

**MONITORING *LEPIDIUM PAPILLIFERUM* (SLICKSPOT PEPPERGRASS)
IN SOUTHWESTERN IDAHO
2002 RESULTS**

by

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ABSTRACT

Slickspot peppergrass (*Lepidium papilliferum*) is an annual or biennial forb endemic to southwestern Idaho. It has been proposed for federal listing under the Endangered Species Act largely because much of its original sagebrush-steppe habitat has been destroyed or 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 Area (OTA) southeast of Boise. 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. The monitoring protocol consists of four integrated parts: a Habitat Integrity Index (HII) transect, plant community plot sampling, photo point photographs, and an occurrence viability scorecard. Baseline monitoring data were collected in 1998 at the majority of extant occurrences located on public land. Monitoring information was also collected in 1999, 2000, and 2001. A fifth consecutive year of monitoring was conducted at a subset of occurrences in 2002, and results are summarized in this report.

Overall, HII result patterns were similar to previous years, except 2002 was the first year evidence of livestock disturbance was recorded at less than half of the slickspot stations sampled. Less livestock disturbance sign was recorded at all transects compared to previous years, except for two in the Juniper Butte area. Regarding slickspot peppergrass abundance, the total number of plants tallied for the subset of transects sampled was 61% less than any prior year. More than half of the transects sampled had fewer plants than any previous year. Plant community plots were resampled only at transects in the OTA. Reduced total grass cover was recorded at six transects compared to baseline values. This was due to large decreases in cheatgrass (*Bromus tectorum*) cover at four transects, and decreases in Sandberg's bluegrass (*Poa secunda*) cover at two transects. Total forb cover was higher at three transects due to large increases in the cover of bur buttercup (*Ranunculus testiculatus*). Other species composition and associated cover class values were similar to baseline results. No new disturbances were observed in 2002 to reduce the viability rank of any of the occurrences visited. Habitat integrity trends were evaluated for all transects and are discussed in the report.

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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. Loss or degradation of the surrounding sagebrush matrix from wildfire or other disturbance factors is also thought to reduce habitat integrity and suitability for slickspot peppergrass.

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). In 2002, it was proposed to be listed as Endangered (U.S. Fish and Wildlife Service 2002). The primary reason for the decline of slickspot peppergrass 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. Population, life history, habitat, distribution, and other background information concerning slickspot peppergrass is discussed in other publications (e.g., Fisher et al. 1996; Meyer et al. 2002; Quinney 1998; U.S. Fish and Wildlife Service 2002).

Several years ago, it became clear a rangewide program to monitor slickspot peppergrass was necessary. To address this need, the Idaho Conservation Data Center (IDCDC) collaborated with the Idaho Army National Guard (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). The HII focuses on three types of disturbance: wildfire, livestock grazing, and off-road motorized vehicle use. These disturbances are widespread and known or suspected to effect 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 is based on the premise that sagebrush-steppe in excellent ecological condition, including undisturbed slickspot microsites, represents the highest integrity and best habitat for slickspot peppergrass. In contrast, disturbed areas with weedy, early seral vegetation represents habitat in poor ecological condition of low integrity, and believed to be less suitable for the long-term persistence of slickspot peppergrass.

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/Juniper Butte area (Mancuso 2000). Most transects were resampled again in 2000 (Mancuso 2001) and 2001 (Mancuso 2002). A fifth consecutive year of monitoring was conducted at a selected subset of the transects in 2002. All transects in the OTA, most transects in the Juniper Butte area, and several other priority transects along the western Snake River Plain were sampled. This report summarizes results from 2002.

METHODS

The monitoring protocol for slickspot peppergrass consists of four integrated parts: the HII transect and associated scorecard; vegetation plot sampling; photo point photographs, and an occurrence viability scorecard. Methods used in 2002 followed the protocols detailed and refined in previous reports (Mancuso and Moseley 1998; Mancuso et al. 1998; Mancuso 2000; Mancuso 2001).

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 IDCDC for database tracking purposes. Each occurrence also has a name that relates to a nearby geographic reference. Many occurrences have one transect, but others have multiple transects.

A total of 52 transects at 41 occurrences have been established for the slickspot peppergrass HII monitoring program over the years. For various reasons, several were abandoned in 2001 (Mancuso 2002). One new transect was established at the Christmas Mountain occurrence (053) within the OTA in 2002. The rangewide monitoring program presently includes a total of 49 transects at 38 occurrences. A subset of these were resampled in 2002. All occurrences included in the HII monitoring program are listed in Table 1, along with the years they were sampled. In 2002, a total of 27 transects at 21 occurrences were sampled. Twelve of these transects were located within the OTA; ten others on BLM lands scattered across the western Snake River Plain between New Plymouth and Glenns Ferry; and five in the Juniper Butte area in Owyhee County.

A modification to the HII protocol was initiated at four transects within the OTA in 2001. It was extended to all of the OTA transects in 2002. The modification entails marking each of the ten slickspot sample stations comprising the HII transect with a labeled metal tag. The tags are held in place by 6" long nails hammered into the ground at a point in the slickspot not hidden by a shrub, rock, or other distracting feature. A stout 7" long spike was also hammered into the ground adjacent to the metal tag as "insurance" the slickspots remain marked in case the tags are disturbed by curious ravens or mammals.

In the original HII protocol, the first ten slickspots encountered along the transect azimuth were sampled. Although not a prerequisite of the protocol, the same ten slickspots would, in theory, be resampled each monitoring year by following the transect azimuth. However, experience has proven this is often not the case. The ease of straying off the azimuth due to the usually patchy distribution of slickspots, and the ease of overlooking some slickspots, makes it impossible to consistently sample the same slickspot microsites with certainty. 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 and azimuth from one station to the next was recorded on a special form to expedite relocating the marked slickspots in the future. Copies of these forms are in Appendix 1.

Monitoring was a collaborative effort in 2002. I sampled transects within the OTA between June 19 and August 28, 2002. Monitoring information was collected by BLM biologists between June 28 and July 16, for the other transects. A map, location form, and other transect information for the new transect on the southern flank of Christmas Mountain are in Appendix 2.

Table 1. List of occurrences included in the HII monitoring program, 1998 – 2002. Occurrences sampled in 2002 are highlighted and marked by an *.

