

**MONITORING *LEPIDIUM PAPILLIFERUM* (SLICKSPOT PEPPERGRASS)
IN SOUTHWESTERN IDAHO
2001 RESULTS**

by

Michael Mancuso
Conservation Data Center

February 2002

Idaho Department of Fish and Game
Natural Resource Policy Bureau
600 South Walnut, P.O. Box 25
Boise, Idaho 83707



Report prepared for
State of Idaho, Military Division
Task Order No. 001-FY-2001

ABSTRACT

Slickspot peppergrass (*Lepidium papilliferum*) is an annual or biennial forb endemic to southwestern Idaho. It is a Candidate species for federal listing under the Endangered Species Act largely because much of its original sagebrush-steppe habitat has been destroyed or seriously degraded over the past century. The majority of remaining known populations occur on Idaho BLM land, including the Idaho Army National Guard's Orchard Training Range southeast of Boise. Slickspot peppergrass is a high priority conservation concern for both of these agencies. In response to growing conservation concerns, a monitoring program was developed to assess conditions and monitor the rangewide, long-term ecological integrity of slickspot peppergrass habitat. Baseline monitoring data were collected in 1998 at most extant occurrences located on public land. Monitoring information was also collected in 1999 and 2000. This report summarizes results from 2001, when a fourth consecutive year of monitoring was conducted.

For most monitoring transects, the majority of habitat attribute scores in 2001 were similar to previous years. Fluctuations for many scores have also occurred over the years, and a few show consistent annual improving or declining trend. The majority of slickspot microsites sampled continue to be affected by one or more factors thought to negatively influence their ecological integrity, and therefore, their suitability to support slickspot peppergrass. Vegetation plot results in 2001 showed that the ecological quality of sagebrush-steppe habitat at most transects has either been stable or decreased since 1998. The number of slickspot peppergrass plants counted in 2001 was the second lowest total in four years of monitoring, and approximately 57% of last year's tally. Livestock disturbance tallies were similar to previous years at the majority of transects, although this varied somewhat by geographic area. Factors affecting occurrence viability and defensibility were also reassessed in 2001. New disturbances or other factors resulted in reduced viability or defensibility scores for a few occurrences. Overall, the ongoing cumulative effects of occasional fires, habitat fragmentation, increases in cheatgrass abundance, new mining claims, etc., all contribute to a sense of urgency for southwestern Idaho's sagebrush-steppe ecosystem and dependent species such as slickspot peppergrass.

ACKNOWLEDGMENTS

I gratefully acknowledge several biologists who helped collect monitoring information in 2001. Specifically, I want to thank Dana Quinney, Jay Weaver, and Chris Horass with the Idaho Army National Guard; Valerie Geertson, Kendra Moseley, and Wendy Velman with the Bureau of Land Management; Angelia Martin with Mountain Home Air Force Base; and Chris Murphy with the Conservation Data Center. Binders containing the photo point photographs were assembled by Terry Vernholm at the Idaho Department of Fish and Game, and Cyndi Coulter did most of the data entry. Funding for this project was provided by the Idaho Army National Guard, longtime leaders in supporting *Lepidium papilliferum* conservation.

TABLE OF CONTENTS

ABSTRACT	i
ACKNOWLEDGMENTS	i
TABLE OF CONTENTS	ii
LIST OF FIGURES	iii
LIST OF TABLES.....	iii
LIST OF APPENDICES	iii
INTRODUCTION	1
METHODS	1
RESULTS	4
Slickspot microsite attributes	4
Sagebrush-steppe attributes.....	5
Integrity condition rating.....	5
<i>Lepidium papilliferum</i> abundance	6
Livestock disturbance abundance.....	6
Vegetation sampling	7
Photo points	8
Occurrence viability rank.....	8
DISCUSSION.....	8
CONCLUSION	14
REFERENCES	14

LIST OF FIGURES

- Figure 1. Habitat Integrity Index trends for *Lepidium papilliferum* monitoring transects 10

LIST OF TABLES

Table 1.	List of occurrences included in the HII monitoring program, 1998 - 2001	15
Table 2.	Summary of HII monitoring scores, 1998 - 2001	16
Table 3.	Summary of HII slickspot microsite attribute scores, 1998 - 2001.....	18
Table 4.	Summary of HII sagebrush-steppe attribute scores, 1998 - 2001	19
Table 5.	Integrity condition rating system for HII scores.....	20
Table 6.	Summary of Integrity condition ratings, 1998 - 2001	21
Table 7.	Summary of slickspot microsite abundance class data for <i>Lepidium papilliferum</i> , 1998 – 2001	22
Table 8.	Summary of <i>Lepidium papilliferum</i> abundance by HII transect, 1998 - 2001	22
Table 9.	Total number of counted or estimated <i>Lepidium papilliferum</i> plants for HII transects, 1998 - 2001	23
Table 10.	Summary of HII livestock sign abundance class data, 1998 - 2001	24
Table 11.	Summary of HII livestock sign disturbance data, 1998 - 2001	24
Table 12.	Livestock disturbance (hoof prints/scats) tally for HII transects, 1998 - 2001	25
Table 13.	Noteworthy changes in transect plant composition based on vegetation plot data collected in 1998 versus 2001	26
Table 14.	A chronology of occurrence viability and defensibility scores for <i>Lepidium papilliferum</i> occurrences included in the HII monitoring program	28
Table 15.	1998 versus 2001 plant community and seral status information for <i>Lepidium papilliferum</i> occurrences	29

LIST OF APPENDICES

- Appendix 1. Map locations, location forms, and transect information for the four new Orchard area monitoring transects established in 2001. Also, updated maps and location forms for selected transects in the Inside Desert (Juniper Butte) area.
- Appendix 2. Sampling notes, and general transect observations for 2001.
- Appendix 3. Habitat Integrity Index questionnaire form.
- Appendix 4. 2001 Habitat Integrity Index field data sheets.
- Appendix 5. 2001 Habitat Integrity Index attribute scores data set.

- Appendix 6. Data set summary for Habitat Integrity Index attribute scores, 1998 - 2001.
- Appendix 7. *Lepidium papilliferum* abundance class data by transect, 1998 - 2001.
- Appendix 8. Livestock disturbance sign abundance class data by transect, 1998 - 2001.
- Appendix 9. Plant community plot data sheets for 2001.
- Appendix 10. Tabulation of four years of Habitat Integrity Index plant community data.
- Appendix 11. 2001 Occurrence viability scorecard forms.

INTRODUCTION

Slickspot peppergrass (*Lepidium papilliferum*) is a small annual/biennial plant species endemic to the sagebrush-steppe ecosystem of southwestern Idaho. It is restricted to small-scale, sparsely vegetated, visually distinct, edaphically-determined openings within the sagebrush matrix. These microsite openings are commonly referred to as slickspots. Ground disturbing activities adversely affecting slickspot integrity are thought to diminish the suitability of microsites to support slickspot peppergrass. Reduced habitat integrity and quality for slickspot peppergrass is also associated with loss or degradation of the surrounding sagebrush matrix from wildfire or other disturbance factors.

Slickspot peppergrass has been a high priority conservation concern for public land managers in southwestern Idaho for many years. This concern was highlighted in a status survey conducted in the mid-1990s that revealed it had the highest documented extirpation rate for any of Idaho's rare flora (Moseley 1994). A continuing conservation decline led the U.S. Fish and Wildlife Service to propose listing slickspot peppergrass under the Endangered Species Act in 1999 (U.S. Fish and Wildlife Service 1999). The primary reasons for the decline of this species has been the extensive and accelerating loss of sagebrush-steppe habitat, and the diminished ecological quality of most of what remains of this ecosystem in southwestern Idaho.

Most early monitoring efforts concentrated on collecting demographic information for slickspot peppergrass populations within the Idaho Army National Guard's (IDANG) Orchard Training Range (OTA), southeast of Boise (Quinney 1998). However, the above-ground number of slickspot peppergrass plants naturally fluctuates greatly from one year to the next, a pattern found in many other short-lived plant species of arid environments. For this reason, an alternative monitoring approach was needed; one focusing on slickspot peppergrass habitat. In addition, it became evident a rangewide program to monitor slickspot peppergrass was needed. To address these needs, the Idaho Conservation Data Center (CDC) collaborated with the IDANG and Bureau of Land Management (BLM) to develop a Habitat Integrity Index (HII) to assess conditions and monitor the rangewide ecological integrity of slickspot peppergrass habitat (Mancuso and Moseley 1998). Baseline index and associated monitoring data were collected at most occurrences located on public land in 1998 (Mancuso et al. 1998). In 1999, a second year of sampling was completed and several additional monitoring transects were established in the Inside Desert area (Mancuso 2000). Most transects were resampled again in 2000 (Mancuso 2001). This report summarizes results from 2001, when a fourth consecutive year of monitoring information was collected.

METHODS

The monitoring protocol for slickspot peppergrass consists of four integrated parts – the HII transect and associated scorecard; an Occurrence Viability scorecard; vegetation plot sampling; and photo-point photographs. Background information and an explanation of the methods for each of these protocols have been detailed in previous reports (Mancuso and Moseley 1998; Mancuso et al. 1998). Refinement of the monitoring protocol and additional information to help relocate some of the transects have also been detailed elsewhere (Mancuso 2000; Mancuso 2001). These references should be consulted for a thorough review of the monitoring program. Monitoring in 2001 consisted of resampling most HII transects, resampling associated plant community plots, re-taking photo-point photographs, and reassessing Occurrence Viability ranks.

The land unit being assessed with the HII is a specific geographic location known as an Element Occurrence. An Element Occurrence is the standard database record used by the Natural Heritage Program/Conservation Data Center network to track elements of conservation concern. Monitoring transects are referenced by their Element Occurrence Record number, a

three-digit identifier (e.g., 001, 002) assigned by the CDC for database tracking purposes. Each occurrence also has a name that relates to a nearby geographic reference. Most occurrences have one transect, but seven have two transects, and one, West of Orchard (027), has five. Transects at occurrences with multiple transects have a letter added to the three-digit code (e.g., 027A, 027B) to distinguish them.

Forty-five transects were established at 37 occurrences when the monitoring program began in 1998. One or more transects have been added to the monitoring program each subsequent year, including in 2001. For various reasons (new transects added, time constraints, access problems, etc.) the number of occurrences sampled each year has fluctuated slightly. A total of 52 transects and 41 occurrences have been included in the monitoring program since its inception. Taking into account the transects established and abandoned in 2001, the monitoring program presently includes a total of 48 transects at 38 occurrences.

In 2001, I decided to abandon four of the monitoring transects. The Willow Creek (047) transect area was destroyed by a recent construction project and apparently located on private land. There remains some discrepancy over where the BLM originally discovered slickspot peppergrass in the area. Recent information indicates the transect was established one ridge west of the actual occurrence location, and explains why no slickspot peppergrass was encountered during three years of monitoring. I recommend the area originally reported to have slickspot peppergrass in 1993 be revisited in 2002. If slickspot peppergrass is found on BLM land, a new HII transect can be established. The transects at Pleasant Valley North (022A and 022B) were inadvertently established on private land in 1998. The land is now for sale and the transects have been discontinued to avoid trespassing. The transect at Fivemile Creek (049) was abandoned because no slickspot peppergrass was found in two years of sampling and its questionable location within the general occurrence area.

Four new HII transects were established during 2001, all within or immediately adjacent to the OTA. Three of them were established at West of Orchard (027) in order to have better representation across this large occurrence. The other new transect was established at Fake Raptor Rock (059), a newly discovered occurrence within the OTA. Map locations and transect location forms for the new transect are in Appendix 1. A list of occurrences included in the HII monitoring program are in Table 1, along with the years they were sampled.

Monitoring was conducted between May 9 and September 28, 2001, and was a collaborative effort. Twenty-six occurrences were monitored by the CDC, seven were monitored by biologists from the Boise District BLM, and five by biologists at the IDANG. All monitoring information was forwarded to the CDC for compilation of this report.

