Davis' peppergrass is a clump-forming perennial up to about 5 inches tall, with numerous stems emanating from the top of the deep, fleshy root. The slender stems are mostly unbranched and densely pubescent with small, simple hairs. Leaves are sessile, spoon-shaped, with entire to toothed or lobed margins, and only sparsely pubescent. The subcorymbose inflorescence is comprised of small, four-petaled white flowers. Fruits are roundish in outline with a small notch at the apex.

Technical description: Caespitose, deep-rooted perennial forming clumps; roots thick and fleshy, 0.5-2 cm across, expanding at summit and divided into numerous caudex branches; caudex corymbose, the apex of the branches partially invested in old-leaf bases; stems slender, numerous, each terminated by an inflorescence, simple or rarely branched, leafy, 4-8 cm high, densely pubescent with minute whitish simple trichomes; leaves sessile, basal and cauline similar, spatulate, obtuse, greenish, sparsely pubescent, much-exceeding the internodes, 1-2.5 cm long, 2-5 mm wide; inflorescence subcorymbose, slightly elongated; sepals broadly oblong, not persistent, greenish with a broad hyaline margin, ca. 1.5 mm long and 1 mm wide, glabrous to very sparsely pubescent near the base; petals white, spatulate, 2-3 mm long, ca. 1 mm wide above; paired stamens only slightly longer than single stamens; infructescence subcorymbose; pedicels divaricate, pubescent, terete, 3-4 mm long; siliques crowded, ovate, glabrous to sparsely pubescent, slightly winged above, flattened contrary to replum, slightly notched at apex, 3-3.5 mm long, 2-2.5 mm wide; styles ca. 0.5 mm long; seeds wingless, one in each locule; cotyledons accumbent (Rollins 1948).

Local field characters: Davis' peppergrass is a white-flowered, clump-forming perennial mustard occurring on otherwise barren or very sparsely vegetated hard clay bottom playas. *Lepidium papilliferum*, an annual or biennial which sometimes occurs in nearby habitats, is much less compact or "woody" looking, and lacks fleshy, entire-margined leaves.

Photos and line drawings: An original line drawing can be found in Meinke (1982) and has been reproduced in DeBolt and Rosentreter (1988) and DeBolt (1989).

Global distribution: Davis' peppergrass occurs in southwestern and south-central Idaho, southeastern Oregon, and north-central Nevada. Its range is approximately 180 miles east-west, by 90 miles north-south.

Idaho distribution: There are four distribution centers in Idaho: (1) the Mountain Home Desert on the western Snake River Plain between Mountain Home and the Snake River in Ada and Elmore counties; (2) the Owyhee Plateau's Bruneau Desert in south-central Owyhee County; (3) the Salmon Falls Creek area in south-central Twin Falls County; and (4) the South Fork Owyhee River area in the very southwestern corner of the state (Moseley 1995).

General habitat description: Davis' peppergrass occurs in hard clay bottom playas on volcanic plains where the regional vegetation is dominated by sagebrush or, to a lesser extent, desert shrubs such as shadscale. The playas are inundated with up to a foot of water (although usually only an inch or two) during spring seasons with average or above precipitation. The beds dry out during the spring and summer and become hard as concrete. The playas may have no standing water during years with little precipitation. These extreme conditions exclude all but a few other species from growing in the playas. Elevations in Idaho range from approximately 2,900 to 5,500 feet (Moseley 1995).

Associated species: Associated species tend to occur at very low densities in the playas. They include *Atriplex confertifolia*, *Chrysothamnus nauseosus*, *Artemisia cana*, *Sitanion hystrix*, *Astragalus calycosus*, *Iva axillaris*, *Salsola iberica*, and *Halogeton glomerata*.

Other rare plant species: *Allium anceps* (twinleaf onion) co-occurs with Davis' peppergrass in playas near Salmon Falls Creek Reservoir in Twin Falls County.

Biology: Davis' peppergrass flowers in May through August. It reproduces only by seed. It has an extensive taproot and appears to be very long lived (Rosentreter 1986). Insects are probably the main pollinators, but this has not been studied. Seed production is profuse some years and may coincide with wet spring seasons. Other years, possibly related to drought conditions, nearly all fruits appear to abort with little seed production (Bernatus and Moseley 1991).

This species is not dependent on large-scale natural disturbances such as fire. It appears, however, to require smaller-scale disturbance to the soil caused by shrink-swell and/or freeze-thaw cycles that cause cracks in the playa bottom necessary for seedling establishment (Moseley 1995).

Occurrence information for NCA: Davis' peppergrass is known from 39 occurrences within the NCA. A few other occurrences (e.g., 024, 026, 153) are located in close proximity, but outside the NCA boundaries. One occurrence (Tadpole Lake 029) has apparently been extirpated.

EO #	Name	Legal description	County	USGS quad	First Obs.	Last Obs.
022*	Dorsey Butte North	T4S R3E S1	Elmore	Dorsey Butte	1981	1995
024	Line NNW	T4S R4E S16	Elmore	Crater Rings SW	1983	1995
025*	Canyon Creek Playa	T4S R4E S27	Elmore	Crater Rings SW	1979	1995
028	Rattlesnake Creek	T5S R6E S17	Elmore	Bruneau	1945	1993
029*	Tadpole Lake	T3S R2E S11	Ada	Big Foot Butte	1981	1992
033*	Mt Home AFB SW	T5S R5E S6	Elmore	Crater Rings SW	1987	2000
034	Extra SE	T4S R6E S29	Elmore	Crater Rings SE	1987	1995
035	South of Tadpole Lk.	T3S T2E S23, 26	Ada	Big Foot Butte	1995	1995
036	Extra NNE	T4S R5E S1	Elmore	Crater Rings SE	1987	1995
037	Extra North	T4S R5E S2	Elmore	Crater Rings SE	1987	1995
039	Mt Home AFB North	T4S R5E S16,17 (AFB&State land)	Elmore	Crater Rings SE Crater Rings SW	1987	1987
042*	Lower Squaw Cr. W.	T4S R4E S2	Elmore	Crater Rings SW	1987	1995
043	SE Corner of OTA	T4S R4E S3	Elmore	Crater Rings SW	1987	1995
044	Ada/Elmore South	T4S R4E S4,9	Elmore	Crater Rings SW	1987	1995
045*	Canyon Creek East	T4S R4E S12,13	Elmore	Crater Rings SW	1987	1995
046	Line Triangulation Pt.	T4S R4E S21	Elmore	Crater Rings SW	1987	2000
047*	Simco Junction	T4S R4E S1	Elmore	Crater Rings SW	1987	1994
048	Nat. Guard Firing Area	T4S R4E S17	Elmore	Crater Rings SW	1988	1988
049*	Dorsey Butte ENE	T4S R4E S5,8	Elmore	Dorsey Butte	1987	1995
050	Dorsey Butte #2	T4S R4E S6	Elmore	Dorsey Butte	1987	1995
051*	Dorsey Butte NE#1	T4S R4E S7	Elmore	Dorsey Butte	1987	1995
052*	Dorsey Butte East	T4S R4E S8,9,17	Elmore	Crater Rings SW	1987	1995
053	Dorsey Butte ESE	T4S R4E S18	Elmore	Dorsey Butte	1987	1995
054	Dorsey Butte SE	T4S R4E S19	Elmore	Dorsey Butte	1987	1995
055	Dorsey Butte North	T4S R3E S12	Elmore	Dorsey Butte	1982	1995
056*	Ada/Elmore Line	T3S R4E S31	Ada	Dorsey Butte	1987	1995
057	Fraser Reservoir	T3S R5E S20	Elmore	Cinder Cone Butte	1987	1995
058*	Nat. G. Firing Area SE	T3S R4E S28	Ada	Cinder Cone Butte	1987	1995
059	Mt Home AFB Gunnery	T3S R5E S35	Elmore	Crater Rings	1987	1987
060*	Orchard Training Area	T3S R4E S33	Ada	Crater Rings SW	1987	1995
061	Corder Creek	T3S R3E S23	Ada	Little Joe Butte	1986	1995
062*	Big Foot Butte South	T3S R2E S21	Ada	Big Foot Butte	1986	1995
064*	Mt Home AFB West	T4 R5E S30,31	Elmore	Crater Rings SW	1987	1995
084	Mt Home AFB S.A.R.	T4S R5E S4,9	Elmore	Crater Rings SE	1990	1995
085	Mt Home AFB S.A.R.	T4S R5E S4,10	Elmore	Crater Rings SE	1990	1990
089*	N. of Dorsey Butte	T4S R3E S1	Elmore	Dorsey Butte	1987	1995
106	Line Triangulation Pt. S.	T4S R4E S21	Elmore	Crater Rings SW	1987	1995
125	E. of Dorsey Butte	T4S R4E S7	Elmore	Dorsey Butte	1987	1995
126*	Dorsey Butte ENE	T4S R4E S8	Elmore	Dorsey Butte	1987	1995

