

**FIELD INVESTIGATION FOR *LEPIDIUM PAPILLIFERUM* (SLICKSPOT PEPPERGRASS) ON
IDAHO BLM LANDS IN THE MOUNTAIN HOME-GLENN'S FERRY AREA**

by

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ABSTRACT

Lepidium papilliferum (slickspot peppergrass) is an annual or biennial forb endemic to southwestern Idaho that has seen much of its original sagebrush-steppe habitat destroyed or seriously degraded over the past century. The documented downward conservation trend of this species resulted in it being made a Candidate species for listing under the Endangered Species Act in 1999. In 2000, the Bureau of Land Management and Conservation Data Center entered into a Challenge Cost-share agreement to conduct a field investigation for *Lepidium papilliferum* in the Mountain Home to Glens Ferry corridor, an area known to have unsurveyed potential habitat for this species. We visited over 20 areas and searched approximately 5,000 acres. Three new occurrences, and additions to one previously known occurrence were discovered during the field investigation. The occurrences contained a total of fewer than 3,000 *Lepidium papilliferum* plants and covered under five acres.

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INTRODUCTION

Lepidium papilliferum (slickspot peppergrass) is an annual or biennial forb endemic to southwestern Idaho. Much of its original sagebrush-steppe habitat has been lost to agricultural and urban development, while an ever-increasing amount has converted to annual grassland or seeded grassland vegetation as a result of wildfires or associated rehabilitation programs. Furthermore, the sagebrush habitat that remains is largely in an impoverished ecological condition due to over a century of intensive use. A direct consequence of this habitat loss and degradation has been the outright loss or reduction in size of many populations. This downward conservation trend resulted in *Lepidium papilliferum* being added to the federal Endangered Species Act Candidate list in 1999 (U.S. Fish and Wildlife Service 1999). Detailed population, life history, habitat, distribution, and other information concerning this species has been outlined elsewhere (e.g., Fisher et al. 1996; Moseley 1994; Quinney 1998).

Rangewide, the majority of known *Lepidium papilliferum* occurrences are located on lands administered by the Bureau of Land Management (BLM). Most of the areas containing additional unsurveyed habitat are also BLM land. The BLM has a leading role in the management and conservation of *Lepidium papilliferum* because of these ownership patterns. Even though *Lepidium papilliferum* has received a relatively large amount of field investigation, substantial gaps remain in documenting the distribution, abundance, and threats in several areas across the species' range. Until more of this information is known, it will be difficult to design a rangewide conservation plan, or implement potentially controversial management actions on behalf of *Lepidium papilliferum*.

As this species has become a priority for the Idaho BLM, the agency has made a concerted effort to conduct additional field surveys and fill in these information gaps. In 2000, the BLM's Lower Snake River District and the Idaho Department of Fish and Game's Conservation Data Center (CDC) entered into a Challenge Cost-share agreement to conduct a field investigation for *Lepidium papilliferum* to further this effort.

METHODS

Our field investigation focused on known or suspected suitable habitat on BLM land north of Interstate 84 between Mountain Home and Glenns Ferry, in Elmore County. This area marks the northeastern edge of the species' range. Prior to initiating field work I met with the BLM to prioritize target areas and review the type of information to be collected. Fieldwork was conducted between June 5 and June 21, 2000. During this time we visited over 20 different areas and surveyed approximately 5000 acres. We documented all our survey routes as polygons on the appropriate USGS topographic map quadrangle (Appendix 1). At each survey area we collected information concerning vegetation, fire history, abundance and condition of slickspot microsites, and degree of livestock use, regardless if *Lepidium papilliferum* was present or not. This descriptive information is summarized in the Results section of this report. If *Lepidium papilliferum* was found, additional population, habitat, and threat information was recorded. The new locations were also drawn on USGS topographic map quadrangles (Appendix 2). In addition, each new site received a GPS reading (Appendix 3). These readings represent single, or small clusters of slickspots having *Lepidium papilliferum*. Multiple GPS readings were taken for sites with more widely scattered clusters of occupied slickspots.

RESULTS

Three new occurrences and additions to one previously known occurrence were discovered during our field investigation. One of the new occurrences was expanded as a result of additional survey work by BLM botanists during the field season. All of the new locations consisted of a relatively small number of slickspot microsites occupied by *Lepidium papilliferum*. They were surrounded or in close proximity to similar-looking habitat where *Lepidium papilliferum* was not found. Several survey areas lacking *Lepidium papilliferum* had habitat conditions that appeared identical to locations that did have *Lepidium papilliferum*. This spotty distribution within a larger area of suitable-appearing habitat is a pattern repeated rangewide for this species.

We concentrated survey efforts in unburned habitat, although a few mosaic burn and burned areas were also searched. In most unburned areas the vegetation was characterized by mature Wyoming sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) with varying amounts of Sandberg's bluegrass (*Poa secunda*). Other native bunchgrasses such as squirreltail (*Sitanion hystrix*) and Thurber's needlegrass (*Stipa thurberiana*) tended to be uncommon or absent. Cheatgrass (*Bromus tectorum*) also tended to be uncommon, although it was locally abundant in places. Interseeded crested wheatgrass (*Agropyron cristatum*) was widespread, but typically had low cover. Native forb cover was never over a trace amount, and in many places they were practically non-existent. Bur buttercup (*Ranunculus testiculatus*) was by far the most common weedy forb. In some places it seemed to nearly blanket the ground. The microbiotic crust was well developed in areas with little livestock disturbance, but reduced in extent or absent from areas intensively used.