Habitat Integrity Index

A modification to the HII protocol was instituted for the four new transects established in 2001. The modification entailed marking each of the ten slickspot sample stations comprising the HII transect with a metal tag. The labeled tags were hammered into the ground at a point in the slickspot not hidden by a shrub, rock, or other distracting feature. In the original HII protocol, the first ten slickspots encountered along the transect azimuth are sampled. In theory it follows that the same ten slickspots should automatically be resampled each monitoring year by following the transect azimuth. However, in reality this is not always the case, owing to the patchy distribution of slickspots at many occurrences, overlooking one, or straying off the azimuth. The intent of marking each slickspot station is to ensure sampling the same slickspots in the same order each monitoring year. This will provide better insight into the disturbance history and fate of individual slickspots, and associated patterns of slickspot peppergrass abundance. The number of paces from one station to the next was recorded to expedite relocating transect slickspots. In the future, I recommend azimuth information from one slickspot to the next also be

recorded. Information to help relocate and resample the four new transects (027C, 027D, 027E, 059) is included in Appendix 1. This is the first time I have marked slickspot stations. I envision marking additional existing transects in a similar fashion in future years, at least within the OTA. Other portions of the HII protocol were followed the same way as previous years. Updated information to help relocate several other transects is contained in Appendix 2.

Vegetation Sampling

Vegetation sampling is included in the monitoring protocol to help quantify composition and structural changes that may occur over time to slickspot peppergrass habitat. Vegetation information also allows seral condition and other habitat condition parameters to be assessed. Plant community information is based on ocular estimates of cover class values for all vascular plant species occurring in a 1/10th acre circular plot. Changes in the species list and associated cover class values from one sampling period to the next are used to monitor changes in the plant community. Because this method has an acceptable accuracy standard of +/- one cover class, an increase or decrease of two or more cover classes is required to be indicative of measurable change. Cover class estimates are also made for several ground cover categories, including soil, gravel, rock, wood, litter, moss/lichen, and basal vegetation. Cover class used for the monitoring program are:

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

Most plots were sampled adjacent to the fifth slickspot along the HII transect in the original sampling protocol. For many transects, the fifth slickspot station was again the reference point for collecting plant community plot information in 2001. However, at a number of transects it was practical to modify the protocol and sample the vegetation at plots centered around, or near the transect location stake. The location of plot center for each transect is included in Appendix 2. This modification was made because the metal rebar transect marker stake is a “permanent” reference point. Using the marker stake will help ensure future sampling occurs in the same 1/10th acre plot each year. There is less of a guarantee a plot located at the “fifth slickspot” will be sampled in the same place each year. This modification accounts for some of the presence/absence differences between the 1998 and 2001 datasets, especially for several perennial forb species. I feel any discrepancies related to this modification were minor and not critical in discerning trend or habitat condition information.

Photo points

Photo points furnish a long-term visual record of the monitoring site. Comparing photographs of the same site taken over a period of years can provide visual evidence of changes to the vegetation or other features and help interpret the HII monitoring data. Photo points were established and photographs taken at the four new transects using the same protocol as previous years.

Occurrence Viability Rank

The Occurrence Viability Rank is related to the prospects of a slickspot peppergrass occurrence persisting at a particular location. It augments other portions of the HII monitoring protocol by assessing and scoring criteria important for conservation planning purposes. Although assigning the rank has always been straightforward, its application has been a point of confusion for several people involved with slickspot peppergrass conservation. The main source of this confusion is the similarly named Element Occurrence Rank, which represents the relative

conservation value of an occurrence with respect to others of the same element (species). Element Occurrence Ranks have been assigned to many rare plant occurrences in Idaho (not just *Lepidium papilliferum*) by CDC biologists. The scores for the Element Occurrence Rank and Occurrence Viability Rank both range from “A” (the highest) to “D” (the lowest), another similarity that has compounded the confusion. Although there is some overlap in the content and purpose of the Element Occurrence and Occurrence Viability ranks, they are not equivalents.

I modified the Occurrence Viability Rank in 2001 in hopes of alleviating this confusion. I simply graded the “occurrence viability” and “occurrence defensibility” components separately on the scorecard form, and eliminated the “A” to “D” combined ranking portion of the protocol. The scale on which the grades are based remains unchanged from the original protocol: 0 = high; 1 = fair; 2 = marginal; and 3 = poor. The lower the grade, the better the occurrence viability and defensibility. “Occurrence viability” and “occurrence defensibility” information is not lost; it is just expressed as individual “0” to “3” scores instead of a combined “A” to “D” ranking. A new Occurrence Viability scorecard that takes these modifications into account will be designed for the 2002 monitoring season.

RESULTS

Monitoring information was collected at 48 transects, representing 38 occurrences in 2001. Information was not collected at the Willow Creek (047), Pleasant Valley North (022), and Fivemile Creek (049) occurrences because they were abandoned. In 2001, a total of 442 slickspot microsite stations were sampled for the 48 transects. This is a slightly greater number of slickspot microsites than previous years. Results from 1998, 1999, and 2000 have been summarized in previous reports (Mancuso 2000; 2001; Mancuso et al. 1998). In most cases, HII results for 2001 were similar to previous years. Discussion of these similarities, as well as differences and trends, comprise most of the remainder of this report.

A copy of the HII questionnaire used in 2001 is in Appendix 3. Slickspot microsite, sagebrush-steppe, and combined HII attribute scores for 2001 are listed in Table 2, along with scores from previous years for comparison. Copies of the completed 2001 HII field form scorecards are in Appendix 4. A spreadsheet of the 2001 HII data set is in Appendix 5. Attribute scores for the four-year HII transect data set are summarized in Appendix 6. Field observations and other transect notes are included in Appendix 2.

Slickspot microsite attributes

The first eight attributes of the HII scorecard focus on the integrity of the individual slickspot microsites. In 2001, the majority of 442 slickspots sampled had some level of organic material accumulation (76%; attribute 1); had some compromise to their perimeter (80%; attribute 2); had some level of weed invasion (87%; attribute 3); and had evidence of livestock disturbance (60%; attribute 7). In contrast, a minority of slickspot stations had evidence of shrub invasion (26%; attribute 5), perennial forb/grass invasion (38%; attribute 6), or signs of ORV disturbance (1%; attribute 8). These scores follow the same general pattern as results from previous monitoring years.

Table 3 breaks down the microsite attribute data by individual slickspot and by transect. The first series of columns lists the number of individual slickspot stations receiving a score of “0”, “1”, or “2”. The second series tallies the most common scores recorded for each transect. Poison Creek North (708) was not included in the 2001 analysis because no slickspot microsites were found. They have all been destroyed by post-fire restoration efforts.

Sagebrush-steppe attributes

The second half of the HII protocol focuses on attributes related to the vegetation and disturbance factors of the transect area. Information provided by these attributes provides an assessment of general habitat conditions and threats at each occurrence. Attribute 9 assesses fire history. The occurrence at Willow Creek (056) burned in a fire during August 2001. This fire killed most, if not all of the shrubs missed by a mosaic burn a number of years ago. A wildfire burned private land immediately adjacent to the monitoring transect at Soles Rest Creek (030) in 2000. I did not report this burn last year because it occurred after the monitoring season was over. Twenty-one of the occurrences being monitored are located in burned or mosaic burned habitat. Nine others occur immediately adjacent to burned habitat, and eight occur in areas that are largely unburned.

Twenty-six of the 48 transects (54%) monitored in 2001 had signs of livestock disturbance (attribute 10). This is a lower percentage compared to previous monitoring years. Disturbance from ORV use (attribute 11) was also reduced from prior years. It was evident at only the Simco Road (015) and New Plymouth SW (066) occurrences. The ORV tracks at New Plymouth SW appeared to be old, not from 2001. Invasive annual grasses (attribute 12) clearly dominated the herbaceous vegetation at 18 (38%) transects, slightly more than last year. Weedy forbs (attribute 13) were widespread and abundant at eight (17%) transects, about the same as past years. Similar to past years, slightly more than half (53%) of the transects had high to moderate microbotic crust cover (attribute 14), while less than a fifth (15%) had no more than a trace amount.

Table 4 summarizes the scores for the vegetation characterization. The first series of columns lists the number of slickspot stations receiving a score "0", "1", "2", or "3". In the second series, the most common score for each attribute by transect is reported. Identical summaries were done for 1998, 1999, and 2000, and are included in the table for comparison.

Integrity condition rating

The Integrity condition rating is a way to relate the HII scores to a relative habitat condition context. It rates occurrences into one of three broad categories based on their HII scores (see Tables 3 and 4). The three categories are good, fair, or poor. Scoring parameters for each category are listed in Table 5. The annual Integrity condition ratings for each occurrence are provided in Table 6. The way the HII is designed, the lower the score the higher the habitat integrity.

In 2001, the combined slickspot microsite and sagebrush-steppe Integrity condition rating was "Good" for three (8%) occurrences, "Fair" for 18 (48%) occurrences, and "Poor" for 16 (43%) of the occurrences monitored. Although most occurrences had the same combined Integrity condition rating in 2001 as in 2000, three (018, 030, and 040) had reduced ratings, while none had an improved rating. The drop from "fair" to "poor" at Kuna Butte SW (018) was primarily due to increased levels of slickspot disturbance for several slickspot microsite attributes at one (018B) of the two transects monitoring this occurrence. A wildfire adjacent to the Soles Rest Creek (030) transect resulted in changes to the fire history attribute score that dropped this occurrence from the "good" to the "fair" category. Increased scores for all of the fire history attributes at Woods Gulch (040) dropped this occurrence from the "fair" to "poor" category. The fire history scores were lower prior to 2001 because I called the surrounding landscape unburned, when in fact it is actually an old mosaic burn.

Lepidium papilliferum abundance

The HII protocol includes a count or estimate of slickspot peppergrass plants at each slickspot microsite station and assignment to one of four abundance class categories. Approximately 4,045 plants were tallied along the 48 monitoring transects in 2001. This is the second lowest total in the four years of monitoring, and about 57% as many plants as last year. In 2001, 24% of the slickspot microsites sampled had one or more slickspot peppergrass plants, compared to 29% in 2000, 26% in 1999, and 38% in 1998. For 2001, nine (19%) transects had slickspot peppergrass plants in at least half of the microsites, but only one had plants in all ten slickspot stations. Two transects had more plants in 2001 than prior monitoring years, but 16 had fewer plants compared to any previous year. Sixteen (33%) transects had no slickspot peppergrass plants in 2001, more than any year since the monitoring program began. Six transects had plants present every year except 2001. Discounting the transects that were abandoned this year, five transects have not had plants any of the four monitoring years. With over 2,100 plants, the transect at Kuna Butte SW (018A) accounted for approximately 53% of all the slickspot peppergrass plants tallied in 2001.

Abundance class data are summarized in Table 7 and transect abundance information in Table 8. The total number of *Lepidium papilliferum* plants for each transect is listed in Table 9. Year 2001 was dry and many occurrences were dominated by small-size plants, especially in the Mountain Home/Glenns Ferry area, the eastern distribution of slickspot peppergrass. Large-size plants were restricted to a few transect sites. The HII scorecards in Appendix 3 have a record of the number of plants observed at each microsite station, including estimates of the number of flowering plants versus vegetative rosettes for some transects. Appendix 7 details abundance class data by individual transect.

Livestock disturbance abundance

Livestock trampling is one of the main disturbances to slickspot microsites. To help quantify this disturbance, the number of livestock hoof prints and scats are counted/estimated at each slickspot station along the transect. As in past years, most livestock sign recorded in 2001 was from cattle. Horse or sheep evidence was restricted to a few transects. Of the 442 slickspot microsites sampled, 262 (60%) had some level of livestock-related disturbance. No livestock sign was recorded in slickspots at 10 (21%) of the 48 transects sampled. In contrast, 19 (40%) had livestock sign in every microsite station. Ten transects had total livestock sign numbers lower than previous years, while seven transects had a higher tally than any previous monitoring year. Livestock disturbance has never been recorded at eight transects.

Overall livestock disturbance results in 2001 were similar to other monitoring years. However, results varied by general area and site. For example, three transects in the Juniper Butte area (702, 705, 709) have shown an increase in the total number of livestock sign each monitoring year. No other transects have consistently shown such a year-to-year increase. One slickspot station at Juniper Butte South (707) had approximately 150 livestock tracks, the highest number tallied in 2001.