EOR #	Name of Occurrence	1998	1999	2000	2001	2002
<i>Boise/Eagle Foothills</i>						
012	Military Reserve Park	X	X	X	X	
038	Goose Creek	X	X	X	X	
040*	Woods Gulch	X	X	X	X	X
052	Woods Gulch	X	X	X	X	
056*	Willow Creek	X	X	X	X	X
065	Lower Seaman Gulch	X	X	X	X	
<i>Kuna/Boise area</i>						
018	Kuna Butte SW	X	X	X	X	
019	Initial Point	X	X	X	X	
024	Kuna Butte	X	X	X	X	
025	Melba Butte	X	X	X	X	
032*	Tenmile Creek	X	X	X	X	X
048*	South Cole Road/Tenmile Ck.	X	X	X	X	X
057	Kuna Butte Northwest	X	X	X	X	
066*	New Plymouth SW	X	X	X	X	X
<i>Orchard area</i>						
015	Simco Road	X	X	X	X	
020	Soles Rest Creek	X	X	X	X	
027*	West of Orchard	X	X	X	X	X
028*	Christmas Mountain N	X	X	X	X	X
030	Soles Rest Creek	X	X	X	X	
031*	Bowns Creek	X	X	X	X	X
035*	Orchard Southwest	X	X	X	X	X
041*	Orchard SSW	X	X	X	X	X
053*	Christmas Mountain	X	X	X	X	X
059*	Fake Raptor Rock	-	-	-	X	X
060	West of Squaw Creek	X	X	X	X	
<i>Mt. Home/Glenns Ferry area</i>						
008*	Bennett Road	X	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	X
050	West Side Canal/Slade Flat W	X	X	X	X	
058*	Glenns Ferry NW	X	X	X	X	X
061*	SE of Reverse	X	X	X	X	X
<i>Inside Desert area</i>						
701*	Post Office Reservoir	X	ns	X	X	X
702*	Three Creek Well	X	X	X	X	X
704	Juniper Butte North	-	X		X	
707*	Juniper Butte South	-	X	X	X	X
708*	Poison Creek North	X	X	X	X	X
709*	Juniper Butte West	-	X	X	X	X

Transects for 704, 707, and 709 established in 1999; for 059 in 2001. Transects at Pleasant Valley North 022, Willow Creek 047, and Fivemile Creek 049 were abandoned in 2001.

RESULTS

In 2002, monitoring information was collected at 27 transects, representing 21 occurrences. All previously established transects in the OTA, most transects in the Juniper Butte area, and several other priority transects on BLM land along the western Snake River Plain were sampled. Several HII attribute questions were misinterpreted at three transects (008A, 029A, 061A). Slickspot peppergrass and livestock disturbance abundance information was used, but other HII scores for these three transects were omitted from the 2002 results analysis. A total of 240 (270 for slickspot peppergrass and livestock tally information) slickspot microsite stations were sampled in 2002, about one-half the number of HII monitoring stations rangewide.

Habitat Integrity Index

A copy of the HII attribute questionnaire (attributes 1 – 14) is in Appendix 3. Slickspot microsite, sagebrush-steppe, and combined HII attribute scores for 2002 are listed in Table 2, along with scores from previous years for comparison. Copies of the completed 2002 HII field form scorecards are in Appendix 4. A spreadsheet of the 2002 HII data set is in Appendix 5, while Appendix 6 summarizes five years of attribute score data.

The first eight attributes of the HII scorecard focus on the integrity of individual slickspot microsites. In 2002, the majority of 240 slickspots sampled rangewide had some level of organic material accumulation (67%; attribute 1); had some compromise to their perimeter (56%; attribute 2); had some level of weed invasion (85%; attribute 3); and had evidence of perennial forb/grass establishment (52%; attribute 6). In contrast, a minority of slickspot stations had evidence of livestock disturbance (32%; attribute 7), shrub invasion (33%; attribute 5), or signs of ORV disturbance (<1%; attribute 8). These percentages varied by geographic area, but, in general, results from the OTA and Snake River Plain were more similar to each other than to the Juniper Butte area. General score patterns were similar to previous monitoring years, except 2002 was the first year evidence of livestock disturbance was recorded at less than half of the slickspot stations sampled.

The second half of the HII protocol focuses on attributes related to the vegetation and disturbance factors surrounding the slickspot microsite stations. These attributes provide information to assess general habitat conditions and threats at each occurrence. The nearest burn perimeter was within an approximately 250 meter radius of the majority of transect stations sampled in 2002, except within the OTA. Twelve (44%) of the 27 transects monitored in 2002 had signs of livestock disturbance (attribute 10). The percentage was lowest for transects in the OTA and highest for those in the Juniper Butte area. The shrub understory grass layer (attribute 12) was dominated by native bunchgrasses in both the OTA and Juniper Butte areas, but by a mix of native and introduced annual grasses or only introduced grasses in the Snake River Plain area. The OTA was the only area where weedy annual species dominated the forb layer along the majority of transects (attribute 13). Evidence of off-road vehicle use (attribute 11) was absent or rare in all areas. Table 3 lists the percentage of monitoring stations receiving scores of "0", "1", "2", or "3" for each of the 14 HII attributes

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. A total of approximately 372 plants were tallied along the 27 transects in 2002. This was the lowest cumulative total recorded for this set of transects in five years of monitoring. The 2002 count

was 96% less than the highest tally recorded for this set of transects in 1998, and 61% less than the previous low tally in 2001. Thirteen of the 27 transects (48%) had zero slickspot peppergrass plants, more than any previous monitoring year. It was the first year that no slickspot peppergrass plants were recorded at six of these transects. Fourteen transects (52%) had fewer plants than any prior year, including ten with less than half as many plants as the previous lowest tally. Slickspot peppergrass was absent from 85% of all slickspot microsite stations sampled in 2002, with only three transects (027A, 027C, 027D) having plants present in half or more of its transect stations. No stations had greater than 100 (class 3) slickspot peppergrass plants. In contrast, slickspot peppergrass was recorded at one transect (027B) for the first time in five years. Another OTA transect (041) had a few plants recorded for the first time since 1998.

The total number of slickspot peppergrass plants tallied for each transect between 1998 and 2002 is listed in Table 4. Figure 1 and tables 5 and 6 review abundance class data patterns in different ways. The HII scorecards in Appendix 4 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 many transects. Appendix 7 provides more detailed abundance class information by transect.

Livestock disturbance abundance

Livestock trampling is one of the main disturbances to slickspot microsities. To help quantify this disturbance, the number of livestock hoof prints and scats are counted/estimated at each slickspot station along the transect. All, or nearly all livestock sign recorded in 2002 was by cattle. Of the 270 slickspot microsities sampled, 99 (37%) had some level of livestock-related disturbance. No livestock sign was recorded in slickspots at 6 (22%) of the 27 transects. Livestock disturbance has never been recorded at two (032, 040) of the transects sampled in 2002. For transects with some level of disturbance sign, 10 (37%) had totals of less than 10 prints/scats. Only one transect (008) had livestock sign in every microsite station. Less livestock disturbance sign was recorded in 2002, than any previous monitoring year, except for two transects in the Juniper Butte area. The cumulative tally of livestock disturbance sign for transects sample in 2002, was 74% less than the previous low tally.

Table 7 summarizes the livestock disturbance abundance class data for 2002, and includes previous years information for comparison. Table 8 lists the total number of livestock disturbance signs 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 2002 tallies for each slickspot station.