In the past, crested wheatgrass seedings were attempted at much of the burned habitat we searched. These seedings met with varying success. Post-fire vegetation was usually dominated by cheatgrass, with bur buttercup and tumbled mustard (*Sisymbrium altissimum*) being the primary associated forbs. In some burned areas, green rabbitbrush (*Chrysothamnus viscidiflorus*) was common. Bare ground cover was often very high in disturbed areas, and ground squirrel and badger evidence were common in most places, whether burned or unburned.

Occurrence descriptions

Brief descriptions for the new occurrences are referenced by the Occurrence name and associated database identifier number. Tables 1 and 2 summarize additional population and disturbance information. More detailed location, abundance, size, habitat, and threat information is provided in the Occurrence Records for each occurrence (Appendix 4).

Alkali Creek (026) – This occurrence is located about five miles northwest of Glenns Ferry, both east and west of Alkali Creek. It is comprised of scattered, small groupings of *Lepidium papilliferum*, and combines discoveries made during our field investigation as well as those by BLM botanists. Most of the occurrence was not burned, but portions were in mosaic burn or burned habitat. Most of the occurrence supported sagebrush with an understory dominated by Sandberg's bluegrass. Cheatgrass cover tended to be sparse, but was common in some areas. Native forbs were invariably sparse, but a nice microbiotic crust was present in places. Slickspots were widespread and usually common where *Lepidium papilliferum* was found. Weed invasion of slickspots was

minimal in places, but was variable overall. Cattle use was light in some areas, but much more intensive in others.

Hot Creek Road (051) This new occurrence is located about three miles east of Mountain Home in the vicinity of the Hot Creek Road. The Wyoming sagebrush vegetation supported an understory of Sandberg’s bluegrass and squirreltail, occasional Thurber’s needlegrass, and in most places, a well-developed microbial crust. Some nearby areas were more disturbed and had a lot of bur buttercup. Slickspots were widespread and fairly common where *Lepidium papilliferum* was found, and most had few if any weedy species. Recent cattle use was very light in this area too. However, north of Hot Creek Road, livestock disturbances were widespread, including trampling in some slickspots. Despite more suitable-looking habitat, *Lepidium papilliferum* was found in only two small areas.

SW of Eureka Cave (062) – This new occurrence is located about four miles east of Mountain Home, north of the I-84 Bennett Road interchange. The unburned occurrence area is within sight of burned habitat to the north. The Wyoming sagebrush stand had very high bare ground cover and an extremely depauperate herbaceous understory - not much more than a trace of bunchgrass cover, a few interseeded crested wheatgrass plants, and bur buttercup. Even cheatgrass was rare in most of the general vicinity. Slickspots were locally common, but were relatively sparse in some nearby areas. The majority of slickspots had moderate to low levels of cattle trampling, but minimal weed invasion. *Lepidium papilliferum* was found in only one small area even though additional similar-looking habitat occurred in the general area.

Bennett Creek (063) - This occurrence, originally discovered in 1998, is located about five miles north of Hammett, near Bennett Creek. Additions to the occurrence were found during our field investigation. Most of the *Lepidium papilliferum* occurs in a band of mosaic burn Wyoming sagebrush/cheatgrass bordering an expanse of post-fire annual grassland vegetation extending to the southern horizon. Slickspots were patchy in distribution and all were invaded by weeds and impacted by livestock trampling. None of the livestock sign appeared to be recent, however. Only a few slickspots had *Lepidium papilliferum*.

Table 1. Summary of population information for *Lepidium papilliferum* occurrences discovered in 2000.

	Occurrence #				
	026 CDC survey area	026 BLM survey area	051	062	063
Population information					
Ca # of plants	2200	560	10	50	250
Ca % of slickspots occupied by <i>Lep. pap.</i>	1-10	-	<1	<1	1-10
Ca area (acre)	1	1	0.1	1	1

Table 2. Summary of livestock and weed disturbance information for *Lepidium*

papilliferum occurrences discovered in 2000.

	Occurrence #				
	026 CDC survey area	026 BLM survey area	051	062	063
Livestock information					
Level of livestock use in general area	Light	Light/mod.	Light	Heavy	Light/mod.
Avg. # of livestock sign/slickspot	1-10	>10	0	1-10	>10
Avg. % of slickspot affected by trampling	<10	<50	<1	<10	<10
Avg. density (/sq.ft.) of weeds/slickspot	Rare	10-25	<10	<10	10-25

Survey area descriptions

Regina area – this area is located north of I-84 and the Mayfield interchange.

1. T1N R4E sections 20E2, 21W2, 28N2, and 29 (Appendix 1, Map 1) - The entire survey area has burned and annual grassland vegetation now covers most of the landscape, especially medusahead rye (*Elymus caput-medusae*). Shrub regeneration was largely absent. Rocky, shallow-soil scabland inclusions were common throughout the area. Hooker's balsamroot (*Balsamorhiza hookerii*) was especially abundant in many of these rocky soil sites and when flowering enmass gives the landscape an orange-colored cast. Slickspots were very rare, although some of the small scabland openings may superficially resemble a slickspot. We counted fewer than 10 slickspots over several hundred acres. They were all heavily invaded by one of more weedy species such as clasping peppergrass (*Lepidium perfoliatum*) or cheatgrass (*Bromus tectorum*). We did not observe any evidence of recent livestock use, although older sign was common throughout the area. Our survey did not include land in T1N R4E section 17, or the west half of section 20. However, vantage point views revealed a continuation of the burned vegetation and a lack of suitable *Lepidium papilliferum* habitat.

Bowns Creek area – north of I-84 and east of the Simco Road interchange.