Tables 10 and 11 summarize the livestock disturbance abundance class data for 2001, and include previous years information for comparison. Table 12 provides an estimate of the total number of livestock disturbance sign tallied at each transect each monitoring year. More detailed livestock abundance sign information is listed by transect in Appendix 8, while the HII scorecards in Appendix 4 have the tallies for each sample station.

Vegetation sampling

Plant community plot data were collected at each of the original transects in 1998. Identical information was collected for new transects added to the monitoring program in 1999, 2000, and 2001. Plant community plot information was also collected at many transects in 2000. In 2001, most plots were resampled, except in the OTA.

With a few notable exceptions, 2001 plant community cover class values were similar to baseline values collected in 1998. Sagebrush cover was unchanged at all transects. The only shrub to change was rabbitbrush (*Chrysothamnus* spp.), which increased at two transects in the Boise/Eagle foothills area and one in the Juniper Butte area. The most pervasive trend was the increase in cheatgrass (*Bromus tectorum*) between 1998 and 2001. This occurred at 19 of the 34 (56%) transects with two years of comparative data. When broken down by geography, cheatgrass has increased at 83% of the transects in the Boise/Eagle foothills area; 80% of the transects in the Kuna/Boise area; 75% of the transects in the Orchard area; 38% of the transects in the Mt. Home/Glenns Ferry area; and at none of the transects in the Inside Desert area. Cheatgrass abundance decreased at only the Kuna Butte SW (018B) transect. The cover of crested wheatgrass (*Agropyron cristatum* and related cultivars) has apparently decreased at four transects, one each in the Kuna/Boise and Inside Desert areas, and two transects in the Mt. Home/Glenns Ferry area. No transects showed an increase in crested wheatgrass. Sandberg's bluegrass (*Poa secunda*) is the most common native bunchgrass at many transects. Goose Creek (038) and New Plymouth SW (066) were the only transects to have an increase in this species, while Three Creek Well (702) and Poison Creek North (708) had decreases.

Rush skeletonweed (*Chondrilla juncea*), a plant on the Idaho noxious weed list, has been recorded at a total of ten transects in the Boise/Eagle foothills and Orchard areas. One of these transects (Willow Creek 047) was abandoned in 2001, however. Rush skeletonweed has increased in cover at one of the foothill transects since 1998. Two other foothill transects with no rush skeletonweed in 1998, had trace amounts in 2001. In contrast, two Orchard area transects with trace amounts in 1998, had none recorded in 2001. Rush skeletonweed cover at the remaining four transects has not changed. Forage kochia (*Kochia prostrata*) is a perennial species sometimes included in post-fire restoration plantings. Forage kochia is a concern because unlike most other planted species, it can establish, persist, and be a resource competitor in slickspot microsites. It is known from one of the transects at Initial Point (019B).

Nearly all plant community plots outside of the Boise Foothills and Inside Desert areas have three or less perennial forbs species. Eleven plots have none. For all plots, most perennial forbs occur with only trace cover. There are many transects where a trace amount of one or more perennial forb species was recorded in either 1998 or 2001, but not both years. This likely represents natural fluctuations in the expression of above ground and/or flowering individuals, or in some cases, reflect sampling the vegetation in slightly different places in 2001 compared to prior years.

It is not uncommon for native and/or introduced annual forb species to outnumber the perennials present at a transect site. Annual forbs occur at all transects, and although their abundance can fluctuate depending on seasonal precipitation patterns, increases or decreases are also indicative of disturbance or other factors. Tall annual willow-weed (*Epilobium brachycarpum*) is the most widespread and common native annual forb recorded at the monitoring transects. It was present at most transects during 1998, a relatively wet year. However, it was absent, or present with only trace cover at most of these same transects during the dry year of 2001. Tansymustard (*Descurainia* spp.), clasping peppergrass (*Lepidium perfoliatum*), tumbled mustard (*Sisymbrium altissimum*), bur buttercup (*Ranunculus testiculatus*), and prickly lettuce (*Lactuca serriola*) are examples of introduced annual forbs found at many transects. The abundance of tumbled mustard was less at many transects in 2001, compared to

1998. This reduction was dramatic at three burned habitat transects in the Kuna/Boise area, as well as Simco Road (015). A trend of increasing bur buttercup has been recorded at one of the Bennett Road (008B) transects.

A list of noteworthy plant community changes is summarized in Table 13. The table omits changes for species such as tall willow-weed because they have little if any management implication concerning slickspot peppergrass habitat quality. Perennial forbs recorded at trace amount one year, but absent the other sample year, are also omitted. Plant community information for the Inside Desert may be incomplete because these transects were sampled too late in 2001 to identify many taxa to the species level. Plant community plot data sheets for 2001 are in Appendix 10. Spreadsheets with plant community data for each monitoring year are in Appendix 11.

Photo points

Photo-point photographs were taken at all transects sampled in 2001. This represents a fourth year of monitoring photos for most transects. Baseline photos were taken at the four new transects established in the OTA. All photographs are on file at the CDC office in Boise, along with a duplicate set at the Army National Guard's Boise office. Changes between 2000 and 2001 are documented well by photos from three transects in particular. Photos from Fraser Reservoir East (021) show a newly bladed two-track cutting through the sagebrush close to the transect, and encroachment of giant rock piles from an adjacent mining operation. The fire that burned adjacent to Soles Rest Creek (030) in 2000 is documented by the lack of sagebrush to the south and west of the transect. Photos from Willow Creek (056) dramatically show the burned landscape from the 2001 wildfire.

Occurrence Viability Rank

Most baseline "occurrence viability" and "occurrence defensibility" information and associated grades were assigned in 1998 (Mancuso et al. 1998). Factors affecting viability and defensibility are reassessed each monitoring visit to update the grades if necessary. The grades are not expected to change unless an occurrence is subject to new or changing disturbances, threats, land ownership, or some other conservation-related factor. Viability grades for the Tenmile Creek (032) and South Cole Road/Tenmile Creek (048) occurrences were downgraded. Defensibility grades for Chalk Flats (010), Melba Butte (025), and Poison Creek North (708) were also downgraded. No occurrences were upgraded based on re-evaluations made in 2001. Rationale for the downgrades are listed on the scorecards contained in Appendix 11. Table 14 summarizes the "occurrence viability" and "occurrence defensibility" grades scored at each occurrence over the years.

DISCUSSION

Habitat Integrity Index

The HII focuses on three types of disturbance: wildfire, livestock grazing, and off-road motorized vehicle use. These disturbances are widespread and known to impact slickspot peppergrass habitat at both the microsite and landscape scales. Each is an important management concern in southwestern Idaho and has the potential to be addressed by management decisions and actions. The HII monitoring program was developed to collect trend information regarding the ecological integrity of slickspot peppergrass habitat. It is based on the premise that sagebrush-steppe in excellent ecological condition represents the highest integrity and best habitat for slickspot peppergrass. Trend refers to the direction of change, if any, towards specific management objectives. Trend information is important to help land managers determine and

evaluate the effectiveness of decisions or other actions taken to meet management goals (Bureau of Land Management 1985).

With the availability of several years of monitoring data, it is now possible to begin assessing trends at most transects. Trends at each transect are based on the HII scores recorded each year for each of the 14 HII attributes. The way the HII is scored, the lower the score, the higher the integrity. I considered an attribute to have an improving integrity trend if the attribute score for the transect decreased each consecutive year. It has a declining integrity trend if the score increased each consecutive year. If scores fluctuate from year to year then there is no clear trend. The trend is stable if attribute scores remain the same each year.

Between 1998 and 2001, 20 transects had an improving or declining trend in one or more of the HII attributes. This is slightly less than half of the 43 transects still being monitored and possessing three or more years of monitoring data. Eight transects had one or more attributes with an improving trend, while 14 transects had one or more attributes with a declining trend. Most trends concerned slickspot microsite attributes as opposed to sagebrush-steppe attributes. For all transects, the majority of attributes were stable or did not reveal a consistent trend. For many transects it was not uncommon for one or more attribute scores to be substantially higher or lower one year compared to the other years. The most common trend concerned the integrity of the slickspot microsite boundaries (attribute 2). Eight transects showed a declining trend for this attribute. This is the attribute with the most subjectivity in its interpretation. In addition, four transects (018B, 701, 702, 709) had increasing overall slickspot microsite attribute scores each year. This suggests an overall declining trend in slickspot integrity. Three transects (021, 027A, 035B) had scores suggesting an overall improvement in slickspot integrity. A declining trend in sagebrush-steppe integrity was suggested for five transects (030, 032, 040, 053, 057) showing increased overall sagebrush-steppe scores each year. No transects had an improving sagebrush-steppe trend. Figure 1 depicts the number of transects having an improving or declining trend for each attribute. Trend information for each transect is discussed below.

Boise/Eagle Foothills area

Military Reserve Park (012) – Stable trend.

Goose Creek (038) – Stable trend. 2001 was the first year perennial forbs or grasses were reported in the slickspot microsite.

Woods Gulch (040) – Prior to 2000, I considered the area surrounding this transect to be unburned. In reality it is an older mosaic burn. Because of this original misinterpretation, fire history scores were artificially low in previous monitoring years. The 2001 scores more accurately represent the fire history of the surrounding landscape. Although the trend is stable for several attributes, this transect has shown an increase in the total sagebrush-steppe score each year. This suggests an overall declining trend of sagebrush-steppe integrity.

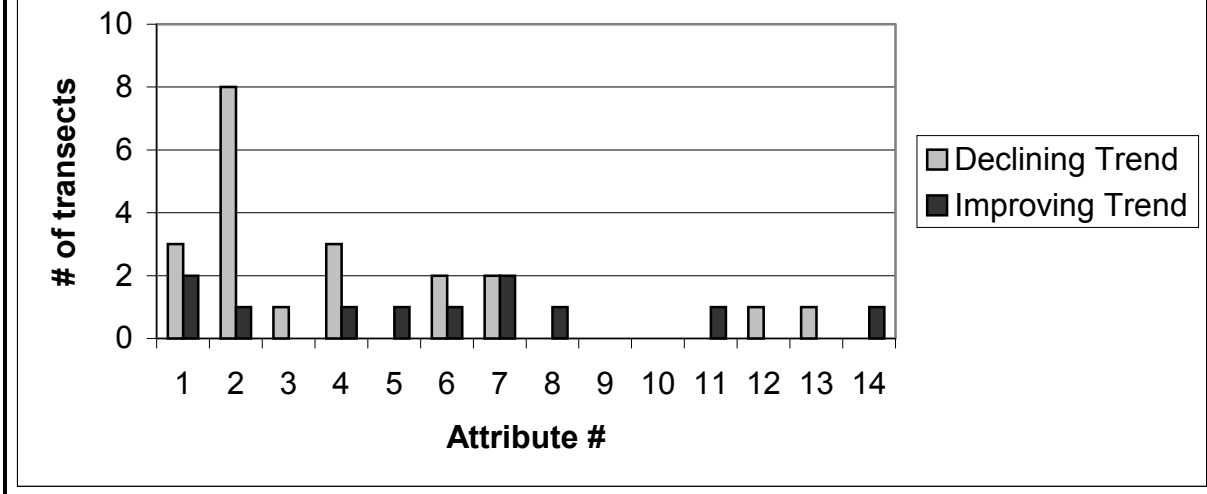
Willow Creek (047) – The transect for this occurrence was abandoned in 2001.

Woods Gulch (052) – Increasing slickspot microsite weed density scores (attribute 4) each year suggests a declining trend for this attribute.

Willow Creek (056) – Increasing organic debris deposition and slickspot boundary compromise scores (attributes 1 & 2) each year suggests a declining trend for these two slickspot microsite attributes. In addition, scores increased all but one year for slickspot weed density (attribute 4) and livestock disturbance sign (attribute 7). Fire history scores (attributes 9a-9d) increased in 2001 due to a wildfire in August. The 2001 total slickspot microsite, total sagebrush-steppe, and combined HII scores were the highest yet recorded, and reflect increases in habitat degradation associated with the fire.

Lower Seaman Gulch (065) – This transect shows a declining trend in slickspot microsite boundary integrity (attribute 2) and weed density (attribute 4). Most other attributes are stable.