Plant community monitoring

Plant community information is used to document and monitor changes and trends in slickspot peppergrass habitat and to help assess habitat condition. This information is collected in 0.1 acre circular macroplots associated with each HII monitoring transect. Plant community monitoring is based on changes in composition and ocular estimates of cover class values for all vascular plant species occurring in the plots. Baseline plant community plot data was collected at each of the transects in the past. Plots were resampled at the majority of transects outside the OTA in 2001 (Mancuso 2002). In 2002, only plots associated with transects in the OTA were resampled. In addition, baseline community information was collected for the newly established transect 053B within the OTA.

The monitoring protocol requires that for each transect, the same plot area be sampled each year plant community information is collected. Unfortunately, this was not consistently followed in 2002. Plot data for 2002 was collected from a different point along the transect than comparative baseline data at three (027C, 027E, 059A) of the OTA transects. It is unclear if this also happened at a fourth transect (041A) as well. This sampling site difference may account for some of the plant community discrepancies recorded at these transects. To avoid this confusion and inconsistency in the future, Appendix 9 includes a list of all plant community plots located in the OTA.

With a few notable exceptions, species composition and associated cover class values were similar to baseline results for all transects in the OTA. Sagebrush (*Artemisia tridentata*) cover was the same as baseline values at all transects. Reduced total grass cover was recorded at six transects compared to baseline values. This was due to large decreases in cheatgrass (*Bromus tectorum*) cover at four transects, and decreases in Sandberg's bluegrass (*Poa secunda*) cover at two transects. Compared to earlier baseline values, total forb cover was higher at three transects due to large increases in the cover of bur buttercup (*Ranunculus testiculatus*). A large decrease in the cover of tall annual willowherb (*Epilobium brachycarpum*) resulted in a decline in total forb cover at one transect. Plant community plot species composition and cover class value changes between 2002 and baseline readings are listed in Table 9. Annual discrepancies in recording some species present in only trace (cover class 1) amounts (e.g., represented by only one or two individual plants) are inevitable because they are easily overlooked, especially if not in flower. For this reason, species recorded at trace cover one year, but not the other sample year are omitted from Table 9. Appendix 9 has copies of the 2002 plant community plot data sheets. A spreadsheet with detailed plant community information for each transect is in Appendix 10.

Photo points

Photo point photographs were taken at all transects located within the OTA and the majority of other transects sampled in 2002. This represents a fifth year of monitoring photos for many of these transects. Baseline photos were taken at the one new transect (053B) established in the OTA. Photographs taken in 2002 were organized in a binder and given to the IDARNG as part of this report. A duplicate photo set is at the IDCDC office in Boise. Several of the 2002 photos from the OTA show high bur buttercup ground cover compared to baseline photo points, but overall it is difficult to distinguish changes to the herbaceous component of the vegetation.

Occurrence viability

Factors affecting occurrence viability and defensibility are reassessed each monitoring visit to update occurrence viability ranks if necessary. Ranks are not expected to change unless an occurrence is subject to new or changing disturbances, threats, land ownership, or some other conservation-related factor. No new occurrence viability information was noted for occurrences within the OTA. The limited amount of new information noted for a few of the other occurrences monitored in 2002 did not warrant a change to any of their occurrence viability grades. Copies of the 2002 Occurrence viability scoresheets are in Appendix 11.

DISCUSSION

Habitat Integrity Index

With the availability of several years of monitoring data, it is possible to begin assessing habitat integrity trends at many transects. Trend refers to the direction of change, if any, towards specific management objectives. For slickspot peppergrass, management objectives are to maintain a stable trend for occurrences with high integrity habitat, and to improve trends where habitat integrity is low. Trend evaluations are based on changes in the annual HII attribute scores recorded for each transect. The way the HII is scored, the lower the score, the higher the integrity. Trend can be assessed for an individual attribute, or the transect as a whole. This information can then be used to evaluate habitat integrity at the occurrence scale.

There are four trend possibilities: improving integrity, declining integrity, stable integrity, or no trend. The integrity trend is interpreted to be improving if its associated transect score has decreased each consecutive year, or has remained stable at a lower value for three or more consecutive years compared to a baseline score. An attribute has a declining integrity trend if the score increases each consecutive year, or has remained stable at a higher value for three or more consecutive years compared to a baseline score. The trend is stable if attribute scores remain approximately the same each year. If scores fluctuate from year to year then there is no clear trend. In most cases, there is also no clear trend when an attribute score is substantially higher or lower one year compared to all the other monitoring years. This is a relatively common pattern. Initial trend evaluations were made for most HII transects in 2001 (Mancuso 2002). Trend information for 19 transects was re-evaluated based on results from 2002. No trend assessment was made for some of the HII transects in the OTA having only one or two years of monitoring history.

Monitoring results indicate Tenmile Creek (032) and Willow Creek (056) have declining integrity trends. Total HII scores at all other transects show no clear trend. None of the transects sampled in 2002 have an overall improving trend. Nearly one-half (49%) of the possible 306 (18 transects X 17 attributes) individual HII transect attributes have a stable integrity trend. Only 5% show either an upward or downward trend, with all others (46%) showing no clear trend. Slickspot organic debris deposition (attribute 1) and boundary compromise (attribute 2) are the most subjective attributes in the HII protocol, and at many transect are characterized by relatively high levels of fluctuating annual scores. These two attributes have a stable trend at only one transect each, fewer than any other attributes. Annual forb abundance has a declining integrity trend at four transects in the OTA. This decline is the result of increasing bur buttercup cover at the transects. This is the only attribute with a downward trend in the OTA. It is unclear to what degree, if any, fluctuating scores for attributes such as slickspot weed density (attribute 4) and transect weedy annual grass (attribute 12) or forb (attribute 13) abundance may be influenced by annual climatic variations.

Wildfire, livestock grazing, and off-road motorized vehicle use are the three main disturbance types addressed by the HII protocol. Fire history attributes (9a – 9d) show a stable trend for all transects sampled in 2002, except the Willow Creek occurrence (056) which burned in 2000. The fire history HII questions were clarified in 2000 to make answering them more straightforward and consistent. This accounts for the different pre-2000 versus post-2000 scores recorded for this attribute at many of the transects (see Appendix 6). These different scores give the false impression a transect area was impacted by fire, when in fact, it was not. This scoring inconsistency was corrected and taken into account when evaluating fire history trend. Livestock grazing disturbance (attributes 7 and 10) trends were stable or fluctuated slightly at

most transects prior to 2002. In 2002, 10 (53%) transects had substantially lower and 2 (11%) transects had higher livestock disturbance scores than any previous year. Orchard Southwest (035B) is the only transect with an improving trend for slickspot microsite livestock disturbance level. Off-road-vehicle disturbance (attributes 8 and 11) has been absent or nearly so at all transects since monitoring was initiated. This stable trend has been documented well by the HII. Trend information for all of the transects sampled in 2002 is summarized in Tables 10, 11, and 12. Updated trend assessments for each transect are discussed below.