1. T1S R4E portions of sections 12 and 13 (Appendix 1, Map 2) – Unburned Wyoming sagebrush/ bunchgrass habitat intermixed with varying amounts of cheatgrass. Slickspots were widespread and many appear to be in good condition. Light livestock grazing occurs in the area and a salt block was seen near the junction of the Bowns Creek dirt road and the gas pipeline.
2. T1S R5E section 7 (Appendix 1, Map 2)– Burned habitat dominated by annual grasses, with a few remnant sagebrush shrubs and native herbaceous species scattered about. The few slickspots we observed were all disturbed. Heavy livestock grazing occurs in the area.

Hot Creek Road area – east of Mountain Home and I-84 in the vicinity of the Hot Creek road. For about the first four miles east of Highway 20 the survey area contained large remnants of unburned sagebrush, as well as some smaller blocks in areas that burned in a mosaic pattern. Further east, extensive, post-wildfire, annual grassland vegetation dominated the landscape.

1. T3S R7E sec 21 E2, sec 22, and sec 26 NE4 (Appendix 1, Map 3) – The vegetation is largely unburned Wyoming sagebrush with an understory of Sandberg's bluegrass and

squirreltail, occasional Thurber's needlegrass, and in most places, a well-developed microbial crust. Section 22 E2, north of Hot Creek Road was more disturbed and had a lot of bur buttercup. Slickspots were widespread, being abundant in some places (such as around Point 3497), but ranging to sparse or largely absent from other places. Most slickspots had few if any weedy species. Recent cattle use appeared to be very light south of the road, but north of the road in sections 22 and 26 associated disturbances were more widespread, including trampling in some slickspots. Despite more suitable-looking habitat, *Lepidium papilliferum* was found in only two small areas.

2. T3S R8E section 30 NW4 (Appendix 1, Map 4) – Sagebrush has re-established well in this old burn area. The early-seral herbaceous layer was dominated by bur buttercup. Slickspots were common, but also weedy, and most were also heavily disturbed by cattle trampling.

3. T3S R8E small portions of sections 28 and 29 (Appendix 1, Map 4)– A weedy, mosaic burn area that is totally surrounded by burned early-seral vegetation. Slickspots were scattered about and all were impacted by weeds and cattle trampling. People use this area for dumping.

4. T3S R7E sections 27SW4, 28E2, and 34N2 (Appendix 1, Maps 3, 5) – A mosaic burn area with small to larger patches of Wyoming sagebrush and low cover of native bunchgrasses grading into burned annual grassland vegetation in most directions. Bur buttercup was abundant in many places. Slickspots were scattered throughout the area, and some were impacted by weed invasion and livestock trampling disturbances.

5. T3S R7E sections 28W2 and 29E2 (Appendix 1, Map 6) – Burned or mostly burned mosaic vegetation except for the large patch of sagebrush on the north-facing slope below the radio tower. The lower slopes were heavily grazed, very weedy, and in poor ecological condition. The few slickspots on the lower flanks of the butte were all disturbed. Slickspots scattered along the upper slopes were less disturbed, but still impacted by weeds and trampling.

6. T3S R7E sections 34E2 and 35W2; and T4S R7E section 2NW4 (Appendix 1, Map 5) – This block of unburned Wyoming sagebrush has very high bare ground cover and an extremely depauperate herbaceous understory. Native bunchgrass cover was restricted to a trace in most places, along with a few interseeded crested wheatgrass plants. Even cheatgrass was rare except for a few local dense clusters. Forbs were non-existent except for bur buttercup, which was common. Slickspots were widespread, ranging from locally abundant to sparse, including some large complexes. A majority of the slickspots had moderate to low levels of cattle trampling, but minimal weed invasion. Cattle were present in the general area during our visit, although the nearest stock pond was bone dry. *Lepidium papilliferum* was found in one small area and additional plants should be expected in the same general vicinity in more favorable precipitation years.

Bennett Road area – east and southeast of Mountain Home, both north and south of Bennett Road. Most of the large area that lies east of I-84, between Bennett and Hot Creek roads, and then south of Bennett Road to Dry Creek, was burned and in poor ecological condition. Remnant blocks of sagebrush were most common within one or two miles of the I-84 Bennett Road interchange.

1. T4S R7E sections 4SW4, 5, 8NE4, and 9NW4 (Appendix 1, Map 7) – This survey area is west of I-84. The burned annual grassland vegetation covering the western and

southern flanks of Stone Triangulation Point (Point 3262) grades into a mosaic burn pattern with patches of Wyoming sagebrush and an early-seral understory to the south and southwest. Further south, a large block of unburned Wyoming sagebrush covers most of sections 8E2 and 9 north of Bennett Road. Portions had an herbaceous component dominated by Sandberg's bluegrass, but many places had little more than bur buttercup and bare ground. Slickspots were rare or absent along the west-facing slope descending Stone Triangulation Point, and in sections 4SW4 and adjacent 9NW4, otherwise, they were a fairly regular habitat feature. To varying degrees, most slickspots were impacted by weed invasion and cattle trampling. Ground disturbance from ground squirrel and badger diggings was common throughout the area, including in many slickspots. *Lepidium papilliferum* plants were found at the known occurrence (029) near the Interstate, but nowhere else in this survey area. The area north of the survey area in T3S R7E section 32 supports nearly all burned annual grassland vegetation.

2. T4S R7E sections 3SW4 and 10N2 (Appendix 1, Map 5) – A mosaic burn area with patches of green rabbitbrush and Wyoming sagebrush and an herbaceous layer dominated by cheatgrass. Slickspots were uncommon, but widely scattered. They tended to have some degree of weed invasion and low levels of cattle trampling.

3. T4S R7E section 14NW4 and small portions of adjacent sections (Appendix 1, Map 5) – Mosaic burn vegetation with large patches of Wyoming sagebrush. The herbaceous component was dominated by cheatgrass, with crested wheatgrass being common in some of the open areas. Slickspots become more sparse as one proceeds south from Bennett Road. Some weed invasion and trampling of slickspots has taken place.