Figure 1.
Habitat Integrity Index trends for
***Lepidium papilliferum* monitoring transects**



Kuna/Boise area

Kuna Butte SW (018A) – The 2001 slickspot boundary compromise score (attribute 2) was the highest recorded in four years. There have been no livestock disturbances recorded for the transect area since 1998. Most other attributes have been stable.

Kuna Butte SW (018B) – This transect shows a declining trend in slickspot microsite boundary integrity (attribute 2), weed density (attribute 4), and perennial forbs/grasses establishment (attribute 6). An increasing total slickspot microsite attribute score each year suggests an overall declining trend of slickspot microsite integrity.

Initial Point (019A) – Most of the slickspots in this area were destroyed following post-fire rehabilitation efforts a number of years ago. However, scattered slickspot microsites remain. These show an improving trend in the amount of organic matter being deposited in the slickspots (attribute 1). The transect area shows an improving trend of microbiotic crust cover (attribute 14). Year 2001 was the first year livestock disturbance sign was recorded in most of the slickspot microsite stations.

Initial Point (019B) – Slickspot microsite attributes are stable or have no discernable trends. Sagebrush-steppe attributes have been largely stable.

Pleasant Valley North (022A and 022B) – Both of these transects were abandoned in 2001.

Kuna Butte (024) - This transect shows a declining trend in slickspot microsite integrity due to increasing weed density (attribute 4).

Melba Butte (025) - This transect shows improving trends regarding slickspot livestock disturbance sign (attribute 7) and ORV disturbance sign (attribute 11).

Tenmile Creek (032) – HII scores were generally lower in 1999 compared to other years, but no single attribute trends can be discerned. However, this transect has an increase in the total sagebrush-steppe score each year, suggesting an overall declining trend of sagebrush-steppe integrity.

South Cole Road/Tenmile Creek (048) – No discernable trends.

Fivemile Creek (049) – This transect was abandoned in 2001.

Kuna Butte Northwest (057) – No discernable trend for most attributes, although a few are stable. The total HII score was higher in 2001 compared to previous years largely due to more abundant weeds in both the slickspots (attribute 4) and the occurrence area (attribute 12). This transect has an increase in the total sagebrush-steppe score each year, suggesting an overall declining trend of sagebrush-steppe integrity.

New Plymouth SW (066) – Increasing annual scores for perennial forb/grass establishment (attribute 6) within slickspot microsites suggests a declining integrity trend for this attribute.

Orchard area

Simco Road (015) - No discernable trends for most of the slickspot microsite attributes.

Sagebrush-steppe attributes have been largely stable.

Soles Rest Creek (020A) – Year 1999 had lower scores for several slickspot microsite attribute scores, but overall, no trends can be discerned for the slickspot microsite attributes. Sagebrush-steppe attributes have been largely stable.

Soles Rest Creek (020B) – Sagebrush-steppe attributes have been stable. Slickspot microsite attributes have been either stable or have fluctuated too much to provide a trend.

West of Orchard (027A) – The total slickspot microsite attribute score has decreased every year and suggests an overall improving trend in slickspot integrity. Although there have been no consistent trends in any of the individual attributes, scores have tended to decrease for most slickspot attributes between 1998 and 2001. Sagebrush-steppe attributes have been stable.

West of Orchard (027B) – No discernable trend for most attributes. The total HII score for 2001 was the highest recorded in four years. This was largely due to an increased score for two of the fire history attributes (9a and 9b). A high score for the compromise of the slickspot boundaries (attribute 2) also contributed to the increased HII score.

West of Orchard (027C, D, and E) – No trend information is available for these three transects established in 2001.

Christmas Mountain N (028A) – Scores for this transect shows an improving trend in slickspot microsite ORV disturbance (attribute 8). This may be an artifact of not counting old tank tracks the past couple of years. There are also fewer perennial forbs/grasses (attribute 6) established in the slickspots compared to 1998.

Christmas Mountain N (028B) – This transect shows an improving trend concerning organic debris being deposited in the slickspots (attribute 1). In contrast, it has a declining trend for weedy forb presence in the transect area (attribute 13).

Soles Rest Creek (030) – This transect has an improving trend of livestock disturbance sign in the slickspots (attribute 7). There is also a trend of increasing exotic grass abundance in the transect area (attribute 12). The total sagebrush-steppe attribute score was higher in 2001 than any previous year due to higher fire history scores (attributes 9b-9d). These scores increased due to a wildfire that burned sagebrush habitat adjacent to the transect area. This transect has an increase in the total sagebrush-steppe score each year, which suggests an overall declining trend of sagebrush-steppe integrity.

Bowns Creek (031) – A stable trend for most attributes. The apparent increasing trend in one of the fire history attributes is an artifact of inconsistent sampling. There have been no fires in the immediate transect area the past four years.

Orchard Southwest (035A) – No discernable trends, except for some of the sagebrush-steppe attributes, which are stable.

Orchard Southwest (035B) – The total slickspot microsite attribute score has decreased each year since 1998. This was due to a general decrease in slickspot weed density (attribute 4), perennial forb/grass establishment (attribute 6), and livestock disturbance sign (attribute 7). There has also been reduced exotic grass abundance in the transect area the past two years (attribute 12).

Orchard SSW (041) – A stable trend for most attributes.

Christmas Mountain (053) – Year 1999 had lower scores for most of the slickspot microsite attributes scores compared to other years. Livestock disturbance sign in the slickspots (attribute 7) and the abundance of exotic annual forbs (attribute 13) have increased the past two years compared to 1998 and 1999. The total sagebrush-steppe attribute score has increased every year, suggesting an overall decline in transect area habitat integrity.

Fake Raptor Rock (059) - No trend information is available for this transect established in 2001.

West of Squaw Creek (060) – A stable trend for most attributes.

Mt. Home/Glenns Ferry area

Bennett Road (008A) – The total HII score has decreased each monitoring year even though most attribute scores have been fairly consistent. This suggests an improvement in overall habitat quality for the transect area. Since 1998, scores have improved most years for slickspot weed abundance (attribute 3), and transect area exotic grass abundance (attribute 12).

Bennett Road (008B) – This transect shows a declining slickspot integrity trend due to increasing slickspot boundary compromise (attribute 2). Other attribute scores have been fairly consistent.

Chalk Flat (010) – No discernable trends. The slickspot boundary compromise score (attribute 2) was lower in 1999 and 2000 than other monitoring years, corresponding to the two years livestock did not graze the occurrence.

Fraser Reservoir East (021) – This transect has improving slickspot microsite trends for weed density (attribute 4) and perennial forb/grass establishment (attribute 6). These trends help account for the reduced total slickspot microsite attribute score recorded each year.

Mountain Home SE (029) – No discernable trend for most of the slickspot microsite attributes. The others show a stable trend. The fire history of the occurrence area has not changed during the monitoring period despite fluctuations in the fire history attribute scores.

West Side Canal/Slade Flat W (050) - This transect shows a trend of increasing slickspot boundary compromise (attribute 2), corresponding to a declining trend for this attribute. Other attributes appear stable.

Glenns Ferry NW (058) – Scores for slickspot boundary compromise (attribute 2) are considerably higher the past two years compared to 1998 and 1999. The transect shows a trend of decreased shrub establishment (attribute 5) within the slickspots.

SE of Reverse (061) - This transect shows a trend of increasing slickspot boundary compromise (attribute 2), corresponding to a declining trend for this attribute.

Inside Desert area

Post Office Reservoir (701) - This transect shows a trend of increased organic debris being deposited in the slickspots (attribute 1) and slickspot boundary compromise (attribute 2). As a result, the total slickspot microsite attribute score has increased each year and suggests a declining trend of slickspot integrity.

Three Creek Well (702) - This transect shows trends of increased slickspot boundary compromise (attribute 2) and livestock disturbance sign (attribute 7). An increasing total slickspot microsite attribute score each year suggests an overall declining trend of slickspot microsite integrity.

Juniper Butte North (704) – This transect has only two years of associated HII data. Scores for most slickspot microsite attributes were higher in 2001 than in 1999.

Juniper Butte South (707) - This transect shows an improving trend regarding slickspot boundary compromise (attribute 2).

Poison Creek North (708) – Post-fire restoration actions have more or less destroyed all the slickspots in this occurrence area. HII information was not collected in 2001 because there were no slickspot microsities to sample.

Juniper Butte West (709) - This transect shows slickspot microsite trends of increasing organic debris deposition (attribute 1), weed invasion (attribute 3), and livestock disturbance sign (attribute 7). An increasing total slickspot microsite attribute score each year suggests an overall declining trend of slickspot microsite integrity.

Vegetation sampling

The main habitat types supporting slickspot peppergrass populations belong to the big sagebrush (*Artemisia tridentata*) series of Hironaka et al. (1983). In most of the western Snake River Plain, late seral conditions have big sagebrush dominating the shrub layer, with one or more tall native bunchgrass species dominating the herbaceous layer. A change in the make-up of the vegetation and seral status can occur depending on an area's disturbance history. A mid-

seral shrub layer is usually characterized by reduced sagebrush cover, but increased rabbitbrush (*Chrysothamnus* spp.) cover. The shrub component has been eliminated or contains only scattered individuals in early seral conditions. A mid-seral herbaceous layer is dominated by native bunchgrasses such as Sandberg's bluegrass (*Poa secunda*) and squirreltail (*Sitanion hystrix*), with only small amounts of cheatgrass. Late seral grasses such as bluebunch wheatgrass (*Agropyron spicatum*) and Thurber's needlegrass (*Stipa thurberiana*) are absent, or rare. Many areas have a herbaceous layer with invasive annual grass cover equal to or greater than that of mid-seral bunchgrasses. This mix of cheatgrass dominance or co-dominance and relatively high bunchgrass cover represents a mid-early seral category. Early seral herbaceous vegetation supports very high cheatgrass cover with comparatively few or no bunchgrasses.

One can assess the condition of slickspot peppergrass habitat by assessing the site's seral status. This is based on the premise that late seral sagebrush-steppe vegetation equates to the highest integrity and best habitat for slickspot peppergrass. Vegetation plot information can be used to evaluate changes in plant community and associated seral status determinations over time. Baseline plant community and seral status information for each transect was originally determined using vegetation plot data collected in 1998 (Mancuso et al. 1998). These determinations were re-evaluated and updated based on plot data collected in 2001. Table 15 lists the plant community and seral status of each transect for both years. It includes seral status descriptors for the shrub layer, followed by a descriptor for the herbaceous component (e.g., Artrwy/Pose). Assignment of a habitat type and associated late seral vegetation in many areas was difficult due to past disturbances and/or insufficient historical vegetation information. This limitation needs to be taken into consideration when interpreting my seral status designations. The designations for the OTA are based on recognizing the habitat type for most of the area as *Artemisia tridentata wyomingensis*/*Stipa thurberiana* and not *Artemisia tridentata wyomingensis*/*Poa secunda*.

The shrub layer had the same seral category at all transects between the two years. However, seral status of the herbaceous component declined for five transects and improved at one. Four transects (020B, 038, 052, 057) declined from the mid-seral to the mid-early seral category, and one (019B) from mid-early to early seral. A dramatic increase in the abundance of cheatgrass occurred at each of these transects between 1998 and 2001. A decrease in cheatgrass abundance improved the seral category from mid-early to mid-seral for the herb layer at the Kuna Butte SW (018B) transect.

Wildfire

In 2000 a fire re-burned one of the transects at Soles Rest Creek (020A). This was an area that initially burned prior to 1998. The second fire did not result in any substantial changes to the annual grassland vegetation characterizing this area. The other transect at Soles Rest Creek (020B), located across Old Highway 30, escaped both fires. Its unburned sagebrush habitat had much higher cheatgrass cover in 2001 compared to 1998. A hot wildfire in 2001 completely burned an area that included the Willow Creek (056) occurrence south of Emmett. Portions of this area had a mosaic burn a number of years ago as well. Plot information was collected a few days after the 2001 fire, but the fire made plant species identification difficult in some cases. Nonetheless, it appears rush skeletonweed has increased over 1998 levels. Future sampling will help reveal any other plant community changes.

Wildfires have not burned any other transects since the monitoring program began in 1998. However, a wildfire in 2000 burned an area immediately adjacent to the transect at Soles Rest Creek (030). This event did not result in any noteworthy changes in plant community plot information collected at this transect in 2001. Since 1998, wildfires have occurred within one mile of the Fraser Reservoir East (021) and Tenmile Creek (032) occurrences. These fires have

been relatively small and located far enough away as not to influence the HII scores for the two occurrences.