Orchard Training Area

West of Orchard (027A) – Slickspot microsite attributes are stable or show no clear trend due to having a substantially higher or lower score one year compared to the others. The slickspot microsite sum attribute score improved in 2000, and has been stable since then. Sagebrush-steppe attributes have been stable with one exception. Scores have increased each of the past three years for weedy annual forb abundance (attribute 13) to suggest a declining trend for this vegetation condition attribute. Livestock-related attribute (7 and 10) scores were substantially lower in 2002 compared to all previous years.

West of Orchard (027B) – The 2002 slickspot microsite sum score was substantially lower than any previous year. This was due to lower livestock disturbance (attribute 7) and weed density (attribute 4) scores compared to prior years. Most other attributes are either stable, or show no trend due to fluctuating annual scores. No recent fires have occurred in the vicinity of the transect. Higher fire history (attributes 9a and 9b) scores in recent years reflect a more consistent interpretation of the attribute questions, and not a change in site fire history. In reality, the sagebrush-steppe sum attribute score has been stable since monitoring began.

West of Orchard (027C) - No trend information is available for this transect established in 2001. Attribute scores in 2002 were similar to baseline values, except for reduced weed density (attribute 4), and increased weedy annual forb abundance (attribute 13).

West of Orchard (027D) - No trend information is available for this transect established in 2001. Attribute scores in 2002 were similar to baseline values, except for an increase in weedy annual forb abundance (attribute 13).

West of Orchard (027E) - No trend information is available for this transect established in 2001. Attribute scores in 2002 were similar to baseline values, except for reduced weedy annual grass abundance (attribute 12).

Christmas Mountain North (028A) – Most slickspot microsite attributes show no clear trend, although scores have been lower for shrub and perennial forb establishment within slickspots (attributes 5 and 6) since 1999, and may represent an improving trend for these two attributes. Scores that show an improving trend in slickspot microsite ORV disturbance (attribute 8) since 1999 are an artifact of no longer counting old tank tracks as this disturbance. Livestock-related attribute (7 and 10) scores were substantially lower in 2002 compared to previous years. Sagebrush-steppe attributes have been stable except for the 2002 decrease in livestock disturbance.

Christmas Mountain North (028B) – The improving trend noted for organic debris deposition (attribute 1) in 2001 was short-lived. A higher score in 2002 changes the assessment for this attribute to one of no clear trend. Other slickspot microsite attributes are either stable or show no clear trend. The slickspot microsite sum attribute score continues to be stable. Sagebrush-

steppe attributes have been stable with one exception. Scores have increased each of the past three years for weedy annual forb abundance (attribute 13) to suggest a declining trend for this attribute. Livestock-related attribute (7 and 10) scores were substantially lower in 2002 compared to previous years.

Orchard Southwest (035A) – No clear trend for most slickspot microsite attributes, while the majority of sagebrush-steppe attributes have been stable. No recent fires have occurred in the vicinity of the transect. Higher fire history (attributes 9a – 9d) scores in recent years reflect a more consistent interpretation of the attribute questions, and not a change in site fire history. Livestock-related attribute (7 and 10) scores were substantially lower in 2002 compared to previous years.

Orchard Southwest (035B) - Most slickspot microsite attributes show no clear trend, although livestock disturbance (attribute 7) scores have declined slightly each year to suggest an improving trend. Fire history attributes (9a - 9d) have been stable. Most other sagebrush-steppe attributes do not reveal a trend, except exotic grass abundance (attribute 12) has declined from baseline levels. It is unclear if this represents an improving trend or an artifact of dry conditions the past few years.

Orchard SSW (041) – Livestock evidence near the transect area (attribute 10) has exhibited relatively large annual fluctuations over the years. Weedy annual forb abundance (attribute 13) has been stable at a high level the past three years, to indicate a downward trend compared to baseline conditions. In contrast, weedy annual grass cover (attribute 12) has been lower than the first two monitoring years. It is not clear if this reflects an improving trend or an artifact of drier conditions the past few years. Other attributes have been stable or have fluctuated slightly.

Christmas Mountain (053B) – This transect was established in 2002.

Fake Raptor Rock (059) - No trend information is available for this transect established in 2001. Scores in 2002 were similar to baseline except for lower weedy annual grass abundance (attribute 12).

Snake River Plain

Bowns Creek (031) – Three attributes had their highest scores, and two, including slickspot livestock disturbance (attribute 7) their lowest scores in 2002. I suspect the reported 2002 decrease in microbial crust cover (attribute 13) is due to sampler error. Fluctuating annual scores characterize several other attributes. The lower fire history (attributes 9a and 9b) scores in 1998 and 1999 are an artifact of inconsistent sampling. There have been no fires in the immediate transect area the past five years. The sagebrush-steppe sum attribute score for 2002 was the highest yet recorded, but a trend is not clear.

Tenmile Creek (032) – Year 2002 marked the first year livestock sign (attributes 7 and 10) was recorded for this transect. The slickspot boundary attribute (2) had a substantially lower score in 2002 compared to prior years. Other individual attribute trends have been stable or unclear due to one year of high or low scores. The sagebrush-steppe attribute sum score has increased slightly each year and suggests a declining trend. A decline is also suggested by the total HII score, which has been stable for three years, but at a value higher than baseline.

Woods Gulch (040) – Weedy annual grass abundance (attribute 12) has a declining trend. Most other attributes are stable. No recent fires have occurred in the vicinity of the transect. Higher

fire history (attributes 9a – 9d) scores in recent years reflect a more consistent interpretation of the attribute questions, and not a change in site fire history.

South Cole Road/Tenmile Creek (048) – Most sagebrush-steppe attributes have been stable, while most slickspot microsite attributes show no clear trend. I suspect the reported 2002 decrease in microbiotic crust cover (attribute 13) is due to sampler error.

Willow Creek (056) – Slickspot microsite organic debris deposition (attribute 1) and perennial grass establishment (attribute 6) have a declining trend. The majority of other individual slickspot microsite attribute scores have fluctuated over the years and show no clear trend. Fire history scores (attributes 9a - 9d) increased in 2001 due to a wildfire in August 2000. The 2001 and 2002, slickspot microsite sum attribute, sagebrush-steppe sum attribute, and combined HII scores were higher than pre-fire years, and reflect increased habitat degradation associated with the burn, and an overall downward integrity trend for the occurrence.