4. T4S R8E sections 17E2, 19NE4, and 20N2 (Appendix 1, Map 8) – This survey area burned in the past, although scattered patches of remnant Wyoming sagebrush remain. Widespread shrub regeneration has begun, especially by green rabbitbrush. Cheatgrass was sparse, but denser patches occur too. Tumblemustard and bur buttercup were abundant throughout the area, while native grasses or forbs were practically absent. Slickspots were totally absent from some segments, but had a widespread, low density distribution overall. Low to moderate amounts of cattle disturbance were observed at all slickspots, and most were also subject to some level of weed invasion. Ground squirrel and badger digging disturbances were common throughout this area and also further to the south.

5. T4S R8E sections 31NE4 and 32NW4 (Appendix 1, Map 8) – The two-track access road that leads south from Bennett Road ends at some stock water tanks in this survey area. The vegetation was a mix of weedy annual forbs, predominantly bur buttercup and tumblemustard, and interspersed stands of post-fire green rabbitbrush. Little cheatgrass was observed. Slickspots were commonplace and most had low to moderate levels of cattle trampling and weed invasion.

Alkali Creek area – Located about five miles northwest of Glenns Ferry. Portions of the survey area located west of Alkali Creek have burned, while a very large block of unburned Wyoming sagebrush habitat occurs east of the creek.

1. T5S R9E sections 9, and 10W2 (Appendix 1, Maps 9, 10) – South of Bennett Road, the Wyoming sagebrush vegetation had an understory of Sandberg's bluegrass and some squirreldtail, along with sparse forb cover, sparse cheatgrass, and a very nice microbiotic crust component. Few if any weeds were observed in the widespread, locally

common slickspots, and only a few had evidence of some old livestock disturbance. Cattle use appears to be light south of Bennett Road and no recent sign was observed. *Lepidium papilliferum* occurred in a few scattered locations, and additional slickspots with plants will probably be found during more favorable precipitation years.

In contrast, north of Bennett Road the habitat was much more degraded. Northward from the unburned sagebrush near the junction of Alkali Creek and Bennett Road there was an area of mosaic burn vegetation that eventually gave way to burned and seeded habitat covering most of section 9N2 on into section 4. Weedy species characterized the herbaceous layer throughout this area and cattle use appeared to be heavy. Most slickspots had evidence of cattle trampling, and *Lepidium papilliferum*, which we found in a few places, was absent from the most severely trampled slickspots.

2. T5S R9E section 4 (Appendix 1, Map 9)– This is mostly burned habitat where subsequent drill seeding restoration efforts met with mixed results. Seeded grasses established in some places, but not in others. Weedy species were common everywhere, including in the remnant or re-established patches of Wyoming sagebrush and green rabbitbrush. Slickspots were widely scattered, but uncommon overall. All were impacted by livestock trampling and most were in poor condition. If *Lepidium papilliferum* was ever present in this area, it is now likely extirpated. A little north, in the vicinity of the two-track road south of the airway beacon, the vegetation was a mix of Wyoming sagebrush with an early-seral understory and patches of weedy burned habitat. This area was used by livestock and slickspots were uncommon or rare.

3. T4S R9E section 34S2 and small portions of adjacent sections (Appendix 1, Maps 9, 11) – Wyoming sagebrush, Sandberg's bluegrass, a depauperate forb component, and minimal cheatgrass characterized the vegetation of this survey area. Judging by the size of the shrubs and other vegetation attributes, the southern half of the sagebrush stand within the survey area was older and had not burned for many years. In contrast, the smaller shrubs in the northern half likely re-established following a past wildfire. Slickspots were rare in section 34SW4, but clusters of slickspot complexes were scattered elsewhere within the survey area. Many of them looked suitable for *Lepidium papilliferum*. Coinciding with the sagebrush stand age pattern, weeds were rare or absent from most slickspots in the southern half, but not the northern half of the survey area. Nearly all slickspots had some evidence of livestock trampling disturbance, and overall, livestock grazing appeared to be light to moderate.

4. T5S R9E section 10 (Appendix 1, Maps 11, 12) – Located north of Chevron's Glens Ferry Booster Pump Station, this area is part of a large contiguous block of unburned habitat. It is bisected by a ditch carrying water from Blair Trail Reservoir. The Wyoming sagebrush/Sandberg's bluegrass community has some interseeded crested wheatgrass, but little cheatgrass, lots of bur buttercup in disturbed areas, and a well-developed microbial crust in some places. At least some bur buttercup and livestock trampling sign were present in most slickspots, which had a widespread, but patchy distribution. *Lepidium papilliferum* was found in a couple of places that looked identical to other areas where none was found.

5. A large area centered around T5S R9E section 2 (Appendix 1, Map 11) – This area supports a large block of Wyoming sagebrush/Sandberg's bluegrass. Associated understory vegetation was sparse. Slickspots were found to be widespread and often locally common in the survey area, except for section 2SW4, where they were absent.

Livestock use appeared to be moderate and evidence of ground squirrel activity was widespread.

Blair Trail Reservoir area – Located north of Glenns Ferry, between Little Canyon Creek on the east and Alkali Creek on the west. This area is part of the largest block of unburned sagebrush habitat we surveyed for this project. Another BLM Sensitive species, *Astragalus atratus* var. *inseptus*, occurs throughout much of this area.