\* = included in BLM monitoring program for Davis' peppergrass

EO #	Fire history and disturbance/threat factors	Population information	Size (acres)	EO Rank
022	burned landscape	10,000+ genets	3	A
024	burned landscape	numerous	unknown	B
025	burned landscape	ca 2,000 genets	1	B
028	unburned; fence trapping tumbleweed	ca 400 genets	0.2	C
029	burned landscape	-	-	X
033	burned landscape; cattle	300+	unknown	C
034	burned landscape	ca 1,000 genets	1	B
035	unburned; playa disturbed	100+ genets	1	D
036	burned landscape	ca 25 genets	1+	B
037	burned landscape	ca 500 genets	2	C
039	burned landscape	unknown	unknown	unranked
042	burned landscape	1,000+ genets	unknown	B
043	burned landscape	ca 500 genets	unknown	B
044	burned landscape; roads in playa	unknown	10	C
045	burned landscape	5,000+ genets	1+	B
046	burned landscape; cattle	ca 300 genets	unknown	B
047	burned landscape	ca 50 genets	unknown	unranked
048	burned landscape	unknown	unknown	unranked
049	burned landscape	unknown	1+	C
050	burned landscape	ca 10,000 genets	unknown	B
051	unburned (1995)	100,000+ genets	5	A
052	burned landscape	unknown	unknown	C
053	burned landscape	1,000+ genets	unknown	C
054	burned landscape	1,000+ genets	4	C
055	burned landscape	1,000+ genets	10	C
056	unburned (1995)	100-1,000+ genets	unknown	A
057	burned landscape; cattle	200 genets	unknown	C
058	burned landscape; cattle	200-300 genets	3	B
059	burned landscape	unknown	unknown	unranked
060	burned landscape; cattle	1,000+ genets	7	B
061	burned landscape; cattle	unknown	unknown	C
062	unburned; cattle	100+ genets	1	C
064	unburned (1995)	2000+ genets	2	B
084	burned landscape; vehicle traffic	>800 genets	unknown	BC
085	unburned (1990)	>200 genets	unknown	B
089	burned landscape	ca 1,000 genets	1	C
106	burned landscape	ca 500 genets	unknown	B
125	burned landscape	1,000+ genets	unknown	B
126	burned landscape	ca 100 genets	unknown	C

Conservation assessment: There are 172 Davis' peppergrass occurrences in Idaho. At least three (003, 029, 087) of them are considered extirpated. Nearly all Idaho occurrences are located on BLM land, as is the case in Nevada and Oregon. Idaho occurrences range in size from just a few plants to over 100,000 individuals, and many have over 1,000 genets. The Mountain Home Desert population center has 44 occurrences (ca 25% of Idaho total), most of which are found within the NCA. Davis' peppergrass populations appear to be stable throughout

its range except for the Mountain Home Desert area. Populations in this region have shown an overall decline and are the most vulnerable to extirpation. This decline is related to the poor ecological condition of the sagebrush-steppe on the western Snake River Plain (Moseley 1995).

Several threats have been identified for Davis' peppergrass occurrences in the Mountain Home Desert area. Threats operate by directly disturbing plants and/or altering their playa habitat, and include livestock trampling and grazing, stock pond development within the playas, vehicle traffic, and accelerated playa erosion, siltation, and weed invasion associated with rangeland fires (Moseley 1995). Three-quarters of the occurrences within the NCA are located within a burned or partially burned landscape matrix. Most playas in burned habitats have some level of weed invasion. Many Davis' peppergrass occurrences were assigned their high EO Ranks (A and B) prior to the surrounding landscape being burned. Future revisits to these occurrences should re-evaluate these ranks in light of the widespread landscape changes.

A number of conservation actions have been instituted on behalf of Davis' peppergrass within the NCA. Eighteen occurrences in the NCA are part of a BLM monitoring program for Davis' peppergrass. Monitoring sites should be sampled on a schedule that will allow timely intervention by the BLM to protect an occurrence if monitoring indicates it is necessary. In addition, playas with Davis' peppergrass are off limits to military training activities in the Orchard Training Area. Davis' peppergrass conservation in the northern part of its range is obviously dependent on its conservation within the NCA.

### ***LEPIDIUM PAPILLIFERUM***

Scientific name: *Lepidium papilliferum* (L. Henderson) Nels. & Macbr.

Common name: Slickspot peppergrass

Family: Brassicaceae (Mustard)

Pertinent synonyms: *Lepidium montanum* Nutt. ssp. *papilliferum* (L. Henderson) C.L. Hitchcock; *Lepidium montanum* Nutt. ex Torrey & Gray var. *papilliferum* Henderson

General nontechnical description: Slickspot peppergrass is a simple or more commonly an intricately branched taprooted annual or biennial ranging in height from about 1 to 12 inches. It has pubescent stems and pinnate to bipinnate leaves that are divided into linear or oblong segments. Flowers are small, white, four-petaled, and form a tight, roundish, multi-flowered inflorescence. Club-shaped hairs cover the filaments and anthers. The small, orbicular, flattened fruits are about 3 mm long.