Glenns Ferry NW (058) – Slight or inconsistent increases in the amount of slickspot organic debris deposition (attribute 1) and boundary compromise (attribute 2) may represent declining trends for these two attributes. The lower 2002 score reported for slickspot microsite livestock sign (attribute 7) seemed to contradict the high transect livestock use (attribute 10) score. Prior to 2002, all of the sagebrush-steppe attributes had a stable trend. However, ORV evidence, (attribute 11), weedy grass abundance (attribute 12), and weedy forb abundance (attribute 13) were substantially higher in 2002 compared to previous years. Slickspot weed density (attribute 4) was another attribute with a higher score in 2002 than previous years.

New Plymouth SW (066) – Except for fire history, which has a stable trend, attribute scores have tended to fluctuate and show no clear trend.

Juniper Butte

Post Office Reservoir (701) – The slickspot organic debris deposition (attribute 1) score has increased slightly each year and suggests a declining trend. Most other attributes have been stable, although slight increases in weedy grass (attribute 12) and weedy forb (attribute 13) were recorded in 2002.

Three Creek Well (702) – Most slickspot microsite attributes improved over 2001 scores. Increased weedy forb abundance (attribute 13) was an exception. No attributes show a clear trend. The lower slickspot microsite livestock sign (attribute 7) did not have a corresponding lower transect livestock (attribute 10) score.

Juniper Butte South (707) - The slickspot organic debris deposition (attribute 1) score has increased slightly each year and suggests a declining trend. The improved trend reported for slickspot boundary compromise (attribute 2) in 2001 appears to have been premature. No trend is clear. Fire history scores have been stable, but most other sagebrush-steppe attributes show no clear trend.

Poison Creek North (708) – Poor sagebrush-steppe integrity scores continue to characterize this occurrence.

Juniper Butte West (709) – Year 2002 slickspot microsite livestock sign (attribute 7) was lower than previous years. Most other attributes have been stable.

Plant community monitoring

The vegetation at most slickspot peppergrass occurrences within the OTA is characterized by a well developed sagebrush canopy, Sandberg's bluegrass dominating the perennial grass layer, and a very sparse perennial forb component. Cheatgrass varies from none to relatively high cover depending on the site and also apparently on the year. Native, or usually introduced annuals are typically the most conspicuous part of the forb layer. To date, rush skeletonweed (*Chondrilla juncea*) or other noxious/aggressive perennial weed species have not been recorded in any of the plots located within the OTA.

Vegetation plot information can be used to evaluate changes in plant community and associated seral status conditions over time. Seral status 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* (Hironaka et al. 1983). Most transects within the OTA have a late seral sagebrush shrub layer and a mid-seral herbaceous component. No transects in the OTA have seen a change in seral status, although bur buttercup has become a prominent part of the herb layer at several of the transects. Table 13 compares 2002 and baseline plant community and seral status information.

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Table 2. Summary of HII monitoring scores, 1998-2002. Transects not sampled in 2002 are excluded from the table.

EOR	Slickspot microsite attributes average score					Sagebrush-steppe attributes average score					Combined average score				
	98	99	00	01	02	98	99	00	01	02	98	99	00	01	02
Orchard Training Range															
027A	6.1	4.5	3.7	3.4	3.6	1.0	1.0	1.5	2.0	2.0	7.1	5.5	5.2	5.4	5.6
027B	6.9	5.7	8.1	6.9	3.7	10.3	7.5	10.0	13.5	13.1	17.2	13.2	18.1	20.4	16.8
027C	-	-	-	4.7	3.8	-	-	-	0.8	1.7	-	-	-	5.5	5.5
027D	-	-	-	3.8	3.7	-	-	-	0.2	1.0	-	-	-	4.0	4.7
027E	-	-	-	5.1	4.4	-	-	-	1.2	0.9	-	-	-	6.3	5.3
028A	6.1	3.4	5.0	4.0	3.4	1.4	1.0	2.8	2.6	2.0	7.5	4.4	7.8	6.6	5.4
028B	3.9	3.3	3.8	4.2	4.1	2.0	1.0	1.7	2.1	2.0	5.9	4.3	5.5	6.3	6.1
035A	3.7	2.3	5.7	4.0	4.0	5.2	5.4	12.8	9.1	6.6	8.9	7.7	18.5	13.1	10.6
035B	5.2	4.8	4.6	3.6	4.4	13.4	12.5	9.2	11.5	10.3	18.6	17.3	13.8	15.1	14.7
041	4.8	3.9	5.0	4.8	4.3	17.0	16.0	15.5	17.2	14	21.8	19.9	20.5	22.0	18.3
053A	6.5	3.8	6.9	6.3		9.0	10.4	11.3	11.9		15.5	14.2	18.2	18.2	
053B	-	-	-	-	3.3	-	-	-	-	6.2	-	-	-	-	9.5
059	-	-	-	4.3	4.6	-	-	-	8.0	6.6	-	-	-	12.3	11.2
Western Snake River Plain															
031	5.4	4.2	4.8	5.4	4.6	7.9	7.3	8.0	8.6	10.9	13.3	11.5	12.8	14.0	15.5
032	5.4	2.0	4.5	3.8	2.7	2.5	2.8	5.0	6.0	7.0	7.9	4.8	9.5	9.8	9.7
040	4.7	5.2	5.3	5.1	4.1	4.0	3.7	8.0	12.0	13.7	8.7	8.9	13.3	17.1	17.8
048	4.5	2.8	5.5	4.8	3.7	3.0	3.1	3.2	5.1	6.8	7.5	5.9	8.7	9.9	10.5
056	5.7	5.3	7.6	8.7	6.9	14.8	14.0	15.0	20.0	17.7	20.5	19.3	22.6	28.7	24.6
058	4.2	3.2	6.0	5.3	3.9	1.6	2.0	2.0	2.0	4.7	5.8	5.2	8.0	7.3	8.6
066	4.5	5.2	6.2	4.8	5.0	9.6	8.8	10.0	9.8	8.9	14.1	14.0	16.2	14.6	13.9
Juniper Butte															
701	3.3	ns	4.1	4.3	3.4	6.3	ns	6.4	5.0	5.3	9.6	ns	10.5	9.3	8.7
702	4.6	3.0	4.8	6.5	3.1	6.0	7.3	3.3	7.5	7.4	10.6	10.3	10.1	14.0	10.5
707	-	6.6	4.9	5.3	5.3	-	8.7	8.8	10.0	10.8	-	15.3	13.7	15.3	16.1
708	6.5	6.5	5.4		5.1	18.7	16.0	17.2		19.3	25.2	22.5	22.6		24.4
709	-	4.2	4.7	7.0	3.5	-	7.4	7.0	5.4	6.3	-	11.6	11.7	12.4	9.8

Blank cells indicate the transect was not sampled a particular year. A dash mark in a cell indicates no transect was yet established.

Table 3. 2002 HII attribute score percentages by geographic region. The percentage for each score is listed. N = 120 slickspot microsite stations for the Orchard Training Area, 70 for the Snake River Plain, and 50 for Juniper Butte. See the HII scorecard in Appendix 3 for the attribute questions and scoring parameters.

Attribute score	Orchard Training Area				Snake River Plain				Juniper Butte			
	0	1	2	3	0	1	2	3	0	1	2	3
Slickspot microsite attributes												
Attribute 1	31	63	6	-	27	50	23	-	48	28	24	-
Attribute 2	42	56	2	-	44	24	32	-	48	30	22	-
Attribute 3	2	98		-	6	94		-	60	40		-
Attribute 4	61	39		-	41	37	21	-	86	14		-
Attribute 5	54	46		-	84	16		-	76	24		-
Attribute 6	52	48		-	60	40		-	22	78		-
Attribute 7	77	23		-	76	20	4	-	38	42	20	-
Attribute 8	99	1		-	100			-	100			-
Sagebrush-steppe attributes												
Attribute 9a	78	-	13	8	67	-	19	14	60	-	20	20
Attribute 9b	68	-	24	8	40	-	46	14	60	-	20	20
Attribute 9c	51	-	41	8	26	-	60	14	20	-	60	20
Attribute 9d	50	-	50		16	-	70	14		-	80	20
Attribute 10	95	5		-	46	33	21	-	26	12	62	-
Attribute 11	100			-	91	6	3	-	98	2		-
Attribute 12	73	19		8		64		36	72	8		20
Attribute 13	6	69	25	-	54	44	2	-	60	30	10	-
Attribute 14	86	12	2	-	20	44	36	-	8	66	26	-

Blank cells indicate a 0% score. A dash mark indicates the score is not possible for the attribute.

Table 4. *Lepidium papilliferum* abundance for HII transects, 1998 – 2002.

Transect	Number of plants (approximate)				
	1998	1999	2000	2001	2002
Orchard Training Range					
027A	1840	114	28	70	30
027B	0	0	0	0	5
027C	-	-	-	112	29
027D	-	-	-	124	78
027E	-	-	-	36	16
028A	1380	125	805	56	7
028B	550	220	305	104	0
035A	175	38	10+	0	34
035B	30	0	1+	11	0
041	2	0	0	0	4
053A	0	3	192	0	-
053B	-	-	-	-	0
059	-	-	-	15	0
Sum	3977	500	1330	528	203
Western Snake River Plain					
008	1640	2	236	0	110
029	320	231	148	8	0
031	570	0	330	25	0
032	500	230	118	3	0
040	40	5	31	5	0
048	0	0	0	0	0
056	1	0	0	0	0
058	138	0	0	1	37
061	700	274	92	6	5
066	2000	249	603	335	0
Sum	5909	991	1558	383	152
Juniper Butte					
701	11	ns	2	0	6
702	27	17	13	24	0
707	-	204	12	12	3
708	0	0	0	0	0
709	-	10	2	5	11
Sum	38	231	29	41	20
Total sums	9924	1722	2928	952	372

A dash mark in a cell indicates the transect was not sampled or had not yet been established.

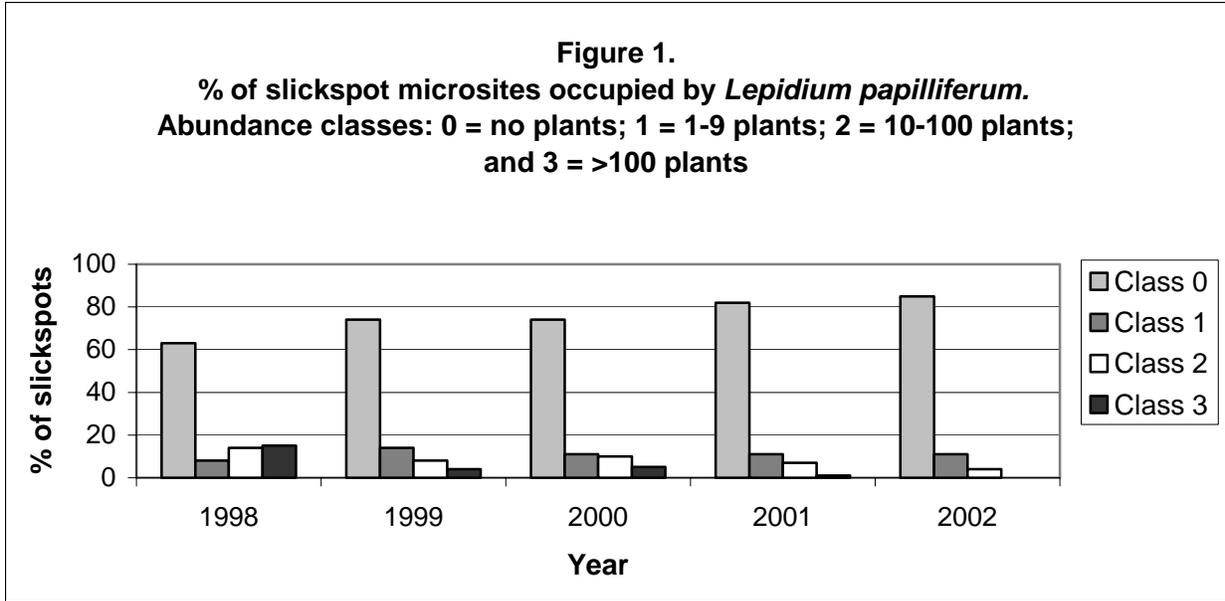


Table 5. Percentage of slickspot microsites occupied by *Lepidium papilliferum*, by geographic area, 1998 – 2002. Transects not sampled in 2002 are excluded from the table.

	Class 0					Class 1					Class 2					Class 3				
	98	99	00	01	02	98	99	00	01	02	98	99	00	01	02	98	99	00	01	02
Orchard Training Area	71	84	78	75	76	4	6	9	13	18	15	8	6	13	6	10	3	8	0	0
Snake River Plain	57	79	72	89	93	3	6	4	6	3	16	9	18	3	4	24	6	6	6	0
Juniper Butte	59	38	73	85	92	41	53	27	12	8	0	6	0	3	0	0	3	0	0	0

Abundance classes: 0 = no plants; 1 = 1-9 plants; 2 = 10-100 plants; and 3 = >100 plants

Table 6. Summary of *Lepidium papilliferum* abundance by HII transect, 1998 - 2002. N = 21 transects for 1998; 22 for 1999; 23 for 2000; 26 for 2001, and 27 for 2002. Transects not sampled in 2002 are excluded from the table.

Number of <i>Lepidium papilliferum</i> plants/transect	Number of transects (%)				
	1998	1999	2000	2001	2002
0	4	8	6	8	13
1 – 100	6	6	9	14	13
101 - 1000	7	8	8	4	1
>1000	4	0	0	0	0

Table 7. Summary of HII livestock sign abundance class data, 1998 - 2001. N = 195 for 1998; 205 for 1999; 219 in 2000; 254 in 2001, and 270 in 2002. Transects not sampled in 2002 are excluded from the table.

Abundance class	#of livestock tracks/scat in a slickspot microsite	Number of slickspot microsites (%)				
		1998	1999	2000	2001	2002
0	0	53 (27)	61 (30)	55 (25)	83 (33)	171 (63)
1	1 –10	81 (42)	76 (37)	80 (36)	86 (34)	83 (31)
2	>10	61 (31)	68 (33)	84 (38)	85 (33)	16 (6)

Table 8. Livestock disturbance (hoof prints/scats) tally for HII transects, 1998 – 2002. Tallies based on disturbance sign counted or estimated at each slickspot microsite along the transect.

Transect	1998	1999	2000	2001	2002
Orchard Training Area					
027A	121	134	170	27	2
027B	751	228	356	119	29
027C	-	-	-	4	1
027D	-	-	-	6	1
027E	-	-	-	21	14
028A	113	74	28	48	1
028B	65	39	24	30	2
035A	66	35	197	106	11
035B	175	78	86	50	4
041	0	0	2	2	0
053B	-	-	-	-	2
059	-	-	-	0	0
<i>Sum</i>	<i>1387</i>	<i>631</i>	<i>1055</i>	<i>692</i>	<i>67</i>
Snake River Plain					
008	48	281	46	42	30
029	36+	19	5	4	4
031	179	336	266	203	53
032	0	0	0	0	0
040	0	0	0	0	0
048	0	2	0	0	0
056	44	33	145	114	2
058	48	146	488	136	17
061	249	133	65	128	20
066	20	0	4	0	0
<i>Sum</i>	<i>588</i>	<i>950</i>	<i>1019</i>	<i>627</i>	<i>126</i>
Juniper Butte					
701	197	ns	283	145	92
702	98	79	105	229	33
707	-	956	83	379	169
708	2	60	34	no ³	76
709	-	127	170	280	28
<i>Sum</i>	<i>297</i>	<i>1222</i>	<i>675</i>	<i>1033</i>	<i>398</i>
<i>Total sums</i>	<i>2272</i>	<i>2803</i>	<i>2749</i>	<i>2352</i>	<i>591</i>

Table 9. Plant community changes for transects in the Orchard Training Area. Changes reflect species composition and cover value differences between 2002 and baseline values. (d) = decrease in two or more cover class values; (i) = increase in two or more cover class values.

Transect	Plant community changes
027A	<i>Ranunculus testiculatus</i> (i)
027B	<i>Bromus tectorum</i> (d); <i>Ranunculus testiculatus</i> (i)
027C	no change
027D	no change
027E	<i>Bromus tectorum</i> (d)
028A	<i>Poa secunda</i> (d); <i>Ranunculus testiculatus</i> (i)
028B	<i>Astragalus lentiginosus</i> (d); <i>Lepidium perfoliatum</i> (d)
035A	no change
035B	<i>Chrysothamnus viscidiflorus</i> (d); <i>Bromus tectorum</i> (d); <i>Vulpia microstachys</i> (d); <i>Epilobium brachycarpum</i> (d)
041A	<i>Chrysothamnus viscidiflorus</i> (d); <i>Bromus tectorum</i> (d); <i>Epilobium brachycarpum</i> (d); <i>Lepidium perfoliatum</i> (d); <i>Ranunculus testiculatus</i> (i)
053B	established in 2002
059A	unknown – plots sampled in different areas the two years

Baseline sampling conducted in 1998 for all HII transects except 027C, 027D, 027E, and 059A, which had baseline plot information taken in 2001.

Table 10. Trends for HII slickspot microsite attributes. Transects sampled in 2002, but with less than four years of comparative data are excluded from the table. Attributes 1 – 8 are listed in Appendix 3.

Transect	Attribute #							
	1	2	3	4	5	6	7	8
Orchard Training Area								
027A	2000-	2000+	=	+1998	1+/-	2002+	-2002	=
027B	1+/-	2+/-	=	-2002	1+/-	=	-2002	=
028A	1+/-	=	=	1999-	+1998	+1998	-2002	=
028B	1+/-	1+/-	=	+2000	=	=	-2002	=
035A	1+/-	1+/-	=	+2000	1+/-	2002+	-2002	=
035B	1+/-	1+/-	=	1+/-	1+/-	1+/-	Trend +	=
041	1+/-	=	=	-1999	=	=	=	=
Western Snake River Plain								
031	+2002	1+/-	-1999	1+/-	+1998	-2002	-2002	=
032	+1998	-2002	=	1999-	+1998	1+/-	+2002	=
040	1+/-	1+/-	=	1+/-	=	=	=	=
048	=	2+/-	=	2+/-	+1998	1+/-	=	=
056	1+/-	1+/-	=	1+/-	=	Trend -	-2002	=
058	Trend -	2+/-	1+/-	+2002	+1998	1999-	-2002	=
066	-1998	1998-	=	1+/-	+1998	1+/-	+1998	=
Juniper Butte								
701	Trend -	1+/-	=	=	=	-2002	+2000	=
702	2+/-	+2001	-1999	=	+1998	=	-2002	=
707	Trend -	1+/-	2002-	=	=	=	+1999	=
708	2+/-	-2002	-2002	=	=	=	+1999	=
709	1+/-	+2001	1+/-	=	=	=	-2002	=

Trend - = declining trend

Trend + = improving trend

"=" = trend is stable; scores within 0.3 point of baseline each year

1+/- = no clear trend; scores have fluctuated up and down slightly (<1.0 point) between years

2+/- = no clear trend; scores have fluctuated up and down substantially (>1.0 point) between years

-Year = no clear trend; score markedly lower in the one year noted compared to other monitoring years, with scores from all other years stable

+Year = no clear trend; score markedly higher in the one year noted compared to other monitoring years, with scores from all other years stable

Table 11. Trends for HII sagebrush-steppe attributes. Transects sampled in 2002, but with less than four years of comparative data are excluded from the table. Attributes 9 – 14 are listed in Appendix 3.

Transect	9a	9b	9c	9d	10	11	12	13	14
Orchard Training Area									
027A	=	=	=	=	-2002	=	=	Trend -	=
027B	2001+	2+/-	1+/-	=	-2002	=	-2000	-1999	-2000
028A	=	=	=	=	-2002	=	=	Trend -	=
028B	=	=	=	=	-2002	=	=	Trend -	=
035A	2+/-	2+/-	=	=	-2002	=	+2000	2+/-	=
035B	=	=	=	=	-2002	=	2+/-	-1999	1+/-
041	=	=	=	=	2+/-	=	2+/-	Trend -	Trend +
Western Snake River Plain									
031	1+/-	2+/-	=	=	1+/-	=	+2002	=	+2002
032	=	=	=	=	+2002	=	2+/-	=	+2002
040	=	=	=	=	=	=	Trend -	1+/-	-1999
048	=	=	=	=	=	=	2+/-	=	+2002
056	Trend -	Trend -	Trend -	Trend -	=	=	2+/-	=	-1999
058	=	=	=	=	+2002	+2002	+2002	+2002	=
066	-2002	=	=	=	=	1+/-	+1998	1+/-	+2002
Juniper Butte									
701	=	=	-2002	=	+2002	=	=	=	+2002
702	=	1+/-	=	=	1+/-	+1998	=	+2002	2+/-
707	=	=	=	=	+2002	=	1+/-	+2001	1+/-
708	=	=	=	=	+2002	=	-1999	1+/-	=
709	=	=	=	=	=	=	=	=	+2002

Codes are the same as explained in Table 10.

Table 12. Slickspot microsite, sagebrush-steppe, and overall HII transect trends. Transects sampled in 2002, but with less than four years of comparative data are excluded from the table.

Transect	Slickspot microsite sum attribute score	Sagebrush-steppe sum attribute score	Overall transect trend HII total score
Orchard Training Area			
027A	+1998	=	+1998
027B	-2002	1+/-	2+/-
028A	+1998	1+/-	1+/-
028B	=	-1999	-1999
035A	-1999	2+/-	+2000
035B	-2001	2+/-	1+/-
041	-1999	-2002	1+/-
Western Snake River Plain			
031	1+/-	+2002	+2002
032	2+/-	Trend -	Trend -
040	1+/-	2+/-	1+/-
048	2+/-	2+/-	-1999
056	2+/-	2+/-	Trend -
058	+2000	+2002	+2002
066	+2000	1+/-	+2000
Juniper Butte			
701	1+/-	1+/-	1+/-
702	+2001	-2000	+2001
707	+1999	1+/-	1+/-
708	1+/-	2+/-	1+/-
709	+2001	2+/-	1+/-

Trend - = declining trend

Trend + = improving trend

"=" = trend is stable; scores within 1.0 point of baseline each year

1+/- = no clear trend; scores have fluctuated up and down slightly (<3.0 point) between years
 2+/- = no clear trend; scores have fluctuated up and down substantially (>3.0 point) between years

-Year = no clear trend; score markedly lower in the one year noted compared to other monitoring years, with scores from all other years stable

+Year = no clear trend; score markedly higher in the one year noted compared to other monitoring years, with scores from all other years stable

Table 13. Comparative plant community and seral status information for HII monitoring transects in the Orchard Training Area. A change from baseline is noted by an *.

Transect	Plant community		Seral status	
	Baseline (year)	2002	Baseline	2002
West of Orchard (027A)	Arttrwy/Pose (1998)	Arttrwy/Pose/Rate*	late/mid	late/mid
West of Orchard (027B)	Artrwy/Brte (1998)	Artrwy/Sihy/Rate*	late/early	late/early
West of Orchard (027C)	Arttrwy/Pose (2001)	Arttrwy/Pose	late/mid	late/mid
West of Orchard (027D)	Arttrwy/Pose (2001)	Arttrwy/Pose	late/mid	late/mid
West of Orchard (027E)	Arttrwy/Pose (2001)	Arttrwy/Pose	late/mid	late/mid
Christmas Mt. N. (028A)	Arttrwy/Pose (1998)	Arttrwy/Pose/Rate*	late/mid	late/mid
Christmas Mt. N. (028B)	Arttrwy/Pose (1998)	Arttrwy/Pose	late/mid	late/mid
Orchard SW (035A)	Arttrwy/Pose (1998)	Arttrwy/Pose	late/mid	late/mid
Orchard SW (035B)	Arttrwy/Pose (1998)	Arttrwy/Pose	mid/mid	mid/mid
Orchard SSW (041)	Chvi/Brte (1998)	Pose/annual forb*	early/early	early/early
Christmas Mt. (053A)	Arttrwy/Pose (1998)	not sampled	mid/mid	-
Christmas Mt. (053B)	Artrwy/Sihy/Rate	2002 is baseline	late/early	-
Fake Raptor Rock (059)	Arttrwy/Pose	Arttrwy/Pose	late/mid	late/mid

Arttrwy = *Artemisia tridentata* ssp. *wyomingensis*

Brte = *Bromus tectorum*

Chvi = *Chrysothamnus viscidiflorus*

Pose = *Poa secunda*

Rate = *Ranunculus testiculatus*

Sihy = *Sitanion hystrix*

Appendix 1.

Forms to help relocate slickspot stations for HII transects located in the Orchard Training Range area.

Appendix 2

Map location, location form, and transect information for the new HII transect established at Christmas Mountain in 2002.

Information for the *Lepidium papilliferum* HII transect established at Christmas Mountain in 2002

Occurrence number = 053

Transect number = 053B

Transect marker stake GPS = 564310 E 4791406 N (Datum = NAD 27 Central)

Legal description = T2S R2E sec 3

Transect azimuth = 345 degrees (declination = 0 degrees)

Metal tags used to label individual slickspot microsite stations are stamped 053A (not 053B)

Photo point photographs = 345⁰, 75⁰, 165⁰, 255⁰

Appendix 3

Habitat Integrity Index questionnaire form.

Appendix 4

2002 HII field data sheets.

Appendix 5

2002 HII attribute scorecard summary data set.

Appendix 6

Data set summary for HII attribute scores, 1998 - 2002.

Appendix 7

Lepidium papilliferum abundance class data by transect, 1998 - 2002.

Appendix 8

Livestock disturbance sign abundance class and tally data by transect, 1998 - 2002.

Appendix 9

2002 plant community data sheets for *Lepidium papilliferum* HII monitoring plots located within the Orchard Training Range area.

The location of *Lepidium papilliferum* Hill plant community plots for transects within the Orchard Training Area.

Transect 027A – plot center is located 12 m due south of slickspot station #5.

Transect 027B – plot center is located 12 m due north of slickspot #5.

Transect 027C – plot center is located 12 m due south of slickspot station #5.

Transect 027D – plot center is located 15 m west of slickspot station #1.

Transect 027E – plot center is located 12 m due south of slickspot station #2.

Transect 028A – plot center is located 12 m due west of slickspot station #5.

Transect 027B – plot center is located 12 m due south of slickspot station #5.

Transect 035A – plot center is located 12 m due south of slickspot station #5.

Transect 035B – plot center is located 12 m @ 130 degrees from slickspot station #5.

Transect 041A – the middle enclosure (with slickspot station #4 and 5) is the plot. The enclosure is ca 0.1 acre in size.

Transect 053B – the transect marker stake is plot center.

Transect 059A – plot center is located 12 m due south of slickspot station #5.

Appendix 10

Species composition and cover class data for *Lepidium papilliferum* HII plant community monitoring plots located within the Orchard Training Range area.

Appendix 11

2002 Occurrence viability scorecard forms.