1. T4S R9E section 36SE4, R10E section 31S2, and T5S R10E section 6 (Appendix 1, Map 11) – The northwestern portion of this survey area contained the best ecological condition Wyoming sagebrush/Sandberg's bluegrass community found during the field investigation. In this segment, Sandberg's bluegrass cover, forb diversity and cover, and microbial crust cover were all relatively high, and cheatgrass sparse or absent. Habitat quality was considerably lower closer to Little Canyon Creek, and in the vicinity of the powerline access road in the southern portion of the survey area. These areas were subject to greater livestock use and tended to be much more weedy. Overall, slickspots were widespread and a regular landscape feature, although they were more common in the western half of the survey area compared to closer to Little Canyon Creek. The slickspots had little or no evidence of weed invasion and livestock trampling sign in the northwestern segment of the survey area. Elsewhere, slickspots tended to be much more weedy (mostly clasping pepperweed and bur buttercup) and had much greater cattle trampling disturbance. Livestock use was most evident in the vicinity of the southernmost powerline access road and the ditch leading to Morrow Reservoir. Many slickspots looked suitable for *Lepidium papilliferum*, but one thing that struck me as different about this area was the almost complete lack of ground squirrel or badger digs.

2. T4S R10E section 29 and small portions of adjacent sections (Appendix 1, Map 13) – Wyoming sagebrush/Sandberg's bluegrass community with cheatgrass common in some areas, but absent from others. Scattered, small "playas" occur near the rim of Little Canyon Creek. This area has only a handful of slickspots, so very limited potential for *Lepidium papilliferum*.

3. T4S R10E section 30 and small portions of adjacent sections (Appendix 1, Map 13) – Most of this area supported Wyoming sagebrush with Sandberg's bluegrass, but in some places cheatgrass was the dominant or co-dominant grass species. Crested wheatgrass has been interseeded, but sparse overall. Slickspots were most common in the northwestern section of this survey area, but were infrequent elsewhere. Livestock grazing appeared to be relatively light and I found little evidence of current year use. Even so, a majority of slickspots showed signs of livestock trampling, although only a few could be regarded as heavy.

4. T4N R9E sections 23, 24SW4, 25N2 (Appendix 1, Map 13) – Cheatgrass dominated the Wyoming sagebrush understory in most places, but with at least some Sandberg's bluegrass and a few native forbs also persisting in most places. Although slickspots were locally common in places, they typically occurred as widely spaced individuals or in small clusters with wide gaps between them. Weed invasion by clasping peppergrass and bur buttercup varied from light to severe. Also, Sandberg's bluegrass has established in many slickspots. Livestock use was very evident in this area, and all slickspots had some degree of trampling. In some cases this was severe.

5. T4S R9E sections 13, 24N2; R10E sections 18SW4 and 19NW4 (Appendix 1, Map 13) – A majority of this area is Wyoming sagebrush/Sandberg's bluegrass, although cheatgrass, and medusahead rye are widespread and locally common. What appear to be slickspots were more or less common throughout the area, including some very large complexes. However, Sandberg's bluegrass, Hood's phlox (*Phlox hoodii*), and occasionally other species occurred in many of the slickspots. Livestock graze this area and light to severe slickspot trampling was observed in nearly every slickspot.

Bennett Creek area – This area is located north of Hammett both above and below the Snake River breaks, in the vicinity of Bennett Creek.

1. T5S R8E section 2 and small part of section 3 (Appendix 1, Map 14) – This area has a band of mosaic burn Wyoming sagebrush/cheatgrass near the access road along the private land/BLM land boundary. It borders an expanse of post-fire annual grassland vegetation extending to the southern horizon. Most slickspots were associated with remnant sagebrush patches. The slickspots were all invaded by weeds and impacted by livestock trampling. None of the livestock sign appeared to be from year 2000, however. A few slickspots had *Lepidium papilliferum*.

2. T5S R8E section 34 NW4 (Appendix 1, Map14) – All the land not under cultivation in this general area burned and is now dominated by annual grassland vegetation. This burned habitat extends as far north as the eye can see. I did not see any slickspots during a very quick survey.

3. T5S R8E section 15SE4, 21NE4, and 22N2 (Appendix 1, Map 15) – The Bennett Creek bottomlands in and around this survey area contain an extensive greasewood/inland saltgrass (*Sarcobatus vermiculatus/Distichlis stricta*) community type. This grades into sagebrush-rabbitbrush/cheatgrass, and then sagebrush/cheatgrass vegetation proceeding upslope from the bottoms towards I-84. Patches of burned, weedy habitat were intermixed on the slopes. Light-colored, sparsely-vegetated openings scattered throughout the bottoms superficially resembled, but were not slickspots. Nearby slopes had either sand or silty-sand soils, and none of the handful of small openings I came across really qualified as slickspots. It seems unlikely that *Lepidium papilliferum* could occur in this area. Livestock use in the area appeared to be moderate.

4. T5S R8E section 23 (Appendix 1, Map 15) – This area supports a patch of sagebrush surrounded by burned, annual grassland vegetation. The sandy soil slopes were dominated by the basin big sagebrush/needle-and-thread grass (*Artemisia tridentata* ssp. *tridentata/Stipa comata*) habitat type, although cheatgrass was by far the most abundant graminoid. I did not find any slickspots. Cattle sign was ubiquitous in this area.

5. T5S R8E section 25N2 and small portion of adjacent section 24 (Appendix 1, Map15) – An unburned patch of sagebrush just north of the BLM's Hammett Fire Guard Station. Cheatgrass dominated the degraded understory in this sandy soil area. It looked like the area had not been grazed for awhile. I did not find any slickspots.

DISCUSSION

The 2000 season was a marginal year to look for *Lepidium papilliferum*. The number of germinating and flowering plants was relatively low throughout most of the species' range and probably reflects unfavorable precipitation patterns during the year. With few

exceptions, those plants we did find were very small, often less than five centimeters tall if flowering, and considerably less in diameter if in the rosette stage. Although the combination of low numbers and small size increased our likelihood of missing plants, conditions seemed adequate to determine if any *Lepidium papilliferum* was present in a particular survey area. During more favorable years, all of the new locations we discovered could have more slickspots with a greater number of plants than observed in 2000.