Technical description: Annual or biennial with a taproot but no caudex, usually with numerous branches from the root crown and these intricately branched to the inflorescences; stems 1-4 dm long, pubescent especially dense toward the inflorescences with obovate to broadly clavate trichomes, these scalelike when dry; leaves pinnate or the lower somewhat bipinnate with linear to narrowly oblong lobes, glabrous to pubescent especially on the petioles and undersides of the lobes of the upper leaves; sepals glabrous with narrowly scarious margins, erect; petals white, spatulate or the blade broader, ca. 3 mm long; stamens 6, filaments covered with clavate to elator-like trichomes; fruiting pedicels widely spreading, sometimes slightly arched downward, densely to sparsely pubescent, 4-6 mm long; siliques broadly ovate to nearly orbicular, 2.5-3 mm long, glabrous or with a few trichomes on the lower part of the replum; styles exerted from a small but definite U-shaped notch (Rollins 1993).

Local field characters: The basal rosettes of individual plants can be as small as 1 cm in diameter, but range up to about 10 cm. The pinnately dissected rosette leaves are a deep green color, which helps to make plants stand out against the light-colored slick spot surface. Large reproductive plants are easy to distinguish by their basal rosette of dissected leaves, intricate branching pattern, and profusion of small white flowers in a round-topped inflorescence. Smaller reproductive plants can be distinguished by a much reduced scale of the same set of characters. *Lepidium perfoliatum* (clasping peppergrass) is an introduced species also capable of colonizing slick spot microsites. It superficially resembles slickspot peppergrass, but can be distinguished by heart-shaped stem leaves having a clasping base. The species' slick spot microsite habitat is usually quite distinctive within the sagebrush matrix.

Photos and line drawings: A brochure produced by the Idaho Army National Guard has both line drawings and photographs of slickspot peppergrass (Quinney 1998).

Global distribution: Endemic to southwestern Idaho.

Idaho distribution: Known from two distribution centers. The larger one extends across the western Snake River Plain and adjacent northern foothills from near New Plymouth, east to the Glens Ferry area. This is an elongated area about 90 miles long and 25 miles wide and covers portions of Payette, Gem, Canyon, Ada, and Elmore counties. The other distribution center occurs on the Owyhee Plateau, approximately 50 miles south of Glens Ferry and the Snake River Plain, in Owyhee County's Inside Desert.

General habitat description: Slickspot peppergrass occurs in visually distinct "slickspot" microsites created by unusual edaphic conditions within the sagebrush-steppe ecosystem of southern Idaho. Slickspots can be visually distinguished by their whitish- or light-colored pan-like surface and sparse vegetation. Slickspot surfaces are highly reflective and sometimes have patterns of surface cracking as they dry out. Undisturbed slick spots do not possess the uneven soil surface microtopography evident in adjacent areas. Slickspots are edaphically distinguished from surrounding soils by a very thin surface layer that forms a light-colored, prominently vesicular crust, and by the natric-like argillic horizons found just below the soil surface (Fisher et al. 1998). Slickspots are often distributed in a more or less clumpy pattern in a given area. However, in some landscapes they occur as widely scattered individual or more evenly dispersed openings. Slickspots in unburned areas are surrounded by sagebrush vegetation. Burned habitats are typically dominated by annual grassland or forbland vegetation.

Associated species: Very few native plant species are adapted to conditions within the slickspot microsites. Several weed species are the most common and abundant associates within slickspots, especially *Lepidium perfoliatum*, *Ranunculus testiculatus* (bur buttercup), and *Bromus tectorum*. Surrounding unburned habitats are dominated by *Artemisia tridentata* and lesser amounts of *Chrysothamnus* species. *Poa secunda*, and to a lesser extent, *Sitanion hystrix* and *Stipa thurberiana*, are the main native bunchgrasses. The abundance of *Bromus tectorum* can vary tremendously between sites. Native forb abundance and diversity is almost universally low for occurrences along the Snake River Plain. This is generally not the case for sites in the foothills and Owyhee County. Burned areas are typically dominated by *Bromus tectorum* and other weedy species, especially *Sisymbrium altissimum* (tumblemustard). Crested wheatgrass often dominates seeded areas.

Other rare plant species: No other rare plant species occur directly with slickspot peppergrass. In unburned habitats the rare soil lichen, *Texasporium sancti-jacobi*, is sometimes sympatric within the adjacent sagebrush matrix.

Biology: Slickspot peppergrass displays both an annual and biennial life form. It reproduces by seed, with seedlings emerging in early spring and plants flowering during May and June. Some surviving fraction of each cohort sets seeds as summer annuals. Another fraction remains as vegetative rosettes and potentially biennial. Surviving biennials flower and set seed the following year (Meyer et al. 2002). Rare individuals flower both years. The number of above ground plants fluctuates greatly from year to year, with their abundance and survival probably linked to seasonal precipitation patterns. Seeds can persist in the soil for up to 12 years (Meyer et al. 2002), and the seed bank is a critical component of slickspot peppergrass populations. Slickspot peppergrass is pollinated by a variable community of insects (Robertson 2002).

Post-fire changes to slickspots are not well understood at this time. Slickspot peppergrass is known to persist in areas that burned over a decade ago. It has also apparently been extirpated from areas following wildfire. Post-fire mechanical restoration/rehabilitation efforts can cause major disturbance to, and in some cases destroy, slickspot microsites.

Occurrence information for NCA: Nineteen extant and one extirpated occurrence are known from the NCA. Two others (042 - East of Kuna Butte; and 057 - Kuna Butte NW) occur less than 0.1 mile north of the NCA boundary south of Kuna. It would not be surprising if further surveys in the area found both occurrences to extend onto the NCA. The location of an extirpated occurrence (045) south of Mountain Home was originally mapped within one mile, but outside the NCA.

EO #	Name	Legal description	County	USGS quad	First Obs.	Last Obs.
002	Crater Rings	T3S R5E S15	Elmore	Crater Rings	2000	2000
008*	Bennett Road	T4S/5S R8E/9E multiple sections	Elmore	Hammett Hot Spring Ck. Res.	1940	2002
010*	Chalk Flat	T5S R7E S30	Elmore	Indian Cove	1947	2001
018*	Kuna Butte SW	T1N R1W S28, 29, 32, 33	Ada	Kuna	1989	2001
019*	Initial Point	T1S R1W multiple sections	Ada	Initial Point; Kuna; Coyote Butte	1989	2001
024*	Kuna Butte	T1N R1W S2,11	Ada	Kuna	1990	2001
025*	Melba Butte	T1N R1W S20	Ada	Kuna	1990	2001
027*	National Guard OTA	T1S R3E S20, 21,27- 29,32,33	Ada	Orchard Christmas Mtn.	1990	2002
028*	Christmas Mt. N.	T1S R2E S15, 16,21- 23,26, 27,34,35	Ada	Christmas Mtn.	1990	2002
029*	Mt Home SE	T3S R7E S32 T4S R7E S4,5	Elmore	Mountain Home South	1990	2001
035*	Orchard SW	T2S R3E S2,11	Ada	Orchard	1991	2002
041*	Orchard SSW	T2S R3E S1	Ada	Orchard	1992	2002
044	Ada/Elmore Co Line	T3S R4E S33	Ada	Crater Rings SW	1975	1975
046	Rattlesnake Cr.	T5S R6E S20	Elmore	Bruneau	1964	1964
051	Hot Creek Road	T3S R7E S21,22	Elmore	Teapot Dome	2000	2000

EO #	Name	Legal description	County	USGS quad	First Obs.	Last Obs.
053*	Christmas Mtn.	T1S R2E S34 T2S R2E S3	Ada	Christmas Mtn.	1993	2002
059*	Fake Raptor Rock	T2S R3E S12	Ada	Orchard	2001	2002
061*	SE of Reverse	T5S R7E S11	Elmore	Reverse	1995	2001
062	SW of Eureka Cave	T3S R7E S35	Elmore	Reverse	2000	2000
063	Bennett Creek	T5S R8E S2	Elmore	Hot Spring Creek Res.	1998	2000

\* = included in Habitat Integrity Index monitoring program for slickspot peppergrass

EO #	Fire history and disturbance/threat factors	Population information	Size (acres)	EO Rank
002	unburned/near burn; land transfer	ca 170 genets	4+	C
008	burned and unburned; livestock	100 - 10,000+ genets	770	B
010	mosaic burn; cattle	3-25 genets	<0.1	D
018	burned and unburned	0 - 10,000+ genets	280	B
019	burned; mechanical fire rehab.; seeding of forage kochia	<100 – 1,000s genets	780	D
024	mostly burned; mechanical fire rehab	<1000 – 4,000 genets	55	C
025	burned and unburned	0 – 1,000+ genets	35	D
027	unburned; livestock	<5000 – 100,000+ genets	2500	A
028	unburned; livestock	ca 100 – ca 10,000 genets	1800	A
029	unburned/near burn	ca 300 – 2,000 genets	110	C
035	mosaic burn; livestock	ca 20 – 2,000+ genets	150	B
041	burned	0 – ca 1,200 genets	1	D
044	burned	-	-	X
046	probably burned	unknown	unknown	H
051	unburned	ca 7 genets	0.1	C
053	unburned/mosaic burn; livestock	0 – ca 100 genets	30	D
059	unburned/near burn	ca 100 genets	3	C
061	mosaic burn; cattle	ca 125 – 1,000+ genets	14	C
062	unburned; cattle	ca 50 genets	1	C
063	burned	200-300 genets	1	D

Conservation assessment: Slickspot peppergrass has been a high priority conservation concern for the BLM for many years. The decline of this species was highlighted in 2002, when it was proposed for federal listing as Endangered under the Endangered Species Act (U.S. Fish and Wildlife Service 2002). Rangelwide, most extant occurrences, and potential habitat areas are on BLM land. Approximately 30% of all known slickspot peppergrass occurrences are within the NCA. Extant occurrences in the NCA range from small, isolated sites with doubtful long-term persistence (e.g., 010), to large, relatively high quality sites (e.g., 027) critical to the species' long-term conservation. Most occurrences fall between these two extremes. The status of one occurrence (046) in the NCA is based on vague original location and unknown. Another occurrence (044) is considered extirpated. The NCA encompasses southern portions of the Kuna/Boise, Orchard, and Mountain Home/Glenns Ferry slickspot peppergrass population centers. Northern portions of these centers, as well as all of the New Plymouth/Canyon County, Boise/Eagle Foothills, and Inside Desert population centers are located outside the NCA boundaries.

The decline of slickspot peppergrass is linked to the ongoing loss and degradation of the region's sagebrush-steppe ecosystem. Wildfire is the most devastating largescale threat to the ecosystem and integrity of slickspot peppergrass habitat. More than half of all extant occurrences on the NCA are within burned or mosaic burned habitats, and several others are located immediately adjacent to burned areas. All occurrences are vulnerable to future wildfires, the top management challenge regarding slickspot peppergrass conservation. Most occurrences on the NCA receive some level of livestock disturbance, which poses another difficult management challenge. Weed invasion is a serious threat throughout the NCA and invariably linked to disturbance factors.

The majority of occurrences within the NCA are part of a rangewide habitat integrity monitoring program (Mancuso et al. 1998). In addition, several research projects are ongoing or have been proposed to further slickspot peppergrass conservation. The NCA will have a critical role in any regional sagebrush-steppe and related slickspot peppergrass conservation plan. The long-term conservation of slickspot peppergrass along the western Snake River Plain largely depends on its conservation management within the NCA.

### ***NEMACLADUS RIGIDUS***

Scientific name: *Nemacladus rigidus* Curan

Common name: Rigid threadbush

Family: Campanulaceae (Bellflower)

Pertinent synonyms: None

General nontechnical description: Rigid threadbush is a small annual 1-5 inches tall with simple to basally branched spreading, relatively stout stems and greenish-purple or brownish-purple herbage. The small basal leaves have entire to slightly wavy margins. Flower pedicels are spreading-ascending, stiff, and straight and terminated by white flowers with red-margined upper lobes. Sepals are small and unequal.

Technical description: Small, compact annual 1-9(11) cm tall, 2-12 cm across; stems spreading, simple to branched from the base, relatively stout; herbage dark greenish-purple or brownish-purple, puberulent to sparsely pubescent, sometime glabrous above; basal leaves 4-10 mm long, oblanceolate, entire to weakly crenulate; racemes zigzag, the pedicels 3.5-8.5 mm long, spreading-ascending, stiff and straight, the bracts 2-4 mm long, (ob)lanceolate to obovate, conduplicate and arched, blunt-tipped; calyx segments unequal, the larger ones (1.5)2-3(4) mm long, lanceolate to broadly lanceolate, blunt-tipped, the smaller ones obtuse to acute; corolla white, the upper lobes red-margined with a red central nerve, 1-1.5 mm long, the tube 0.2-0.3 mm long; filament tube 1-1.3 mm long, the anthers 0.2-0.3 mm long; capsule half inferior, 2.5-3.5 mm long, acute at the tip, oblique; seeds 0.6-0.7 mm long, ellipsoid (Holmgren 1984).

Local field characters: This diminutive annual is hard to see in the field. It is distinguished by its basally branched habit, greenish-purple or brownish-purple herbage, spreading-ascending, stiff flower pedicels, small, red-margined flowers, and unequal sepals.

Photos and line drawings: An original line drawing can be found in Cronquist (1984). Atwood et al. (2000) contains a reproduction of this drawing and photos.

Global distribution: Southeastern Oregon and southwestern Idaho, south to northeastern California and Nevada.

Idaho distribution: Northern Owyhee County.

General habitat description: In Idaho, this species occurs on dry, open, silty, to more commonly sandy or dark cindery soils in the desert shrub zone. Sites vary from flat to moderately steep, and are usually very sparsely vegetated.

Associated species: *Salvia dorrii*, *Artemisia tridentata*, *Tetradymia* spp., *Chrysothamnus* spp., *Sarcobatus vermiculatus*, *Grayia spinosa*, *Atriplex confertifolia*, *Oryzopsis hymenoides*, *Bromus tectorum*, *Mentzelia albicaulis*, *Penstemon acuminatus*, *Cryptantha circumscissa*, and *Astragalus* spp.

Other rare plant species: Rigid threadbush co-occurs with *Eatonella nivea* and *Glyptopleura marginata* at Fossil Butte NW (008); with *Glyptopleura marginata* and *Psathyrotes annua* at West of Wild Horse Butte (016); and with *Chaenactis stevioides* and *Glyptopleura marginata* at Wild Horse Butte (017). Rigid threadbush is also sympatric with multiple rare desert annuals at the EnviroSAFE sites just outside the NCA.

Biology: Rigid threadbush is an annual and reproduces by seed. Plants flower May through June and population numbers can fluctuate from one year to the next. Effects of fire and associated habitat degradation on rigid threadbush have not been studied. Habitat changes such as large increases in weed abundance may be detrimental to rigid threadbush due to increased competition or other ecological interactions.

Occurrence information for NCA: Three occurrences are known from the NCA south of the Snake River between Grand View and Murphy. Information is included here for two others located at the EnviroSAFE site within 0.3 mile of the NCA boundary.

EO #	Name	Legal description	County	USGS quad	First Obs.	Last Obs.
008	Fossil Butte NW	T3S R1W S29	Owyhee	Sinker Butte	1996	1996
014	South of Castle Butte	T4S R2E S19 (outside NCA)	Owyhee	Castle Butte	2000	2000
015	South of Castle Butte	T4S R2E S18 (outside NCA)	Owyhee	Castle Butte	2000	2000
016	W. of Wild Horse Butte	T3S R1E S29	Owyhee	Wild Horse Butte	2000	2000
017	Wild Horse Butte	T3S R1E S27	Owyhee	Wild Horse Butte	2000	2000

EO #	Fire history and disturbance/threat factors	Population information	Size (acres)	EO Rank
008	unburned (1996)	7 genets	<0.1	B
014	unburned; EnviroSAFE expansion	105+ genets	<0.1	B
015	unburned; EnviroSAFE expansion	10+ genets	<0.1	B
016	unburned; ORV nearby	4 genets	<0.1	B
017	unburned	2 genets	<0.1	B

Conservation assessment: Rigid threadbush occurrences in Idaho are characterized by scattered individual or small clusters of plants. This low density distribution is often very localized, but in the largest occurrences can extend over several acres. The largest known rigid threadbush occurrences in Idaho are located south of the NCA in the Murphy area. Even these typically contain only a few hundred plants at most. The three known NCA occurrences are all tiny. They appear to be relatively secure, although their small size makes them vulnerable to even a single large disturbance event. ORVs, livestock grazing, and other disturbances are presently not a problem. Open habitats with rigid threadbush are attractive to ORV riders, and off-road use presently does occur near one occurrence (016). The two rigid threadbush occurrences located near the NCA at Envirosafe are vulnerable to habitat alteration/destruction associated with expansion of the hazardous waste site. This threat is imminent at one occurrence (014). The small size and usually small number of individuals combine to make surveying for rigid threadbush difficult. Additional occurrences will probably be discovered in the NCA in the future, most likely in the Murphy area.

### ***PSATHYROTES ANNUA***

Scientific name: *Psathyrotes annua* (Nutt.) A Gray

Common name: Turtleback

Family: Asteraceae (Aster; Composite; Sunflower)

Pertinent synonyms: *Bulbostylis annua* Nutt.

General nontechnical description: Turtleback is a taprooted annual, or perhaps sometimes perennial herb that forms loose mats or low mounds up to 12 inches wide, although it is often much smaller. Scruffy hairs thinly cover the small, toothed leaves. Heads have 10–30 yellowish discoid flowers subtended by involucre bracts in two series. The outer bracts are broader and more herbaceous than the inner series. The pappus consists of 35–50 bristles arranged in a single series, and achenes are densely hairy.

Technical description: Annual or reputedly sometimes short-lived perennial, forming loose mats or open, low mounds up to 1.5 dm high and 3 dm wide; leaves thinly tomentose and scurfy, with a broad, angularly few-toothed, basally trinerved blade mostly 0.5-1.5 cm long and 0.5-2 cm wide; petiole about as long as or somewhat shorter than the blade; involucre mostly 5-7 mm high, with ca 8 or ca 13 inner bracts; outer involucre bracts loosely erect or distally recurved, broader and more herbaceous than the inner, mostly 1-2 mm wide, often broadly rounded above; flowers (10)13-16(30) per head; pappus of 35-50 relatively coarse, tawny or rufous bristles in a single series; achenes densely beset with straight, ascending tawny or rufous hairs ca 0.5-1 mm long (Cronquist 1994).

Local field characters: The low, fuzzy, freely branching plants have a strong bluish-green cast, yellowish flower heads that seem to sit atop the foliage, and roundish, toothed leaves. This combination of characters makes this plant distinctive and quite striking.

Photos and line drawings: An original line drawing can be found in Cronquist (1994). Atwood et al. (2000) contains a reproduction of this drawing and photos.

Global distribution: Northwestern Arizona, California, Nevada, western Utah, and disjunct in southwestern Idaho.

Idaho distribution: Northern Owyhee County.

General habitat description: In Idaho, turtleback occurs on barren to sparsely vegetated openings on sandy or cindery (one report of ashy) edaphic sites in the desert shrub zone. It occurs on level, to moderate, or occasionally steep slopes, and on various aspects.

Associated species: *Chrysothamnus* spp., *Tetradymia* spp., *Artemisia tridentata* ssp. *wyomingensis*, *Sarcobatus vermiculatus*, *Grayia spinosa*, *Atriplex confertifolia*, *Atriplex canescens*, *Eriogonum* spp., *Oryzopsis hymenoides*, *Bromus tectorum*, *Mentzelia albicaulis*, *Langloisia punctata*, *Malacothrix glabrata* (smooth desert-dandelion), and *Astragalus* spp.

Other rare plant species: Turtleback is sympatric with *Chaenactis stevioides*, *Glyptopleura marginata*, and *Nemacladus rigidus* within the NCA. It is known to co-occur with *Peteria thompsoniae* outside the NCA.

Biology: Turtleback is generally an annual and reproduces by seed. Plants flower late May through August, and population numbers and the size of plants can vary one year to the next. Effects of fire and associated habitat degradation on turtleback have not been studied. The ability of fire to carry through its open, relatively sparsely vegetated habitat is probably limited.

Occurrence information for NCA: Six occurrences are known from the southwestern segment of the NCA. One (007) occurs very close to the NCA boundary and may at least partially be on private land.

EO #	Name	Legal description	County	USGS quad	First Obs.	Last Obs.
001	Wild Horse Butte	T3S R1E S29,32	Owyhee	Wild Horse Butte	1993	2000
002	NW of Wild Horse Butte	T3S R1E S21	Owyhee	Wild Horse Butte	1992	1992
007	Sinker Creek Butte	T3S R1W S2	Owyhee	Sinker Butte	1998	1998
008	SE of Rye Patch	T4S R1E S5	Owyhee	Castle Butte	2000	2000
009	Lower Sinker Creek	T3S R1E S7	Owyhee	Sinker Butte	2000	2000
010	South of Montini Ranch	T3S R1E S18,19	Owyhee	Sinker Butte	2000	2000

EO #	Fire history and disturbance/threat factors	Population information	Size (acres)	EO Rank
001	unburned; ORV nearby	1000+ genets	20	A
002	unburned	4 genets	<0.1	C
007	unburned	11 genets	<0.1	C
008	unburned; ORV nearby	27+ genets	<0.1	B
009	unburned	100-200 genets	0.2	B
010	unburned	3 subpops; 100-200 genets	0.1	B

Conservation assessment: Turtleback populations in southwestern Idaho are disjunct from the species' main range further south. This species was not even known to occur in Idaho until 1992. Half of Idaho's 12 known turtleback occurrences are located in the southwestern segment of the NCA. The other main population center in the state is south of Bruneau (e.g., Horse Hill area). Wild Horse Butte (001), within the NCA, is by far the largest occurrence documented in the state. It is worthy of special management attention regarding turtleback conservation on

BLM lands in Idaho. All other occurrences in the NCA, and most others south of Bruneau, have a more limited extent and relatively few plants. Habitat conditions are generally good for sites in the NCA. The open, sparse vegetation and high bare ground cover probably protects these sites from direct fire impacts, but makes them vulnerable to ORV travel. Minimal forage availability limits cattle use at the sites. ORV use has been documented near a few occurrences and is potentially the main anthropogenic disturbance threat.

### ***STANLEYA CONFERTIFLORA***

Scientific name: *Stanleya confertiflora* (Robinson) Howell

Common name: Malheur prince's plume; biennial stanleya

Family: Brassicaceae (Mustard)

Pertinent synonyms: *Stanleya viridiflora* Nutt ex Torrey & Gray var. *confertiflora* Robinson; *Stanleya annua* M.E. Jones

General nontechnical description: Malheur prince's plume is a taprooted biennial ranging from about 8 inches to nearly 3 feet tall. Plants are glabrous (without hairs) and glaucous (having a whitish to bluish waxy coating), with a single erect stem that may be branched in the inflorescence. The cluster of basal leaves are sessile or nearly so, while the stem leaves are sessile and have auricled leaf bases. All the leaves have entire margins. The inflorescence is a dense, elongated, beautiful raceme of slender dull yellow to cream-colored flowers a little less than 1 inch long. The elongated fruits (siliques) are approximately 1 to 2 inches long, nearly round in cross section, and attached to slender, widely spreading or ascending pedicels.

Technical description: Annual or biennial, glabrous throughout except on lower petioles of young plants, usually glaucous; stems single, erect, simple or rarely branched above, leafy, 3-8 dm high; basal leaves obovate, obtuse, entire, shortly petiolate; cauline leaves all sessile except the lowermost, crowded, sagittate, glabrous, lanceolate, acute, entire, 4-16 cm long, 1-4 cm wide; inflorescences densely racemose, 1-4 dm long; sepals linear-oblong, glabrous, lemon yellow, spreading or reflexed at anthesis, slightly dilated at base, 8-12 mm long, ca. 2 mm wide; petals linear, lemon yellow, glabrous, not markedly differentiated into blade and claw, very slender toward base, 1.5-2.5 cm long, ca. 1 mm wide; stamens exceeded by petals, filaments glabrous, nectar glands poorly developed, merely subtending all the filaments; fruiting pedicels divaricately ascending, glabrous, rather slender, 1-2 cm long; siliques nearly terete, glabrous, erect, nearly straight, nerved from base to apex, 2-4 cm long; gynophores slender, glabrous, 1-2 cm long; styles evident, 1-2 mm long; seeds numerous, brown, wingless, oblong, plump, ca. 2 mm long, ca. 1 mm broad; cotyledons incumbent to obliquely accumbent (Rollins 1993).

Local field characters: Malheur prince's plume is a stunning plant. Useful field characteristics include its glabrous, glaucous, nearly succulent appearance; entire-margined, clasping, sessile stem leaves; and profusion of dull yellow or cream flowers along an elongated raceme. It is not likely to be confused with anything beside other *Stanleya* species. The range of Malheur prince's plume overlaps the distribution of two other congeners. *Stanleya viridiflora* (perennial prince's plume) can be separated by its perennial habit, basal leaves with evident petioles, and fruits on stout, arcing pedicels 4-7 cm long. *Stanleya pinnata* var. *pinnata* (bushy prince's plume) can be distinguished by its perennial habit, vibrant yellow-colored flowers, deeply lobed basal leaves, and stem leaves that are not sessile (Mancuso 1997).

During certain years, populations of Malheur prince's plume apparently contain few if any flowering individuals. However, old skeletons may persist for at least a year. These skeletons can look superficially similar to skeletons of *Caulanthus crassicaulis* (thick-stemmed wild cabbage). This other mustard species is widespread and locally common in southwestern Idaho.

Photos and line drawings: Line drawings of Malheur prince's plume appear in Abrams (1944), Hitchcock (1964), and Atwood et al. (2000). Color plates are in Meinke (2001) and Gisler and Meinke (2002).

Global distribution: Endemic to eastern Oregon and adjacent southwestern Idaho.

Idaho distribution: Known from near Weiser in Washington County, northwestern Owyhee County, and a disjunct population in the Mount Bennett Hills, Gooding County.

General habitat description: Malheur prince's plume typically occurs on open, relatively sparsely vegetated, clay soil exposures in the sagebrush or desert shrub zone. Shrubs are sparse or absent on these exposures. Several native or exotic annual species are common associates at a number of populations. Malheur prince's plume is most common on northwest to northeast aspects, although it can occur on other aspects as well. It occurs on nearly flat to steep slopes, and from top to bottom slope positions. Elevations range from approximately 2,400 to 5,000 feet.

Associated species: In Idaho, most associated species are annuals such as *Cleome platycarpa* (golden spiderflower), *Cleomella macbrideana* (Macbride's cleomella), *Mentzelia albicaulis*, *Phacelia lutea* (yellow phacelia), *Gayophytum* spp. (groundsmoke), annual *Eriogonum* spp. (buckwheat), *Descurainia* spp., *Lepidium perfoliatum*, *Halogeton glomerata*, and *Bromus tectorum*. A few perennial species noted at one or more sites include *Atriplex confertifolia*, *Eriogonum ochrocephalum* (whitewooly buckwheat), *Oryzopsis hymenoides*, and *Lomatium nudicaule* (barestem biscuitroot). Occurrences are surrounded by shrub-steppe or desert shrub vegetation dominated by *Artemisia arbuscula*, *Artemisia tridentata*, or *Atriplex confertifolia* (Mancuso 1997). *Helianthus cusickii* (Cusick's sunflower) is a common associate in the Vale area of Oregon (Geertson 1999).

Other rare plant species: Malheur prince's plume is sympatric with four other rare plant species at a site in Owyhee County (Dead Horse Creek) - *Chaenactis cusickii* (Cusick's false yarrow), *Lomatium packardiae* (Packard's desert-parsley), *Mentzelia mollis* (smooth stickleaf), and *Phacelia lutea* var. *calva* (Malheur yellow phacelia). It is associated with *Eriogonum ochrocephalum* at one site near Weiser (Buttermilk Slough) and several in Oregon. It is uncertain whether this is one of the common varieties of *E. ochrocephalum*, or the more rare variety *calcareum*.

Biology: Malheur prince's plume flowers during May and June. It is likely a biennial (Gisler and Meinke 2002) and reproduces by seed. Populations tend to be localized and plant abundance can fluctuate widely from one year to the next. No plants may be observed during some dry years. Reproductive studies indicate Malheur prince's plume is self-compatible and capable of autogamous pollination in the absence of pollinators, although seed production under this condition is significantly lower compared to open-pollinated fruits. Inventories of insects visiting this species reveal it attracts an amazing diversity and abundance of visitors (Gisler and Meinke 2002). Seed bank information is lacking at this time.

Effects of fire and other disturbances on Malheur prince's plume have not been studied. It would be difficult for fire to carry through some populations due to the relatively sparse vegetation. However, abundant cheatgrass at some populations may be sufficient to carry a fire that could damage or kill Malheur prince's plume plants. Habitat changes from fire such as increased cheatgrass abundance may be detrimental because of increased competition or other ecological interactions.

Occurrence information for NCA: Two occurrences are known from the NCA, both north of Oreana.

EO #	Name	Legal description	County	USGS quad	First Obs.	Last Obs.
003	Rye Patch North	T3S R1E S30,31 T3S R1W S25	Owyhee	Oreana Sinker Butte	1980	1997
007	Rye Patch	T4S R1E S7	Owyhee	Oreana	2000	2000

EO #	Fire history and disturbance/threat factors	Population information	Size (acres)	EO Rank
003	unburned; ORV	series of subpops; ca 1,000 genets	12	A
007	unburned; ORV nearby	ca 25 genets	1	B

Conservation assessment: Conservation concern has increased for Malheur prince's plume in recent years as the degree of its rarity and range and level of threats have become better known. Field surveys in both Oregon (Geertson 1999; Gisler and Meinke 2002) and Idaho (Mancuso 1997) indicate this species is very uncommon in its range and that most populations are limited in size. It is clear the number of above-ground plants can fluctuate greatly between years. Because of its biennial habit and apparent capability of prolonged seed dormancy, the number of plants is by itself an inadequate measure of population quality. Habitat quality and area are other attributes that need to be used to assess a population's conservation status.

Fewer than ten Malheur prince's plume occurrences are known for Idaho. At least three are located on private land and present limited conservation options. Within the NCA, Rye Patch North (003) is by far the largest occurrence known for Idaho. In light of increasing ORV and weed invasion impacts, this occurrence is worthy of heightened conservation concern and management action by the BLM. ORV and weed invasion impacts are presently not as great at Rye Patch (007), but the potential for their increase is real. Most Idaho populations occur in areas open to livestock, but grazing and related disturbances on Malheur prince's plume habitat appear to be limited at this time.

### ***TEUCRIUM CANADENSE VAR. OCCIDENTALE***

Scientific name: *Teucrium canadense* var. *occidentale* (A. Gray) McClintock & Epling

Common name: American wood sage; American Germander

Family: Lamiaceae (Mint)

Pertinent synonyms: *T. occidentale* A. Gray; *T. canadense* ssp. *occidentale* W.A. Weber

General nontechnical description: American wood sage is a rhizomatous perennial with solitary, erect stems 8 inches to 3 feet tall. Plants are hairy, with many of the hairs gland-tipped, especially in the inflorescence. The more or less broadly lance-shaped leaves are toothed along the margin and 1 to 4 inches long. Flowers are arranged in a crowded, terminal, bracteate, spike-like inflorescence. The purplish flowers are roughly 0.5 to 1 inch long, and have an upper lip larger than the other petals. Two of the calyx teeth are longer than the other three.

Technical description: Rhizomatous perennial with solitary, erect stems 2-10 dm tall, spreading-hairy throughout, or the hairs of the upper leaf surfaces appressed, many of the hairs, especially in the inflorescence, gland-tipped; lower leaves deciduous, the others short-petiolate, with lance-ovate to narrowly elliptic or lance-oblong, serrate blade 3-10 cm long and 1-4 cm wide; inflorescence a crowded, spiciform raceme 5-20 cm long, with slender bracts about 1 cm long or less; calyx 5-7 mm long, the three upper teeth deltoid or broader and acutish to obtuse, the two lower longer and lance-subulate; corolla purplish, 11-18 mm long, the upper lip longer than the tube and with broad, declined central lobe, the corolla cleft on the upper side to the mouth of the campanulate calyx (Cronquist 1959).

Local field characters: Useful field characteristics include: (1) plants generally tall, with solitary, erect stems, and spreading hairs that are often gland-tipped; (2) purplish flowers arranged in a terminal, bracteate, spike-like inflorescence; (3) flowers with a large upper lip and exerted stamens; and (4) ovary and fruit merely lobed, not cleft to the base. American wood sage is most likely to be confused with the genus *Stachys*. However, plants of this other mint genus have axillary, as well as apparently terminal inflorescences, spine-tipped calyx teeth, stamens only minimally exerted, and two-lipped flowers.

Photos and line drawings: A line drawing of American wood sage can be found in Cronquist (1959). A reproduction of this drawing and a photo are in Atwood et al. (2000).

Global distribution: Widespread in the United States, except in the southeastern states, and also occurring across most of Canada, and south into Mexico. It is less common in the western states compared to further east.

Idaho distribution: Scattered populations along the Snake, Boise, Owyhee, and Bruneau river systems in Idaho, Washington, Canyon, southern Ada, and northern Owyhee counties.

General habitat description: River and stream banks, and moist bottom lands.

Associated species: Associates listed for Idaho occurrences include *Juncus balticus* (Baltic rush), *Urtica dioica* (stinging nettle), *Typha latifolia* (cattail), *Carex sheldonii* (Sheldon's sedge), and *Betula occidentalis* (water birch).

Other rare plant species: Not known to occur with other BLM Special Status plants in Idaho.

Biology: Plants flower June through August and reproduce vegetatively by rhizomes and also by seed. American wood sage is probably sensitive to site hydrology and actions that would alter this regime.

Occurrence information for NCA: Three occurrences are known from the NCA. All of them are located along the Snake River in the western half of the NCA. We were unable to relocate the occurrence reported for Halverson Lake (002) in September 2000.

EO #	Name	Legal description	County	USGS quad	First Obs.	Last Obs.
002	Halverson Lake	T1S R1W S32	Ada	Initial Point	1975	1975
003	Guffey Butte	T1S R2W S36	Owyhee	Walters Butte	1971	1971
008	TNC Tract-SRBOP	T2S R1E S31 T3S R1E S6	Ada	Sinker Butte	1997	2000

EO #	Fire history and disturbance/threat factors	Population information	Size (acres)	EO Rank
002	unburned	unknown	unknown	F
003	unknown	unknown	unknown	not ranked
008	unburned; noxious weeds	2 subpops; ca 150 genets	3	A

Conservation assessment: American wood sage apparently occurs in widely scattered populations along the major river systems in southwestern Idaho. Two of the eight known occurrences in the state are based on old herbarium collections with vague location information. Occurrence information is minimal and well over a decade old for several other reported sites. No occurrences seem to cover a large area, or contain very many plants, and overall, not much is known about this species in Idaho. We were unable to relocate the Halverson Lake occurrence (002) during our survey. Its disposition remains unclear at this time. Purple loosestrife (*Lythrum salicaria*) and several other weed species were observed near one occurrence (008) within the NCA. They pose a potential threat to this occurrence and may warrant control measures.

### ***TEXOSPORIUM SANCTI-JACOBI***

Scientific name: *Texosporium sancti-jacobi* (Tuck.) Nadv.

Common name: Woven-spore lichen

Family: Caliciaceae

Pertinent synonyms: *Acolium sancti-jacobi* Tuck.; *Cyphelium sancti-jacobi* (Tuck.) Zahlbr.

General nontechnical description: Woven-spore lichen forms an inconspicuous whitish to grayish crust on soil and organic matter. The apothecia (reproductive structures) are typically circular, 0.5-1.5 mm in diameter, and have a dark blackish, powdery center tinged with yellow. The rims of the apothecia are whitish. The edges of the blackish disk are distinctly yellowish or greenish tinged. The apothecia tend to occur in clusters seldom larger than 1 cm in diameter (McCune 1992).

Local field characters: The apothecia for woven-spore lichen are relatively distinctive and easier to spot in the field than the lichen thallus (McCune 1992). Look for the distinctive whitish-margined apothecia with a dark olive powdery spore mass. The spores will dislodge from the apothecia when touched. Woven-spore lichen may be confused with other whitish soil crusts that produce dark soredia in roundish or irregular soralia. These other soralia generally do not have a thalline margin and tend to be smaller than the apothecia of woven-spore lichen. Microscopically, the unique fungal hyphae covering the spores of woven-spore lichen are

diagnostic (Washington Natural Heritage Program 2001). Woven spore lichen is always locally rare. Even at sites where it is known to occur, it may take a trained observer half an hour or more to find a colony. It often occurs on dead bunchgrass stubble thoroughly impregnated with soil, or old, partly decomposed small mammal scat (McCune 1992).

Photos and line drawings: Photographs can be found in rare plant field guides by Atwood et al. (2000) and the Washington Natural Heritage Program (2001).

Global distribution: A very spotty distribution in the western United States. Populations are known from southwestern Idaho, central Oregon, and California.

Idaho distribution: Restricted to southwestern Idaho in Ada and adjacent western Elmore counties.

General habitat description: Woven-spore lichen occurs in arid to semi-arid grasslands, shrublands, or savannas. Soil texture and depth can vary greatly and seem to be less important than soil chemistry. Parent material is apparently always non-calcareous, and non-saline (McCune and Rosentreter 1992). In Idaho, this lichen occurs in big sagebrush shrub-steppe habitats with more or less flat topography.

Associated species: In Idaho and Oregon, woven-spore lichen sites typically have a well developed soil crust. Associated lichens include *Acaropora scheicheri*, *Aspicillia reptans*, *Buellia punctata*, *Candelariella terrigena*, *Cladonia pocillum*, *Collema* spp., *Diploschistes muscorum*, *Lecanora muralis*, *Phaeorrhiza sareptana*, and *Psora* spp. All Idaho populations are associated with sagebrush vegetation. Vascular plant associates include *Artemisia tridentata* ssp. *wyomingensis*, *Chrysothamnus nauseosus*, *Poa secunda*, *Sitanion hystrix*, *Agropyron spicatum*, and *Stipa* spp. (McCune and Rosentreter 1992)

Other rare plant species: Woven-spore lichen and *Lepidium papilliferum* are sympatric in several places.

Biology: Woven-spore lichen is most readily recognized during periods of moisture (winter and spring) when the colors of the apothecia are most prominent. Wind is the primary dispersal agent for most fungal spores. No information is available for this species regarding spore establishment. Woven-spore lichen is associated with older sagebrush stands in southwestern Idaho. Conditions for its establishment may not be met in early seral vegetation. Woven-spore lichen has been extirpated from several areas following wildfire.

Occurrence information for NCA: Nine occurrences are known from the NCA, two of which have been extirpated. Most are located close to the northern boundary of the NCA between the Kuna and Orchard areas.

EO #	Name	Legal description	County	USGS quad	First Obs.	Last Obs.
002	Cinder Cone Butte	T2S R4E S28,29	Ada	Cinder Cone Butte	1993	1998
005	Kuna Butte East	T1N R1W S11	Ada	Kuna	1994	1994
006	Orchard Southwest	T2S R3E S2	Ada	Orchard	1994	1994
007	Higby Cave East-Red Tie Area	T1S R3E S28, 29,32,33	Ada	Orchard	1993	1996

EO #	Name	Legal description	County	USGS quad	First Obs.	Last Obs.
010	Owyhee Southwest	T1N R2E S20, 28,29,33	Ada	Owyhee	1983	1988
013	N of Initial Point	T1N R1E S30,31	Ada	Kuna; Initial Point	1995	1995
018	E. of Wild Horse Butte	T3S R1E S24	Ada	Wild Horse Butte	2000	2000
019	N of Christmas Mtn	T1N R2E S35,36	Ada	Christmas Mtn.; Owyhee	2000	2000

EO #	Fire history and disturbance/threat factors	Population information	Size (acre)	EO Rank
002	unburned (1998)	100-150 clumps	2	BC
005	burned	-	-	X
006	burned and unburned; livestock	ca 1,000 clumps	350	C
007	unburned (1996); livestock	several 1,000 clumps	750	AB
010	burned (20-30 years ago) and unburned	several 100 clumps	>100	BC
013	burned	-	-	X
018	unburned	1 clump	<0.1	C
019	unburned	2 subpops; ca 25 clumps	0.1	B

Conservation assessment: Woven-spore lichen is known from 18 extant occurrences in southwestern Idaho. Another three are considered extirpated, including two within the NCA. A few occurrences are located on private land, but the majority are on land administered by the BLM. Occurrences vary in size from less than 1 over 100 acres, with a majority in the less than 5 acre range. Lichen abundance is also variable, ranging from a few to over 1,000 clumps or colonies. Occurrences in the NCA, especially in the Orchard Training Range, are among the largest known. They are critical to the species long-term conservation in Idaho. The two woven-spore lichen extirpations followed habitat loss from wildfire, which looms as the most serious threat to remaining unburned occurrences. Other disturbances such as livestock grazing and military training can have negative impacts, at least on a local scale. Like slickspot peppergrass, the conservation of woven-spore lichen is closely linked to conservation actions on behalf of the regional sagebrush-steppe ecosystem. With some of the largest blocks of relatively intact sagebrush left in the western Snake River Plain the NCA will be an important contributor to any regional sagebrush conservation plans.

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## Appendix 1

List of survey areas for the Snake River Birds of Prey National Conservation Area, BLM Special Status plant inventory project.

## Appendix 2

Element Occurrence Records for BLM Special Status plant species occurring in the Snake River Birds of Prey National Conservation Area.

### Appendix 3

Map locations of BLM Special Status plant species within the Snake River Birds of Prey National Conservation Area.