CONCLUSION

Monitoring results the past four years reveal there has not been a dramatic, rapid, widespread decline in the condition of slickspot peppergrass habitat. It also shows habitat improvement is limited to a few sites. The pattern the past four years has been a slow, but steady decline, affecting a few occurrences each year. After any one monitoring season conditions do not seem too much different or worse than the previous year. However, the ongoing cumulative effects of occasional fires, habitat fragmentation, increases in cheatgrass abundance, new mining claims, etc., all contribute to a sense of urgency for southwestern Idaho's sagebrush-steppe ecosystem and dependent species such as slickspot peppergrass.

REFERENCES

- Bureau of Land Management. 1985. Rangeland monitoring. Trend studies. Technical Reference 4400-4. Bureau of Land Management, Denver, CO. 130 p.
- Hironaka, M., M.A. Fosberg, and A.H. Winward. 1983. Sagebrush-grass habitat types of southern Idaho. Bulletin No. 15. Forest, Wildlife, and Range Experiment Station, university of Idaho, Moscow. 44 p.
- Mancuso, M. 2000. Monitoring habitat integrity for *Lepidium papilliferum* (slickspot peppergrass): 1999 results. Unpublished report prepared by the Idaho Department of Fish and Game, Conservation Data Center, Boise ID. 16 p., plus appendices.
- Mancuso, M. 2001. Monitoring habitat integrity for *Lepidium papilliferum* (slickspot peppergrass): 2000 results. Unpublished report prepared by the Idaho Department of Fish and Game, Conservation Data Center, Boise ID. 22 p., plus appendices.
- Mancuso, M. and R.K. Moseley. 1998. An ecological integrity index to assess and monitor *Lepidium papilliferum* (slickspot peppergrass) habitat in southwestern Idaho. Unpublished report prepared by the Idaho Department of Fish and Game, Conservation Data Center, Boise ID. 15 p., plus appendices.
- Mancuso, M., C. Murphy, and R.K. Moseley. 1998. Assessing and monitoring habitat integrity for *Lepidium papilliferum* (slickspot peppergrass) in the sagebrush-steppe of southwestern Idaho. Unpublished report prepared by the Idaho Department of Fish and Game, Conservation Data Center, Boise ID. 28 p., plus appendices.
- Moseley, R.K. 1994. Report on the conservation status of *Lepidium papilliferum*. Unpublished report prepared by the Idaho Department of Fish and Game, Conservation Data Center, Boise, ID. 35 p., plus appendices.
- Quinney, D. 1998. LEPA (*Lepidium papilliferum*). Booklet produced by the Natural Resources Group, Environmental Management Office, Idaho Army National Guard, Boise, ID. 25 p.
- U.S. Fish and Wildlife Service. 1999. Endangered and threatened wildlife and plants; review of plant and animal taxa that are candidates or proposed for listing as Endangered or Threatened; annual notice of findings on recycled petitions; and annual description of progress and listing actions. Federal Register Vol. 64, No. 205 (Monday, October 25, 1999).

Table 1. List of occurrences included in the HII monitoring program, 1998 - 2001.

EOR #	Name of Occurrence	1998	1999	2000	2001
Boise/Eagle Foothills					
012	Military Reserve Park	X	X	X	X
038	Goose Creek	X	X	X	X
040	Woods Gulch	X	X	X	X
047	Willow Creek	X	X	X	abandon
052	Woods Gulch	X	X	X	X
056	Willow Creek	X	X	X	X
065	Lower Seaman Gulch	X	X	X	X
Kuna/Boise area					
018	Kuna Butte SW	X	X	X	X
019	Initial Point	X	X	X	X
022	Pleasant Valley North	X	X	X	abandon
024	Kuna Butte	X	X	X	X
025	Melba Butte	X	X	X	X
032	Tenmile Creek	X	X	X	X
048	South Cole Road/Tenmile Ck.	X	X	X	X
049	Fivemile Creek	X	X	ns ¹	abandon
057	Kuna Butte Northwest	X	X	X	X
066	New Plymouth SW	X	X	X	X
Orchard area					
015	Simco Road	X	X	X	X
020	Soles Rest Creek	X	X	X	X
027	West of Orchard	X	X	X	X
028	Christmas Mountain N	X	X	X	X
030	Soles Rest Creek	X	X	X	X
031	Bowns Creek	X	X	X	X
035	Orchard Southwest	X	X	X	X
041	Orchard SSW	X	X	X	X
053	Christmas Mountain	X	X	X	X
059	Fake Raptor Rock	-	-	-	X
060	West of Squaw Creek	X	X	X	X
Mt. Home/Glenns Ferry area					
008	Bennett Road	X	X	X	X
010	Chalk Flat	X	X	X	X
021	Fraser Reservoir East	X	X	X	X
029	Mountain Home SE	X	X	X	X
050	West Side Canal/Slade Flat W	X	X	X	X
058	Glenns Ferry NW	X	X	X	X
061	SE of Reverse	X	X	X	X
Inside Desert area					
701	Post Office Reservoir	X	ns	X	X
702	Three Creek Well	X	X	X	X
704	Juniper Butte North	-	X	ns	X
707	Juniper Butte South	-	X	X	X
708	Poison Creek North	X	X	X	X
709	Juniper Butte West	-	X	X	X

¹ ns = not sampled. Transects for EORs 704, 705, and 709 established in 1999; 059 established in 2001.

Table 2. Summary of HII monitoring scores, 1998 - 2001.

EOR	Slickspot microsite attributes average score				Sagebrush-steppe attributes average score				Combined average score			
	98	99	00	01	98	99	00	01	98	99	00	01
Kuna/Boise area												
018A	2.5	2.1	3.4	3.8	16.5	15.3	15.0	14.5	19.0	17.4	18.4	18.3
018B	3.5	4.0	4.1	5.7	11.6	10.1	10.4	11.4	15.1	14.1	14.5	17.1
019A	6.7	5.6	5.8	7.0	20.0	18.0	16.7	17.0	26.7	23.6	22.5	24.0
019B	4.3	2.5	3.2	3.9	18.0	17.0	18.0	17.4	22.3	19.5	21.2	21.3
022A	5.9	4.8	4.8	x ¹	16.1	16.8	14.4	x	22.0	21.6	19.2	x
022B	2.9	2.8	4.6	x	10.0	10.2	11.0	x	12.9	13.0	15.6	x
024	4.1	6.5	5.6	6.0	16.6	13.7	16	14.0	20.7	20.2	21.6	20.0
025	8.0	5.7	5.4	6.1	14.7	11.6	11.8	12.8	22.7	17.3	17.2	18.9
032	5.4	2.0	4.5	3.8	2.5	2.8	5.0	6.0	7.9	4.8	9.5	9.8
048	4.5	2.8	5.5	4.8	3.0	3.1	3.2	5.1	7.5	5.9	8.7	9.9
049	5.8	8.8	ns ²	x	13.0	14.2	ns	x	18.8	23.0	ns	x
057	5.1	3.0	3.7	5.5	4.9	6.6	6.8	7.2	10.0	9.6	10.5	12.7
066	4.5	5.2	6.2	4.8	9.6	8.8	10.0	9.8	14.1	14.0	16.2	14.6
Boise/Eagle Foothills area												
012	5.0	7.0	5.0	5.0	19.0	16.0	16.0	18.0	24.0	23.0	21.0	23.0
038	2.0	4.0	4.8	4.0	15.0	13.0	13.0	13.0	17.0	17.0	17.8	17.0
040	4.7	5.2	5.3	5.1	4.0	3.7	8.0	12.0	8.7	8.9	13.3	17.1
047	5.2	5.6	7.0	x	20.0	17.7	19.0	x	25.2	23.3	26.0	x
052	3.4	3.1	5.2	5.1	14.0	12.0	13.0	13.0	17.4	15.1	18.2	18.1
056	5.7	5.3	7.6	8.7	14.8	14.0	15.0	20.0	20.5	19.3	22.6	28.7
065	3.0	2.7	6.2	5.6	8.0	9.2	10.0	9.0	11.0	11.9	16.2	14.6
Orchard area												
015	4.6	2.7	6.2	5.8	20.0	19.0	19.8	18.6	24.6	21.7	26.0	24.4
020A	7.7	5.4	6.7	6.7	18.0	15.8	16.8	16.3	25.7	21.2	23.5	23.0
020B	4.7	3.6	5.9	5.2	6.0	6.0	6.2	6.2	10.7	9.6	12.1	11.4
027A	6.1	4.5	3.7	3.4	1.0	1.0	1.5	2.0	7.1	5.5	5.2	5.4
027B	6.9	5.7	8.1	6.9	10.3	7.5	10.0	13.5	17.2	13.2	18.1	20.4
027C	-	-	-	4.7	-	-	-	0.8	-	-	-	5.5
027D	-	-	-	3.8	-	-	-	0.2	-	-	-	4.0
027E	-	-	-	5.1	-	-	-	1.2	-	-	-	6.3
028A	6.1	3.4	5.0	4.0	1.4	1.0	2.8	2.6	7.5	4.4	7.8	6.6
028B	3.9	3.3	3.8	4.2	2.0	1.0	1.7	2.1	5.9	4.3	5.5	6.3
030	4.6	3.8	4.3	3.9	2.1	2.2	3.0	6.4	6.7	6.0	7.3	10.3
031	5.4	4.2	4.8	5.4	7.9	7.3	8.0	8.6	13.3	11.5	12.8	14.0
035A	3.7	2.3	5.7	4.0	5.2	5.4	12.8	9.1	8.9	7.7	18.5	13.1
035B	5.2	4.8	4.6	3.6	13.4	12.5	9.2	11.5	18.6	17.3	13.8	15.1
041	4.8	3.9	5.0	4.8	17.0	16.0	15.5	17.2	21.8	19.9	20.5	22.0
053	6.5	3.8	6.9	6.3	9.0	10.4	11.3	11.9	15.5	14.2	18.2	18.2
059	-	-	-	4.3	-	-	-	11.0	-	-	-	15.3
060	6.7	7.2	6.6	6.8	7.5	4.8	7.0	7.0	14.2	12.0	13.6	13.9
Mt. Home/Glenns Ferry area												
008A	5.0	4.1	4.3	3.2	9.5	8.4	8.0	7.1	14.5	12.5	12.3	10.3
008B	4.2	5.4	5.1	5.2	16.7	15.1	16.5	12.9	20.9	20.5	21.6	18.1
010	6.3	3.7	4.5	5.3	14.7	13.5	12.6	13.4	21.0	17.2	17.1	18.7
021	5.6	4.4	3.4	2.7	2.0	1.8	4.2	3.1	7.6	6.2	7.6	5.8
029	3.7	2.3	3.4	3.1	10.1	8.2	11.8	11.7	13.8	10.5	15.2	14.8
050	2.5	2.3	2.4	2.7	7.8	9.0	10.8	9.8	10.3	11.3	13.2	12.5

EOR	Slickspot microsite attributes average score				Sagebrush-steppe attributes average score				Combined average score			
	98	99	00	01	98	99	00	01	98	99	00	01
058	4.2	3.2	6.0	5.3	1.6	2.0	2.0	2.0	5.8	5.2	8.0	7.3
061	5.7	6.5	5.6	5.3	11.5	10.5	12.0	12.0	17.2	17.0	17.6	17.3
Inside Desert area												
701	3.3	ns	4.1	4.3	6.3	ns	6.4	5.0	9.6	ns	10.5	9.3
702	4.6	3.0	4.8	6.5	6.0	7.3	3.3	7.5	10.6	10.3	10.1	14.0
704	-	5.3	ns	8.0	-	12.6	ns	10.5	-	17.9	ns	18.5
707	-	6.6	4.9	5.3	-	8.7	8.8	10.0	-	15.3	13.7	15.3
708	6.5	6.5	5.4	na ³	18.7	16.0	17.2	na	25.2	22.5	22.6	na
709	-	4.2	4.7	7.0	-	7.4	7.0	5.4	-	11.6	11.7	12.4

x¹ = transect abandoned

ns² = not sampled

na³ = no slickspots found, unable to sample

Table 3. Summary of HII slickspot microsite attribute scores, 1998 - 2001.
 N = 403 slickspots for 1998; 433 for 1999; 429 for 2000; and 442 for 2001.

Slickspot microsite attributes	Attribute scores by slickspot microsite Number of slickspots (%)			Attribute scores by transect Number of transects (%)		
	0	1	2	0	1	2
1. Is organic debris or soil being deposited within the slickspot?						
2001	106 (24)	278 (63)	58 (13)	9 (19)	36 (77)	2 (4)
2000	79 (18)	271 (63)	79 (18)	6 (13)	34 (74)	6 (13)
1999	110 (26)	248 (57)	75 (17)	8 (17)	34 (72)	5 (11)
1998	141 (35)	186 (45)	81 (20)	9 (20)	25 (56)	11 (24)
2. Are the slickspot boundaries (perimeter) compromised?						
2001	87 (20)	234 (53)	121 (27)	9 (19)	27 (57)	11 (24)
2000	87 (20)	209 (49)	133 (31)	10 (22)	26 (57)	10 (22)
1999	191 (44)	155 (36)	87 (20)	19 (40)	19 (40)	9 (20)
1998	173 (42)	154 (38)	81 (20)	14 (31)	24 (53)	7 (16)
3. Are weedy annual species present in the slickspot?						
2001	56 (13)	385 (87)	-	4 (9)	43 (91)	-
2000	69 (16)	360 (84)	-	6 (13)	40 (87)	-
1999	95 (22)	433 (78)	-	8 (17)	39 (83)	-
1998	19 (5)	389 (95)	-	2 (4)	43 (96)	-
4. What is the average density of weedy annual species?						
2001	224 (51)	154 (35)	64 (14)	26 (55)	15 (32)	6 (13)
2000	228 (53)	166 (39)	35 (8)	26 (57)	18 (39)	2 (4)
1999	313 (72)	99 (23)	21 (5)	33 (70)	11 (24)	3 (6)
1998	211 (52)	165 (40)	32 (8)	21 (47)	22 (49)	2 (4)
5. Are rabbitbrush or other shrub species established within the slickspot?						
2001	328 (74)	114 (26)	-	39 (83)	8 (17)	-
2000	327 (76)	102 (24)	-	42 (91)	4 (9)	-
1999	359 (83)	74 (17)	-	43 (91)	4 (9)	-
1998	208 (51)	200 (49)	-	23 (51)	22 (49)	-
6. Are perennial forbs or grasses established within the slickspot?						
2001	274 (62)	168 (38)	-	33 (70)	14 (30)	-
2000	278 (65)	151 (35)	-	35 (76)	11 (24)	-
1999	326 (75)	107 (25)	-	37 (79)	10 (21)	-
1998	244 (60)	164 (40)	-	29 (64)	16 (36)	-
7. How much livestock disturbance sign (tracks/scat) is present within the slickspot?						
2001	176 (40)	164 (37)	102 (23)	21 (45)	16 (34)	10 (21)
2000	191 (45)	122 (28)	116 (27)	22 (48)	11 (24)	13 (28)
1999	165 (38)	154 (36)	114 (26)	19 (40)	17 (36)	11 (24)
1998	146 (36)	157 (38)	105 (26)	17 (38)	19 (42)	9 (20)
8. Are ORV or other vehicle tracks present across the slickspot?						
2001	437 (99)	5 (1)	-	48 (100)	0 (0)	-
2000	410 (96)	19 (4)	-	45 (98)	1 (2)	-
1999	385 (89)	48 (11)	-	44 (94)	3 (6)	-
1998	386 (95)	22 (5)	-	44 (98)	1 (2)	-

¹Attribute # 1: 0 = none, 1 = <10%, 2 = >10%

Attribute #2: 0 = no, 1 = <10%, 2 = >10%

Attribute #3: 0 = none or < 5 plants, 1 = > 5 plants

Attribute #4: 0 = <10 plants/sq.ft., 1 = 10 to 25 plants/sq.ft., 2 = >25 plants/sq.ft

Attribute #5: 0 = 2 or fewer plants, 1 = more than 2 plants

Attribute #6: 0 = 3 or fewer plants, 1 = more than 3 plants

Attribute #7: 0 = none, 1 = 1 to 10, 2 = >10

Attribute #8: 0 = no, 1 = yes

Table 4. Summary of HII sagebrush-steppe attribute scores, 1998 - 2001.
 N = 403 slickspots for 1998; 433 for 1999; 429 for 2000; and 442 for 2001.

	¹ Attribute scores by sagebrush-steppe Number of slickspots (%)				Attribute scores by transect Number of transects (%)			
	0	1	2	3	0	1	2	3
9a. Fire history – adjacent to slickspot microsite								
2001	242 (55)	-	81 (18)	119 (27)	24 (51)	-	10 (21)	13 (28)
2000	218 (51)	-	85 (20)	126 (29)	25 (54)	-	8 (17)	13 (28)
1999	241 (56)	-	60 (14)	132 (30)	22 (47)	-	9 (19)	16 (34)
1998	215 (52)	-	70 (17)	127 (31)	22 (49)	-	9 (20)	14 (31)
9b. Fire history – scale of surrounding 3 acres								
2001	174 (39)	-	173 (39)	95 (22)	19 (40)	-	17 (36)	11 (24)
2000	135 (31)	-	193 (45)	101 (24)	14 (30)	-	21 (46)	11 (24)
1999	153 (35)	-	166 (39)	114 (26)	16 (34)	-	10 (40)	12 (26)
1998	154 (37)	-	139 (34)	119 (29)	16 (36)	-	15 (33)	14 (31)
9c. Fire history – scale of surrounding 3 to 50 acres								
2001	100 (23)	-	276 (62)	66 (15)	10 (21)	-	29 (62)	8 (17)
2000	95 (22)	-	266 (62)	68 (16)	10 (22)	-	27 (58)	9 (20)
1999	106 (25)	-	249 (57)	78 (18)	12 (26)	-	25 (53)	10 (21)
1998	108 (26)	-	226 (55)	78 (19)	12 (27)	-	23 (51)	10 (22)
9d. Fire history – scale of surrounding 50+ acres								
2001	80 (18)	-	312 (71)	50 (11)	8 (17)	-	34 (72)	5 (11)
2000	50 (12)	-	334 (78)	45 (10)	5 (11)	-	36 (78)	5 (11)
1999	113 (26)	-	253 (58)	67 (16)	13 (28)	-	25 (53)	9 (19)
1998	115 (28)	-	220 (53)	77 (19)	11 (25)	-	24 (53)	10 (22)
10. What is the level of livestock use near (ca 40 m radius) the slickspot station?								
2001	192 (43)	225 (51)	25 (6)	-	22 (47)	23 (49)	2 (4)	-
2000	168 (39)	227 (53)	34 (8)	-	19 (41)	23 (50)	4 (9)	-
1999	150 (35)	243 (56)	40 (9)	-	18 (38)	25 (53)	4 (9)	-
1998	86 (21)	271 (66)	51 (13)	-	13 (29)	28 (62)	4 (9)	-
11. Do ORVs or other vehicles go off-road in cross-country fashion near (ca 40 m radius) the slickspot station?								
2001	431 (98)	11 (2)	0 (0)	-	46 (98)	1 (2)	0 (0)	-
2000	393 (92)	36 (8)	0 (0)	-	43 (93)	3 (7)	0 (0)	-
1999	378 (87)	53 (12)	2 (<1)	-	41 (87)	6 (13)	0 (0)	-
1998	314 (77)	94 (23)	0 (0)	-	36 (80)	9 (20)	0 (0)	-
12. The grass layer near (ca 40 m radius) the slickspot station is?								
2001	134 (30)	134 (30)	-	174 (40)	15 (32)	15 (32)	-	17 (36)
2000	111 (26)	144 (34)	-	174 (41)	12 (26)	17 (37)	-	17 (37)
1999	74 (17)	163 (38)	-	196 (45)	8 (17)	20 (43)	-	19 (40)
1998	87 (21)	95 (23)	-	226 (56)	8 (18)	13 (29)	-	24 (54)
13. Are weedy annual forbs present near (ca 40 m radius) the slickspot station?								
2001	291 (66)	81 (18)	70 (16)	-	31 (66)	8 (17)	8 (17)	-
2000	199 (46)	141 (33)	89 (21)	-	22 (48)	13 (28)	11 (24)	-
1999	358 (83)	54 (12)	21 (5)	-	37 (79)	8 (17)	2 (4)	-
1998	229 (56)	121 (30)	58 (14)	-	23 (51)	14 (31)	8 (18)	-
14. How much microbial crust cover is there near (ca 40 m radius) the slickspot station?								
2001	251 (57)	127 (29)	64 (14)	-	26 (55)	14 (30)	7 (15)	-
2000	233 (54)	118 (28)	78 (18)	-	25 (54)	12 (26)	9 (20)	-
1999	243 (56)	91 (21)	99 (23)	-	24 (51)	12 (26)	11 (23)	-
1998	196 (48)	133 (33)	79 (19)	-	19 (42)	16 (36)	10 (22)	-

Table 4 continued

¹Attribute #9a-d: scales are given in the table

Attribute #10: 0 = no evidence, 1 = light to moderate use, 2 = heavy use

Attribute #11: 0 = no, or rare, 1 = light to moderate use, 2 = heavy use

Attribute #12: 0 = clearly dominated by native bunchgrasses, 1 = both bunchgrasses and exotic annual grasses common, 3 = clearly dominated by exotic annual or seeded grasses, native bunchgrasses reduced to remnant status or largely extirpated

Attribute #13: 0 = sparse or absent, 1 = patchy, 2 = widespread and abundant

Attribute #14: 0 = high/moderate (>10%), 1 = low (1-10%), 2 = trace or absent (<1%)

Table 5. Integrity condition rating system for HII scores.

Rating	Slickspot microsite attributes avg. score	Sagebrush-steppe attributes avg. score	Combined avg. score
Good	0 – 3	0 – 4	0 - 8
Fair	3.1 – 6.5	4.1 – 11.5	8.1 – 16.9
Poor	6.6 - 12	11.6 - 22	17 – 34

Table 6. Summary of Integrity condition ratings, 1998-2001.

EOR	Slickspot microsite rating				Sagebrush-steppe rating				Hll combined score integrity rating			
	98	99	00	01	98	99	00	01	98	99	00	01
Boise/Eagle Foothills area												
012	fair	poor	fair	fair	poor	poor	poor	poor	poor	poor	poor	poor
038	good	fair	fair	fair	poor	poor	poor	poor	poor	poor	poor	poor
040	fair	fair	fair	fair	good	good	fair	poor	fair	fair	fair	poor
047	fair	fair	poor	X ¹	poor	poor	poor	X	poor	poor	poor	X
052	fair	fair	fair	fair	poor	poor	poor	poor	poor	poor	poor	poor
056	fair	fair	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor
065	good	good	fair	fair	fair	fair	fair	fair	fair	fair	fair	fair
Kuna/Boise area												
018	good	good	fair	fair	poor	poor	poor	poor	poor	poor	fair	fair
019	fair	fair	fair	fair	poor	poor	poor	poor	poor	poor	poor	poor
022	fair	fair	fair	X	poor	poor	poor	X	poor	poor	poor	X
024	fair	fair	fair	fair	poor	poor	poor	poor	poor	poor	poor	poor
025	poor	fair	fair	fair	poor	poor	poor	poor	poor	poor	poor	poor
032	fair	good	fair	fair	good	good	fair	fair	good	good	fair	fair
048	fair	good	fair	fair	good	good	good	fair	good	good	fair	fair
049	fair	poor	ns ²	X	poor	poor	ns	X	poor	poor	ns	X
057	fair	good	fair	fair	fair	fair	fair	fair	fair	fair	fair	fair
066	fair	fair	fair	fair	fair	fair	fair	fair	fair	fair	fair	fair
Orchard area												
015	fair	good	fair	fair	poor	poor	poor	poor	poor	poor	poor	poor
020	fair	fair	fair	fair	poor	fair	fair	fair	poor	poor	poor	poor
027	fair	fair	fair	fair	fair	fair	fair	good	fair	fair	fair	fair
028	fair	fair	fair	fair	good	good	good	good	good	good	good	good
030	fair	fair	fair	fair	good	good	good	fair	good	good	good	fair
031	fair	fair	fair	fair	fair	fair	fair	fair	fair	fair	fair	fair
035	fair	fair	fair	fair	fair	fair	fair	fair	fair	fair	fair	fair
041	fair	fair	fair	fair	poor	poor	poor	poor	poor	poor	poor	poor
053	fair	fair	poor	fair	fair	fair	fair	poor	fair	fair	poor	poor
059	- ³	-	-	fair	-	-	-	fair	-	-	-	fair
060	poor	poor	poor	poor	fair	fair	fair	fair	fair	fair	fair	fair
Mt. Home/Glenns Ferry area												
008	fair	fair	fair	fair	poor	poor	poor	fair	poor	poor	fair	fair
010	fair	fair	fair	fair	poor	poor	poor	poor	poor	poor	poor	poor
021	fair	fair	fair	good	good	good	fair	good	good	good	good	good
029	fair	good	fair	fair	fair	fair	poor	fair	fair	fair	fair	fair
050	good	good	good	good	fair	fair	fair	fair	fair	fair	fair	fair
058	fair	fair	fair	fair	good	good	good	good	good	good	good	good
061	fair	fair	fair	fair	fair	fair	poor	poor	poor	poor	poor	poor
Inside Desert area												
701	fair	ns	fair	fair	fair	ns	fair	fair	fair	ns	fair	fair
702	fair	good	fair	fair	fair	fair	fair	fair	fair	fair	fair	fair
704	-	fair	ns	poor	-	poor	ns	fair	-	poor	ns	poor
707	-	poor	fair	fair	-	fair	fair	fair	-	fair	fair	fair
708	fair	fair	fair	ns	poor	poor	poor	ns	poor	poor	poor	ns
709	-	fair	fair	poor	-	fair	fair	fair	-	fair	fair	fair

¹X = transect abandoned; ²ns = occurrence not sampled (in the case of 708, no slickspots could be found); ³ = monitoring transect not yet established

Table 7. Summary of slickspot microsite abundance class data for *Lepidium papilliferum*, 1998 – 2001. N = 408 for 1998; 433 for 1999; 429 in 2000; and 442 in 2001.

Abundance class	Number of <i>Lepidium papilliferum</i> plants	Number of slickspot microsites (%)			
		1998	1999	2000	2001
0	0	252 (62)	320 (74)	306 (71)	336 (76)
1	1 – 9	32 (8)	55 (13)	47 (11)	51 (12)
2	10 – 100	71 (17)	48 (11)	53 (13)	45 (10)
3	>100	53 (13)	10 (2)	23 (5)	10 (2)

Table 8. Summary of *Lepidium papilliferum* abundance by HII transect, 1998 - 2001. N = 45 transects for 1998; 47 for 1999; 46 for 2000; and 48 for 2001.

Number of <i>Lepidium papilliferum</i> plants/transect	Number of transects (%)			
	1998	1999	2000	2001
0	11 (24)	15 (32)	14 (30)	16 (33)
1 – 100	12 (27)	19 (40)	18(39)	26 (54)
101 - 1000	17 (38)	13 (28)	13 (28)	5 (10)
>1000	5 (11)	0 (0)	1 (2)	1 (2)

Table 9. Total number of counted or estimated *Lepidium papilliferum* plants for HII transects, 1998 – 2001.

Transect #	ca # of plants				Transect #	ca # of plants			
	1998	1999	2000	2001		1998	1999	2000	2001
Boise/Eagle Foothills area					Kuna/Boise area				
012	15	27	16	4	018A	448	0	2517	2155
038	25	42	17	3	018B	845	50	402	535
040	40	5	31	5	019A	0	18	0	29
047	0	0	0	X ¹	019B	30	3	6	7
052	203	176	200	58	022A	83	252	0	X
056	1	0	0	0	022B	0	0	0	X
065	95	52	155	53	024	1400	285	416	76
Orchard area					025	60	106	236	91
015	790	0	0	0	032	500	230	118	3
020A	0	0	0	0	048	0	0	0	0
020B	288	43	44	19	049	0	0	ns ²	X
027A	1840	114	28	70	057	900	149	35	6
027B	0	0	0	0	066	2000	249	603	335
027C	-	-	-	112	Mt. Home/Glenns Ferry area				
027D	-	-	-	124	008A	1640	2	236	0
027E	-	-	-	36	008B	525	18	40	0
028A	1380	125	805	56	010	0	0	0	0
028B	550	220	305	104	021	385	19	1	0
030	142	3	84	27	029	320	231	148	8
031	570	0	330	25	050	265	86	16	0
035A	175	38	10+	0	058	138	0	0	1
035B	30	0	1+	11	061	700	274	92	6
041	2	0	0	0	Inside Desert area				
053	0	3	192	0	701	11	ns	2	0
059	-	-	-	15	702	27	17	13	24
060	0	6	0	0	704	-	3	ns	30
					707	-	204	12	12
					708	0	0	0	0
					709	-	10	2	5
					Totals	16,423	3,060	7,113	4,045

¹X = transect abandoned

²ns = not sampled

Table 10. Summary of HII livestock sign abundance class data, 1998 - 2001. N= 408 slickspot microsites for 1998; 433 for 1999; 429 for 2000; and 442 for 2001.

Abundance class	Number of livestock tracks and scat in slickspot microsite	Number of slickspot microsites (%)			
		1998	1999	2000	2001
0	0	146 (36)	176 (41)	191 (44)	175 (40)
1	1 –10	154 (38)	145 (33)	125 (28)	143 (33)
2	>10	108 (26)	112 (26)	118 (28)	119 (27)

Table 11. Summary of HII livestock sign disturbance data, 1998 - 2001.

	1998	1999	2000	2001
Number (%) of slickspot stations with livestock sign	262 (64)	257 (59)	239 (56)	262 (59)
% of slickspots with livestock sign – Kuna/Boise area	-	27	12	19
% of slickspots with livestock sign – Boise/Eagle Foothills area	-	34	27	34
% of slickspots with livestock sign – Orchard area	-	77	86	73
% of slickspots with livestock sign – Mt. Home/Glenns Ferry area	-	79	66	68
% of slickspots with livestock sign – Inside Desert area	-	81	96	100
Number of transects with no livestock sign – Kuna/Boise area	6	5	9	8
Number of transects with no livestock sign – Boise/Eagle Foothills	4	4	4	4
Number of transects with no livestock sign – Orchard area	0	2	0	0
Number of transects with no livestock sign – Mt. Home/Glenns Ferry	0	0	0	0
Number of transects with no livestock sign – Inside Desert area	0	0	0	0
Number of transects with livestock sign in all slickspot stations – Kuna/Boise	1	1	0	1
Number of transects with livestock sign in all slickspot stations – Boise/Eagle Foothills area	1	0	0	0
Number of transects with livestock sign in all slickspot stations – Orchard area	8	5	8	6
Number of transects with livestock sign in all slickspot stations – Mt. Home area	4	4	2	4
Number of transects with livestock sign in all slickspot stations – Inside Desert	1	3	4	5
Number of transects with 50% or more of slickspot stations with livestock sign - Kuna/Boise area	3	3	0	2
Number of transects with 50% or more of slickspot stations with livestock sign – Boise/Eagle Foothills area	1	2	1	1
Number of transects with 50% or more of slickspot stations with livestock sign – Orchard area	13	12	13	13
Number of transects with 50% or more of slickspot stations with livestock sign – Mt. Home/Glenns Ferry area	6	7	5	5
Number of transects with 50% or more of slickspot stations with livestock sign – Inside Desert area	3	4	6	5

Table 12. Livestock disturbance (hoof prints/scats) tally for HII transects, 1998 – 2001. Tallies based on disturbance sign counted or estimated at each slickspot microsite along the transect.

EOR	1998	1999	2000	2001	EOR	1998	1999	2000	2001
Boise/Eagle Foothills area					Kuna/Boise area				
012	0	0	0	0	018A	0	0	0	0
038	0	0	0	0	018B	5	67	2	40
040	0	0	0	0	019A	4	15	0	78
047	40	42	13	x ¹	019B	0	0	0	0
052	5	3	16	4	022A	4	3	0	x
056	44	33	145	114	022B	6	14	0	x
065	0	0	0	0	024	0	0	0	0
Orchard area					025	20	2	0	0
015	40	0	282	290	032	0	0	0	0
020A	76	19	55	45	048	0	2	0	0
020B	75	139	307	103	049	218	328	ns ²	x
027A	121	134	170	27	057	2	1	1	0
027B	751	228	356	119	066	20	0	4	0
027C	-	-	-	4	Mt. Home/Glenns Ferry area				
027D	-	-	-	6	008A	48	281	46	42
027E	-	-	-	21	008B	89	445	31	61
028A	113	74	28	48	010	144+	20	25	324
028B	65	39	24	30	021	39	112	3	6
030	99	49	40	4	029	36+	19	5	4
031	179	336	266	203	050	7	4	7	1
035A	66	35	197	106	058	48	146	488	136
035B	175	78	86	50	061	249	133	65	128
041	0	0	2	2	Inside Desert area				
053	96	43	192	279	701	197	ns	283	145
059	-	-	-	0	702	98	79	105	229
060	750	542	449	283	704	-	95	ns	107
					707	-	956	83	379
					708	2	60	34	no ³
					709	-	127	170	280
					Sum	3751	4703	3980	3698

x¹ = not sampled

ns² = not sampled

no³ = no slickspots found

Table 13. Noteworthy changes in transect plant composition based on vegetation plot data collected in 1998 versus 2001. (a) = absent in 1998, but present in 2001; (d) = cover has decreased; (i) = cover has increased; (n) = no change in cover.

EOR	Name	Plant community changes - 1998 vs. 2001
Boise/Eagle Foothills		
012	Military Reserve Park	<i>Chrysothamnus nauseosus</i> (i); <i>Bromus tectorum</i> (i); <i>Chondrilla juncea</i> (n)
038	Goose Creek	<i>Bromus tectorum</i> (i); <i>Poa secunda</i> (i); <i>Chondrilla juncea</i> (n)
040	Woods Gulch	<i>Chrysothamnus viscidiflorus</i> (i); <i>Bromus tectorum</i> (i); <i>Chondrilla juncea</i> (a)
047	Willow Creek	not sampled in 2001 – transect abandoned
052	Woods Gulch	<i>Aristida longisetata</i> (d); <i>Bromus tectorum</i> (i); <i>Chondrilla juncea</i> (a)
056 ¹	Willow Creek	<i>Chondrilla juncea</i> (i)
065	Lower Seaman Gulch	<i>Bromus tectorum</i> (i); <i>Vulpia myuros</i> (i); <i>Chondrilla juncea</i> (n)
Kuna/Boise area		
018A	Kuna Butte SW	<i>Bromus tectorum</i> (i)
018B	Kuna Butte SW	<i>Bromus tectorum</i> (d)
019A	Initial Point	<i>Agropyron cristatum</i> (d); <i>Bromus tectorum</i> (i); <i>Sisymbrium altissimum</i> (d)
019B	Initial Point	<i>Agropyron cristatum</i> (d); <i>Agropyron spicatum</i> (d); <i>Bromus tectorum</i> (i); <i>Elymus cinereus</i> (d)
022A	Pleasant Valley North	not sampled in 2001 – transect abandoned
022B	Pleasant Valley North	not sampled in 2001 – transect abandoned
024	Kuna Butte	<i>Bromus tectorum</i> (i); <i>Sisymbrium altissimum</i> (d)
025	Melba Butte	<i>Bromus tectorum</i> (i); <i>Sisymbrium altissimum</i> (d)
032	Tenmile Creek	<i>Bromus tectorum</i> (i)
048	South Cole Road/Tenmile Ck.	<i>Bromus tectorum</i> (i)
049	Fivemile Creek	not sampled in 2001 – transect abandoned
057	Kuna Butte Northwest	<i>Bromus tectorum</i> (i)
066	New Plymouth SW	<i>Elymus cinereus</i> (i); <i>Poa secunda</i> (i); <i>Vulpia microstachys</i> (d)
Orchard area		
015	Simco Road	<i>Bromus tectorum</i> (i); <i>Lepidium perfoliatum</i> (d); <i>Sisymbrium altissimum</i> (d)
020A	Soles Rest Creek	<i>Chondrilla juncea</i> (a)
020B	Soles Rest Creek	<i>Bromus tectorum</i> (i); <i>Chondrilla juncea</i> (a)
027A	West of Orchard	not sampled in 2001
027B	West of Orchard	not sampled in 2001
027C	West of Orchard	new transect in 2001- no comparative data
027D	West of Orchard	new transect in 2001- no comparative data
027E	West of Orchard	new transect in 2001- no comparative data
028A	Christmas Mountain N	not sampled in 2001
028B	Christmas Mountain N	not sampled in 2001
030B ²	Soles Rest Creek	no noteworthy changes
031	Bowns Creek	no noteworthy changes
035A	Orchard Southwest	not sampled in 2001
035B	Orchard Southwest	not sampled in 2001
041	Orchard SSW	not sampled in 2001
053	Christmas Mountain	not sampled in 2001
059	Fake Raptor Rock	new transect in 2001- no comparative data
060	West of Squaw Creek	<i>Bromus tectorum</i> (i); <i>Chondrilla juncea</i> (n)

EOR	Name	Plant community changes - 1998 vs. 2001
Mt. Home/Glenns Ferry area		
008A	Bennett Road	no noteworthy changes
008B	Bennett Road	<i>Agropyron cristatum</i> (d); <i>Ranunculus testiculatus</i> (i); <i>Sisymbrium altissimum</i> (d)
010	Chalk Flat	<i>Bromus tectorum</i> (i)
021	Fraser Reservoir East	no noteworthy changes
029	Mountain Home SE	<i>Bromus tectorum</i> (i); <i>Poa secunda</i> (d)
050	West Side Canal/Slade Flat W	<i>Sisymbrium altissimum</i> (d)
058	Glenns Ferry NW	<i>Bromus tectorum</i> (i)
061	SE of Reverse	<i>Agropyron cristatum</i> (d); <i>Ranunculus testiculatus</i> (d)
Inside Desert area³		
701	Post Office Reservoir	no noteworthy changes
702	Three Creek Well	<i>Poa secunda</i> (d)
704 ⁴	Juniper Butte North	<i>Chrysothamnus nauseosus</i> (i)
707 ⁴	Juniper Butte South	<i>Agropyron smithii</i> (d); <i>Agropyron spicatum</i> (d)
708	Poison Creek North	<i>Agropyron cristatum</i> (d); <i>Poa secunda</i> (d); <i>Sitanion hystrix</i> (d); <i>Phlox longifolia</i> (d)
709 ⁴	Juniper Butte West	<i>Aster scopulorum</i> (i)

¹ = species identification not always possible because transect burned prior to sampling in 2001

² = sample years 2000 vs. 2001

³ = Species identification incomplete for Inside Desert transects in 2001 due to late sampling date

⁴ = sample years 1999 vs. 2001

Table 14. A chronology of occurrence viability and defensibility scores for *Lepidium papilliferum* occurrences included in the HII monitoring program. * indicates a downward change from the previous year; ** indicates an upward change from the previous year.

EOR #	Name of Occurrence	Occurrence viability				Occurrence defensibility			
		98	99	00	01	98	99	00	01
Boise/Eagle Foothills									
012	Military Reserve Park	3	3	3	3	2	2	2	2
038	Goose Creek	3	3	3	3	2	2	2	2
040	Woods Gulch	3	3	3	3	3	3	3	3
047	Willow Creek	3	3	3	X	3	3	3	X
052	Woods Gulch	2	2	2	2	2	2	2	2
056	Willow Creek	3	3	3	3	2	2	2	2
065	Lower Seaman Gulch	2	2	2	2	1	1	1	1
Kuna/Boise area									
018	Kuna Butte SW	2	2	2	2	1	1	1	1
019	Initial Point	3	3	3	3	3	3	3	3
022	Pleasant Valley North	2	3*	3	X	2	3*	3	X
024	Kuna Butte	2	2	2	2	1	1	1	1
025	Melba Butte	2	2	2	2	2	1**	1	2*
032	Tenmile Creek	1	1	1	2*	1	1	1	1
048	South Cole Road/Tenmile Ck.	1	1	1	2*	1	1	1	1
049	Fivemile Creek	2	2	ns	X	2	2	ns	X
057	Kuna Butte Northwest	2	2	2	2	1	1	1	1
066	New Plymouth SW	3	3	3	3	2	2	2	2
Orchard area									
015	Simco Road	3	3	3	3	3	3	3	3
020	Soles Rest Creek	2	2	2	2	1	2*	2	2
027	West of Orchard	0	0	0	0	1	1	1	1
028	Christmas Mountain N	0	0	0	-	0	0	0	-
030	Soles Rest Creek	1	1	1	1	1	2*	2	2
031	Bowns Creek	1	1	1	1	2	2	2	2
035	Orchard Southwest	1	1	1	-	1	1	1	-
041	Orchard SSW	2	2	2	-	0	0	0	-
053	Christmas Mountain	2	2	2	-	2	2	2	-
059	Fake Raptor Rock	-	-	-	2	-	-	-	1
060	West of Squaw Creek	2	2	2	2	2	2	2	2
Mt. Home/Glenns Ferry area									
008	Bennett Road	2	2	2	2	1	1	1	1
010	Chalk Flat	3	3	3	3	2	2	2	3*
021	Fraser Reservoir East	1	1	2*	2	1	1	2*	2
029	Mountain Home SE	3	3	3	3	2	2	2	2
050	West Side Canal/Slade Flat W	2	2	2	2	3	3	3	3
058	Glenns Ferry NW	0	0	0	1*	1	1	1	1
061	SE of Reverse	2	2	2	2	2	2	2	2
Inside Desert area									
701	Post Office Reservoir	2	ns	2	2	2	ns	2	2
702	Three Creek Well	2	2	2	2	2	2	2	2
704	Juniper Butte North	-	2	ns	2	-	1	ns	1
707	Juniper Butte South	-	2	2	1	-	2	2	2
708	Poison Creek North	3	3	3	3	2	2	2	3
709	Juniper Butte West	-	2	2	1	-	2	2	2

X = transect abandoned; ns = not sampled

Table 15. 1998 versus 2001 plant community and seral status information for *Lepidium papilliferum* occurrences. A change in seral status between the two years is noted by an *.

	¹ Plant community		Seral status	
	1998	2001	1998	2001
Boise/Eagle Foothills area				
012	annual grassland	annual grassland	early/early	early/early
038	Sihy-Arlo	Brte-Sihy	early/mid	early/mid-early*
040	Chna/Brte	Chna/Brte	mid/early	mid/early
047	annual grassland	transect abandoned	early/early	-
052	Chna/Arlo	Chna/Brte-Arlo	early/mid	early/mid-early*
056	annual grassland	annual grassland	early/early	early/early
065	Artrtr/Sihy	Artrtr/Brte-Sihy	late/mid-early	late/mid-early
Kuna/Boise area				
018A	annual grassland	annual grassland	early/early	early/early
018B	Artrwy/Brte-Pose	Artrwy/Pose	mid/mid-early	mid/mid*
019A	Agcr (seeding)	Agcr-Brte	early/early	early/early
019B	Agsp-Brte	annual grassland	early/mid-early	early/early*
022A	annual grassland	transect abandoned	early/early	-
022B	Artrwy/Brte	transect abandoned	late/early	-
024	annual grassland	annual grassland	early/early	early/early
025	annual grassland (in part); Artrwy/Brte (in part)	annual grassland; Artrwy/Brte	early/early & late/early	early/early & late/early
032	Artrwy/Brte-Pose	Artrwy/Brte-Pose	late/mid-early	late/mid-early
048	Artrwy/Pose-Brte	Artrwy/Brte-Pose	late/mid	late/mid
049	Artrwy/Brte	transect abandoned	mid/early	-
057	Artrwy/Pose	Artrwy/Brte-Pose	late/mid	late/mid-early*
066	Artrtr/Agcr	Artrtr/Agcr	mid/early	mid/early
Orchard area				
015	annual grassland	annual grassland	early/early	early/early
020A	annual grassland	annual grassland	early/early	early/early
020B	Artrwy/Pose	Artrwy/Brte-Pose	late/mid	late/mid-early*
027A	Artrwy/Pose	not sampled	late/mid	-
027B	Artrwy/Brte	not sampled	late/early	-
027C	-	Artrwy/Pose	-	late/mid
027D	-	Artrwy/Pose	-	late/mid
027E	-	Artrwy/Pose	-	late/mid
028A	Artrwy/Pose	not sampled	late/mid	-
028B	Artrwy/Pose	not sampled	late/mid	-
030	Artrwy/Brte-Pose	Artrwy/Brte-Pose	late/mid-early	late/mid-early
031	Artrwy/Pose-Brte	Artrwy/Pose-Brte	late/mid	late/mid
035A	Artrwy/Pose	not sampled	late/mid	-
035B	Artrwy/Pose	not sampled	late/mid	-
041	Chvi/Brte	not sampled	early/early	-
053	Artrwy/Pose	not sampled	mid/mid	-
059	-	Artrwy/Pose	-	late/mid
060	Artrwy/Brte-Pose	Artrwy/Brte-Pose	mid/mid-early	mid/mid-early
Mt. Home/Glenns Ferry area				
008A	Artrwy/Pose	Artrwy/Pose	late/mid	late/mid
008B	Agcr-Pose (seeding)	Agcr-Pose	early/early	early/early
010	Artrwy/Brte (in part); annual grassland (in part)	Artrwy/Brte; annual grassland	mid/early & early/early	mid/early & early/early
021	Artrwy/Pose	Artrwy/Pose	late/mid	late/mid

	Plant community		Seral status	
	1998	2001	1998	2001
029	Artrwy/Brte-Pose	Artrwy/Brte-Pose	late/mid-early	late/mid-early
050	Artrwy/Brte	Artrwy/Brte	late/early	late/early
058	Artrwy/Pose-Brte	Artrwy/Pose-Brte	late/mid	late/mid
061	Artrwy/Brte-Pose (in part) Agcr (in part)	Artrwy/Brte-Pose; Agcr	late/mid-early & early/early	late/mid-early & early/early
Inside Desert area				
701	Artrwy/Pose	Artrwy/Pose	late/mid	late/mid
702	Artrwy/Pose	Artrwy/Pose	late/mid	late/mid
704	Artrwy/Pose	Chna/Pose	mid/mid	mid/mid
707	Artrwy/Pose	Artrwy/Pose	late/mid	late/mid
708	Agcr	Agcr	early/early	early/early
709	Artrwy/Pose	Artrwy/Pose	late/mid	late/mid

¹ Species codes: Artrwy=*Artemisia tridentata wyomingensis*; Artrtr=*Artemisia tridentata tridentata*; Chna=*Chrysothamnus nauseosus*; Agcr=*Agropyron cristatum*; Agsp=*Agropyron spicatum*; Arlo=*Aristida longiseta*; Brte=*Bromus tectorum*; Pose=*Poa secunda*; Sihy=*Sitanion hystrix*; annual grassland=dominated by one or more invasive annual grass species, mostly *Bromus tectorum*.

² Represents the predominant seral status condition. Many occurrences have inclusions of other seral states.

Appendix 1

Map locations, location forms, and transect information for the four new Orchard area monitoring transects established in 2001. Also, updated maps and location forms for selected transects in the Inside Desert (Juniper Butte) area.

Appendix 2

Sampling notes and general transect observations for 2001.

Appendix 3

Habitat Integrity Index questionnaire form.

Appendix 4

2001 Habitat Integrity Index field data sheets.

Appendix 5

2001 Habitat Integrity Index attribute scores data set.

Appendix 6

Data set summary for Habitat Integrity Index attribute scores, 1998 – 2001.

Appendix 7

Lepidium papilliferum abundance class data by transect, 1998 – 2001.

Appendix 8

Livestock disturbance sign abundance class data by transect, 1998 – 2001.

Appendix 9

Plant community plot data sheets for 2001.

Appendix 10

Tabulation of four years of *Lepidium papilliferum* monitoring transect
plant community data.

Appendix 11

2001 occurrence viability scorecard forms.