Most of the areas we surveyed appeared to contain habitat suitable for *Lepidium papilliferum*, including the area around Blair Trail Reservoir north of Glenns Ferry. During our survey we began to pick up another BLM Sensitive plant species, *Astragalus atratus* var. *inseptus* (mourning milkvetch) immediately northwest, north, east and south of the reservoir. The occurrence of this species may be indicative of habitat or environmental changes precluding and helping to shape what appears to be the northeastern distribution limit of *Lepidium papilliferum*.

The long-term conservation of *Lepidium papilliferum* is going to require innovative and probably controversial measures. As the dominant public agency managing *Lepidium papilliferum* and its habitat, much of the conservation burden will fall on the BLM. Part of the BLM's overall conservation strategy for *Lepidium papilliferum* will likely include prioritizing some occurrences for extra protection and monitoring based on population numbers, habitat integrity, and other conservation factors. Certain occurrences could be designated *Lepidium papilliferum* conservation areas or something similar to this that recognizes their special conservation and management importance.

The portion of the Alkali Creek occurrence (026) located west of Alkali Creek and south of Bennett Road would be one area I would recommend for such a special management designation. It should be a priority for protection because of the relatively high quality sagebrush and slickspot microsite habitats in this area. Most of the area appears to receive only minimal livestock use and a fence line is already in place around most, if not all of this BLM parcel. This area would benefit from additional searching during a favorable survey year to more fully circumscribe the distribution and abundance of *Lepidium papilliferum*.

Although we found only a couple of slickspots occupied by *Lepidium papilliferum* at the Hot Creek Road occurrence (051), the area is worthy to be a high priority for additional searching during a favorable survey year. If these follow-up surveys show the occurrence to be substantially larger than we found in 2000, then it too may make a good candidate for special management consideration. Searching should concentrate in an area south of the new locations to the power transmission line. This area, which supports a relatively large amount of suitable-looking habitat, is made more valuable by being the least disturbed habitat along the Hot Creek Road corridor.

The SW Eureka Cave occurrence (062) is presently very small, but additional potential habitat occurs in the general vicinity. I would consider additional searching during a favorable survey year to be a moderate priority. Livestock use is relatively heavy around this occurrence area and in light of the discovery of *Lepidium papilliferum* probably needs to be re-evaluated. The very depauperate herbaceous layer may make this area a candidate for restoration efforts.

Of the four new occurrences we found in 2000, viability may be most tenuous for the one at Bennett Creek (063). The mosaic burn habitat at this occurrence borders cultivated private land to the north and post-fire, annual grassland vegetation extends to the horizons in all other directions. Because of the degraded habitat conditions we did not make these surrounding areas a priority to survey. However, slickspots likely occur in at least portions of this annual grassland landscape and the occurrence of *Lepidium papilliferum* cannot be absolutely ruled out. I would consider these areas a low priority for field investigation in the near future unless they are proposed for large-scale mechanical seeding efforts that will impact the remaining slickspots.

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Appendix 1

Maps of areas surveyed for *Lepidium papilliferum*.

- Map 1. Regina survey area. Portion of USGS 7.5' Mayfield quadrangle.
- Map 2. Bowns Creek survey area. Portion of USGS 7.5' Mayfield SW quadrangle.
- Map 3. Hot Creek Road survey area. Portion of USGS 7.5' Hot Springs Creek Reservoir quadrangle.
- Map 4. Hot Creek Road survey area. Portion of USGS 7.5' Teapot Dome quadrangle.
- Map 5. Hot Creek Road and Bennett Road survey areas. Portion of USGS 7.5' Reverse quadrangle.
- Map 6. Hot Creek Road survey area. Portion of USGS 7.5' Mountain Home North quadrangle.
- Map 7. Bennett Road survey area. Portion of USGS 7.5' Mountain Home South quadrangle.
- Map 8. Bennett Road survey area. Portion of USGS 7.5' Reverse quadrangle.
- Map 9. Alkali Creek survey area. Portion of USGS 7.5' Hot Springs Creek Reservoir quadrangle.
- Map 10. Alkali Creek survey area. Portion of USGS 7.5' Hammett quadrangle.
- Map 11. Alkali Creek and Blair Trail Reservoir survey areas. Portion of USGS 7.5' Morrow Reservoir quadrangle.
- Map 12. Alkali Creek survey area. Portion of USGS 7.5' Glens Ferry quadrangle.
- Map 13. Blair Trail Reservoir survey area. Portion of USGS 7.5' Morrow Reservoir quadrangle.
- Map 14. Bennett Creek survey area. Portion of USGS 7.5' Hot Springs Creek Reservoir quadrangle.
- Map 15. Bennett Creek survey area. Portion of USGS 7.5' Hammett quadrangle.

Appendix 2

Map locations for new *Lepidium papilliferum* occurrences.

- Map 1. Part of the Alkali Creek occurrence (026). A portion of the USGS 7.5' Hot Springs Creek Reservoir quadrangle.
- Map 2. Part of the Alkali Creek occurrence (026). A portion of the USGS 7.5' Hammett quadrangle.
- Map 3. Part of the Alkali Creek occurrence (026). A portion of the USGS 7.5' Morrow Reservoir quadrangle.
- Map 4. Part of the Alkali Creek occurrence (026). A portion of the USGS 7.5' Glenss Ferry quadrangle.
- Map 5. Hot Creek Road occurrence (051). A portion of the USGS 7.5' Teapot Dome quadrangle.
- Map 6. SW of Eureka Cave occurrence (062). A portion of the USGS 7.5' Reverse quadrangle.
- Map 7. Bennett Creek occurrence (063). A portion of the USGS 7.5' Hot Springs Creek Reservoir quadrangle.

Appendix 3

GPS coordinates for new *Lepidium papilliferum* locations.

UTM coordinates 11T

Alkali Creek (026)	0631857	4762184
	0631315	4761742
	0630934	4761921
	0630517	4761871
	0633120	4762188
	0632882	4761822

Hot Creek Road (051)	0612842	4777822
	0612361	4777901

SW of Eureka Cave (062)	0614405	4773943
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Bennett Creek (063)	0624872	4763893
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Appendix 4

Element Occurrence Records for *Lepidium papilliferum*.

LEPIDIUM PAPILLIFERUM
SLICK SPOT PEPPERGRASS

Occurrence Number: 026

Survey Site Name: ALKALI CREEK

County: Elmore

USGS quadrangle: Glens Ferry; Hammett; Morrow Reservoir; Hot Springs Creek Res.

Latitude: 425928N Longitude: 1152225W

TOWNRANGE:	SECTION:	MERIDIAN:	TRSNOTE:
005S009E	09,10,15	BO	

Location: About 5 air miles NW of Glens Ferry, from the vicinity of the junction of Bennett Road and Bennett Mountain Road, extending northwest for about 1.5 miles to west of Alkali Creek.

Survey Date: 2000-06-06

Last Observed: 2000-06-06

First Observed: 2000-06-05

EORANK: A

EORANK Comments: Portions of occurrence in relatively good ecological condition and little disturbance. Other portions are more weedy and/or disturbed.

Population Data: 2000 (BLM): Estimated 560 individuals, 65% vegetative, 35% in flower. Thorough search by BLM (Ann Debolt, Heather Swartz, Valerie Geertson, and Kendra Moseley). 2000 (IDCDC): Estimated 2250-2350 individuals, mix of rosettes and flowering plants. Almost all plants very small in size. Slick spots widespread, locally common. Less than 10% of the slick spots in the survey area were occupied by *Lepidium*. In Section 10 there were 3 small groupings with 1 to about 10 slick spots each, and 1 to about 200 *Lepidium* plants/slick spot. In Section 9, northern grouping with 300-400 plants in 7 slickspots; the southern group with ca 200 plants in ca 10 slick spots. Thorough survey by Michael Mancuso IDCDC and Cleve Davis, BLM, on 6/5; and by Mancuso 6/6.

Habitat Description: 2000 (BLM): Vegetation dominated by *Artemisia tridentata wyomingensis*/*Poa secunda*. Some soil crusts. *Bromus tectorum* 10-20% cover. Other associated species include *Sitanion hystrix*, *Chrysothamnus nauseosus*, *Lepidium perfoliatum*, *Allium acuminatum*, and *Epilobium paniculatum*. Many large slick spots in area. Survey area recently burned. 2000 (IDCDC): Vegetation is mostly *Artemisia tridentata wyomingensis*/*Poa secunda*; mixed with *A. t. tridentata* near Alkali Creek. *Bromus tectorum* rare in most places, but *Ranunculus testiculatus* common north of Bennett Road. Microbiotic crust cover is high in places. Section 10 is nearly all unburned habitat; Section 9 is unburned in southern parts, but mosaic burn or burned in northern part.

Minimum Elevation: 3100 feet

Maximum Elevation: 3170 feet

Size: 1 acre

Land Owner/Manager: Lower Snake River District, Jarbidge Resource Area

Ownership Comments: Lower Snake River District, BLM, Jarbidge RA.

Comments: BLM recorded GPS readings and assessed the overall site quality as fair. UTM's recorded: 4760865N, 632585E to 4760818N, 632303E. Mancuso assessed the overall site quality from poor (part of Section 9) to good (Section 9, in part, and Section 10). Mancuso

recorded GPS coordinates: (1) 0633120, 4762188; 0632882, 4761822; (2) 0631857, 4762184; and (3) 0631315, 4761742; 0630934, 4761921; 0630517, 4761871.

Protection Comments: BLM: Light to moderate livestock use; <50% trampling of slick spot surfaces. The irrigation ditch that runs through occurrence is used as a watering site. Density of annual weeds on slick spots = 10-25 plants/sq ft. Mancuso (IDCDC): Blair Trail Reservoir ditch bisects part of the occurrence; also old (discontinued?) small stock pond located north of the Chevron Pumping Station grouping. Livestock use varies; much less south of Bennett Road. Livestock disturbance of slick spots also varies - most <1% trampled south of Bennett Road, but a few up to 50% trampled north of road.

Management Comments:

Specimens:

LEPIDIUM PAPILLIFERUM
SLICK SPOT PEPPERGRASS

Occurrence Number: 051

Survey Site Name: HOT CREEK ROAD

County: Elmore

USGS quadrangle: Teapot Dome

Latitude: 430847N Longitude: 1153646W

TOWNRANGE:	SECTION:	MERIDIAN:	TRSNOTE:
003S007E	21	BO	SE4SE4NE4
003S007E	22	BO	N2SW4

Location: About 3 miles east of Mountain Home, just south of the Hot Creek road.

Survey Date: 2000-06-12
Last Observed: 2000-06-12
First Observed: 2000-06-12

EORANK: C

EORANK Comments: Only a few plants in two small areas. However, additional relatively good quality suitable habitat exists in general area and may support additional *Lepidium* during favorable years.

Population Data: 2000: 7 plants in 3 slick spots, 100% tiny vegetative rosettes. Less than 1% of slick spots in the area were occupied by *Lepidium*. Thorough survey by Michael Mancuso, IDCDC.

Habitat Description: *Artemisia tridentata wyomingensis/Poa secunda* community type. Ca 0.5 mile from nearest burn edge. Low diversity and abundance of native forbs; trace amounts of *Bromus tectorum* and *Ranunculus testiculatus*. Flat topography. Slick spots widespread and with varying density in general area. Good microbiotic crust cover in places.

Minimum Elevation: 3470 feet Maximum Elevation: 3490 feet
Size: 0.1 acre

Land Owner/Manager: Lower Snake River District, Bruneau Resource Area

Ownership Comments: Lower Snake River District, BLM, Bruneau RA.

Comments: Overall site quality assessed as good. Mancuso recorded GPS coordinates: 0612842, 4777822, 0612361, 4777901.

Protection Comments: 2000: Light livestock use where *Lepidium* was found, but moderate levels nearby, north of Hot Creek Road. No livestock disturbance in the few slick spots with *Lepidium*. No salt blocks or troughs in the area. Average density of annual weeds in slick spots = <10 plants/sq. ft.

Management Comments:

Specimens:
LEPIDIUM PAPILLIFERUM
SLICK SPOT PEPPERGRASS

Occurrence Number: 062

Survey Site Name: SW OF EUREKA CAVE

County: Elmore

USGS quadrangle: Reverse

Latitude: 430642N Longitude: 1153537W

TOWNRANGE:	SECTION:	MERIDIAN:	TRSNOTE:
003S007E	35	BO	SE4SE4SW4SW4 on/near section line

Location: About 4 miles east of Mountain Home; about 2 miles north of I-84 Bennett Road interchange.

Survey Date: 2000-06-09

Last Observed: 2000-06-09

First Observed: 2000-06-09

EORANK: C

EORANK Comments: Only a few slickspots and plants were found, but there is potential for more in general area.

Population Data: 2000: Estimated 50 individuals in ca 12 slick spots, 90% vegetative rosettes, 10% in flower, all plants very small. *Lepidium* present in 1-10% of slickspots in general area. Thorough survey by Michael Mancuso and Cyndi Coulter, IDCDC.

Habitat Description: *Artemisia tridentata wyomingensis* stand with very low cover of *Poa secunda*, *Sitanion hystrix*, and interseeded *Agropyron cristatum*; *Bromus tectorum* locally common, but sparse in most places; native forbs are more or less non-existent; *Ranunculus testiculatus* very common. In some nearby places it is just sagebrush and dirt. The *Poa secunda* appears dead in many instances. Slick spots locally abundant where *Lepidium* was found.

Minimum Elevation: 3280 feet

Size: 1 acre

Land Owner/Manager: Lower Snake River District, Bruneau Resource Area

Ownership Comments: Lower Snake River District, BLM, Bruneau RA.

Comments: Site quality assessed as fair. Mancuso recorded GPS coordinates: 0614405, 4773943.

Protection Comments: 2000: Heavy use by livestock in the general area. A dry stock pond exists ca 0.5 mile west of the *Lepidium* occurrence. Exotic annual species are present in many slick spots, but varying density; mostly in the >10 plants/sq. ft. range.

Management Comments:

Specimens:

LEPIDIUM PAPILLIFERUM
SLICK SPOT PEPPERGRASS

Occurrence Number: 063

Survey Site Name: BENNETT CREEK

County: Elmore

USGS quadrangle: Hot Springs Creek Res.

Latitude: 430108N Longitude: 1152819W

TOWNRANGE:	SECTION:	MERIDIAN:	TRSNOTE:
005S008E	02	BO	E2SE4NW4, SW4NW4SW4

Location: About 5 miles N of Hammett, near Bennett Creek.

Survey Date: 2000-06-20
Last Observed: 2000-06-20
First Observed: 1998-06-12

EORANK: D

EORANK Comments: Degraded mosaic burn and burned habitat surrounded by annual grassland vegetation or cultivated fields.

Population Data: 1998: 34 genets, 10% vegetative, 90% in flower. cursory visit by Bob Moseley, IDCDC. 2000: Estimated 200-300 individuals, vegetative and in flower. Plants small to tiny in size. Visit by Michael Mancuso, Cyndi Coulter, and Tammy Tanaka, IDCDC.

Habitat Description: 1998: Level volcanic plain with numerous slick spots - only 2 having *Lepidium*. Burned recently and vegetation surrounding slick spots is entirely exotic - *Sisymbrium altissimum*, *Bromus tectorum*, *Lepidium perfoliatum*. A few remnant *Artemisia tridentata wyomingensis*. Slick spots look degraded. 2000: Strip of mosaic burn and unburned patches of sagebrush bordering a vast annual grassland sea dominated by *Bromus tectorum* extending to the south. Unburned areas with *Bromus tectorum* understory; native bunchgrasses largely extirpated. Agriculture land to north of population. Slick spots locally common in a few places where sagebrush persists, but absent or sparse in much of burn area; low density overall; most disturbed to some degree.

Minimum Elevation: 3120 feet Maximum Elevation: 3135 feet
Size: 1 acre

Land Owner/Manager: Lower Snake River District, Bruneau Resource Area
Ownership Comments: Lower Snake River District, BLM, Bruneau Resource RA.

Comments: 1998: Overall site quality assessed as poor. 2000: Overall site quality assessed as poor. Mancuso recorded GPS coordinates: 0624872, 4763893 UTM.

Protection Comments: 1998: Horse grazing. Fire is biggest threat. 2000: light to moderate livestock use; <10% of slick spot surfaces trampled. No evidence of livestock use in year 2000. Average density of weedy annual species = 10-25 plants/sq. ft.

Management Comments: