2005 RANGEWIDE HABITAT INTEGRITY AND POPULATION MONITORING OF SLICKSPOT PEPPERGRASS (*LEPIDIUM PAPILLIFERUM*)

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ABSTRACT

Slickspot peppergrass (*Lepidium papilliferum*) is a rare annual or biennial forb endemic to sagebrush steppe in southwestern Idaho. Slickspot peppergrass is currently a proposed endangered species while the U.S. Fish and Wildlife Service reconsiders its 2004 decision to not list the species. The objectives of this study were to report on: 1) performance metrics and triggers addressed by the Candidate Conservation Agreement; and 2) slickspot peppergrass abundance, slickspot and habitat integrity, anthropogenic and non-anthropogenic disturbance, and plant community trends. In 2005, the habitat integrity and population (HIP) monitoring protocol was used to collect a second year of monitoring data at 71 HIP transects and establish 8 additional HIP transects. The HIP monitoring protocol developed in 2004 was used to monitor and assess slickspot peppergrass abundance, habitat integrity, and disturbance, for the purpose of evaluating and improving management actions implemented by the Candidate Conservation Agreement. The plant community data were analyzed with Sorensen classification and nonmetric multidimensional scaling ordination. Slickspot and plant community data results were summarized by HIP transect, EO, Management Area, and for the Consideration Zone. Slickspot peppergrass abundance was greater in 2005 than 2004, likely because of the higher spring precipitation in 2005. Total livestock trampling and the size and number of fires were also greater in 2005 than 2004. This report represents a second year of monitoring and provides information to adaptively manage threats to slickspot peppergrass and objectively measure trends in future years.

KEY WORDS

Slickspot peppergrass, Lepidium papilliferum, sagebrush-steppe, monitoring, habitat, abundance, rare plant conservation, Idaho.

SUGGESTED CITATION

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INTRODUCTION

Slickspot peppergrass (*Lepidium papilliferum*) is a rare annual or biennial forb endemic to sagebrush steppe in southwestern Idaho (Moseley 1994). The <4 dm (<16 in) tall plant is in the mustard family (Brassicaceae) and has multi-flowered inflorescences terminating on highly divided branches. The flowers are small, white, and 4-petaled and the fruits are flattened and orbicular. Slickspot peppergrass is distinctive from similar species by the presence of clavate to elatorate trichomes on the stamen filaments, pinnately or bi-pinnately divided leaves, and ovate to orbicular siliques (Rollins 1993, Moseley 1994). Pollination is likely the principle mechanism for gene flow, and the main pollinators include bees, flies, and some beetle species (Robertson and Klemash 2003). High quality slickspot peppergrass habitat is characterized by intact sagebrush steppe, low abundance of non-native species, and low levels of anthropogenic disturbances (Moseley 1994, U.S. Fish and Wildlife Service 2003; Colket et al. 2006).

Slickspot peppergrass is highly specific to slickspots that have developed on remnant Pleistocene surfaces (Fisher et al. 1996). Slickspots, also known as mini-playas or natric sites, are defined as small soil inclusions with a silt loam surface crust, a restrictive hardpan, and a subsurface argillic horizon (high clay content; Sandoval et al. 1959, Lewis and White 1964, Fisher et al. 1996). Slickspots are associated with shrub interspaces in sagebrush steppe and are visually distinct, due to their high albedo and sparsely vegetated surface (Fisher et al. 1996). Penetration (and compaction) through the surface crust to the argillic horizon decreases slickspot integrity and potentially reduces slickspot peppergrass viability (P. Seronko, pers. comm. 2004). Penetrating anthropogenic disturbances include livestock prints, drill seeding, fire-fighting activities (e.g., fire lines), and off-highway motorized vehicle (OHV) tracks. Repeated and severe penetrating disturbances, especially during saturated soil conditions during the spring, may be precursors to slickspot invasion by non-native species, further reducing slickspot integrity (U.S. Fish and Wildlife Service 2003).

Degradation of slickspot peppergrass habitat has been attributed to large, uncharacteristic wildfires, conversion of sagebrush steppe to non-native annual grasslands, excessive livestock grazing, and historic rangeland rehabilitation practices (e.g., drill seeding; Whisenant 1990, Peters and Bunting 1994, Moseley 1994, Noss et al. 1995, Lesica and DeLuca 1996, U.S. Fish and Wildlife Service 2003, Colket 2005). Habitat loss and degradation, fragmentation, and population isolation may correspondingly result in the loss of genetic fitness (Moseley 1994, Reed and Frankham 2003). Many slickspot peppergrass element occurrences (EOs) occur in fragmented sagebrush steppe or non-native annual grasslands and are highly susceptible to reduced genetic diversity and gene flow (Robertson and Klemash 2003, Robertson 2004). An EO is a specific geographic location where “a species or natural community is, or was, present“(NatureServe 2002:10).

Concern for declining slickspot peppergrass trends in abundance and habitat quality led to slickspot peppergrass being a proposed endangered species in 2002 (U.S. Fish and Wildlife Service). In January 2004, the U.S. Fish and Wildlife Service withdrew the

proposed rule based on “the lack of strong evidence of a negative population trend, and the conservation efforts contained in formalized plans [that] have sufficient certainty they will be implemented and will be effective such that the risk to the species is reduced to a level below the statuary definition of endangered or threatened” (U.S. Fish and Wildlife Service 2004:1). These formalized plans are described in the “Candidate Conservation Agreement for slickspot peppergrass” (2003), a legally binding agreement between the Bureau of Land Management (BLM), the state of Idaho, Idaho Army National Guard (IDANG), and non-governmental cooperators. The Candidate Conservation Agreement addresses cooperative management actions to eliminate or reduce threats to slickspot peppergrass that would warrant future listing of the species under the Endangered Species Act (ESA). In August 2005, Judge Mikel H. Williams reversed the U.S. Fish and Wildlife Service 2004 decision to withdraw the proposal to list slickspot peppergrass. Slickspot peppergrass remains a proposed endangered species while the U.S. Fish and Wildlife Service reconsiders its 2004 decision. The objectives of this study were to report on: 1) performance metrics and triggers addressed by the Candidate Conservation Agreement; and 2) slickspot peppergrass abundance, slickspot and habitat integrity, anthropogenic and non-anthropogenic disturbance, and plant community trends.

STUDY AREA

The study area is located in southwestern Idaho, from New Plymouth to Glenns Ferry along the lower Snake River Plain and its foothills, and on the Owyhee Plateau (Figs. 1-9). Elevation ranges from 765 m (2510 ft) on the lower Snake River Plain to 1650 m (5413 ft) on the Owyhee Plateau. The climate at the Boise BFSO Airport is semi-arid and mean annual temperature and precipitation are 11°C (51°F) and 299 mm (12 in), respectively. There are 2 main peaks of annual precipitation, a larger peak during November-January and a smaller peak during March-May (Fig. 10). Prevailing winds are northwesterly during April-August and southeasterly during September-March (Desert Research Institute 2006).

Soils within the study area are predominantly Argids, defined as Aridisols having an argillic horizon (Fisher et al. 1996). Sites within the main portion of the study area, along the lower Snake River Plain, are associated with basalt ridges and plains, stable piedmont, and alluvial floodplains and deposits (Fisher et al. 1996). The portion of the Owyhee Plateau within the study area has a complex geologic history, being centered on the Bruneau-Jarbridge eruptive center, and was formed by the Idavada Volcanics and the Banbury Basalts during the middle and late Miocene (Bonnichsen 1982).

Wyoming big sagebrush (*Artemisia tridentata ssp. wyomingensis*) forms the dominant vegetative structure within higher quality habitat across the study area. Other common shrub species include gray rabbitbrush (*Ericameria nauseosa*) and green rabbitbrush (*Chrysothamnus nauseosus*). Native perennial grass species include Sandberg bluegrass (*Poa secunda*), bottlebrush squirreltail (*Elymus elymoides*), bluebunch wheatgrass (*Pseudoroegneria spicata*), basin wildrye (*Leymus cinereus*), and Thurber needlegrass (*Achnatherum thurberianum*). Some common native forb species include

smallflower woodland star (*Lithophragma parviflora*), Hood's phlox (*Phlox hoodii*), sagebrush phlox (*Phlox aculeata*), longleaf phlox (*Phlox longifolia*), and tall annual willowherb (*Epilobium brachycarpum*), although most forbs occur in low abundance. Non-native species are abundant and often include cheatgrass (*Bromus tectorum*), clasping leaf pepperweed (*Lepidium perfoliatum*), crested wheatgrass (*Agropyron cristatum*), Russian thistle (*Salsola tragus*), and bur buttercup (*Ceratocephala testiculata*). See Appendix D for a complete list of plant species. All plant nomenclature is from the U.S. Department of Agriculture (2006).

METHODS

In 2005, the habitat integrity and population (HIP) monitoring protocol was used to collect a second year of monitoring data at 71 HIP transects and establish 8 additional HIP transects. The HIP monitoring protocol was developed in 2004 to monitor and assess slickspot peppergrass abundance, habitat integrity, and disturbance, for the purpose of evaluating and improving management actions implemented by the Candidate Conservation Agreement (2003; Colket 2005). The HIP monitoring protocol replaced the habitat integrity index (HII) monitoring protocol (Mancuso and Moseley 1998, Mancuso et al. 1998, Mancuso 2000:2003) to provide more replicable data specific to the needs of the Candidate Conservation Agreement. The HIP monitoring protocol consisted of the following procedures: 1) establish and permanently mark HIP transects, 2) record location information, 3) take photographs, 4) measure abundance, habitat, and disturbance attributes at selected slickspots, 5) measure plant community attributes, and 6) analyze and describe the results.

HIP transect establishment

One or more HIP transects were established within most slickspot peppergrass EOs in 2004 and 2005 (Colket 2005). HIP transect establishment occurred before all EOs and sub-EOs were updated using standardized EO specifications (Colket et al. 2006). Sub-EOs are used to facilitate data management for a very large EO (EO 16) and are identified by 700+ numbers. HIP transects were numbered and named based on the numerical identification code (e.g., 026) and survey site name of the associated EO/sub-EO, respectively (Appendix C). After updating the EOs/sub-EOs, the numbers often did not correspond with the HIP transect numbers (Colket et al. 2006). Both the HIP transect numbers and updated EO/sub-EO numbers are presented in the attached tables and appendices to facilitate cross-walking between EO/sub-EO and HIP transect numbers. In 2004, multiple HIP transects were established within larger EOs/sub-EOs (>1 km^2; 250 ac) consisting of multiple, discrete subpopulations. Transects established as part of the HII monitoring program were used as much as possible for HIP transects to allow some comparisons between years. However, differences in methodology and the lack of permanently marked slickspots before 2004 (except at the Orchard Training Range Management Area in 2002; MA 7) preclude comparisons of 1998-2005 data as powerful as those of 2004-2005 data.

The HIP transect location was determined after surveying the EO and locating slickspots inhabited by slickspot peppergrass. The HIP transects were arbitrarily

located and permanently marked within the EOs to ensure sampling was initiated in an area capable of supporting slickspot peppergrass plants, and to facilitate assessing future and current population trends. The beginning of each HIP transect was permanently marked with a red "potato digger" stake. The first 10 slickspots encountered within approximately 10 m of the HIP transect azimuth were permanently marked with a metal stake and a nail attached to a metal tag labeled with the EO 3-digit identification code and slickspot number (1-10). HIP transects with few or widely-spaced slickspots sometimes had slickspots located >10 m from the HIP transect azimuth. One previously established HII transect with <10 slickspots was converted into HIP transects.

The locations of the red "potato digger" stake and the 10th (or last) slickspot were recorded with a GPS unit (Appendix C). The azimuths (always using 0° declination) and step counts were recorded between the red "potato digger" stake and the 1st slickspot, the 1st and the 2nd slickspot, and so on, to help relocate the slickspots during future sampling years (Appendix B). Driving directions to the red "potato digger" stake and triangulation azimuths from this point to prominent landscape features were also recorded to help relocate the HIP transect (Appendix I). Five landscape view photographs were taken from the red "potato digger" stake, looking towards the azimuth directions of 0°, 90°, 180°, 270°, and the HIP transect. Photographs were also taken of slickspots where the livestock trigger was exceeded (Candidate Conservation Agreement 2003). Care was taken to ensure that each photograph was horizontally oriented, and that the horizon and sky were visible in each photograph to assist future photo point relocation (Elzinga et al. 1998).

HIP protocol—Slickspots

The "Habitat integrity and population monitoring field form" (Appendix A) was used to measure attributes within each slickspot along the HIP transect. Attributes were selected to measure the effectiveness of conservation measures implemented by the Candidate Conservation Agreement (2003), to allow for limited comparison between HII and HIP transect data, and to address additional concerns specified by the slickspot peppergrass technical committee before the 2005 field season. Unless otherwise noted, the following Daubenmire cover class scale was used to estimate attribute cover: 0=0%, 1=<1%, 2=1-4.9%, 3=5-9.9%, 4=10-24.9%, 5=25-49.9%, 6=50-74.9%, 7=75-94.9%, and 8=95-100% (Bonham 1989).

HIP transects were monitored using the same methods as 2004 (Colket 2005), with some modifications as described below (Appendix A). In 2004, slickspot peppergrass plant abundance was recorded in absolute terms or using categories (counted number up to 50, 51-100, 101-300, 301-500, and >500 plants). In 2005, the protocol was modified so the absolute number of plants were recorded at every slickspot. In 2004, the counted number of livestock prints were recorded as definite, probable, or possible. In 2005, only definite and probable livestock prints were counted to eliminate the ambiguity associated with possible livestock prints. In 2005, the proximity of residential and commercial development, agricultural lands, and cumulative landscape disturbance (defined as fire history, residential and commercial development, and agricultural lands)

were also evaluated. In 2005, livestock trailing (as defined as an actual livestock trail) was measured in slickspots and for the general occurrence area (GOA).

In addition, there have been issues about the methodology used to categorize livestock prints as penetrating or non-penetrating in both 2004 and 2005. Penetrating livestock prints were defined as "breaking of the restrictive layer underneath the silt surface area during saturated conditions exposing the clay layer of the slickspot" according to the Candidate Conservation Agreement (2003:9). In 2004, livestock prints with a reddish coloration (due to the exposed clay layer) were classified as penetrating livestock prints. This method generally worked well, except in the Jarbridge MA (MA 11) and/or when the soils were wet or drying (Colket 2005). These exceptions influenced the Technical Team to find an alternative method for determining livestock print penetration.

In spring 2005, the Technical Team evaluated the silt crust method during a series of meetings and field trips with BLM soil scientist Paul Seronko. The silt crust method involved measuring the depth from the slickspot surface to the restrictive layer using a thin metal rod. This measurement was taken at 3 locations in every slickspot, and close to slickspot peppergrass plants, if present. Any livestock print deeper than the mean silt crust depth for the slickspot was defined as penetrating. The Technical Team recommended this method to the Conservation Committee at a field trip in mid-May 2005, with the intention that it be used during the imminent field season. In late-May 2005 (after commencement of the field season), select members of the Conservation Committee reconvened and recommended that a penetrating livestock print be defined as any livestock print greater than 3 in (7.6 cm) deep. In 2005, the field crew used the silt crust depth method for the entire field season. In addition, the 3-in deep method was used for the entire field season after July 4, 2005. All results reported in this report are based on the silt crust method, although data for both the silt crust method and 3-in deep method are located in Appendices F and G. The different methodology for assessing penetrating livestock trampling in 2004 and 2005 means that they can not be directly compared with each other.

HIP protocol—Vegetation transects

Vegetation sampling was included in the HIP monitoring protocol to measure plant community composition and structural changes that may occur over time. Three slickspots were randomly selected to have an associated 10-m vegetation transect. If the HIP transect only had 1 slickspot, then all 3 vegetation transects were established at the 1 slickspot. Each vegetation transect was established by starting from the metal stake at each slickspot and measuring towards a randomly selected azimuth until the measuring tape was 2 m outside of the slickspot. A metal stake was hammered at this point to permanently mark the vegetation transect start point. From this start point, the measuring tape was extended 10 m in the same direction, and another metal stake was used to mark the end point of the vegetation transect. This information was recorded and summarized for future relocation of the vegetation transects (Appendix B). One landscape view photograph was taken of the vegetation transect from the metal stake at the slickspot. A second photograph was taken of the slickspot from the vegetation transect start point. At only the Orchard Training Range MA (MA 7) HIP transects,

photographs were also taken of all slickspots not already photographed from the vegetation transect. These photographs were taken from the south so that the entire slickspot was in the photograph.

In 2004, live shrub cover was estimated along the vegetation transects using the line-interception method (Canfield 1941). In 2005, dead shrub cover was also estimated along the vegetation transects. A plumb bob was used to estimate shrub cover to the nearest centimeter on the metric tick (left) side of the tape. Canopy breaks in the cover of an individual shrub were not included in the cover estimate. Overlapping canopy cover of multiple individuals of the same species was measured as a continuous unit (i.e., from the start point of the first intercepting shrub to the end point of the last intercepting shrub).

Herbaceous (grasses and forbs) and ground cover (i.e. crust, bare ground, rock, litter) were estimated along each vegetation transect using 20 x 50-cm modified Daubenmire cover quadrats on the metric tick side of the tape (Bonham 1989, Coulloudon et al. 1999). There were 5 quadrats per vegetation transect, spaced 2 m apart, starting and ending at the 2- and 10-m marks, respectively. The long side of the quadrat was aligned perpendicular to the vegetation transect and a plumb bob was used as needed for accurate alignment. All plant cover extending into the quadrat was counted, regardless if the plant was rooted within the quadrat. Plant inflorescences were not counted during vegetation sampling for both sampling methods described above.

Data analysis

All slickspot peppergrass abundance data from 1998-2005 were reported to reflect the use of categorical values in the past. If categorical values had been used in 2004 (often at just 1 or 2 slickspots), the categorical value midpoint was used for data analysis. Slickspots at HIP transects with open-ended categories (>500 plants; 066 and 070) were excluded from analysis. Abundance in 2004 and 2005 was compared using the Wilcoxon signed-rank test for each HIP transect and MA, as well as rangewide. In 2002, slickspots were permanently marked at most HII transects located within the Orchard Training Range MA (MA 7). These permanently marked slickspots are the same ones used in 2004 and 2005 at HIP transects 027A:E, 028A:B, 053B, and 059A. Due to the replicability of these HIP transects, the 2002 abundance data were also compared with 2004 and 2005 data using the Wilcoxon signed-rank test.

Data were summarized and analyzed based on the midpoint of modified Daubenmire cover classes by EO and MA. In Colket (2005) and in this report, all slickspot data were expressed in absolute terms. In Colket (2005), all vegetation data were relativized for all tables and figures throughout the report. In this report, all vegetation data (for both 2004 and 2005) were expressed in absolute terms to show actual coverage throughout the report, except for the ordination and community classification analyses. As in Colket (2005), the ordination and community classification analyses were relativized by their maximum. Summarized absolute and relativized data for both 2004 and 2005 are located in Appendix G of this report. Mean non-native species and livestock disturbance cover within slickspots in 2004 and 2005 were compared rangewide using

Wilcoxon signed-rank test. HIP transect 060 was removed from all plant-related analyses because it had burned just before it was monitored.

PC-ORD version 4.25 was used to classify and ordinate absolute plant cover data from the vegetation transects (McCune and Mefford 1999, McCune and Grace 2002). All HIP transects sampled in 2004 (except HIP transect 060; n=70) and 2005 (n=79) were used in these analyses. The vegetation transect data were classified into a dendrogram using the Sorensen distance measure technique and a flexible beta linkage (β=-0.25). Nonmetric multidimensional scaling (NMS) was used to ordinate the vegetation transect data. Outlier analysis was performed for both 2004 and 2005 relativized data, resulting in the exclusion of 8 and 5 species from each year, respectively. Ordination dimensionality (D) was assessed using a 6-D solution stepping down to a 1-D solution, an instability criterion of 0.0005, 500 iterations, and 30 runs with real and randomized data. The output suggested a 3-D solution was best for both 2004 and 2005 data. Mean stress with the 2004 3-D solution was 10.0 using real data, and 14.9 using randomized data for the Monte Carlo test (p=0.0300; random seed=116). Mean stress with the 2005 3-D solution was 11.4 using real data, and 13.9 using randomized data for the Monte Carlo test (p=0.0300; random seed=5129). The final solutions were developed using a 3-D solution, an instability criterion of 0.0005, 500 iterations, and 1 run with real data (using the random seed integer provided in the preliminary run). These models produced outputs consistent with outputs specified in McCune and Grace (2002). The classification output was used to group the 1st and 2nd axes of the ordination results. The Mantel test was also used to evaluate the 2004 and 2005 data for a significant relationship.

Photographs were not used in the analysis, but are included in Appendix E. Triggers were evaluated using HIP data collected in 2004 and 2005. Habitat quality decline for a HIP transect with predominantly native cover was defined as when one or more of the following occurred: 1) change in dominant 2 species comprising plant community resulting in loss of native perennial species; 2) transition in HIP transect from higher quality to lower quality class (determined used classification analyses; and/or 3) partial or complete burning, drill seeding, or other major, documented disturbance resulting in plant community change.

RESULTS

Rangewide

Background

In 2005, 8 HIP transects were established and the 71 HIP transects established in 2004 were re-sampled (Figs. 1-9). HIP transects 012, 038, and 056 were HII transects before 2004 that were new HIP transects in 2005. New HIP transects 042, 054, 062, and 069 were established at EOs that were scheduled to have a HIP transect established in 2004. New HIP transect 076 was established at an EO that was discovered in 2005. All HIP transects that are associated with EOs that changed numbers during the recent

EO review (Colket et al. 2006) are indicated with the updated EO number in parentheses following the HIP transect number (e.g., HIP transect 019A (EO 18)).

Slickspot peppergrass

In 2005, a total of 29,508 slickspot peppergrass plants were observed (n=79). There were more plants observed in 2005 (27,114 plants) than in 2004 (>14,838 plants) at the same 71 HIP transects (p=0.0148; Table 1). Rosettes comprised 64% of all plants observed in 2005 (Table 2), similar to the roughly 65% rosettes observed in 2004.

Slickspots

Mean slickspot size was 37 m² rangewide (Table 2). MAs 7 and 11 typically had larger slickspots than the rest of the MAs. Mean biological soil crust was lowest at MAs 10 and 11 (Table 2), similar to 2004 results (Colket 2005). MAs 1, 3, 5, 7, and 9 typically had the highest mean biological soil crust in 2005, also similar to 2004 results.

Recent OHV use within slickspots was observed at HIP transect 030B in MA 8A, and was caused by a tractor (Table 2). Recent OHV use was also observed within the GOA at HIP transects 069 in MA 1 and 008B in MA 10. No recent evidence of drill seeding or other restoration activities were observed at any HIP transects (Table 2). Ten HIP transects (13%) have slickspots that have been drill seeded in the past. No recent firefighting disturbances were observed at any slickspots (Table 2).

Rangewide, total non-native seeded and unseeded species cover were not different in 2005 compared to 2004 (Table 3 and Fig. 11). Crested wheatgrass was the most common non-native seeded species within slickspots, and was most prevalent in MA 11. Cheatgrass was the most common non-native unseeded species within slickspots, followed by clasping-leaf pepperweed, tall tumblemustard, bur buttercup, and Russian thistle.

Livestock use within slickspots was highest in MAs 8, 10, and 11, based on mean livestock trampling and frequency of slickspots with >10% penetrating livestock print cover (Table 4). Rangewide, both mean penetrating (p=0.0001) and total livestock print cover (p=0.0039) was greater in 2005 than in 2004 (Fig. 11). In 2005, 39% (n=31) and 42% (n=33) of HIP transects had slickspots with at least 5-10% penetrating and total livestock print cover, respectively (MAs 1, 2, 7, 8, 9, 10, and 11). In 2004, 23% (n=16) and 27% (n=19) of HIP transects had slickspots within at least 5-10% penetrating and total livestock print cover, respectively (MAs 6, 7, 8, 9, and 11). MAs 3 and 4 were the only MAs where no livestock sign was observed within slickspots.

Wildlife use within slickspots was greatest at MAs 1, 2, 5, 6, and 10 (Table 2). Most wildlife use consisted of trails and badger/rodent activity (e.g., badger and ground squirrel diggings), although divots (depressions of unknown source) and anthills were also common. Trails were most common at MAs 2 and 5, and badger/rodent activity was most common at MAs 1 and 2. Non-livestock ungulate prints within slickspots were observed at MAs 2, 5, 7, 8, 9, 10, and 11. Non-livestock ungulate prints were attributed

to deer and pronghorn antelope, and nearly always comprised a fraction of the total livestock print cover.

Plant community

The Sorenson dendrogram for the 2005 data produced 4 community classes that were consistent with the 6 community classes described for 2004 data (Colket 2005). These 6 community classes were simplified into 4 community classes that better explained plant community trends at HIP transects in both 2004 and 2005. Classes A and B were merged into Class A/B; and Classes C and D were merged into Class C/D. The 4 community classes were defined as: Class A/B=unburned and dominated by big sagebrush; Class C/D=transitional class in between Classes A/B, E, and/or F; Class E=burned and dominated by cheatgrass; and F=burned and dominated by crested wheatgrass. The 2004 and 2005 NMS ordinations show the relationship between HIP transects in these 4 classes (Figs. 12 and 13). Please note that these classes are unrelated to the EO ranks described in Colket et al. (2006).

The 2004 NMS ordination in this report appears different than the one in Colket (2005) because outlier analysis was used for this report. Outlier analysis removes species with high standard deviations (>2.0) from the data set, so that associated noise can be reduced. The Mantel Test rejected the hypothesis of no relationship between the same 70 HIP transects that were sampled in 2004 and 2005 (n=70; p=0.001), meaning that 2004 and 2005 data were not different from each other. HIP transects 066 and 714 (EO 93) were the only ones that declined from a higher to lower community class. HIP transect 061 was the only one that improved from a lower to higher community class (Table 6). Most of the HIP transects added in 2005 were in Class C/D or E (Fig. 13). Noxious or aggressive species occurred within the general occurrence area of HIP transects at MAs 1, 2, 3, 4, 6, and 8 (Table 3).

Fragmentation

Forty-one of the HIP transects (53%) were unburned, 5 were predominantly unburned (6%), 3 had burned and unburned areas (4%), 13 were predominantly burned (17%), and 16 were completely burned (21%; Table 5). Eighty-four percent of the HIP transects (66/79) had been at least partially burned within 500 m. Only 1 HIP transect was adjacent to commercial and/or residential development (HIP transect 030B; EO 30). Most HIP transects (n=60; 77%) were at least 500 m from the nearest commercial and/or residential development. Commercial and/or residential development occurred within 500 m of at least 1 HIP transect at MAs 1, 2, 3, 4, 7, 8, 9, and 10. Ten HIP transects (13%) occurred within 500 m of agricultural lands; and affected at least 1 HIP transect in MAs 1, 2, 6, 9, and 10, as well as the 2 HIP transects not included in a MA (061 and 010).

Triggers

The following is a summary of all triggers that occurred in 2005. Triggers associated with performance metrics were developed for the Candidate Conservation Agreement (2003). Additional information about triggers that occurred in 2004 and 2005, as well as more descriptive information about each trigger is located in Tables 7-12.

- The fire trigger was tripped at 3 EOs (8, 30, and 54) in MAs 8 and 10 (Table 7).
- The OHV trigger was tripped at HIP transect 030B in MA 8 (Table 9).
- The habitat quality trigger was tripped at HIP transect 066 in MA 1 and HIP transect 714 (EO 93) in MA 11 (Table 10).
- The non-native species trigger was tripped at HIP transects 002, 008A, 020B, 029, 030B, 032, 050, 708, and 715 in MAs 5, 8, 9, 10, and 11 (Table 10).
- No drill seeding or other restoration activities that occurred since implementation of the Candidate Conservation Agreement (2003) were detected on HIP transects (Table 10).
- No military training and activities that occurred since implementation of the Candidate Conservation Agreement (2003) were detected on HIP transects (Table 11).
- The livestock trigger was tripped at HIP transects 063, 072A (EO 104), 072B, 072C, 700 (EO 99), 705 (sub-EO 704), 706 (EO 88), 710 (EO 84), 712, 713 (sub-EO 704), 714 (EO 93), 716, and 722 (EO 98) in MAs 8, 10, and 11 (Table 12).

New Plymouth Management Area (MA 1)

Background

New Plymouth MA (MA 1) is located in Payette County (Figs. 1-2). HIP transects 066, 068, and 070 were re-sampled and new HIP transect 069 was established at EO 69. All 4 HIP transects are located on BLM lands.

Slickspot peppergrass

In 2005, a total of 6796 slickspot peppergrass plants were observed at the 4 HIP transects in MA 1 (Table 1). In 2004, at least 3545 plants were observed at HIP transects 066, 068, and 070, compared to the 6791 plants observed at the same HIP transects in 2005. There was no difference in the number of plants between 2004 and 2005 at these 3 HIP transects when slickspots with >500 plants were excluded from the analysis ($p=1.000$; Table 1). The only HIP transect with a significant change in the number of plants was HIP transect 068, which decreased from 631-1277 plants in 2004 to 9 plants in 2005 ($p=0.0313$).

Slickspots

Mean slickspot size was 23 m^2 in MA 1 (Table 2). Mean biological soil crust within slickspots was 42%, high compared to the rest of the Consideration Zone (Table 2). Mean biological soil crust within slickspots was high at HIP transects 066, 068, and 070, and very low at 069 (Table 2). Recent OHV tracks were observed in the general occurrence area of HIP transect 069, but not within slickspots along the HIP transect (Tables 2 and 9). No evidence of recent or older drill seeding or other restoration activities was observed at the MA 1 HIP transects (Table 2). In addition, no evidence of recent or older firefighting disturbances were observed at the MA 1 HIP transects (Table 2).

None of the MA 1 HIP transects had a 5% or more increase in total non-native species cover within slickspots between 2004 and 2005 (Table 3). HIP transects 066 and 070 had very low non-native unseeded species cover within slickspots, primarily comprised of cheatgrass. HIP transects 068 and 069, particularly 068, had much higher non-native unseeded species cover within slickspots. Clasping-leaf pepperweed was the most prevalent non-native species within slickspots at HIP transect 069. Tall tumblemustard was the most prevalent non-native species within slickspots at HIP transect 068.

None of the MA 1 HIP transects had greater than 10% penetrating livestock trampling in any slickspot (Table 4). However, HIP transect 068 had 3 slickspots comprised of very deep, penetrating prints (ca 3 in deep). These slickspots were all categorized as 5-10% penetrating livestock trampling, but at least one was on the high end of this category, almost >10% penetrating livestock print trampling. HIP transect 069 had more moderate livestock disturbance. HIP transects 066 and 070 had zero and very low livestock disturbance, respectively. Most wildlife use in MA 1 consisted of badger/rodent activity, especially at HIP transects 066 and 068 (Table 2). No non-livestock ungulate prints occurred within slickspots in MA 1.

Plant community

In 2005, HIP transects 066, 068, and 069 were all in Class C/D and 070 was in Class A/B (Table 6 and Figs. 12-13). HIP transect 066 underwent a decrease from Class A/B to C/D from 2004 and 2005. Photographs and vegetation transect data at HIP transect 066 indicate that tall tumblemustard was much more prevalent in 2005 than 2004 (Appendices E:G). The 2004 and 2005 NMS ordinations indicate that HIP transect 066 moved towards Class F, likely influenced by the crested wheatgrass present.

Noxious or aggressive species occurred within the general occurrence area of HIP transects 066, 068, and 69 (Table 3). Diffuse knapweed (*Centaurea diffusa*) occurred in the general occurrence area of HIP transects 066 and 069. Scotch cottonthistle (*Onopordum acanthium*) occurred in the general occurrence area of HIP transects 068 and 069. Scotch cottonthistle was not previously observed within the general occurrence area of HIP transect 068.

Fragmentation

Both HIP transects 068 and 069 were predominantly to completely burned at all 4 landscape scales (Table 5). HIP transect 068 also had commercial and residential development occurring within 500 m. HIP transect 066 was unburned within 65 m, but was partially burned within 250 m. In addition, agricultural lands occurred within 250 m and commercial and residential development (farm) occurred within 500 m. HIP transect 070 was predominantly unburned within 250 m, and partially burned within 500 m. Residential and commercial development occurred within 500 m, and agricultural lands occurred within 250 m. All MA 1 HIP transects were partially to completely fragmented within 250 m.

Triggers

- HIP transect 066 underwent a decline in habitat quality between 2004 and 2005 (Table 10).

Boise Foothills/BLM Management Areas (MAs 2A, 2B, and 2C)

Background

Boise Foothills/BLM MAs (MAs 2A, 2B and 2C; referred to as MA 2) is located north of Eagle in Gem and Ada Counties (Figs. 1 and 3). HIP transect 052 was re-sampled and new HIP transects 056 and 076 were established at EOs 56 and 76, respectively. HIP transect 056 was a former HII transect between 1998 and 2002. All 3 HIP transects are located on BLM lands.

Slickspot peppergrass

In 2005, a total of 5742 slickspot peppergrass plants were observed at the 3 HIP transects in MA 2 (Table 1). In 2005, 3728 plants were observed at HIP transect 052, more than the 394-443 plants observed at the same HIP transect in 2005 ($p=0.0318$).

Slickspots

Mean slickspot size was 9 m^2 in MA 2 (Table 2). Mean biological soil crust within slickspots was 36%, moderately high compared to the rest of the Consideration Zone (Table 2). Mean biological soil crust within slickspots was higher at HIP transects 052 and 056, and low at 076. No evidence of OHV tracks, drill seeding or other restoration activities, or firefighting disturbances were observed at the MA 2 HIP transects (Table 2). None of the MA 2 HIP transects had a 5% or more increase in total non-native species cover within slickspots between 2004 and 2005 (Table 3). HIP transects 052 and 076 had low non-native unseeded species cover within slickspots, and were primarily comprised of cheatgrass and tall tumblemustard, respectively. HIP transects 056 had higher non-native unseeded species cover within slickspots, comprised of clasping-leaf pepperweed and cheatgrass.

HIP transect 076 had up to 5-10% penetrating livestock trampling within slickspots that were attributed to horse and cattle, although they appeared to be older (Table 4). HIP transects 052 and 056 did not have any evidence of livestock within slickspots. Most wildlife use in MA 2 consisted of trails and badger/rodent diggings (Table 2). Trace penetrating deer print cover (<1%) was observed at 1 slickspot at each of the 3 MA 2 HIP transects.

Plant community

HIP transect 052 underwent a change from Class E to C/D between 2004 and 2005, although this change does not necessarily indicate an improvement in habitat quality (Table 6 and Figs. 12-13). Vegetation transect data at HIP transect 052 indicates cheatgrass was lower in 2005 compared to 2004. However, associated photos indicate cheatgrass still has high cover across the HIP transect (Appendix E). New HIP transects 056 and 076 were both in Class C/D. Noxious or aggressive species occurred

within the general occurrence area of HIP transects 052 and 056 (Table 3). St. Johnswort (*Hypericum perforatum*) and rush skeletonweed (*Chondrilla juncea*) occurred within the general occurrence area of HIP transects 052 and 056, respectively.

Fragmentation

HIP transects 052, 056, and 076 were all predominantly to completely burned at all landscape scales (Table 5). HIP transect 076 burned long enough ago so that big sagebrush has since regenerated and is in better condition than the other MA 2 HIP transects. Residential and commercial development occurs within 250 m of HIP transect 076 and within 500 m of HIP transect 052 (both ranchettes). Agricultural lands also occur within 500 m of both HIP transects 056 and 076. All MA 2 HIP transects were predominantly to completely fragmented.

Triggers

- No triggers were detected at any MA 2 HIP transects.

Boise Foothills/County Landfill Management Area (MA 3)

Background

Boise Foothills/County Landfill MA (MA 3) is located in the Boise foothills in Ada County. HIP transect 065 was re-sampled and new HIP transect 038 was established at EO 38. HIP transect 038 was a former HII transect between 1998 and 2001. Both HIP transects are located on land within the Ada County landfill buffer zone.

Slickspot peppergrass

In 2005, a total of 91 slickspot peppergrass plants were observed at the 2 MA 3 HIP transects (Table 1). In 2005, 21 plants were observed at HIP transect 065, not different than the 13 plants observed at the same HIP transect in 2005.

Slickspots

Mean slickspot size was 3 m² in MA 3 (Table 2). Mean biological soil crust within slickspots was 48%, high compared to the rest of the Consideration Zone (Table 2). No evidence of OHV tracks, drill seeding or other restoration activities, or firefighting disturbances were observed at the MA 3 HIP transects (Table 2). None of the MA 3 HIP transects had a 5% or more increase in total non-native species cover within slickspots between 2004 and 2005 (Tables 3 and 10). HIP transects 038 and 065 both had moderately high non-native species cover within slickspots, primarily comprised of cheatgrass. Neither HIP transect had any evidence of livestock (Table 4). Wildlife use was very low at both HIP transects (Table 2).

Plant community

HIP transect 065 remained in Class A/B in 2005. New HIP transect 038 was in Class E (Table 6 and Figs. 12-13). Rush skeletonweed occurred within the general occurrence area of both MA 3 HIP transects.

Fragmentation

HIP transect 038 was predominantly burned at all landscape scales (Table 5). HIP transect 065 was predominantly unburned at the transect and partially burned within 65 m. Residential and commercial development occurred within 65 m of HIP transect 065 (water tower) and within 250 m of HIP transect 038. No agricultural lands occurred within 500 m of the MA 3 HIP transects.

Triggers

- No triggers were detected at any MA 3 HIP transects.

Boise Foothills/Private Management Area (MA 4)

Background

Boise Foothills/Private MA (MA 4) is located in the Boise foothills in Ada County. New HIP transect 012 was established. HIP transect 012 was a former HII transect between 1998 and 2001. HIP transect 012 is located on City of Boise lands within Military Reserve Park.

Slickspot peppergrass

In 2005, 0 slickspot peppergrass plants were observed at HIP transect 012 (Table 1). Even though HIP transect 012 was not established until 2005, the single, permanently marked slickspot comprising the HIP transect was also visited in 2004. As in 2005, 0 plants were observed in 2004.

Slickspots

Slickspot size was 15 m² at HIP transect 012 (Table 2). Biological soil crust within the single slickspot was <1% (Table 2). No evidence of OHV tracks, drill seeding or other restoration activities, or firefighting disturbances were observed (Table 2). HIP transect 012 was comprised of 98% non-native unseeded species cover within the slickspot, predominantly cheatgrass (Table 3). No evidence of livestock or wildlife use was observed (Tables 2 and 4).

Plant community

HIP transect 012 was in Class C/D, although most closely aligned with Class E (Table 6 and Figs. 12-13). The associated community was dominated by garden cornflower (*Centaurea cyanus*) and cheatgrass. This was the only HIP transect with garden cornflower. In addition to garden cornflower occurring within the slickspot, the vegetation transects, and the general occurrence area, rush skeletonweed also occurs along the vegetation transects and the general occurrence area.

Fragmentation

HIP transect 012 was completely burned at the transect and within 65 m (Table 5). HIP transect 012 was predominantly burned within 250 m and 500 m—the remaining areas

at these scales that were not classified as burned had residential and commercial development. No agricultural lands occurred within 500 m of HIP transect 012.

Triggers

- No triggers were detected at HIP transect 012.

Boise Management Area (MAs 5A and 5B)

Background

The Boise MA (MA 5) is located east of Mora and south of the Boise airport, in Ada County (Figs. 1 and 4). HIP transects 032 and 048 were re-sampled. Both HIP transects occur on BLM lands.

Slickspot peppergrass

In 2005, a total of 23 slickspot peppergrass plants were observed at both MA 5 HIP transects (Table 1). In 2004, 61 plants were observed at the same HIP transects. There was no difference in the number of plants between years at each HIP transect and for MA 5.

Slickspots

Mean slickspot size was 34 m² in MA 5 (Table 2). Mean biological soil crust within slickspots was 57% in MA 5, high compared to the rest of the Consideration Zone (Table 2). No evidence of OHV tracks, drill seeding or other restoration activities, or firefighting disturbances were observed at either HIP transect (Table 4). HIP transect 032 had a 5% increase in total non-native species cover within slickspots between 2004 and 2005, comprised of non-native unseeded species (Tables 3 and 10). Cheatgrass was the dominant non-native species within slickspots at both HIP transects. Trace non-penetrating livestock trampling was observed within slickspots at both HIP transects (Table 4). Some wildlife use was also observed at both HIP transects, primarily trails (Table 2). Both HIP transects had a trace amount of pronghorn antelope prints within slickspots.

Plant community

Both HIP transects 032 and 048 remained in Class A/B between 2004 and 2005 (Table 6 and Figs. 12-13). No noxious or aggressive species were detected in the general occurrence area of either HIP transect (Table 3).

Fragmentation

Both HIP transects 032 and 048 are 250-500 m from the nearest burned area, but the surrounding landscape scale is predominantly unburned (Table 5). No residential or commercial development or agricultural lands occurred within 500 m of either HIP transect.

Triggers

- HIP transect 032 had a 5% or more increase in total non-native species cover within slickspots between 2004 and 2005 (Table 10).

Kuna Management Area (MA 6)

Background

The Kuna MA (MA 6) is located near Kuna, Melba, and Mora in Ada County (Figs. 1 and 5). HIP transects were re-sampled at 018A, 018B, 019A (EO 18), 019B, 024, 025, and 057 (EO 24). In addition, New HIP transect 042 was established and sampled. All HIP transects are located on BLM lands.

Slickspot peppergrass

In 2005, a total of 1786 slickspot peppergrass plants were observed at the MA 6 HIP transects (Table 1). In 2004, 2318-3212 plants were observed, compared to the 1786 plants observed at the same 7 HIP transects in 2005. There was no difference in the number of plants between years within the entire MA 6. The only HIP transect with a significant change, HIP transect 025, decreased from 1002-1449 plants in 2004 to 455 plants in 2005 ($p=0.0089$).

Slickspots

Mean slickspot size was 28 m^2 in MA 6 (Table 2). Mean biological soil crust within slickspots was 27% in MA 6 (Table 2). No evidence of recent OHV tracks, drill seeding or other restoration activities, or firefighting disturbances were observed at the MA 6 HIP transects (Table 2). HIP transects 019A (EO 18), 019B, and 024 had evidence of past drill seeding (before implementation of the Candidate Conservation Agreement 2003; Table 2).

HIP transects 019A and 024 had a 5% increase in total non-native species cover within slickspots between 2004 and 2005, comprised of non-native unseeded species (Tables 3 and 10). However, they were not comprised of predominantly native vegetation, so did not trip the trigger. Cheatgrass was the dominant non-native species within slickspots at all MA 6 HIP transects except HIP transect 019A (EO 18), which was dominated by forage kochia (*Kochia prostrata*). Clasping-leaf pepperweed was also common within slickspots at all MA 6 HIP transects except HIP transects 018A and 018B. No livestock trampling was observed at the MA 6 HIP transects (Table 4). Wildlife use occurred within slickspots at all MA 6 HIP transects, predominantly comprised of badger/rodent activity, trails, and anthills. HIP transect 018B had high coverage of badger/rodent activity (Table 2). The rest of the MA 6 HIP transects had moderate wildlife use. No evidence of non-livestock ungulate disturbance was observed within slickspots at MA 6 HIP transects.

Plant community

None of the MA 6 HIP transects underwent a classification change between 2004 and 2005 (Table 6; Figs. 12-13). HIP transects 018B and 057 (EO 24) were the only MA 6

HIP transects that were in Class A/B. HIP transects 018A, 019A (EO 18), 019B, 024, 025, and 042 were all in Class E. Hoary cress was observed within the general occurrence area of HIP transects 018B and 024. Rush skeletonweed was observed within slickspots and the general occurrence area of HIP transect 042 (Table 3).

Fragmentation

HIP transects 018A, 019A (EO 18), 019B, 024, 025, and 042 were all predominantly to completely burned at all 4 landscape scales (Table 5). HIP transects 018B and 057 (EO 24) were both unburned within 65 m. Both were also predominantly unburned between 65 to 250m and partially burned within 500 m. No residential or commercial development occurred within 500 m of any MA 6 HIP transect. Agricultural lands occurred within 65 m of HIP transect 042.

Triggers

- No triggers occurred within MA 6 HIP transects in 2005.

Orchard Training Range Management Area (MA 7)

Background

The Orchard Training Range MA (MA 7) is located in Ada County (Figs. 1 and 6). HIP transects were re-sampled at 027A, 027B, 027C, 027D, 027E (EO 100), 028A (EO 71), 028B (EO 71), 035A, 041A (EO 35), 053B, 059A, 067, 071A, and 071B. No new HIP transects were established. HIP transects 027D and 071A are on state land and the rest are on BLM land.

Slickspot peppergrass

In 2005, 6542 slickspot peppergrass plants were observed at all MA 7 HIP transects, more than the 2806-3896 plants observed at the same 14 HIP transects in 2004 ($p=0.0303$). At the same 10 HII/HIP transects, 203 plants were observed in 2002, 2096-3186 plants were observed in 2004, and 4941 were observed in 2005. Even though there were differences found between 2004 and 2005 based on the 14 HIP transects, there were not differences between 2002, 2004, and 2005 based on the 10 HIP transects sampled all 3 years. At HIP transect 027A, there were more plants observed in 2004 (431-976) and 2005 (1816) than in 2002 (30; both $p=0.0089$). At HIP transect 027C, there were also more plants observed in 2004 (318-566) and 2005 (632) than in 2002 (29; 2002-2004 $p=0.0088$; 2002-2005=0.0318). Similarly, HIP transect 027D also had more plants in 2004 (1108-1307) and 2005 (1615) than in 2002 (78; both $p=0.0127$). At HIP transect 053B, there were more plants in 2005 (785) than 2004 (176-274; $p=0.0318$), and more plants in 2004 than 2002 (0; $p=0.0317$). HIP transect 067 had more plants in 2005 (433) than in 2004 (101; $p=0.0127$). HIP transect 071B also had more plants in 2005 (903) than in 2004 (314; $p=0.0068$). Overall, there were more plants in 2005 than 2004 at HIP transects 053B, 067, and 071B. HIP transects 027A, 027C, 027D, and 053B all had more plants in 2004 and 2005 compared to 2002.

Slickspots

Mean slickspot size was 47 m² in MA 7 (Table 2), large compared to the rest of the Consideration Zone. Mean biological soil crust within slickspots was 40% in MA 7, also high compared to the rest of the Consideration Zone (Table 2). No evidence of recent OHV tracks (including military training and activities), drill seeding or other restoration activities, or firefighting disturbances were observed at the MA 7 HIP transects (Table 2). No MA 7 HIP transects had a 5% increase in total non-native species cover within slickspots between 2004 and 2005 (Tables 3 and 10). Clasping-leaf pepperweed and bur buttercup, followed by cheatgrass, were the dominant non-native species within slickspots at MA 7 HIP transects.

No livestock trampling was observed at HIP transects 041A (EO 35), 053B (EO 53), or 059A (EO 59). Six MA 7 HIP transects had 5-10% penetrating livestock trampling (HIP transects 027A, 027D, 027E (EO 100), 028A (EO 71), 028B (EO 71), and 071A; Table 4). In addition, HIP transects 027B, 027C, 035A, 067, and 071B all had 1-5% penetrating trampling within slickspots. Wildlife use was typically low at the MA 7 HIP transects, predominantly comprised of trails and badger/rodent activity (Table 2). Trace cover of pronghorn prints occurred within slickspots at HIP transects 027A, 027B, 027C, 027D, 027E (EO 100), 041A (EO 35), 059A, and 067.

Plant community

None of the MA 7 HIP transects underwent a classification change between 2004 and 2005 (Table 6). All MA 7 HIP transects except 041A (EO 35) were in Class A/B (n=13). HIP transect 041A (EO 35) was in Class C/D, burned and dominated by native perennial grasses. No noxious or aggressive species were observed at any of the MA 7 HIP transects (Table 3).

Fragmentation

HIP transects 027A, 027C, 027D, 027E (EO 100), 028A (EO 71), 028B (EO 71), 071A, and 071B all had zero burned areas, commercial or residential development, or agricultural lands within 500 m (Table 5). HIP transect 027B was predominantly burned at all landscape scales within 250 m, and was partially burned between 250 and 500 m away. HIP transect 041A (EO 35) was completely burned at all landscape scales and had development (military buildings) within 65 m. HIP transect 053B itself was unburned, but predominantly unburned to predominantly burned within 500 m. HIP transect 053 also has development within 65 m. HIP transect 059A (EO 59) was also unburned itself, but was partially burned within 65 m. HIP transect 067 was unburned within 65 m predominantly unburned between 65 to 500 m.

Triggers

- No triggers occurred within MA 7 HIP transects in 2005.

Orchard Management Areas (MA 8A and 8B)

Background

Orchard Management Areas (MA 8A and 8B; referred to as MA 8) are located northwest and east of Orchard in Ada and Elmore Counties, on both sides of I-84 (Figs. 1 and 6). HIP transects were re-sampled at 015, 020B, 030B, 031, 060, 072A (EO 104), 072B, and 072C. New HIP transect 054 was established in EO 54. Most HIP transects are located on BLM land, or a mix of BLM and private land.

Slickspot peppergrass

In 2005, a total of 1318 slickspot peppergrass plants were observed at the MA 8 HIP transects. In 2004, 1205-1453 plants were observed, not different than the 1318 plants observed at the same 8 HIP transects in 2005. No MA 8 HIP transects underwent a significant change in the number of plants between 2004 and 2005.

Slickspots

Mean slickspot size was 29 m^2 in MA 8 (Table 2). Mean biological soil crust within slickspots was 24% in MA 8, typical compared to the rest of the Consideration Zone (Table 2). Recent evidence of OHV tracks (tractor) occurred within slickspots at HIP transect 030B, likely caused by the owner of an adjacent ranchette (Table 2). No evidence of recent drill seeding or other restoration activities, or firefighting disturbances were observed at the MA 8 HIP transects (Table 2). HIP transects 020B and 030B both had a 5% increase in total non-native species cover within slickspots between 2004 and 2005, mostly attributed to cheatgrass (Tables 3 and 10). Cheatgrass, followed by clasping-leaf pepperweed, were the dominant non-native species within slickspots at MA 8 HIP transects.

Greater than 10% penetrating trampling was observed in at least 1 slickspot at HIP transects 072A (EO 104), 072B, and 072C (Tables 4 and 12). HIP transects 031 and 054 both had several slickspots with 5-10% penetrating trampling. HIP transects 020B and 030B both had several slickspots with 1-5% penetrating trampling. No livestock trampling was observed at HIP transects 015 or 060. Wildlife use was typically very low at MA 8 HIP transects, except at 060 (Table 2). HIP transect 060 also had high coverage of divots, although these were likely really caused by the >10% penetrating livestock trampling that occurred in 90% of the slickspots in 2004. Non-livestock ungulate prints occurred within slickspots at HIP transects 020B, 031, and 060, and was attributed to either deer or antelope pronghorn prints.

Plant community

None of the MA 8 HIP transects underwent a classification change between 2004 and 2005 (Table 6 and Figs. 12-13). HIP transects 020B, 030B, and 031 were all in Class A/B. HIP transects 054 and 072C were in Class C/D. HIP transect 054 was sampled before a 949 ac fire (South Black Fire) burned it in 2005, so habitat quality at HIP transect 054 will likely decline in future years. HIP transects 015, 072A (EO 104), and 072B were all in Class E. Rush skeletonweed was observed within slickspots at HIP

transect 060, and along vegetation transects at HIP transect 060 and 072A (EO 104). Rush skeletonweed was also observed within the general occurrence area at HIP transects 020B, 054, 060, 072A (EO 104) and 072B (Table 3).

Fragmentation

HIP transects 015, 054, 060, and 072C were predominantly to completely burned at every landscape scale (Table 5). HIP transects 072A (EO 104) and 072B were predominantly burned at the transect and within 65 m; and both were predominantly unburned to partially burned at the farther 2 landscape scales. HIP transects 030B and 031 were both unburned, but predominantly unburned to predominantly burned at farther scales. HIP transect 020B was the only one that was not burned within 250 m, but it was partially burned within 500 m. HIP transects 015 and 020B both had development within 250 m, and HIP transect 060 had development within 500 m. HIP transect 030B had development at the HIP transect (adjacent to fence line) and within all other landscape scales. No agricultural lands occurred within 500 m of any MA 8 HIP transects. After sampling the MA 8 HIP transects, 2 separate fires burned part of EO 30 and all of EO 54.

Triggers

- The MP75 I-84 Fire burned a 121-ac portion of MA 8A, partially burning EO 30 (Table 7).
- The South Black Fire burned a 949-ac portion of MA 8B, apparently completely burning EO 54 (according to GIS layers). Note that MA 8B was not established until fall of 2005, after the South Black Fire burned (Table 7).
- BLM fire crews were not aware of EO 54 at the time it burned through it, or they would have prioritized its protection (lack of coordination; Table 7).
- OHV use (tractor) was detected within slickspots at HIP transect 030B (Table 9).
- HIP transects 020B and 030B both had a 5% or more increase in total non-native species cover within slickspot (Table 10).
- HIP transects 072A (EO 104), 072B, and 072C all had >10% penetrating livestock trampling in at least 10% of the slickspots (Table 12).

Mountain Home Management Areas (MA 9A, 9B, and 9C)

Background

Mountain Home Management Areas (MAs 9A, 9B, and 9C; referred to as MA 9) are located near Mountain Home in Elmore County, on both sides of I-84 (Figs. 1 and 7). HIP transects were re-sampled at 002, 021, 029, 050, 051A, and 051B. New HIP transect 062 was established in EO 62. All MA 9 HIP transects are located on BLM land.

Slickspot peppergrass

In 2005, a total of 2218 slickspot peppergrass plants were observed at the MA 9 HIP transects. In 2004, 909-1157 plants were observed, not different than the 2218 plants

observed at the same 6 HIP transects in 2005. No MA 9 HIP transects underwent a significant change in the number of plants between 2004 and 2005.

Slickspots

Mean slickspot size was 35 m² in MA 9 (Table 2). Mean biological soil crust within slickspots was 39% in MA 9, high compared to the rest of the Consideration Zone (Table 2). No evidence of OHV tracks, drill seeding or other restoration activities, or firefighting disturbances were observed at the MA 9 HIP transects (Table 2). HIP transects 002, 029, and 050 all had a 5% or more increase in total non-native species cover within slickspots between 2004 and 2005, mostly attributed to cheatgrass (Tables 3 and 10). In addition to cheatgrass, bur buttercup and clasping-leaf pepperweed were common non-native species within slickspots at MA 9 HIP transects. No livestock trampling was observed at HIP transects 021, 029, 050, 051A, 051B, and 062 (Table 4). HIP transect 002 had 2 slickspots with 5-10% penetrating livestock trampling. Moderate wildlife use occurred at all MA 9 HIP transects, mostly comprised of trails and badger/rodent activity (Table 2). Trace pronghorn antelope prints occurred within slickspots at 021 and 051B.

Plant community

None of the MA 9 HIP transects underwent a classification change between 2004 and 2005 (Table 6 and Figs. 12-13). All 7 MA 9 HIP transects were in Class A/B. No noxious or aggressive weeds were observed in the general occurrence area of MA 9 HIP transects (Table 3).

Fragmentation

All MA 9 HIP transects were unburned at the transect, and all but 002 were unburned within 65 m (Table 5). HIP transect 002 was also predominantly unburned within 250 m and predominantly burned within 500 m. HIP transects 021 and 029 were both predominantly burned within 250 m, and 050 was partially burned within 250 m. HIP transect 021 was within 65 m of development (gravel pit) and 050 was within 500 m of agricultural lands. HIP transects 051A, 051B, and 062 were unburned and had no development or agricultural lands within 500 m.

Triggers

- The MP97 I-84 Fire burned a 146-ac portion of MA 9C (Table 7).
- HIP transects 002, 029, and 050 all had a 5% or more increase in total non-native species cover within slickspots (Table 10).

Glenns Ferry/Hammett Management Area (MA 10)

Background

The Glenns Ferry/Hammett Management Area (MA 10) is located near Hammett and Glenns Ferry in Elmore County (Figs. 1 and 8). HIP transects were re-sampled at 008A, 008B, 026, 058 (EO 26), and 063. All MA 10 HIP transects are located on BLM land.

Slickspot peppergrass

In 2005, a total of 1409 slickspot peppergrass plants were observed at the MA 10 HIP transects (Table 1). In 2004, 1092-1141 plants were observed, not different than the 1409 plants observed at the same 5 HIP transects in 2005. No MA 10 HIP transects underwent a significant change in the number of plants between 2004 and 2005.

Slickspots

Mean slickspot size was 27 m² in MA 10 (Table 2). Mean biological soil crust within slickspots was 13% in MA 10, low compared to the rest of the Consideration Zone (Table 2). No evidence of recent drill seeding or other restoration activities, or firefighting disturbances were observed at the MA 10 HIP transects (Table 2). OHV tracks were observed in the general occurrence area of HIP transect 008B (Table 2). HIP transect 008A had a 5% or more increase in total non-native species cover within slickspots between 2004 and 2005, mostly attributed to tall tumblemustard (Tables 3 and 10). In addition to tall tumblemustard, cheatgrass and bur buttercup were also common non-native species within slickspots at MA 10 HIP transects.

HIP transect 063 had 1 slickspot within >10% penetrating livestock trampling (Tables 4 and 10). Both HIP transects 026 and 063 had several slickspots with 5-10% penetrating livestock trampling, as well as slickspots with lesser coverage of penetrating livestock trampling. HIP transect 008A had 1 slickspot with 1-5% penetrating trampling and both 008A and 008B had several slickspots within trace penetrating livestock trampling. No livestock trampling was observed at HIP transect 026 (EO 58). Low to moderate wildlife use occurred at MA 10 HIP transects, mostly comprised of trails and badger/rodent activity (Table 2). Trace pronghorn antelope and deer prints occurred within slickspots at HIP transects 008B, 026, and 063.

Plant community

None of the MA 10 HIP transects underwent a classification change between 2004 and 2005 (Table 6 and Figs. 12-13). HIP transects 008A, 026, 058 (EO 26), and 063 were all in Class A/B. HIP transect 008B was in Class C/D, burned and dominated by Russian thistle and bur buttercup, non-native annual species. No noxious or aggressive weeds were observed in the general occurrence area of MA 10 HIP transects (Table 3).

Fragmentation

HIP transect 058 (EO 26) was the only MA 10 HIP transect that was unburned within 500 m, but development occurred within 500 m (Table 5). HIP transect 026 was unburned within 250 m, and predominantly unburned within 500 m. HIP transect 008A was unburned at the transect, but predominantly unburned to partially burned at the remaining landscape scales within 500 m. HIP transect 008B was predominantly burned at all landscape scales. HIP transect 063 was partially burned at the transect and within 250 m, and predominantly burned within 500 m. Agricultural lands also occurred within 500 m at HIP transects 026 and 063.

Triggers

- The North Hamm Fire burned a 1466-ac portion of MA 10, and partially burned EO 8 (Table 7).
- HIP transect 008A had a 5% or more increase in total non-native species cover within slickspots (Table 10).
- HIP transect 063 had >10% penetrating livestock trampling in 1 slickspot (Table 12).

Jarbridge Management Area (MA 11)

Background

The Jarbridge Management Area (MA 11) is located south of Bruneau and north of Murphy Hot Springs in Owyhee County (Figs. 1 and 9). HIP transects were re-sampled at 700 (EO 99), 701 (EO 96), 702, 703, 705 (sub-EO 704), 706 (EO 88), 707 (EO 97), 708, 709 (sub-EO 704), 710 (EO 84), 711 (EO 92), 712, 713 (sub-EO 704), 714 (EO 93), 715, 716, 717, 718 (sub-EO 702), 719 (EO 95), 720 (EO 96), 721 (EO 96), and 722 (EO 98). HIP transects 703, 707 (EO 97), and 720 (EO 96) were partially on state lands and the rest were on BLM lands.

Slickspot peppergrass

In 2005, a total of 3624 slickspot peppergrass plants were observed at the MA 11 HIP transects, more than the 1883-2327 plants observed at the same HIP transects in 2004 ($p=0.0229$; Table 1). There were less plants at HIP transect 715 in 2005 than 2004 ($p=0.0194$). There were more plants in 2005 than 2004 at HIP transects 701 (EO 96; $p=0.0098$), 712 ($p=0.0353$), 718 (sub-EO 702; $p=0.0068$), 720 (EO 96; $p=0.0318$), and 721 (EO 96; $p=0.0414$). The number of plants did not change between 2004 and 2005 at the rest of the MA 11 HIP transects.

Slickspots

Mean slickspot size was 50 m² in MA 11, high compared to the rest of the Consideration zone (Table 2). Mean biological soil crust within slickspots was 9% in MA 11, low compared to the rest of the Consideration Zone (Table 2). No evidence of recent OHV use, drill seeding or other restoration activities, or firefighting disturbances were observed at the MA 11 HIP transects (Table 2). HIP transects 708 and 715 both had a 5% or more increase in total non-native species cover within slickspots between 2004 and 2005, mostly attributed to crested wheatgrass and clasping-leaf pepperweed, respectively (Tables 3 and 10). In addition to these species, cheatgrass and bur buttercup were also common non-native species within slickspots at MA 11 HIP transects.

HIP transects 700 (EO 99), 705 (sub-EO 704), 706 (EO 88), 710 (EO 84), 712, 713 (sub-EO 704), 714 (EO 93), 716, and 722 (EO 98) all had >10% penetrating livestock trampling in at least 1 slickspot (Tables 4 and 12). HIP transects 701 (EO 96), 702, 703, 717, and 721 (EO 96) all had 5-10% penetrating livestock trampling in at least 1 slickspot. HIP transects 708, 711 (EO 92), and 718 had 1-5% penetrating livestock

trampling in at least 1 slickspot. HIP transect 709 (sub-EO 704) and 719 (EO 95) each had 1 slickspot with <1% penetrating livestock trampling. HIP transects 707 (EO 97), 715, and 720 (EO 96) were the only MA 11 HIP transects with no sign of livestock feces or trampling. Sixteen of the 22 MA 11 HIP transects had penetrating livestock trampling in all 10 slickspots. Wildlife use within slickspots was typically low at MA 11 HIP transects, mostly comprised of divots, badger/rodent activity, trails, and non-livestock ungulate prints (Table 2). Trace pronghorn antelope prints occurred within slickspots at HIP transects 706 (EO 88), 707 (EO 97), 709 (sub-EO 704), 711 (EO 92), 712, 713 (sub-EO 704), 714 (EO 93), 715, 717, 718 (sub-EO 702), 719 (EO 95), 720 (EO 96), 721 (EO 96), and 722 (EO 98).

Plant community

One MA 11 HIP transect declined in habitat quality and none improved (Table 6 and Figs. 12-13). HIP transect 714 (EO 93) changed from Class A/B in 2004 to C/D in 2005, likely because of the increased clasping-leaf pepperweed detected on vegetation transects. Of the 22 MA 11 HIP transects, 13 were in Class A/B, 5 were in C/D, and 4 were in F. No noxious or aggressive weeds were observed in the general occurrence area of MA 11 HIP transects (Table 3).

Fragmentation

Seven MA 11 HIP transects were predominantly to completely burned at all landscape scales (HIP transects 701 (EO 96), 703, 705 (sub-EO 704), 708, 715, 716, and 717; Table 5). Four MA 11 HIP transects were predominantly unburned to predominantly burned at all landscape scales (HIP transects 700 (EO 99), 706 (EO 88), 709 (sub-EO 704), 714 (EO 93), and 718). Eight HIP transects were unburned, but predominantly unburned to partially burned within 65 m to 500 m. HIP transect 710 (EO 84) was unburned at all landscape scales.

Triggers

- HIP transect 714 (EO 93) declined in habitat quality between 2004 and 2005 Table 10).
- HIP transects 708 and 715 had a 5% or more increase in total non-native species cover within slickspots (Table 10).
- HIP transects 700 (EO 99), 705 (sub-EO 704), 706 (EO 88), 710 (EO 84), 712, 713 (sub-EO 704), 714 (EO 93), 716, and 722 (EO 98) had >10% penetrating livestock trampling in >10% of slickspots (Table 12).

HIP transects located outside of any Management Area

Background

HIP transects 010 and 061 both occur west of Hammett, but do not occur within any MA (Fig. 8). Both HIP transects occur on BLM land in Elmore County. HIP transects 010 and 061 were re-sampled in 2005.

Slickspot peppergrass

Zero slickspot peppergrass plants were observed at HIP transect 010 in 2004 and 2005 (Table 1). In 2005, 319 plants were observed at HIP transect 061, not different than the 625 plants observed in 2004.

Slickspots

Mean slickspot size was 24 m² and 36 m² in HIP transects 010 and 061, respectively (Table 2). Mean biological soil crust within slickspots was 5% and 19% for both HIP transects (Table 2). No evidence of recent OHV tracks, drill seeding or other restoration activities, or firefighting disturbances were observed at these HIP transects (Table 2). HIP transect 061 had a 5% or more increase in total non-native species cover within slickspots between 2004 and 2005, but this was not a trigger because 061 did not comprise predominantly native vegetation (Tables 3 and 10). Non-native species cover within slickspots was high within HIP transect 010, but was lower for 061. Non-native species were primarily comprised of cheatgrass, bur buttercup, Russian thistle, and tall tumblemustard. HIP transect 010 had zero livestock trampling. HIP transect 061 had 1 slickspot with 5-10% penetrating livestock trampling, and 8 additional slickspots with 1-5% penetrating livestock trampling (Table 4). Wildlife use was very low, and was primarily comprised of divots (Table 2).

Plant community

HIP transect 010 remained in Class E in 2005. HIP transect 061 changed from Class C/D to A/B between 2004 and 2005, likely because non-native annual species were less in 2005 than 2004 along the vegetation transects (Table 6 and Figs. 12-13). No noxious or aggressive weeds were observed in the general occurrence area of either HIP transect (Table 3).

Fragmentation

HIP transect 010 was predominantly burned within 65 m, and completely fragmented by both fire and agricultural lands within 250 m; and development also occurred within 500 m (Table 5). HIP transect 061 was predominantly burned at all landscape scales, and completely fragmented by both fire and agricultural lands within 500 m.

Triggers

- No triggers occurred at HIP transects 010 and 061 in 2005.

DISCUSSION

HIP transects representing several subpopulations at a single EO were compiled proportionately to EOs with 1 HIP transect (Figs.14-20). Data were compiled similarly for the 2004 data using the newly revised EOs (Colket et al. 2006). Figs. 12-16 in Colket (2005) are not equivalent to Figs. 14-20 in this report, so 2004 and 2005 data were both summarized using the newly revised EOs in this report.

The 2005 results were based on 53 EOs and do not include what has happened at the remaining 48 EOs. The 53 EOs with HIP transects typically have better overall habitat and landscape quality, as evidenced by greater proportion of B- and C-ranked EOs (Colket et al. 2006). The 48 EOs without HIP transects include many lower quality EOs (e.g., D-ranked), EOs where slickspot peppergrass has not been observed despite through searches by qualified personnel (F-ranked), extirpated (X-ranked) or probable extirpated EOs (X?-ranked), as well as many extant EOs (E-ranked), for which little is known (Colket et al. 2006). This suggests that habitat and landscape quality data presented in this report are better than would occur if HIP transects occurred at all 101 EOs. Regardless of this potential bias, the HIP transect data is an important tool for determining trends at each EO and rangewide, particularly those EOs with the greatest conservation status.

Slickspot peppergrass

Slickspot peppergrass abundance was higher in 2005 than 2004 (Table 1), likely influenced by the higher total March-June precipitation in 2005 (Fig. 10). The higher slickspot peppergrass abundance in 2005 was likely influenced by the high precipitation that occurred between February and June (Meyer 2005, Meyer et al. 2005, Palazzo et al. 2005). MAs 7 (n=14) and 11 (n=22) both had more plants in 2005 than 2004, but there was no difference in abundance at MAs 1, 5, 6, 8, 9, and 10, possibly influenced by sample size.

Slickspots

Non-native species

In 2005, 71% of the EOs had at least 1 slickspot with >5% non-native species cover (Fig. 14). One-fifth of the EOs had at least 1 slickspot with >50% non-native species cover. Most of the new HIP transects added in 2005 had at least 1 slickspot with >50% non-native species cover. Roughly one-quarter of the EOs at least 1 slickspot with non-native seeded species present. Two percent of the EOs at least 1 slickspot with >50% non-native seeded species cover. In 2005, the most prevalent non-native species within slickspots were cheatgrass, clasping-leaf pepperweed, tall tumblemustard, crested wheatgrass, and bur buttercup (Fig. 11).

Livestock disturbance

After completion of the 2005 field season, the Conservation Committee decided neither the silt crust nor the 3-in methods are consistent with the definition of livestock print penetration used in the Candidate Conservation Agreement (2003). The Conservation Committee also decided the method used in the 2004 field season will be used in 2006 and later field seasons, with some modifications to deal with problems that occurred. When the reddish color of the clay layer is difficult to discern (such as in the Jarbridge MA), the field crew will use their best professional judgment to classify livestock print penetration. Some factors that could support this best professional judgment include: 1) fine residue occurring at the bottom of the livestock print; 2) a “slick” or shiny appearance; and/or 3) cracking and curling at the bottom of the livestock print. If the slickspot soil surface is wet, the field crew will count livestock prints ≥1 in deep as

penetrating if they are unable to determine penetration using their best professional judgment. The 1-in depth is based on: 1) 2004 and 2005 field experience at HIP transects (Colket 2005); 2) many years of field experience at the Orchard Training Area (D. Quinney, pers. comm. 2005); and past research (Fischer et al. 1996).

Due to different methods being used to assess penetrating livestock trampling, it is better to compare total livestock trampling than penetrating livestock trampling between 2004 and 2005. Both 2004 and 2005 data are shown in this report (Fig. 15), but total livestock trampling is emphasized because it was measured the same way each year. In both 2004 and 2005, nearly half of the EOs had no livestock trampling within slickspots (Fig. 15). In 2005, only 2 of the 8 new EOs with HIP transects had any livestock trampling, and neither had >10% total livestock trampling in any slickspot. Nearly one-fifth of the EOs had at least 1 slickspot with 10-25% total livestock trampling in 2005, the same as in 2004. However, 37% of the EOs in 2005 had at least 1 slickspot with >5% total livestock trampling, almost double the 22% observed in 2004, indicating that a greater proportion of EOs had more total livestock trampling in slickspots in 2005 than 2004. These findings are also substantiated by the greater mean total livestock trampling observed in 2005 than 2004 (Fig. 11).

Plant community

Plant community trends did not substantially change at EOs between 2004 and 2005, which was expected with only one year between sampling years. The 8 new HIP transects predominantly had lower habitat quality compared to those sampled only in 2004. Most of the new HIP transects added in 2005 were either in Class C/D or E, and only one was in A/B (Table 6 and Figs. 12-13).

Roughly half of the EOs were in Class A/B in 2005, similar to 2004 (Fig. 16). Class A/B included EOs with at least moderate big sagebrush cover. Some of these had relatively high habitat quality with low non-native species cover (e.g., HIP transect 721 (EO 96)). Many had an understory of Sandberg bluegrass or another native perennial bunchgrass. However, many also had an understory of bur buttercup, cheatgrass, or another non-native species, indicative of degraded habitat.

Nearly one-quarter of EOs were in Class C/D. Class C/D included EOs that did not fit into one of the other 3 classes. Some Class C/D EOs were better than others, but some were in communities just as bad as some of the worst Class E EOs. For example, the dominant species at HIP transects 008B, 012, 068, and 703, all in Class C/D, were all annual non-native species (e.g., tall tumblemustard). All Class C/D EOs have typically at least partially burned in the past, but some are comprised of more native species than others (especially those better adapted to disturbance).

Approximately one-fifth of EOs were in Class E. Class E included EOs where cheatgrass was the dominant species. Three percent of EOs were in Class F, dominated by crested wheatgrass. Class E and F EOs both occur in communities with poor, likely irreversible habitat quality. In addition, many of the Class C/D EOs occurred

in similarly poor communities. Nearly half of all EOs with HIP transects were either in or in transition to communities with poor, likely irreversible habitat quality.

The EOs that have burned and are dominated by non-native species have crossed a threshold that is likely irreversible (Class E, F, and some C/D EOs; Laycock 1991, Briske et al. 2005). These EOs should have the lowest priority for conservation, especially where few plants remain. EOs in Class C/D are typically in transition and have habitat quality that varied from poor to fair. These EOs may further degrade to a more irreversible stage, especially if further impacted by fires and other anthropogenic disturbances. EOs in Class A/B have the best habitat quality remaining within the range of slickspot peppergrass. Class A/B EOs, especially those with the highest habitat quality, are most important for the long-term conservation of slickspot peppergrass and its habitat.

Fragmentation

The 2004 fire history data were not summarized in this report for comparison with 2005 data, but not much changed between 2004 and 2005 in terms of fire history. HIP transect 024 was the only one where fire history changed between 2004 and 2005, due to a fire burning part of the EO and surrounding area after it was sampled in 2004. There may have been changes recorded in fire history for other HIP transects, but these were likely caused by sampling error.

Based on the newly revised EOs (Colket et al. 2006), 54% of the EOs are completely unburned at the HIP transect (Fig. 17). The remainder were at least partially burned at the HIP transect, and nearly one-fifth were completely burned. Half of all EOs were predominantly to completely burned within 500 m. Eighty-eight percent of all EOs were partially to completely burned within 500 m. Residential and commercial development occurred at only 1 HIP transect (030B), which occurred adjacent to a ranchette (Fig. 18). Residential and commercial development occurred within 65 m at 9% of the EOs. One-third of all EOs were within 500 m of commercial and residential development, affecting EOs in MAs 1, 2, 3, 4, 6, 7, 8, 9, and 10. Sources of this development were a water tower, agricultural buildings, stores (i.e. gas station, fireworks store), military development, and gravel mining, in addition to ranchettes.

No agricultural lands occurred at any HIP transect. Agricultural lands occurred within 65 m at HIP transect 42, which was located on BLM lands adjacent to an agricultural field (Fig. 19). Nearly one-fifth of EOs were within 500 m of agricultural lands, affecting EOs in MAs 1, 2, 6, 9, and 10. Cumulative landscape disturbance at EOs followed fire history closely (Fig. 20).

MANAGEMENT IMPLICATIONS

Slickspot peppergrass abundance was greater in 2005 than 2004, likely because of the higher spring precipitation in 2005. Some may attribute the greater slickspot peppergrass abundance to the implementation of the Candidate Conservation Agreement (2003). However, it would be misleading to assign cause and effect this

early, especially when climatic factors are outside of the control of managers. It will require many years of monitoring data to assess its effectiveness in conserving slickspot peppergrass habitat and landscape.

Total and penetrating livestock trampling were also greater in 2005 than 2004. It is unclear whether this was attributed to greater livestock use or greater impact associated with the higher spring precipitation. There may have also been more penetrating livestock triggers that occurred because a more sensitive method was used in 2005. However, there was a greater frequency of slickspots at HIP transects with >10% penetrating livestock trampling in 2005 and most HIP transects would have tripped using either method used in 2004 and 2005. Future monitoring years will use the 2004 methodology to ensure long-term consistency between years and with the Candidate Conservation Agreement trigger thresholds (2003; Table 12).

There were more and larger fires that burned EOs and MAs in 2005 than 2004. Most fires that burned were apparently prioritized by BLM for protecting slickspot peppergrass. The South Black Fire that burned EO 54 in 2005 was not prioritized by the BLM because they were not aware of EO 54 at the time it burned (Table 7). Adaptive management actions by the BLM will ensure that fire personnel possess the most accurate spatial data for identifying and protecting slickspot EOs from future fires.

Some of triggers, including those assessing change in habitat quality and non-native species cover in slickspots, require at least 2 years of monitoring data to assess if a trigger has tripped. All of the triggers that have occurred should be evaluated to see how they can be prevented in future years. Tripping of a trigger at an EO should be prevented, especially where the same trigger has tripped several times over multiple years. The effectiveness of the Candidate Conservation Agreement ultimately depends upon the long-term survival of slickspot peppergrass EOs and the integrity of the slickspots and sagebrush steppe that it depends on. This report represents a second year of monitoring and provides information to adaptively manage threats to slickspot peppergrass and objectively measure trends in future years.

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Table 1. Slickspot peppergrass plant abundance at habitat integrity index (HII; 1998-2002) and habitat integrity and population (HIP) transects (2004-2005). Unshaded values indicate abundance values based on the same permanently marked slickspots (2004, 2005, and 2002 only at MA 7). The Wilcoxon signed-rank test was used to evaluate abundance pairwise at transects with permanently marked slickspots (2002 [MA 7 only], 2004, and 2005); and also to evaluate abundance pairwise for each Management Area (MA) and rangewide (2004 and 2005 only). Slickspots with >500 plants in 2004 (only at HIP transects 066 and 070) were excluded from statistical analysis. Abundance that was significantly different between years is indicated by different superscript letters (e.g., [a] vs. [b]). Absence of superscript letters for 2002 (MA 7 only), 2004, and 2005 data indicates abundance is not different between years.

MA	HII/HIP#	EO/SUB-EO#	1998	1999	2000	2001	2002	2003	2004	2005
1	066	66	3075	249	>603	335	30-300	-	>1746	5337
	068	68	-	-	-	-	-	-	631-1277[a]	9[b]
	069	69	-	-	-	-	-	-	-	5
	070	70	-	-	-	-	-	-	>1168	1445
	SUM		**3075**	**249**	**>603**	**335**	**30-300**	**-**	**>3545**	**6796**
2	052	52	198	176	200	58	-	-	394-443[a]	3728[b]
	056	56	1	0	0	0	0	-	-	0
	076	76	-	-	-	-	-	-	-	2014
	SUM		**199**	**176**	**200**	**58**	**0**	**-**	**394-443**	**5742**
3	038	38	25	42	17	3	-	-	-	78
	065	65	95	52	155	53	-	-	21	13
	SUM		**120**	**94**	**172**	**56**	**-**	**-**	**21**	**91**
4	012	12	15	27	16	4	-	-	0	0
	SUM		**15**	**27**	**16**	**4**	**-**	**-**	**0**	**0**
5	32	32	500	230	155	3	0	-	4	0
	48	48	-	-	-	-	-	-	57	23
	SUM		**500**	**230**	**155**	**3**	**0**	**-**	**61**	**23**
6	018A	18	448	0	>2517	2155	-	-	581-780	653
	018B	18	944	50	402	535	-	-	332	499
	019A	18	0	18	0	29	-	-	2	0
	019B	19	30	3	6	7	-	-	0	0
	024	24	>1480	285	416	76	-	-	386-634	171
	025	25	59-139	106	247-337	91	-	-	1002-1449[a]	455[b]
	042	42	-	-	-	-	-	-	-	0
	057	24	901	149	37	6	-	-	15	8
	SUM		**>3862**	**611**	**>3625**	**2899**	**-**	**-**	**2318-3212**	**1786**
7	027A	27	>1842	114	>125	70	30[a]	-	431-976[b]	1816[b]
	027B	27	0	0	0	0	5	-	0	0
	027C	27	-	-	-	112	29[a]	-	318-566[b]	632[b]
	027D	27	-	-	-	124	78[a]	-	1108-1307[b]	1615[b]
	027E	100	-	-	-	36	16	-	38	30
	028A	71	1365	125	755-855	56	7	-	25	63
	028B	71	550	220	306	104	0	-	0	0
	035A	35	175	38	10-100	0	34	-	23	67
	041A	35	2	0	0	0	4	-	0	0
	053B	53	0	3	-	0	0[a]	-	176-274[b]	785[c]
	059A	59	-	-	-	15	0	-	0	0
	67	67	-	-	-	-	-	-	101[a]	433[b]
	071A	71	-	-	-	-	-	-	272	198
	071B	71	-	-	-	-	-	-	314[a]	903[b]
	SUM		**>3934**	**500**	**>1196**	**517**	**203**	**-**	**2806-3896[a]**	**6542[b]**

Table 1. (Continued)

MA	HII/HIP#	EO/SUB-EO#	1998	1999	2000	2001	2002	2003	2004	2005
8	015	15	640-890	0	0	0	-	-	49	37
	020B	20	>338	43	45	19	-	-	106-155	245
	030B	30	142	3	86	27	-	-	1	6
	031	31	570	0	330	25	0	-	5	59
	054	54	-	-	-	-	-	-	-	0
	060	60	0	6	0	0	-	-	0	1
	072A	104	-	-	-	-	-	-	728-927	480
	072B	72	-	-	-	-	-	-	98	295
	072C	72	-	-	-	-	-	-	218	195
	SUM		**>1690**	**52**	**461**	**71**	**0**	**-**	**1205-1453**	**1318**
9	002	2	-	-	-	-	-	-	334	312
	021	21	>386	19	1	0	-	-	0	0
	029	29	371	231	148	8	0	-	161-360	308
	050	50	265	86	16	0	-	-	221	382
	051A	51	-	-	-	-	-	-	175-224	860
	051B	51	-	-	-	-	-	-	18	59
	062	62	-	-	-	-	-	-	-	297
	SUM		**1022**	**336**	**165**	**8**	**0**	**-**	**909-1157**	**2218**
10	008A	8	1640	2	236	0	22-220	-	433	805
	008B	8	504-554	18	40	0	-	-	61	126
	026	26	-	-	-	-	-	-	245	326
	058	26	138	0	0	1	37	-	127	66
	063	63	-	-	-	-	-	-	226-275	86
	SUM		**2282-2332**	**20**	**276**	**1**	**59-257**	**-**	**1092-1141**	**1409**
11	700	99	-	-	-	-	-	-	24	27
	701	96	-	-	-	-	-	-	336-581[a]	721[b]
	702	702	27	17	15	24	0	-	44	62
	703	703	-	-	-	-	-	-	33	13
	705	704	-	-	-	-	-	-	37	52
	706	88	-	-	-	-	-	-	235-434	231
	707	97	-	205	12	12	3	-	80	145
	708	708	18	0	0	0	0	-	0	0
	709	704	-	10	2	5	11	-	72	137
	710	84	-	-	-	-	-	-	177	320
	711	92	-	-	-	-	-	-	7	2
	712	712	-	-	-	-	-	-	146[a]	320[b]
	713	704	-	-	-	-	-	-	201	283
	714	93	-	-	-	-	-	-	10	10
	715	715	-	-	-	-	-	-	21[a]	0[b]
	716	716	-	-	-	-	-	-	396	330
	717	717	-	-	-	-	-	-	6	47
	718	702	-	-	-	-	-	-	7[a]	318[b]
	719	95	11	-	2	0	6	-	6	72
	720	96	-	-	-	-	-	-	8[a]	47[b]
	721	96	-	-	-	-	-	-	33[a]	121[b]
	722	98	-	-	-	-	-	-	4	6
	SUM		**56**	**232**	**31**	**41**	**20**	**-**	**1883-2327[a]**	**3264[b]**
N/A	010	10	0	0	0	0	-	-	0	0
	061	61	705	274	92	6	1-10	-	625	319
	SUM		**705**	**274**	**92**	**6**	**1-10**	**-**	**625**	**319**
	Grand total		**>17460**	**2801**	**>6992**	**3999**	**313-790**	**-**	**>14838[a]**	**29508[b]**
	# HII/HIP transects		**37**	**38**	**38**	**43**	**24**	**-**	**72**	**79**

Table 2. 2005 slickspot attributes, slickspot peppergrass abundance, wildlife use, off-highway vehicle (OHV) use, firefighting, and restoration attributes at habitat integrity and population (HIP) transects.

Land unit			Attributes			Population			Wildlife use				OHV use			Firefighting		Restoration		
Management Area (MA)	EO	HIP transect	M SS silt crust depth (cm)	M SS size (m²)	SS - M biological soil crust cover	Total # plants	% Rosettes*	% Reproductive*	SS - M% wildlife use cover	SS - M% Non-L UNG print cover	SS - M% badger/rodent activity cover	SS - M% trail cover	FREQ of SS w/ OHV tracks	OHV tracks in GOA (#24)**	Recent or older?	Firefighting disturbance in GOA (#25)**	Recent or older?	FREQ of drill seeded SS	Drill seeded SS in GOA (#26)**	Recent or older?
1	66	066	0.8	34	53.5	5337	70	30	13.3	0.0	11.6	0.3	0	a	NA	a	NA	0	a	NA
	68	068	0.9	19	38.1	9	0	100	10.0	0.0	5.0	1.8	0	a	NA	a	NA	0	a	NA
	69	069	0.5	25	7.9	5	0	100	5.3	0.0	1.4	0.0	0	b	R	a	NA	0	a	NA
	70	070	0.6	16	68.5	1445	66	34	5.6	0.0	0.4	1.8	0	a	NA	a	NA	0	a	NA
	MEAN		**0.7**	**23**	**42.0**	**1699**	**34**	**66**	**8.5**	**0.0**	**4.6**	**1.0**	**0**					**0**		
2	52	052	0.3	16	38.1	3728	95	5	6.7	0.1	1.0	3.6	0	a	NA	a	NA	0	a	NA
	56	056	0.7	2	60.3	0	0	0	15.6	0.1	1.4	11.8	0	a	NA	a	NA	0	a	NA
	76	076	0.5	9	10.2	2014	40	60	13.5	0.1	5.3	5.5	0	a	NA	a	NA	0	a	NA
	MEAN		**0.5**	**9**	**36.2**	**1914**	**45**	**22**	**11.9**	**0.1**	**2.5**	**6.9**	**0**					**0**		
3	38	038	0.9	4	56.3	78	99	1	0.4	0.0	0.0	0.0	0	a	NA	a	NA	0	a	NA
	65	065	0.8	2	40.0	13	0	100	0.3	0.0	0.0	0.0	0	a	NA	a	NA	0	a	NA
	MEAN		**0.9**	**3**	**48.1**	**46**	**49**	**51**	**0.3**	**0.0**	**0.0**	**0.0**	**0**					**0**		
4	12	012	-1	15	0.5	0	0	0	0.0	0.0	0.0	0.0	0	a	NA	a	NA	0	a	NA
5	32	032	0.9	28	50.0	0	0	0	9.7	0.3	0.0	8.7	0	a	NA	a	NA	0	a	NA
	48	048	0.7	39	64.0	23	4	96	5.3	0.1	0.0	3.8	0	a	NA	a	NA	0	a	NA
	MEAN		**0.8**	**34**	**57.0**	**12**	**2**	**48**	**7.5**	**0.2**	**0.0**	**6.2**	**0**					**0**		
6	18	018A	0.6	21	12.3	653	4	96	2.1	0.0	1.6	0.0	0	a	NA	a	NA	0	a	NA
	18	018B	1.0	33	25.6	499	52	48	18.1	0.0	13.2	3.8	0	a	NA	a	NA	0	a	NA
	18	019A	1.1	21	21.3	0	0	0	3.1	0.0	0.8	0.0	0	a	NA	a	NA	8	c	O
	19	019B	1.2	28	15.3	0	0	0	0.6	0.0	0.3	0.0	0	a	NA	a	NA	9	c	O
	24	024	0.7	35	29.3	171	37	63	2.4	0.0	1.5	0.0	0	a	NA	a	NA	6	c	O
	25	25	0.6	31	20.9	455	6	94	3.4	0.0	2.1	0.8	0	a	NA	a	NA	0	a	NA
	42	042	0.9	29	37.0	0	0	0	7.2	0.0	1.2	0.0	0	a	NA	a	NA	0	a	NA
	24	057	0.9	27	51.3	8	100	0	4.3	0.0	0.0	2.8	0	a	NA	a	NA	0	a	NA
	MEAN		**0.9**	**28**	**26.6**	**223**	**25**	**38**	**5.1**	**0.0**	**2.6**	**0.9**	**0**					**1**		
7	27	027A	0.8	83	56.3	1816	84	16	1.5	0.1	0.8	0.1	0	a	NA	a	NA	0	a	NA
	27	027B	0.6	34	29.0	0	0	0	1.7	0.2	0.1	0.0	0	a	NA	a	NA	0	a	NA
	27	027C	0.8	57	41.3	632	88	12	1.2	0.2	0.0	0.0	0	b	O	a	NA	0	a	NA
	27	027D	0.7	87	25.5	1615	74	26	1.5	0.3	0.4	0.6	0	a	NA	a	NA	0	a	NA
	100	27E	0.8	78	54.3	30	23	77	1.6	0.1	0.0	0.0	0	a	NA	a	NA	0	a	NA
	71	028A	1.0	25	17.2	63	86	14	2.0	0.0	0.0	0.0	0	a	NA	a	NA	0	a	NA
	71	028B	1.0	17	5.4	0	0	0	2.2	0.0	0.0	0.8	0	a	NA	a	NA	0	a	NA
	35	035A	0.7	51	43.3	67	18	82	6.9	0.0	0.4	5.6	0	-1	-1	-1	-1	0	-1	-1
	35	041A	0.9	21	38.8	0	0	0	2.7	0.1	2.1	0.0	0	a	NA	a	NA	0	a	NA
	53	053B	0.8	15	19.6	785	61	39	1.5	0.0	0.0	0.9	0	a	NA	a	NA	0	a	NA
	59	059A	0.8	39	45.8	0	0	0	3.2	0.1	0.4	1.7	0	a	NA	a	NA	0	a	NA
	67	067	0.6	39	63.0	433	70	30	1.2	0.1	0.4	0.0	0	a	NA	a	NA	0	a	NA
	71	071A	0.7	67	68.5	198	87	13	3.1	0.0	0.1	2.0	0	a	NA	a	NA	0	a	NA
	71	071B	0.6	44	45.5	903	87	13	5.9	0.0	0.7	3.9	0	a	NA	a	NA	0	a	NA
	MEAN		**0.8**	**47**	**39.5**	**467**	**48**	**23**	**2.6**	**0.1**	**0.4**	**1.1**	**0**					**0**		

Abbreviations are: SS=slickspot, GOA=general occurrence area, FREQ=frequency, M=mean, R=recent, O=older, NA=not applicable, L=livestock, UNG=ungulate. *Mean % rosette and reproductive values are based on HIP transect values, and not population totals. **Number in parentheses refers to Appendix I: Habitat Integrity and Population Monitoring Field Form.

Table 2. (Continued)

Land unit			Attributes			Population			Wildlife use				OHV use			Firefighting		Restoration		
Management Area (MA)	EO	HIP transect	M SS silt crust depth (cm)	M SS size (m²)	SS - M biological soil crust cover	Total # plants	% Rosettes*	% Reproductive*	SS - M% wildlife use cover	SS - M% Non-L UNG print cover	SS - M% badger/rodent activity cover	SS - M% trail cover	FREQ of SS w/ OHV tracks	OHV tracks in GOA (#24)**	Recent or older?	Firefighting disturbance in GOA (#25)**	Recent or older?	FREQ of drill seeded SS	Drill seeded SS in GOA (#26)**	Recent or older?
8	15	015	1.6	37	5.1	37	41	59	0.9	0.0	0.0	0.0	0	a	NA	a	NA	0	a	NA
	20	020B	1.0	24	19.8	245	27	73	1.0	0.1	0.0	0.0	0	a	NA	a	NA	0	a	NA
	30	030B	0.8	47	44.0	6	17	83	1.2	0.0	0.0	0.8	1	b	R	a	NA	0	a	NA
	31	031	0.8	36	61.3	59	25	75	2.9	0.1	0.1	2.7	0	a	NA	a	NA	0	a	NA
	54	054	0.7	16	12.6	0	0	0	1.4	0.0	0.0	0.0	0	a	NA	a	NA	0	a	NA
	60	060	0.6	37	2.2	1	100	0	12.0	0.3	0.0	0.0	0	a	NA	a	NA	0	a	NA
	104	072A	0.8	23	29.8	480	38	63	1.4	0.0	0.0	0.0	0	a	NA	a	NA	0	a	NA
	72	072B	0.9	22	24.5	295	37	63	1.1	0.0	0.1	0.0	0	a	NA	a	NA	0	a	NA
	72	072C	0.8	20	15.9	195	24	76	0.8	0.0	0.1	0.0	0	a	NA	a	NA	6	c	O
	MEAN		**0.9**	**29**	**23.9**	**146**	**34**	**55**	**2.5**	**0.0**	**0.0**	**0.4**	**0**					**0**		
9	2	002	0.7	16	13.5	312	79	21	4.2	0.0	1.1	2.5	0	a	NA	a	NA	0	a	NA
	21	021	1.0	31	71.5	0	0	0	1.7	1.0	0.0	0.0	0	a	NA	a	NA	0	a	NA
	29	029	0.7	25	44.3	308	53	47	2.5	0.0	0.0	2.1	0	a	NA	a	NA	0	a	NA
	50	050	1.0	38	25.6	382	69	31	4.6	0.0	1.8	2.5	0	a	NA	a	NA	0	a	NA
	51	051A	1.9	77	40.9	860	37	63	0.8	0.0	0.0	0.0	0	a	NA	a	NA	0	a	NA
	51	051B	0.8	36	61.3	59	25	75	2.9	0.1	0.1	2.7	0	a	NA	a	NA	0	a	NA
	62	062	0.5	20	17.3	297	59	41	4.3	0.0	0.0	3.4	0	a	NA	a	NA	0	a	NA
	MEAN		**0.9**	**35**	**39.2**	**317**	**46**	**40**	**3.0**	**0.2**	**0.4**	**1.9**	**0**					**0**		
10	8	008A	0.9	31	13.9	805	28	72	6.0	0.0	0.0	4.3	0	a	NA	a	NA	0	a	NA
	8	008B	0.6	31	5.9	126	33	67	9.6	0.1	6.3	2.3	0	b	R	a	NA	0	a	NA
	26	026	0.7	34	13.5	326	19	81	5.3	0.1	0.1	4.5	0	a	NA	a	NA	0	a	NA
	26	058	0.6	13	25.5	66	8	92	0.3	0.0	0.0	0.0	0	a	NA	a	NA	0	a	NA
	63	063	0.8	29	6.8	86	8	92	4.0	0.2	0.9	0.0	0	a	NA	a	NA	0	a	NA
	MEAN		**0.7**	**27**	**13.1**	**282**	**19**	**81**	**5.0**	**0.1**	**1.5**	**2.2**	**0**					**0**		

Abbreviations are: SS=slickspot, GOA=general occurrence area, FREQ=frequency, M=mean, R=recent, O=older, NA=not applicable, L=livestock, UNG=ungulate. *Mean % rosette and reproductive values are based on HIP transect values, and not population totals. **Number in parentheses refers to Appendix I: Habitat Integrity and Population Monitoring Field Form.

Table 2. (Continued)

Land unit			Attributes			Population			Wildlife use				OHV use			Firefighting		Restoration		
Management Area (MA)	EO	HIP transect	M SS silt crust depth (cm)	M SS size (m²)	SS - M biological soil crust cover	Total # plants	% Rosettes*	% Reproductive*	SS - M% wildlife use cover	SS - M% Non-L UNG print cover	SS - M% badger/rodent activity cover	SS - M% trail cover	FREQ of SS w/ OHV tracks	OHV tracks in GOA (#24)**	Recent or older?	Firefighting disturbance in GOA (#25)**	Recent or older?	FREQ of drill seeded SS	Drill seeded SS in GOA (#26)**	Recent or older?
	99	700	0.8	11	9.4	27	33	67	0.1	0.0	0.1	0.0	0	a	NA	a	NA	0	a	NA
	96	701	0.7	37	1.3	721	59	41	0.4	0.0	0.0	0.3	0	a	NA	a	NA	9	c	O
	702	702	0.8	26	9.3	62	71	29	3.9	0.0	0.0	0.0	0	a	NA	a	NA	0	a	NA
	703	703	0.8	75	18.1	13	15	85	3.2	0.0	0.8	0.0	0	a	NA	a	NA	0	a	NA
	704	705	0.8	36	6.4	52	92	8	1.2	0.0	0.0	0.0	0	a	NA	a	NA	0	c	NA
	88	706	0.8	94	5.0	231	84	16	2.4	0.1	0.0	0.0	0	a	NA	b	O	0	a	NA
	97	707	0.8	89	11.9	145	70	30	2.0	0.3	0.1	0.3	0	a	NA	a	NA	0	a	NA
	708	708	1.2	9	0.3	0	0	0	2.6	0.0	0.6	0.0	0	a	NA	a	NA	9	c	O
	704	709	0.7	24	11.5	137	64	36	0.9	0.2	0.0	0.0	0	a	NA	a	NA	0	c	O
	84	710	0.6	34	12.0	320	97	3	1.0	0.0	0.0	0.0	0	a	NA	a	NA	0	a	NA
	92	711	0.9	29	10.9	2	100	0	1.8	0.1	0.0	0.8	0	-1	-1	-1	-1	0	-1	-1
11	712	712	0.8	167	10.2	320	76	24	2.4	0.1	0.1	0.4	0	a	NA	a	NA	0	a	NA
	704	713	0.8	144	19.9	283	74	26	2.4	0.3	0.0	0.1	0	a	NA	a	NA	0	a	NA
	93	714	0.8	20	5.5	10	50	50	3.2	0.2	1.1	0.8	0	a	NA	a	NA	0	a	NA
	715	715	0.7	38	3.6	0	0	0	2.0	0.5	0.1	0.8	0	a	NA	a	NA	6	c	O
	716	716	0.7	83	3.7	330	47	53	6.2	0.0	0.4	0.8	0	a	NA	a	NA	8	c	O
	717	717	0.8	16	5.0	47	45	55	0.8	0.2	0.0	0.0	0	a	NA	a	NA	10	c	O
	718	718	0.8	29	4.6	318	52	48	1.1	0.6	0.1	0.0	0	a	NA	a	NA	0	c	O
	95	719	0.6	14	37.9	72	79	21	2.9	0.1	0.0	0.0	0	a	NA	a	NA	0	b	O
	96	720	0.7	46	8.8	47	85	15	0.7	0.5	0.0	0.0	0	a	NA	a	NA	0	b	O
	96	721	0.7	46	4.8	121	80	20	0.9	0.1	0.4	0.0	0	a	NA	a	NA	0	a	NA
	98	722	0.7	40	4.6	6	75	25	0.5	0.1	0.3	0.0	0	a	NA	a	NA	0	a	NA
	MEAN		**0.8**	**50**	**9.3**	**148**	**61**	**30**	**1.9**	**0.1**	**0.2**	**0.2**	**0**					**2**		
-	10	010	0.4	24	5.4	0	0	0	1.2	0.0	0.3	0.0	0	a	NA	a	NA	0	a	NA
-	61	061	0.4	36	18.9	319	65	35	2.0	0.0	0.3	0.0	0	a	NA	a	NA	2	c	O
RANGEWIDE MEAN			**0.8**	**37**	**25.8**	**374**	**43**	**38**	**3.5**	**0.1**	**0.8**	**1.2**	**0**					**1**		

Abbreviations are: SS=slickspot, GOA=general occurrence area, FREQ=frequency, M=mean, R=recent, O=older, NA=not applicable, L=livestock, UNG=ungulate. *Mean % rosette and reproductive values are based on HIP transect values, and not population totals. **Number in parentheses refers to Appendix I: Habitat Integrity and Population Monitoring Field Form.

Table 3. Absolute non-native species cover in slickspots and absolute functional group cover in adjacent community at habitat integrity and population (HIP) transects.

Land unit			Weeds								Functional groups						Substrate		
Management Area (MA)	EO	HIP transect	SS - M% unseeded non-native species	SS - M% BROTEC	SS - M% LEPPER	SS - M% CERTES	SS - M% seeded non-native species	SS - M% AGRCRI	SS - M% KOCPRO	Noxious or aggressive species in GOA (#29)**	Non-native annuals	Non-native perennial grasses	Native forbs	Shrubs	Native perennial grasses	Native annual grasses	Bare ground	Litter	Biological soil crust
1	66	066	0.9	0.3	0.1	0.1	0.5	0.5	0.0	cendif	4.9	2.9	4.0	8.5	3.4	10.9	15.1	28.3	21.2
	68	068	22.5	1.0	0.0	0.0	0.0	0.1	0.0	onoaca	17.4	0.0	2.2	6.5	0.7	3.7	29.9	27.7	10.7
	69	069	9.2	0.5	8.2	0.0	0.0	0.0	0.0	cendif, onoaca	13.6	0.0	1.2	0.0	0.4	19.9	10.9	54.2	12.3
	70	070	0.5	0.5	0.0	0.0	0.0	0.0	0.0	NA	0.1	0.0	4.9	38.3	8.1	12.7	6.4	46.9	22.8
	MEAN		**8.3**	**0.6**	**2.1**	**0.0**	**0.1**	**0.1**	**0.0**		**9.7**	**0.0**	**3.1**	**13.3**	**3.2**	**11.8**	**15.5**	**39.3**	**16.8**
2	52	052	2.7	1.4	1.2	0.0	0.0	0.0	0.0	hypper	5.5	0.5	7.6	21.1	1.3	3.6	16.9	60.3	7.3
	56	056	11.7	6.2	9.8	0.0	0.0	0.0	0.0	chojun	4.8	0.0	4.1	0.6	8.4	3.4	23.5	25.7	18.9
	76	076	1.0	0.2	0.0	0.0	0.0	0.0	0.0	NA	8.0	0.0	6.3	8.5	0.0	8.9	30.8	44.7	5.4
	MEAN		**5.1**	**2.6**	**3.7**	**0.0**	**0.0**	**0.0**	**0.0**		**6.1**	**0.2**	**6.0**	**10.1**	**3.2**	**5.3**	**23.7**	**43.6**	**10.6**
3	38	038	10.0	7.8	0.0	0.0	0.0	0.0	0.0	chojun	16.0	0.0	6.6	0.0	6.2	4.0	3.1	71.2	4.0
	65	065	5.3	5.3	0.0	0.0	0.3	0.0	0.0	chojun	19.6	0.0	3.3	26.4	5.9	5.0	1.2	80.7	3.1
	MEAN		**7.6**	**6.5**	**0.0**	**0.0**	**0.1**	**0.0**	**0.0**		**17.8**	**0.0**	**4.9**	**13.2**	**6.1**	**4.5**	**2.1**	**75.9**	**3.6**
4	12	012	97.5	85.0	0.0	0.0	0.5	0.0	0.0	chojun, cencya	34.2	0.0	1.1	0.0	0.2	0.0	7.2	69.5	0.7
5	32	032	16.9	16.7	0.7	0.0	0.0	0.0	0.0	NA	19.7	0.0	0.6	29.4	3.2	0.8	7.0	52.8	19.1
	48	048	12.0	12.0	0.1	0.0	0.1	0.0	0.0	NA	12.7	0.0	0.2	34.5	5.9	0.7	12.1	43.7	15.3
	MEAN		**14.5**	**14.3**	**0.4**	**0.0**	**0.0**	**0.0**	**0.0**		**16.2**	**0.0**	**0.4**	**31.9**	**4.6**	**0.8**	**9.6**	**48.3**	**17.2**
6	18	018A	30.0	26.1	0.0	0.0	0.0	0.0	0.0	NA	32.2	0.2	0.2	0.9	2.8	0.0	15.8	26.4	2.5
	18	018B	6.7	5.1	0.0	0.1	0.1	0.1	0.0	cardra	5.9	0.2	0.5	15.5	13.2	0.7	30.7	16.8	18.0
	18	019A	26.3	21.0	0.5	0.0	3.7	0.6	3.7	NA	27.7	1.2	3.2	0.0	0.2	0.1	19.2	21.7	12.3
	19	019B	8.1	7.1	0.5	0.0	18.0	0.0	18.0	NA	23.3	1.2	2.3	0.0	0.3	0.3	10.0	57.4	6.0
	24	024	47.0	38.9	4.0	0.0	1.6	0.1	0.0	cardra	15.3	0.2	0.0	0.0	2.3	0.1	3.7	68.8	6.8
	25	25	35.5	25.1	4.8	0.0	0.0	0.0	0.0	NA	24.6	0.0	0.5	5.5	6.8	0.0	3.7	54.9	6.7
	42	042	22.5	18.1	2.7	0.0	0.0	0.0	0.0	chojun	22.5	0.0	0.0	0.0	0.2	0.0	2.9	73.5	6.3
	24	057	40.0	40.0	0.8	0.0	0.0	0.0	0.0	NA	8.3	0.0	0.1	29.0	7.2	0.5	7.0	22.6	43.7
	MEAN		**26.9**	**22.7**	**1.6**	**0.0**	**2.1**	**0.1**	**2.7**		**20.0**	**0.4**	**0.9**	**6.4**	**4.1**	**0.2**	**11.6**	**42.8**	**12.8**
7	27	027A	1.3	0.0	0.4	1.3	0.0	0.0	0.0	NA	3.1	0.0	0.1	27.8	5.1	0.8	29.2	9.4	42.0
	27	027B	5.4	0.5	3.7	0.8	0.0	0.0	0.0	NA	12.1	0.0	0.0	14.5	1.2	0.0	19.5	32.5	9.3
	27	027C	1.3	0.1	0.2	1.0	0.0	0.0	0.0	NA	1.4	0.0	0.0	30.2	8.7	0.6	22.4	14.4	43.4
	27	027D	0.5	0.1	0.2	0.5	0.0	0.0	0.0	NA	1.3	0.0	0.3	30.7	9.5	0.4	18.4	30.2	25.5
	100	27E	2.5	1.3	1.0	0.1	0.0	0.0	0.0	NA	3.1	0.0	0.2	17.3	5.1	2.3	23.3	30.2	20.9
	71	028A	1.9	0.0	0.2	1.4	0.0	0.0	0.0	NA	6.3	0.0	0.4	32.2	6.8	0.0	22.3	27.1	17.2
	71	028B	2.9	0.0	0.1	3.0	0.0	0.0	0.0	NA	8.1	0.0	0.5	27.4	9.3	0.8	22.1	24.7	13.1
	35	035A	0.7	0.3	0.6	0.3	0.0	0.0	0.0	NA	0.6	0.0	0.5	14.1	11.9	1.0	33.4	17.0	27.7
	35	041A	3.4	0.5	2.9	0.5	0.0	0.0	0.0	NA	5.0	0.0	1.8	0.0	16.9	0.4	7.2	42.8	19.0
	53	053B	1.0	0.0	0.0	0.5	0.0	0.0	0.0	NA	2.5	0.0	0.7	39.5	0.5	0.1	35.8	36.8	12.2
	59	059A	3.2	2.0	1.7	0.3	0.0	0.0	0.0	NA	2.5	0.0	0.6	37.1	4.0	1.2	6.2	14.9	58.0
	67	067	1.3	0.5	0.2	1.0	0.0	0.0	0.0	NA	0.7	0.0	0.0	29.4	6.0	8.2	9.8	30.2	31.5
	71	071A	1.5	0.1	0.7	0.8	0.0	0.0	0.0	NA	2.5	0.0	0.1	38.2	5.0	1.1	13.0	24.3	43.8
	71	071B	2.5	0.0	0.6	1.3	0.0	0.0	0.0	NA	5.8	0.0	1.7	33.2	1.2	0.7	13.2	37.1	27.5
	MEAN		**2.1**	**0.4**	**0.9**	**0.9**	**0.0**	**0.0**	**0.0**		**3.9**	**0.0**	**0.5**	**26.6**	**6.5**	**1.3**	**19.7**	**26.6**	**27.9**

Abbreviations are: SS=slickspot, GOA=general occurrence area, M=mean, and NA=not applicable. *Six-letter plant codes are referenced in Appendix D.

Table 3. (Continued)

Land unit			Weeds								Functional groups						Substrate		
Management Area (MA)	EO	HIP transect	SS - M% unseeded non-native species	SS - M% BROTEC	SS - M% LEPPER	SS - M% CERTES	SS - M% seeded non-native species	SS - M% AGRCRI	SS - M% KOCPRO	Noxious or aggressive species in GOA (#29)**	Non-native annuals	Non-native perennial grasses	Native forbs	Shrubs	Native perennial grasses	Native annual grasses	Bare ground	Litter	Biological soil crust
8	15	015	8.2	6.8	2.1	0.5	0.0	0.0	0.0	NA	28.4	0.0	3.4	0.0	1.6	0.0	14.0	43.5	0.7
	20	020B	6.4	3.9	1.2	0.0	0.0	0.0	0.0	chojun	4.0	0.0	0.3	15.1	13.8	1.7	24.5	16.4	33.5
	30	030B	14.1	11.4	0.3	0.0	0.0	0.0	0.0	NA	2.4	0.0	0.1	36.7	13.8	3.2	21.2	22.1	36.5
	31	031	1.5	1.3	0.2	0.0	0.0	0.0	0.0	NA	1.6	0.0	0.2	31.6	7.8	3.7	27.1	23.5	27.8
	54	054	3.7	0.8	3.0	0.0	0.0	0.0	0.0	chojun	8.2	0.0	0.3	13.7	11.2	1.9	8.4	36.0	32.9
	60	060	23.5	8.8	7.4	0.0	0.0	0.0	0.0	chojun	17.4	0.0	2.5	0.0	15.9	0.3	35.1	23.1	2.7
	104	072A	25.5	16.2	7.9	0.0	0.1	0.0	0.0	chojun	14.7	0.0	0.2	0.0	8.4	0.4	6.1	40.6	19.2
	72	072B	15.5	12.8	2.8	0.1	0.0	0.0	0.0	chojun	48.7	2.1	0.7	11.5	2.6	0.0	5.7	57.5	6.6
	72	072C	9.0	4.1	5.4	0.1	0.7	0.7	0.0	NA	7.6	0.0	0.8	7.6	4.9	1.6	31.3	10.2	20.1
	MEAN		**11.9**	**7.3**	**3.3**	**0.1**	**0.1**	**0.1**	**0.0**		**14.8**	**0.2**	**1.0**	**12.9**	**8.9**	**1.4**	**19.2**	**30.3**	**20.0**
9	2	002	10.9	6.3	0.3	0.0	0.0	0.0	0.0	NA	5.1	0.0	1.3	13.7	6.6	0.2	28.1	31.0	17.8
	21	021	4.1	0.1	0.9	3.2	0.0	0.0	0.0	NA	8.6	0.0	2.3	25.2	3.3	0.0	6.7	36.9	37.9
	29	029	20.5	19.6	0.2	0.0	0.0	0.0	0.0	NA	19.4	0.0	0.5	28.4	0.5	0.6	8.0	54.0	18.9
	50	050	31.0	23.0	0.5	0.3	0.0	0.0	0.0	NA	12.8	0.0	0.1	27.7	0.2	3.1	49.9	14.4	7.2
	51	051A	3.9	0.4	1.1	1.9	0.0	0.0	0.0	NA	4.1	0.0	1.5	35.4	1.2	1.1	23.4	10.4	44.2
	51	051B	1.5	1.3	0.2	0.0	0.0	0.0	0.0	NA	0.4	0.0	4.9	37.7	1.6	0.1	18.1	14.2	39.9
	62	062	4.4	0.5	0.5	2.7	0.0	0.0	0.0	NA	21.0	0.0	2.6	33.4	1.8	0.2	20.3	38.9	21.8
	MEAN		**10.9**	**7.3**	**0.5**	**1.2**	**0.0**	**0.0**	**0.0**		**10.2**	**0.0**	**1.9**	**28.8**	**2.2**	**0.8**	**22.1**	**28.5**	**26.8**
10	8	008A	11.1	0.1	0.4	1.2	0.2	0.2	0.0	NA	1.5	0.4	0.2	45.1	6.4	1.1	22.2	21.2	42.2
	8	008B	11.7	0.0	0.1	6.0	0.1	0.1	0.0	NA	22.7	0.0	0.0	5.3	0.2	0.0	27.4	16.9	22.4
	26	026	3.2	2.3	0.1	0.1	0.0	0.0	0.0	NA	1.5	0.0	0.4	21.8	1.9	4.9	15.3	20.4	34.8
	26	058	7.0	4.6	1.2	0.0	0.0	0.0	0.0	NA	9.4	0.0	0.0	39.3	9.5	0.7	23.2	24.8	30.5
	63	063	2.7	0.4	1.0	0.4	0.1	0.0	0.0	NA	9.3	0.0	0.0	33.6	0.4	8.6	12.3	51.5	18.0
	MEAN		**7.1**	**1.5**	**0.5**	**1.5**	**0.1**	**0.1**	**0.0**		**8.9**	**0.1**	**0.1**	**29.0**	**3.7**	**3.1**	**20.1**	**27.0**	**29.6**

Abbreviations are: SS=slickspot, GOA=general occurrence area, M=mean, and NA=not applicable. *Six-letter plant codes are referenced in Appendix D.

Table 3. (Continued)

Land unit			Weeds								Functional groups						Substrate		
Management Area (MA)	EO	HIP transect	SS - M% unseeded non-native species	SS - M% BROTEC	SS - M% LEPPER	SS - M% CERTES	SS - M% seeded non-native species	SS - M% AGRCRI	SS - M% KOCPRO	Noxious or aggressive species in GOA (#29)**	Non-native annuals	Non-native perennial grasses	Native forbs	Shrubs	Native perennial grasses	Native annual grasses	Bare ground	Litter	Biological soil crust
	99	700	1.7	0.2	1.8	0.2	0.0	0.0	0.0	NA	0.7	9.9	1.6	29.6	7.5	0.0	42.3	10.9	23.6
	96	701	0.4	0.0	0.0	0.5	4.7	5.0	0.0	NA	10.1	0.0	2.3	0.4	4.3	0.0	26.1	6.7	30.9
	702	702	0.7	0.1	0.5	0.4	0.0	0.0	0.0	NA	0.6	0.5	0.7	26.6	15.1	0.0	27.3	6.9	35.7
	703	703	12.3	0.5	9.3	0.7	0.4	0.0	0.0	NA	16.4	3.3	2.5	0.0	7.8	0.0	43.7	16.4	12.1
	704	705	2.2	0.0	0.7	1.5	2.5	2.9	0.0	NA	4.1	0.0	1.4	15.6	7.4	0.0	27.0	29.0	28.0
	88	706	2.3	0.0	1.3	0.5	0.0	0.0	0.0	NA	0.4	0.0	0.7	17.4	7.2	0.0	49.7	18.0	22.5
	97	707	0.7	0.3	0.8	0.2	0.0	0.0	0.0	NA	0.3	7.0	0.0	32.6	17.4	0.0	42.4	27.3	20.2
	708	708	0.6	0.1	0.5	0.1	12.1	12.1	0.0	NA	7.2	0.0	0.3	0.0	2.7	0.0	70.0	4.5	1.8
	704	709	0.5	0.5	0.4	0.5	0.3	0.3	0.0	NA	0.3	0.0	1.7	21.5	13.6	0.0	7.8	8.3	48.3
	84	710	0.7	0.0	0.5	0.5	0.0	0.0	0.0	NA	0.2	0.2	1.2	16.0	6.4	0.0	25.6	13.8	26.7
	92	711	1.7	0.5	1.2	0.1	2.9	2.9	0.0	-1	4.3	0.0	0.7	15.9	5.7	0.0	46.7	29.1	9.0
11	712	712	0.7	0.8	0.1	0.3	0.0	0.0	0.0	NA	0.4	0.0	0.5	23.0	12.9	0.0	40.0	30.1	21.8
	704	713	0.7	0.5	0.2	0.5	0.0	0.0	0.0	NA	1.4	0.0	1.6	24.1	10.2	0.0	35.2	12.0	44.5
	93	714	13.4	0.4	13.7	0.3	0.3	0.1	0.0	NA	10.0	0.0	4.4	13.1	7.5	0.0	29.5	11.5	34.2
	715	715	15.9	5.0	10.7	0.2	5.0	5.0	0.0	NA	10.3	18.3	0.6	0.0	16.6	0.0	21.6	15.1	22.8
	716	716	2.2	1.0	2.0	0.5	6.8	6.3	0.0	NA	18.9	13.1	1.5	8.4	2.5	0.0	43.2	10.3	8.6
	717	717	2.2	0.5	1.1	0.2	11.8	11.8	0.0	NA	13.3	0.3	1.0	0.0	7.0	0.0	44.2	9.6	14.9
	718	718	1.3	0.5	1.1	0.2	0.0	0.0	0.0	NA	1.1	0.0	1.5	18.2	7.0	0.0	30.6	24.5	17.5
	95	719	0.4	0.1	0.1	0.4	0.5	0.4	0.0	NA	0.0	0.0	1.1	27.8	10.2	0.0	32.8	25.0	27.0
	96	720	4.2	0.0	0.7	0.5	0.9	0.2	0.0	NA	0.6	0.0	1.6	12.1	14.9	0.0	52.5	6.8	12.9
	96	721	0.5	0.0	0.2	0.5	0.4	0.4	0.0	NA	0.2	0.0	1.7	27.1	17.2	0.0	26.9	9.3	28.5
	98	722	0.0	0.1	0.8	0.4	0.9	0.0	0.0	NA	0.3	0.5	2.0	11.7	7.0	0.0	22.6	7.5	50.4
	MEAN		**3.0**	**0.5**	**2.1**	**0.4**	**2.1**	**2.1**	**0.0**		**4.6**	**2.7**	**1.4**	**15.5**	**9.5**	**0.0**	**35.8**	**15.1**	**24.6**
-	10	010	18.7	9.0	0.3	0.0	0.0	0.0	0.0	NA	22.8	0.1	1.4	2.2	1.4	0.1	12.9	53.0	7.0
-	61	061	5.1	0.4	0.2	1.4	0.0	0.2	0.0	NA	7.5	0.1	0.3	10.5	2.3	0.2	44.7	10.3	22.0
RANGEWIDE MEAN			**8.3**	**4.9**	**1.7**	**0.5**	**0.8**	**0.6**	**0.3**		**9.2**	**0.8**	**1.4**	**18.1**	**6.3**	**1.6**	**23.1**	**28.9**	**22.1**

Abbreviations are: SS=slickspot, GOA=general occurrence area, M=mean, and NA=not applicable. *Six-letter plant codes are referenced in Appendix D.

Table 4. Livestock use attributes at habitat integrity and population (HIP) transects.

Land unit			Livestock use																	
Management Area (MA)	EO	HIP transect	M% PEN LPC in SS	M% non-PEN LPC in SS	M% total LPC in SS	M% L feces cover in SS	FREQ SS w/ >10% PEN LPC	FREQ SS w/ >5% PEN LPC	FREQ SS w/ >1% PEN LPC	FREQ SS w/ >0% PEN LPC	FREQ SS w/ >10% non-PEN LPC	FREQ SS w/ >5% non-PEN LPC	FREQ SS w/ >1% non-PEN LPC	FREQ SS w/ >0% non-PEN LPC	FREQ SS w/ >10% TOT LPC	FREQ SS w/ >5% TOT LPC	FREQ SS w/ >1% TOT LPC	FREQ SS w/ >0% TOT LPC	SS w/ definite PEN LPC in GOA (#17)**	Recent or older?
1	66	066	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	68	068	3.9	0.3	3.9	0.6	0	3	8	10	0	0	0	6	0	3	8	10	c	R
	69	069	0.5	0.1	0.5	1.2	0	0	1	5	0	0	0	1	0	0	1	5	c	R
	70	070	0.3	0.0	0.3	0.0	0	0	1	1	0	0	0	0	0	0	1	1	a	NA
	MEAN		**1.2**	**0.1**	**1.2**	**0.5**	**0**	**1**	**3**	**4**	**0**	**0**	**0**	**2**	**0**	**1**	**3**	**4**		
2	52	052	0.0	0.0	0.0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	56	056	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	76	076	3.1	0.2	3.3	0.7	0	2	7	8	0	0	0	3	0	2	8	8	b	O
	MEAN		**1.0**	**0.1**	**1.1**	**0.2**	**0**	**1**	**2**	**3**	**0**	**0**	**0**	**1**	**0**	**1**	**3**	**3**		
3	38	038	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	65	065	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	MEAN		**0.0**	**0.0**	**0.0**	**0.0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
4	12	012	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
5	32	032	0.1	0.0	0.1	0.0	0	0	0	1	0	0	0	0	0	0	0	1	a	NA
	48	048	0.1	0.0	0.0	0.0	0	0	0	1	0	0	0	0	0	0	0	0	a	NA
	MEAN		**0.0**	**0.0**	**0.0**	**0.0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
6	18	018A	0.0	0.0	0.0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	b	O
	18	018B	0.0	0.0	0.0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	18	019A	0.0	0.0	0.0	0.3	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	19	019B	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	24	024	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	25	25	0.0	0.0	0.0	0.3	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	42	042	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	24	057	0.0	0.0	0.0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	MEAN		**0.0**	**0.0**	**0.0**	**0.1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
7	27	027A	3.9	0.5	4.4	0.0	0	2	10	10	0	0	0	9	0	3	10	10	c	R
	27	027B	2.5	0.0	2.5	0.3	0	0	8	10	0	0	0	0	0	0	8	10	c	R
	27	027C	2.5	0.4	2.8	0.1	0	0	8	10	0	0	0	7	0	0	9	10	c	R
	27	027D	2.6	0.1	2.6	1.0	0	2	5	8	0	0	0	1	0	2	5	8	b	R
	100	027E	2.7	0.0	2.7	0.1	0	2	5	10	0	0	0	0	0	2	5	10	b	R
	71	028A	1.8	0.3	1.8	0.1	0	1	4	7	0	0	0	5	0	1	4	6	b	R
	71	028B	2.0	0.2	2.0	0.1	0	1	5	5	0	0	0	3	0	1	5	5	c	R
	35	035A	0.8	0.1	0.8	0.1	0	0	2	5	0	0	0	1	0	0	2	5	-1	-1
	35	041A	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	53	053B	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	59	059A	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	67	067	1.6	0.2	1.9	0.3	0	0	5	7	0	0	0	3	0	0	6	7	b	R
	71	071A	1.3	0.1	1.3	0.1	0	1	2	6	0	0	0	2	0	1	2	6	b	O
	71	071B	1.4	0.1	1.4	0.1	0	0	4	8	0	0	0	2	0	0	4	8	c	R
	MEAN		**1.6**	**0.1**	**1.7**	**0.1**	**0**	**1**	**4**	**6**	**0**	**0**	**0**	**2**	**0**	**1**	**4**	**6**		

Abbreviations are: SS=slickspot, GOA=general occurrence area, FREQ=frequency, M=mean, L=livestock, LPC=livestock print cover, PEN=penetrating, TOT=total, R=recent, and O=older. **Number in parentheses refers to Appendix A: Habitat Integrity and Population Monitoring Field Form.

Table 4. (Continued)

Land unit			Livestock use																	
Management Area (MA)	EO	HIP transect	M% PEN LPC in SS	M% non-PEN LPC in SS	M% total LPC in SS	M% L feces cover in SS	FREQ SS w/ >10% PEN LPC	FREQ SS w/ >5% PEN LPC	FREQ SS w/ >1% PEN LPC	FREQ SS w/ >0% PEN LPC	FREQ SS w/ >10% non-PEN LPC	FREQ SS w/ >5% non-PEN LPC	FREQ SS w/ >1% non-PEN LPC	FREQ SS w/ >0% non-PEN LPC	FREQ SS w/ >10% TOT LPC	FREQ SS w/ >5% TOT LPC	FREQ SS w/ >1% TOT LPC	FREQ SS w/ >0% TOT LPC	SS w/ definite PEN LPC in GOA (#17)**	Recent or older?
8	15	015	0.0	0.0	0.0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	20	020B	1.0	0.8	2.2	1.4	0	0	2	10	0	0	2	5	0	2	3	10	c	R
	30	030B	1.7	0.6	1.7	0.4	0	0	5	9	0	0	1	6	0	0	5	9	b	R
	31	031	5.7	0.6	6.2	0.2	0	6	10	10	0	0	1	7	0	7	10	10	c	R
	54	054	3.9	0.1	3.9	0.4	0	3	8	10	0	0	0	2	0	3	8	10	c	R
	60	060	0.0	0.0	0.0	0.5	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	104	072A	7.7	1.9	9.2	1.0	2	6	10	10	0	1	4	9	3	7	10	10	c	R
	72	072B	3.7	1.2	3.7	0.1	1	1	7	9	0	0	3	8	1	1	7	9	c	R
	72	072C	4.2	0.9	4.2	0.6	1	1	9	10	0	0	2	8	1	1	9	10	c	R
	MEAN		**3.1**	**0.7**	**3.4**	**0.5**	**0**	**2**	**6**	**8**	**0**	**0**	**1**	**5**	**1**	**2**	**6**	**8**		
9	2	002	3.4	0.4	3.9	0.2	0	2	8	10	0	0	0	7	0	3	8	10	c	R
	21	021	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	29	029	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	50	050	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	51	051A	0.0	0.0	0.0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	51	051B	5.7	0.6	6.2	0.2	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	62	062	0.0	0.0	0.0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	MEAN		**1.3**	**0.1**	**1.4**	**0.1**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**		
10	8	008A	0.4	0.0	0.4	0.2	0	0	1	3	0	0	0	0	0	0	1	3	c	O
	8	008B	0.1	0.0	0.1	0.1	0	0	0	2	0	0	0	0	0	0	0	2	a	NA
	26	026	3.4	0.9	4.1	0.6	0	2	8	9	0	0	2	8	0	3	9	9	c	O?
	26	058	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	b	O
	63	063	4.0	0.2	4.0	0.2	1	3	5	7	0	0	0	4	1	3	5	7	b	R
	MEAN		**1.6**	**0.2**	**1.7**	**0.2**	**0**	**1**	**3**	**4**	**0**	**0**	**0**	**2**	**0**	**1**	**3**	**4**		

Abbreviations are: SS=slickspot, GOA=general occurrence area, FREQ=frequency, M=mean, L=livestock, LPC=livestock print cover, PEN=penetrating, TOT=total, R=recent, and O=older. **Number in parentheses refers to Appendix A: Habitat Integrity and Population Monitoring Field Form.

Table 4. (Continued)

Land unit			Livestock use																	
Management Area (MA)	EO	HIP transect	M% PEN LPC in SS	M% non-PEN LPC in SS	M% total LPC in SS	M% L feces cover in SS	FREQ SS w/ >10% PEN LPC	FREQ SS w/ >5% PEN LPC	FREQ SS w/ >1% PEN LPC	FREQ SS w/ >0% PEN LPC	FREQ SS w/ >10% non-PEN LPC	FREQ SS w/ >5% non-PEN LPC	FREQ SS w/ >1% non-PEN LPC	FREQ SS w/ >0% non-PEN LPC	FREQ SS w/ >10% TOT LPC	FREQ SS w/ >5% TOT LPC	FREQ SS w/ >1% TOT LPC	FREQ SS w/ >0% TOT LPC	SS w/ definite PEN LPC in GOA (#17)**	Recent or older?
	99	700	11.1	2.5	13.5	0.8	4	9	10	10	0	0	8	10	6	10	10	10	c	R
	96	701	4.8	4.9	9.5	1.4	0	4	10	10	1	2	10	10	2	10	10	10	c	R
	702	702	4.4	0.4	4.4	0.8	0	3	10	10	0	0	1	3	0	3	10	10	c	R
	703	703	3.4	0.3	3.8	0.4	0	3	6	10	0	0	0	6	0	4	6	10	c	R
	704	705	14.1	0.4	14.1	0.3	7	9	10	10	0	0	1	2	7	9	10	10	c	R
	88	706	6.7	0.2	7.2	0.4	1	6	10	10	0	0	0	3	1	7	10	10	c	R
	97	707	0.0	0.0	0.0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	708	708	2.8	7.7	9.1	0.3	0	0	9	10	2	6	10	10	2	9	10	10	c	R
	704	709	0.1	0.2	0.2	0.6	0	0	0	1	0	0	0	3	0	0	0	3	a	NA
	84	710	7.2	0.9	7.2	0.9	1	7	10	10	0	0	2	8	1	7	10	10	c	R
	92	711	0.8	0.1	0.8	0.6	0	0	1	10	0	0	0	1	0	0	1	10	-1	-1
11	712	712	9.2	1.2	10.2	0.5	3	7	10	10	0	0	3	8	4	7	10	10	c	R
	704	713	6.7	0.4	6.7	0.3	1	6	10	10	0	0	0	8	1	6	10	10	c	R
	93	714	10.5	2.7	12.5	0.7	3	10	10	10	0	1	7	9	5	10	10	10	c	R
	715	715	0.0	0.0	0.0	0.4	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	716	716	6.3	0.6	7.3	0.5	1	5	10	10	0	0	1	7	2	5	10	10	c	R
	717	717	2.7	0.2	2.7	0.4	0	1	7	10	0	0	0	3	0	1	7	10	c	R
	718	718	0.4	0.2	0.4	0.6	0	0	1	2	0	0	0	3	0	0	1	3	a	NA
	95	719	0.1	0.0	0.1	0.1	0	0	0	1	0	0	0	0	0	0	0	1	a	NA
	96	720	0.0	0.0	0.0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
	96	721	3.0	0.9	3.7	0.3	0	1	8	10	0	0	2	8	0	2	9	10	c	R
	98	722	10.1	3.2	16.5	0.9	3	9	10	10	0	1	9	10	7	10	10	10	c	R
	MEAN		**4.7**	**1.2**	**5.9**	**0.5**	**1**	**4**	**6**	**7**	**0**	**0**	**2**	**5**	**2**	**5**	**7**	**8**		
-	10	010	0.0	0.0	0.0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	a	NA
-	61	061	2.9	0.0	2.9	0.1	0	1	8	9	0	0	0	0	0	1	8	9	c	O
RANGEWIDE MEAN			**2.3**	**0.5**	**2.7**	**0.3**	**0**	**2**	**4**	**5**	**0**	**0**	**1**	**3**	**1**	**2**	**4**	**5**		

Abbreviations are: SS=slickspot, GOA=general occurrence area, FREQ=frequency, M=mean, L=livestock, LPC=livestock print cover, PEN=penetrating, TOT=total, R=recent, and O=older. **Number in parentheses refers to Appendix A: Habitat Integrity and Population Monitoring Field Form.

Table 5. Landscape disturbance pattern attributes at habitat integrity and population (HIP) transects.

Land unit			Fire history				Residential & commercial development				Agriculture				Cumulative landscape disturbance			
Management Area (MA)	EO	HIP transect	At HIP transect (#17A)**	Within 65 m (#17B)**	Within 250 m (#17C)**	Within500 m (#17D)**	At HIP transect (#19A)**	Within 65 m (#19B)**	Within 250 m (#19C)**	Within500 m (#19D)**	At HIP transect (#20A)**	Within 65 m (#20B)**	Within 250 m (#20C)**	Within500 m (#20D)**	At HIP transect (#21A)**	Within 65 m (#21B)**	Within 250 m (#21C)**	Within500 m (#21D)**
1	66	066	1	1	3	3	1	1	1	2	1	1	3	3	1	1	3	4
	68	068	4	5	5	4	1	1	1	2	1	1	1	1	4	5	5	5
	69	069	5	5	5	5	1	1	1	1	1	1	1	1	5	5	5	5
	70	070	1	1	2	3	1	1	1	2	1	1	2	2	1	1	2	3
2	52	052	4	4	4	4	1	1	1	2	1	1	1	1	4	4	4	4
	56	056	5	4	5	5	1	1	1	1	1	1	1	2	5	4	5	5
	76	076	5	5	4	5	1	1	3	3	1	1	1	3	5	5	5	5
3	38	038	4	4	4	4	1	1	2	2	1	1	1	1	4	4	4	4
	65	065	2	3	3	3	1	2	2	2	1	1	1	1	2	3	4	4
4	12	012	5	5	4	4	1	1	4	3	1	1	1	1	5	5	5	5
5	32	032	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2
	48	048	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2
6	18	018A	5	5	4	4	1	1	1	1	1	1	1	1	5	5	4	4
	18	018B	1	1	2	3	1	1	1	1	1	1	1	1	1	1	2	3
	18	019A	5	5	5	4	1	1	1	1	1	1	1	1	5	5	5	4
	19	019B	5	5	5	5	1	1	1	1	1	1	1	1	5	5	5	5
	24	024	5	5	5	5	1	1	1	1	1	1	1	1	5	5	5	5
	25	25	5	5	4	4	1	1	1	1	1	1	1	1	5	5	4	4
	42	042	5	5	5	4	1	1	1	1	1	2	3	4	5	5	5	5
	24	057	1	1	2	3	1	1	1	1	1	1	1	1	1	1	2	3
7	27	027A	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	27	027B	2	2	2	3	1	1	1	1	1	1	1	1	2	2	2	3
	27	027C	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	27	027D	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	100	27E	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	71	028A	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	71	028B	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	35	035A	1	1	2	3	1	1	1	1	1	1	1	1	1	1	2	3
	35	041A	5	5	5	5	1	3	3	3	1	1	1	1	5	5	5	5
	53	053B	1	2	3	4	1	2	2	2	1	1	1	1	1	2	3	4
	59	059A	1	3	3	3	1	1	1	1	1	1	1	1	1	3	3	3
	67	067	1	1	2	2	1	1	1	1	1	1	1	1	1	1	2	2
	71	071A	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	71	071B	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

**Number in parentheses refers to Appendix A: Habitat Integrity and Population Monitoring Field Form. Data values correspond to questions in Appendix A, where 1=undisturbed, 2=predominantly undisturbed, 3=roughly equal areas of undisturbed and disturbed lands, 4=predominantly disturbed, and 5=completely disturbed.

Table 5. (Continued)

Land unit			Fire history				Residential & commercial development				Agriculture				Cumulative landscape disturbance			
Management Area (MA)	EO	HIP transect	At HIP transect (#17A)**	Within 65 m (#17B)**	Within 250 m (#17C)**	Within500 m (#17D)**	At HIP transect (#19A)**	Within 65 m (#19B)**	Within 250 m (#19C)**	Within500 m (#19D)**	At HIP transect (#20A)**	Within 65 m (#20B)**	Within 250 m (#20C)**	Within500 m (#20D)**	At HIP transect (#21A)**	Within 65 m (#21B)**	Within 250 m (#21C)**	Within500 m (#21D)**
8	15	015	5	5	5	4	1	1	3	3	1	1	1	1	5	5	5	5
	20	020B	1	1	1	3	1	1	3	3	1	1	1	1	1	1	3	4
	30	030B	1	2	2	3	2	2	2	2	1	1	1	1	2	2	3	3
	31	031	1	2	4	4	1	1	1	1	1	1	1	1	1	2	4	5
	54	054	4	4	4	4	1	1	1	1	1	1	1	1	4	4	4	4
	60	060	5	5	5	4	1	1	1	2	1	1	1	1	5	5	5	5
	104	072A	4	4	3	2	1	1	1	1	1	1	1	1	4	4	3	2
	72	072B	4	4	3	3	1	1	1	1	1	1	1	1	4	4	3	3
	72	072C	4	4	4	4	1	1	1	1	1	1	1	1	4	4	4	4
9	2	002	1	2	2	4	1	1	1	1	1	1	1	1	1	2	2	4
	21	021	1	1	4	4	1	3	3	3	1	1	1	1	1	3	4	4
	29	029	1	1	4	4	1	1	1	1	1	1	1	1	1	1	4	4
	50	050	1	1	3	3	1	1	1	3	1	1	1	3	1	1	3	4
	51	051A	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	51	051B	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	62	062	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
10	8	008A	1	2	3	3	1	1	1	1	1	1	1	1	1	2	3	3
	8	008B	4	4	4	4	1	1	1	1	1	1	1	1	4	4	4	4
	26	026	1	1	1	2	1	1	1	1	1	1	1	3	1	1	1	3
	26	058	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	2
	63	063	3	3	3	4	1	1	1	1	1	1	1	2	3	3	4	4

**Number in parentheses refers to Appendix A: Habitat Integrity and Population Monitoring Field Form. Data values correspond to questions in Appendix A, where 1=undisturbed, 2=predominantly undisturbed, 3=roughly equal areas of undisturbed and disturbed lands, 4=predominantly disturbed, and 5=completely disturbed.

Table 5. (Continued)

Land unit			Fire history				Residential & commercial development				Agriculture				Cumulative landscape disturbance			
Management Area (MA)	EO	HIP transect	At HIP transect (#17A)**	Within 65 m (#17B)**	Within 250 m (#17C)**	Within500 m (#17D)**	At HIP transect (#19A)**	Within 65 m (#19B)**	Within 250 m (#19C)**	Within500 m (#19D)**	At HIP transect (#20A)**	Within 65 m (#20B)**	Within 250 m (#20C)**	Within500 m (#20D)**	At HIP transect (#21A)**	Within 65 m (#21B)**	Within 250 m (#21C)**	Within500 m (#21D)**
11	99	700	2	2	2	2	1	1	1	1	1	1	1	1	2	2	2	2
	96	701	4	4	4	4	1	1	1	1	1	1	1	1	4	4	4	4
	702	702	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	2
	703	703	5	5	5	4	1	1	1	1	1	1	1	1	5	5	5	4
	704	705	4	4	4	4	1	1	1	1	1	1	1	1	4	4	4	4
	88	706	3	3	3	4	1	1	1	1	1	1	1	1	3	3	3	4
	97	707	1	3	3	2	1	1	1	1	1	1	1	1	1	3	3	4
	708	708	5	5	5	5	1	1	1	1	1	1	1	1	5	5	5	5
	704	709	3	4	4	4	1	1	1	1	1	1	1	1	3	4	4	4
	84	710	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	92	711	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
	712	712	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2
	704	713	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2
	93	714	2	3	4	4	1	1	1	1	1	1	1	1	2	3	4	4
	715	715	5	5	5	5	1	1	1	1	1	1	1	1	5	5	5	5
	716	716	4	4	4	4	1	1	1	1	1	1	1	1	4	4	4	4
	717	717	5	5	5	5	1	1	1	1	1	1	1	1	1	5	5	5
	718	718	2	3	3	4	1	1	1	1	1	1	1	1	2	3	3	4
	95	719	1	1	3	3	1	1	1	1	1	1	1	1	1	1	3	3
	96	720	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2
	96	721	1	1	2	2	1	1	1	1	1	1	1	1	1	1	2	2
	98	722	1	2	2	2	1	1	1	1	1	1	1	1	1	2	2	2
-	10	010	4	4	4	2	1	1	1	2	1	1	2	4	5	5	5	5
-	61	061	4	4	4	4	1	1	1	1	1	1	3	4	4	4	5	5

**Number in parentheses refers to Appendix A: Habitat Integrity and Population Monitoring Field Form. Data values correspond to questions in Appendix A, where 1=undisturbed, 2=predominantly undisturbed, 3=roughly equal areas of undisturbed and disturbed lands, 4=predominantly disturbed, and 5=completely disturbed.

Table 6. Dominant plant communities and plant community trends at habitat integrity and population (HIP) transects (2004-2005). Sorenson distance measures were used to classify HIP transects into the following 4 classes: A/B=unburned and dominated by big sagebrush (*Artemisia tridentata*; ARTTRI); C/D= transitional class in between other 3 classes; E=burned and dominated by cheatgrass (*Bromus tectorum*; BROTEC); and F=burned and dominated by crested wheatgrass (*Agropyron cristatum*; AGRCRI; modified from Table 2 in Colket 2005). Plant species represented by 6 letter codes are in Appendix D. Abbreviations are ns=HIP transect was not sampled in 2004 and nc=no change in class.

MA#	EO/SUB-EO#	HIP#	Plant community		Class		Change
			2004	2005	2004	2005	
1	66	066	VULOCT/ARTTRI	VULOCT/ARTTRI	A/B	C/D	decrease
	68	068	SISALT/ARTTRI	SISALT/ARTTRI	C/D	C/D	nc
	69	069	ns	VULOCT/BROTEC	ns	C/D	ns
	70	070	ARTTRI/VULOCT	ARTTRI/VULOCT	A/B	A/B	nc
2	52	052	BROTEC/ERINAU	ERINAU/EPIBRA	E	C/D	inconclusive
	56	056	ns	ELYELY/BROTEC	ns	C/D	ns
	76	076	ns	VULOCT/ARTTRI	ns	C/D	ns
3	38	038	ns	BROTEC/ELYELY	ns	E	ns
	65	065	BROTEC/ARTTRI	ARTTRI/BROTEC	A/B	A/B	nc
4	12	012	ns	CENCYA/BROTEC	ns	C/D	ns
5	32	032	ARTTRI/BROTEC	ARTTRI/BROTEC	A/B	A/B	nc
	48	048	ARTTRI/BROTEC	ARTTRI/BROTEC	A/B	A/B	nc
6		018A	BROTEC/SISALT	BROTEC/SISALT	E	E	nc
		018B	ARTTRI/POASEC	ARTTRI/POASEC	A/B	A/B	nc
	18	019A	BROTEC/SALTRA	BROTEC/SALTRA	E	E	nc
	19	019B	BROTEC/SALTRA	BROTEC/SALTRA	E	E	nc
	24	024	BROTEC/PSESPI	BROTEC/PSESPI	E	E	nc
	25	025	BROTEC/POASEC	BROTEC/POASEC	E	E	nc
	42	042	ns	BROTEC/SISALT	ns	E	ns
	24	057	ARTTRI/BROTEC	ARTTRI/BROTEC	A/B	A/B	nc
7		027A	ARTTRI/CERTES	ARTTRI/POASEC	A/B	A/B	nc
		027B	ARTTRI/LEPPER	ARTTRI/BROTEC	A/B	A/B	nc
		027C	ARTTRI/POASEC	ARTTRI/POASEC	A/B	A/B	nc
	27	027D	ARTTRI/POASEC	ARTTRI/POASEC	A/B	A/B	nc
		035A	POASEC/ARTTRI	ARTTRI/POASEC	A/B	A/B	nc
	35	041A	LEYCIN/POASEC	ELYELY/LEYCIN	C/D	C/D	nc
	53	053B	ARTTRI/LITPAR	ARTTRI/CERTES	A/B	A/B	nc
	59	059A	ARTTRI/TETGLA	ARTTRI/TETGLA	A/B	A/B	nc
	67	067	ARTTRI/VULOCT	ARTTRI/VULOCT	A/B	A/B	nc
		028A	ARTTRI/CERTES	ARTTRI/POASEC	A/B	A/B	nc
		028B	ARTTRI/POASEC	ARTTRI/POASEC	A/B	A/B	nc
		071A	ARTTRI/POASEC	ARTTRI/POASEC	A/B	A/B	nc
	71	071B	ARTTRI/CERTES	ARTTRI/CERTES	A/B	A/B	nc
	100	027E	ARTTRI/POASEC	ARTTRI/POASEC	A/B	A/B	nc
8	15	015	BROTEC/SISALT	BROTEC/EPIBRA	E	E	nc
	20	020B	ARTTRI/POASEC	ARTTRI/POASEC	A/B	A/B	nc
	30	030B	ARTTRI/VULOCT	ARTTRI/ELYELY	A/B	A/B	nc
	31	031	ARTTRI/POASEC	ARTTRI/POASEC	A/B	A/B	nc
	54	054	ns	CHRVIS/BROTEC	ns	C/D	ns
	60	060	ns	BROTEC/POASEC	ns	E	ns
		072B	BROTEC/ERINAU	BROTEC/ARTTRI	E	E	nc
	72	072C	ERINAU/POASEC	ERINAU/POASEC	C/D	C/D	nc
	104	072A	BROTEC/POASEC	BROTEC/ELYELY	E	E	nc

Table 6. (Continued)

MA#	EO/SUB-EO#	HIP#	Plant community		Class		Change
			2004	2005	2004	2005	
9	2	002	ARTTRI/POASEC	ARTTRI/POASEC	A/B	A/B	nc
	21	021	ARTTRI/CERTES	ARTTRI/CERTES	A/B	A/B	nc
	29	029	ARTTRI/BROTEC	ARTTRI/BROTEC	A/B	A/B	nc
	50	050	ARTTRI/BROTEC	ARTTRI/BROTEC	A/B	A/B	nc
	51	051A	ARTTRI/POASEC	ARTTRI/CERTES	A/B	A/B	nc
		051B	ARTTRI/POASEC	ARTTRI/DESPIN	A/B	A/B	nc
	62	062	ns	ARTTRI/CERTES	ns	A/B	ns
10	8	008A	ARTTRI/POASEC	ARTTRI/POASEC	A/B	A/B	nc
		008B	SALTRA/CERTES	CERTES/SISALT	C/D	C/D	nc
	26	026	ARTTRI/POASEC	ARTTRI/VULOCT	A/B	A/B	nc
		058	ARTTRI/BROTEC	ARTTRI/BROTEC	A/B	A/B	nc
	63	063	ARTTRI/SALTRA	ARTTRI/VULOCT	A/B	A/B	nc
11	84	710	ARTTRI/POASEC	ARTTRI/POASEC	A/B	A/B	nc
	88	706	ARTTRI/ERINAU	ARTTRI/POASEC	A/B	A/B	nc
	92	711	ARTTRI/ERINAU	ARTTRI/POASEC	A/B	A/B	nc
	93	714	ARTTRI/LEPPER	ARTTRI/LEPPER	A/B	C/D	decrease
	95	719	ARTTRI/POASEC	ARTTRI/POASEC	A/B	A/B	nc
	96	701	AGRCRI/PHLHOO	AGRCRI/POASEC	F	F	nc
		720	ARTTRI/PSESPI	ARTTRI/POASEC	A/B	A/B	nc
		721	ARTTRI/POASEC	ARTTRI/POASEC	A/B	A/B	nc
	97	707	ARTTRI/POASEC	ARTTRI/POASEC	A/B	A/B	nc
	98	722	ARTTRI/POASEC	ARTTRI/POASEC	A/B	A/B	nc
	99	700	ERINAU/ARTTRI	ERINAU/ARTTRI	C/D	C/D	nc
	702	702	ARTTRI/PSESPI	ARTTRI/POASEC	A/B	A/B	nc
	703	703	LEPPER/POASEC	LEPPER/POASEC	C/D	C/D	nc
	704	705	ERINAU/AGRCRI	ERINAU/POASEC	C/D	C/D	nc
		709	ARTTRI/POASEC	ARTTRI/POASEC	A/B	A/B	nc
		713	ARTTRI/POASEC	ARTTRI/POASEC	A/B	A/B	nc
	708	708	AGRCRI/POASEC	AGRCRI/POASEC	F	F	nc
	712	712	ARTTRI/POASEC	ARTTRI/POASEC	A/B	A/B	nc
	715	715	POASEC/AGRCRI	POASEC/AGRCRI	C/D	C/D	nc
	716	716	AGRCRI/ATRCAN	AGRCRI/ATRCAN	F	F	nc
	717	717	AGRCRI/POASEC	AGRCRI/POASEC	F	F	nc
	718	718	ARTTRI/POASEC	ARTTRI/POASEC	A/B	A/B	nc
-	10	010	BROTEC/SISALT	BROTEC/CHRVIS	E	E	nc
	61	061	CERTES/ARTTRI	ARTTRI/CERTES	C/D	A/B	increase

Table 7. Fire-related performance metrics and triggers detected in 2004 and 2005. Table is adapted from Effectiveness Monitoring Table (Table 5) in the Candidate Conservation Agreement (2003; version 06/21/2004). If the EO/sub-EO number is different than the HIP transect number (Colket et al. 2006), the updated EO/sub-EO number is indicated in brackets following the HIP transect number (e.g., HIP transect 072A [EO 104]).

Performance Metrics	**Triggers (If…)**		**2004**	**2005**
Using the BLM fire data base, determine if fires in a given MA burn in excess of the upper limit of acres specified in the conservation measure.	Suppress 90% of fires	In **MAs 1, 2** to less than 200 ac	Achieved: No fires occurred.	Achieved: One 1-ac fire occurred in MA 1.
		In **MA 5** to less than 20 ac	Achieved: No fires occurred.	Achieved: No fires occurred.
		In **MAs 6, 7, 8, 9, 10** to less than 100 ac	Not achieved: The Kuna Swan Fire burned 83 ac in MA 6. The Simmer Fire burned 537 ac within MA 8A.	Not achieved: The MP75 I-84 Fire burned a 121-ac portion of MA 8A. The MP97 I-84 Fire burned 146-ac portion within MA 9C. The North Hamm Fire burned a 1466-ac portion of MA 10. MA 8B was established in fall of 2005, after the South Black Fire burned 949-ac within its boundaries. Four 1-ac fires also burned, 2 within MA 8A and one each within MAs 6 and 9.
		In **MA 11** to less than 500 ac	Achieved: No fires occurred.	Achieved: No fires occurred.
Using the BLM fire data base, examine the fire history in a given MA and patterns of fire occurrence.	If there is a fire in any EO, then adaptive management pathway is triggered for evaluation.		Not achieved: EO 60 was completely burned and EO 24 was partially burned.	Not achieved: EO 54 was completely burned; and EOs 8 and 30 were partially burned.
	BLM or other managing agency conducting after-action review identified lack of coordination in implementing fire prevention conservation measures.		Not identified in 2004 slickspot peppergrass progress report.	BLM identified that BLM fire crews were not aware of EO 54 at the time the South Black Fire burned through it, or they would have prioritized its protection. This situation will be corrected and fire crews will be provided updated maps before the next field season.
Conduct post-fire monitoring using the HIP transects to determine if conservation measures avoided impact to slickspots and minimized impact to adjacent habitat.	BLM or other managing agency conducting after-action review identified lack of coordination in implementing fire suppression conservation measures.		Light to moderate, recent OHV use was detected in general occurrence area (GOA) of HIP transect 060 after it had burned, but it is unknown whether this was related to fire suppression activities. Otherwise, fire suppression activities were not detected at HIP transects.	Fire suppression activities were not detected at HIP transects.
	If fire suppression activities occur in an EO, post-fire monitoring will be done by BLM or other managing agency.			
	Post-fire monitoring indicates unanticipated and/or unacceptable direct suppression-related impacts to slickspots and indirect impacts to habitat.			

Table 8. Restoration and rehabilitation-related performance metrics and triggers detected in 2004 and 2005. Table is adapted from Effectiveness Monitoring Table (Table 5) in the Candidate Conservation Agreement (2003; version 06/21/2004). If the EO/sub-EO number is different than the HIP transect number (Colket et al. 2006), the updated EO/sub-EO number is indicated in brackets following the HIP transect number (e.g., HIP transect 072A [EO 104]).

Performance Metrics	Triggers (If…)	2004	2005
Using the HIP transects, determine if emergency stabilization (ES), restoration and/or rehabilitation projects have occurred and if so, determine if there is physical evidence of rehab within the slickspots and the magnitude (% surface area impacted) of that physical evidence.	5% of the HIP monitoring transects in a given MA show declines in habitat quality.	No emergency stabilization (ES), restoration and/or rehabilitation projects that occurred within the past year were detected at HIP transects.	No emergency stabilization (ES), restoration and/or rehabilitation projects that occurred within the past year were detected at HIP transects.
	Within any area covered by an emergency stabilization (ES) plan, land use activities are reinitiated that conflict with restoration objectives when those objectives have not yet been met.	Not identified in 2004 slickspot peppergrass progress report.	Not identified in 2005 slickspot peppergrass progress report.
Using the BLM's ESR database, identify ES, restoration and/or rehabilitation projects that have occurred in the vicinity of EOs and the project's seed mix. Using the HIP vegetation inventory protocol, inventory for perennial forbs, grasses, and shrubs, and identify to the extent possible if species present were the result of seeding. Within slickspots, inventory for perennial forbs, grasses and shrubs and identify if species present were the result of seeding.	HIP monitoring transects indicate greater than 1% non-native seeded species within slickspot surface area.	HIP transects with >1% cover of non-native seeded species was detected within slickspots at HIP transects 019A [EO 18] and 019B [EO 19] (MA 6); 072C [EO 72] (MA 8B); and 701 [EO 96], 705 [sub-EO 704], 708, 711 [EO 92], 715, 716, and 717 (MA 11). At all HIP transects, seeding occurred before implementation of the Candidate Conservation Agreement (CCA; 2003).	HIP transects with >1% cover of non-native seeded species was detected within slickspots at HIP transects 019A [EO 18], 019B, and 024 (MA 6); and 701 [EO 96], 705 [sub-EO 704], 708, 711 [EO 92], 715, 716, and 717 (MA 11). At all HIP transects, seeding occurred before implementation of the Candidate Conservation Agreement (CCA; 2003).

Table 9. Off-highway motorized vehicle (OHV)-related performance metrics and triggers detected in 2004 and 2005. Table is adapted from Effectiveness Monitoring Table (Table 5) in the Candidate Conservation Agreement (2003; version 06/21/2004). If the EO/sub-EO number is different than the HIP transect number (Colket et al. 2006), the updated EO/sub-EO number is indicated in brackets following the HIP transect number (e.g., HIP transect 072A [EO 104]).

Performance Metrics	Triggers (If…)	2004	2005
Using the HIP monitoring transects, determine of there is evidence of OHV or other vehicle tracks present in the slickspots.	Any evidence of OHV use within exclosures associated with **EOs 21, 26, or 66.**	No recent OHV use was observed within exclosure at HIP transect 066 (MA 1). HIP transects are not located within exclosures at EOs 21 and 26.	No recent OHV use was observed within exclosure at HIP transect 066 (MA 1). HIP transects are not located within exclosures at EOs 21 and 26.
Using the HIP monitoring transects, determine if OHV or other vehicles go off-road in the area near (ca 20 m radius) the slickspots.	Greater than 2% HIP transects show evidence of OHVs within slickspots.	Recent OHV use was detected within 4 slickspots at HIP transects 024 (MA 6). This represented 17% and 1% of all HIP transects in MA 6 and the entire CZ, respectively. Light to moderate, recent OHV use was also detected in the general occurrence area (GOA) of HIP transect 060 (MA 8A) after it had burned, but it was not recorded in slickspots.	Recent OHV use (tractor) was detected within 1 slickspot at HIP transect 030B (MA 8A). This represented 11% and 1% of all HIP transects in MA 8 and the entire CZ, respectively. Light to moderate, recent OHV use was also detected in the GOA of HIP transects 008B (MA 10) and 069 (MA 1), but it was not recorded in slickspots.
	Greater than 2% HIP transects in a given MA show evidence of OHVs within slickspots.		

Table 10. Invasive non-native species-related performance metrics and triggers detected in 2004 and 2005. Table is adapted from Effectiveness Monitoring Table (Table 5) in the Candidate Conservation Agreement (2003; version 06/21/2004). If the EO/sub-EO number is different than the HIP transect number (Colket et al. 2006), the updated EO/sub-EO number is indicated in brackets following the HIP transect number (e.g., HIP transect 072A [EO 104]).

Performance Metrics	Triggers (If…)	2004	2005
Using the HIP transects and associated vegetation plots, measure total non-native plant species cover in areas that have been predominantly native vegetation.	5% of HIP transects in a given MA show declines in habitat quality.	Baseline year	HIP transects 066 (MA 1) and 714 [EO 93] (MA 11) underwent declines in habitat quality, representing 25% and 5% of the HIP transects in MAs 1 and 11, respectively. Habitat quality declines of HIP transects are based on their reassignment to a lower quality class in 2005 (and later years; see Table 2 and Figs. 12 and 13). Both HIP transects 066 and 714 were comprised of predominantly native vegetation in 2004 and 2005, where predominantly native vegetation is defined as having more than 50% native cover.
	HIP transects show a 5% or more increase in total non-native plant species cover within slickspots.	Baseline year	HIP transects 032 (MA 5B); 019A (EO 18) and 024 (MA 6); 020B and 030B (MA 8A); 002, 029, and 050 (MA 9); 008A (MA 10); 708 and 715 (MA 11), and 061 (not in any MA) all had a 5% or more increase in total non-native plant species cover within slickspots. Of these, all but HIP transects 019A (EO 18), 024, and 061 had been predominantly native vegetation in 2004, where predominantly native vegetation is defined as having more than 50% native cover. HIP transect 060 was excluded from this trigger because nearly all vegetation was burned when sampled in 2004.
Using HIP transects, determine if non-native invasive or weed species are present in the slickspots. Determine density (percent cover) of non-native invasive or weed species present in the slickspots.	HIP monitoring reveals >1% cover of non-native seeded species observed within slickspot surface area.	HIP transects with >1% cover of non-native seeded species was detected within slickspots at HIP transects 019A [EO 18] and 019B [EO 19] (MA 6); 072C [EO 72] (MA 8B); and 701 [EO 96], 705 [sub-EO 704], 708, 711 [EO 92], 715, 716, and 717 (MA 11). At all HIP transects, seeding occurred before implementation of the Candidate Conservation Agreement (CCA; 2003).	HIP transects with >1% cover of non-native seeded species was detected within slickspots at HIP transects 019A [EO 18], 019B, and 024 (MA 6); and 701 [EO 96], 705 [sub-EO 704], 708, 711 [EO 92], 715, 716, and 717 (MA 11). At all HIP transects, seeding occurred before implementation of the Candidate Conservation Agreement (CCA; 2003).
Using HIP vegetation sampling strategy for habitat surrounding slickspots and where ES, rehabilitation and/or restoration projects have occurred, determine presence of annual forbs, native perennial grasses, and shrubs.	Within and rehab area, land use activities are reinitiated when restoration objectives identified in the ES plan have not been met.	Not identified in 2004 slickspot peppergrass progress report.	Not identified in 2005 slickspot peppergrass progress report.

Table 11. Military training and activities-related performance metrics and triggers detected in 2004 and 2005 (MA 7 only). Table is adapted from Effectiveness Monitoring Table (Table 5) in the Candidate Conservation Agreement (2003; version 06/21/2004). If the EO/sub-EO number is different than the HIP transect number (Colket et al. 2006), the updated EO/sub-EO number is indicated in brackets following the HIP transect number (e.g., HIP transect 072A [EO 104]).

Performance Metrics	Triggers (If…)	2004	2005
Continued compliance as area is monitored on a regular basis and training activities are planned in coordination with the IDARNG Range and Natural Resources Staff	HIP monitoring indicates an EO has been damaged or surrounding habitat is declining due to military training activities.	No recent military training activities were observed at HIP transects.	No recent military training activities were observed at HIP transects.

Table 12. Livestock trampling-related performance metrics and triggers detected in 2004 and 2005. Table is adapted from Effectiveness Monitoring Table (Table 5) in the Candidate Conservation Agreement (2003; version 06/21/2004). If the EO/sub-EO number is different than the HIP transect number (Colket et al. 2006), the updated EO/sub-EO number is indicated in brackets following the HIP transect number (e.g., HIP transect 072A [EO 104]).

Performance Metrics	Triggers (If…)	2004	2005
The effectiveness of conservation measures to reduce, eliminate, or mitigate penetrating trampling by livestock will be measured and gathered in conjunction with the annual HIP monitoring program. The HIP protocol samples a subset of the slickspots within an EO.	Ten percent (10%) of the slickspots sampled along the HIP monitoring transect have penetrating trampling across 10% of their surface area, additional ocular evaluation of the EO will be conducted in conjunction with BLM and the permittee to determine of the sample is representative of the whole EO. If so the trigger has been tripped.	HIP transects having >10% of the slickspots sampled with >10% penetrating trampling across their surface area were detected at the following HIP transects: 060 (MA 8A); 002 (MA 9C); and 709 [sub-EO 704], 714 [EO 93], 717, and 720 [EO 96] (MA 11). In addition, HIP transects 072C (MA 8B); and HIP transects 701 [EO 96], 706 [EO 88], 707 [EO 97], and 715 (MA 11) may have tripped the trigger because they had a large number of penetrating prints probably caused by cattle and that were not used in the coverage estimate. In 2004, penetrating trampling was assessed by tallying all livestock prints with a reddish coloration, indicating exposure of the blocky structured clay layer. Penetrating trampling was difficult to discern within MA 11 because: 1) the reddish coloration of penetrating prints was not obvious when moist; and 2) there was less color contrast between slickspot soil layers than in MAs 1-10. In MA 11 only, field technicians used their previous experience with penetrating trampling depths in MAs 1-10 and categorized prints >1 in deep as penetrating.	HIP transects having >10% of the slickspots sampled with >10% penetrating trampling across their surface area were detected at the following HIP transects: 072A [EO 104], 072B, and 072C (MA 8B); 063 (MA 10); and 700 [EO 99], 705 [sub-EO 704], 706 [EO 88], 710 [EO 84], 712, 713 [sub-EO 704], 714 [EO 93], 716, and 722 [EO 98](MA 11). In 2005, penetrating trampling was assessed by measuring silt crust depth (depth to the restrictive layer) near slickspot peppergrass plants within each slickspot on the HIP transect. Livestock prints deeper than the mean silt crust depth were categorized as penetrating. There may have been some HIP transects that tripped in 2005 that would not have tripped using the 2004 method because the 2005 method was more sensitive. That being said, most HIP transects that tripped in 2005 would likely have been tripped using 2004 method because: 1) most had multiple slickspots with >10% penetrating trampling; 2) mean penetrating and total trampling cover was greater in 2005 than 2004 (Fig. 11); and 3) elevated 2005 spring precipitation increased the likelihood of penetrating events.
Penetrating trampling is defined as breaking through of the restrictive layer under the silt surface area of a slickspot during saturated conditions. The restrictive layer of a slickspot is the heavy clay (35-45% clay content) prismatic structured subsoil layer (Btn1 horizon) below the silty vesicular surface layer (E horizon) and above the lighter textured (25-35% clay content) blocky structured clayey layer (Btn2 horizon).The presence and abundance of penetrating trampling was measured at each of the slickspots sampled along the HIP transect. Different methods were used in 2004 and 2005 to assess penetrating livestock trampling and are described. In future years, methodology for assessing penetrating livestock trampling will be consistent with that used in 2004.			

Figure 1. Map of slickspot peppergrass Management Areas (MAs) and habitat integrity and population (HIP) transects within the Consideration Zone. SPATIAL DATA NOT SHOWN.

Figure 2. Map of New Plymouth Management Area (MA 1). HIP transect labels are in white and EO labels are in black. SPATIAL DATA NOT SHOWN.

Figure 3. Map of Boise Foothills/BLM (MA 2A, 2B, and 2C), Boise Foothills/County Landfill (MA 3), and Boise Foothills/Private Management Areas (MA 4). HIP transect labels are in white and EO labels are in black. SPATIAL DATA NOT SHOWN.

Figure 4. Map of Boise Management Areas (MAs 5A and 5B). HIP transect labels are in white and EO labels are in black. SPATIAL DATA NOT SHOWN.

Figure 5. Map of Kuna Management Area (MA 6). HIP transect labels are in white and EO labels are in black. SPATIAL DATA NOT SHOWN.

Figure 6. Map of Orchard Training Range (MA 7) and Orchard Management Areas (MAs 8A and 8B). HIP transect labels are in white and EO labels are in black. SPATIAL DATA NOT SHOWN.

Figure 7. Map of Mountain Home Management Area (MA 9). HIP transect labels are in white and EO labels are in black. SPATIAL DATA NOT SHOWN.

Figure 8. Map of Glenns Ferry/Hammett Management Area (MA 10). HIP transect labels are in white and EO labels are in black. SPATIAL DATA NOT SHOWN.

Figure 9. Map of Jarbridge Management Areas (MA 11 and 12). HIP transect labels are in white and EO labels are in black. SPATIAL DATA NOT SHOWN.

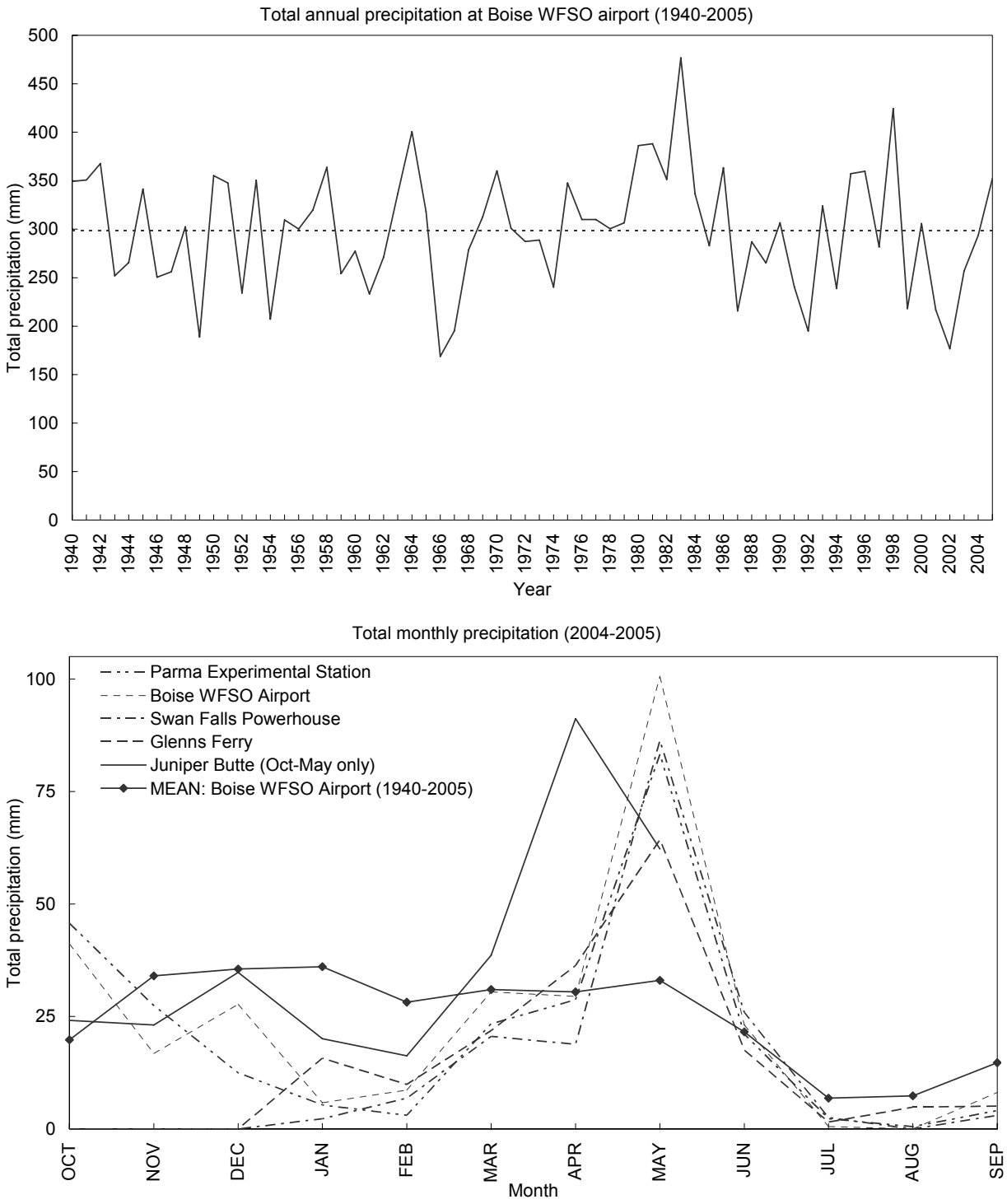

Figure 10. Total annual water-year precipitation (October-September) at the Boise WFSO Airport (1940-2005; above) and total monthly water-year precipitation at multiple weather stations (2004-2005; below). The horizontal dashed line (above) represents total mean annual water-year precipitation at the Boise WFSO Airport (1940-2005). The solid line with diamond markers (below) represents total mean monthly water-year precipitation at the Boise WFSO Airport (1940-2005). The Parma Experimental Station is closest to MA 1; Boise WFSO Airport, MAs 2, 3, 4, and 5; Swan Falls Powerhouse, MAs 6, 7, and 8; Glenns Ferry, MAs 9 and 10; and Juniper Butte, MAs 11 and 12. Weather data were accessed from the Desert Research Institute (2006) and Binder (Juniper Butte; pers. comm. 2006).

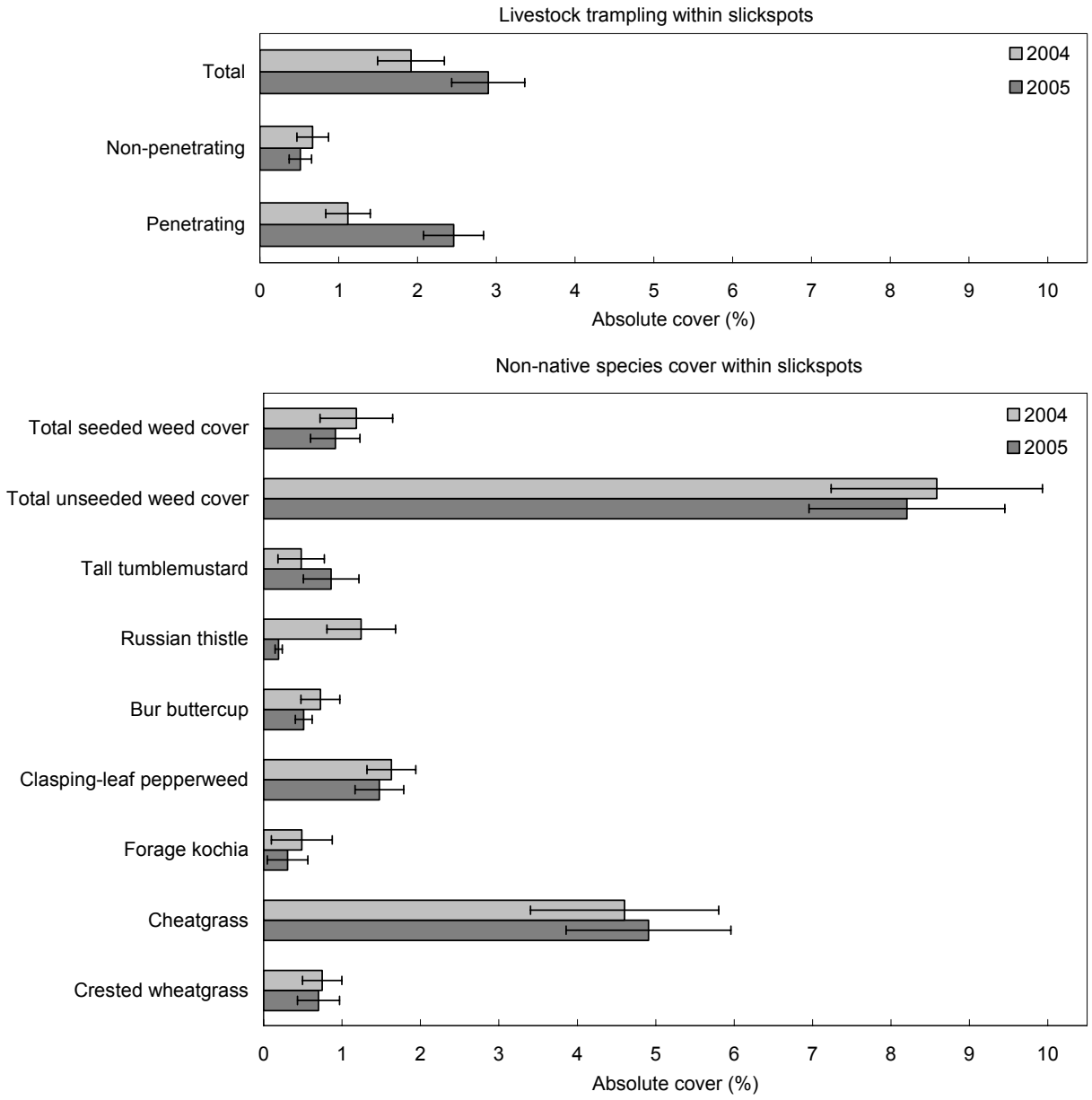

Figure 11. Mean absolute livestock trampling (n=71) and non-native species cover (n=70) within slickspots at habitat integrity and population (HIP) transects in 2004 and 2005. The Wilcoxon signed-rank test was used to evaluate significance of HIP transect data based on 2004 and 2005 data.

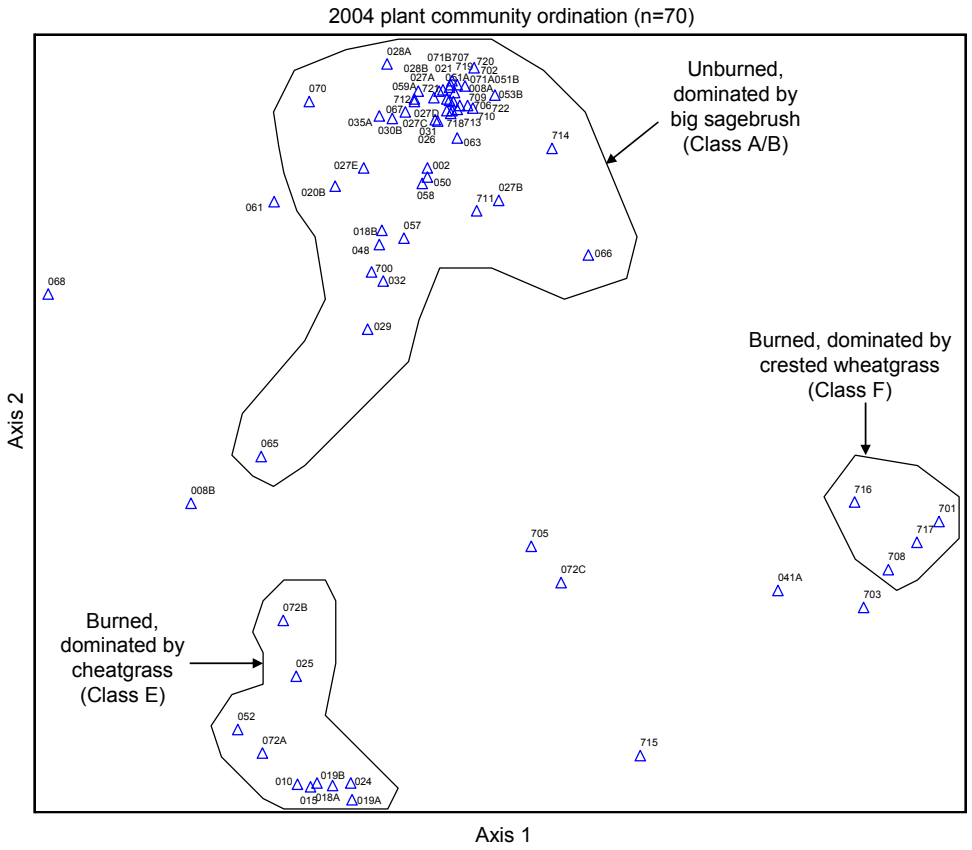

Figure 12. Nonmetric multidimensional scaling (NMS) community ordination of 2004 habitat integrity and population (HIP) transects (n=70). Data are based on mean relative Daubenmire cover quadrat and line-interception values. Sorenson distance measures were used to classify HIP transects into the following 4 classes: A/B=unburned and dominated by big sagebrush (*Artemisia tridentata*; ARTTRI); C/D= transitional class in between other 3 classes; E=burned and dominated by cheatgrass (*Bromus tectorum*; BROTEC); and F=burned and dominated by crested wheatgrass (*Agropyron cristatum*; AGRCRI; modified from Table 2 in Colket 2005). All HIP transects not located within 1 of the 3 polygons are in Class C/D. Plant species represented by 6 letter codes are in Appendix D.

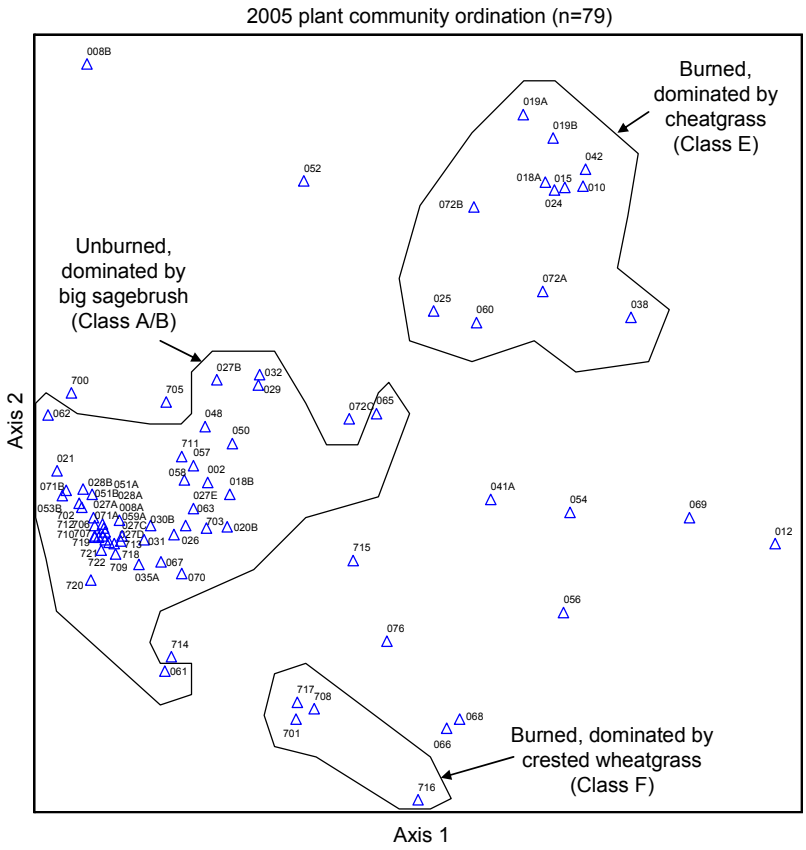

Figure 13. Nonmetric multidimensional scaling (NMS) community ordination of 2005 habitat integrity and population (HIP) transects (n=79). Data are based on mean relative Daubenmire cover quadrat and line-interception values. Sorenson distance measures were used to classify HIP transects into the following 4 classes: A/B=unburned and dominated by big sagebrush (*Artemisia tridentata*; ARTTRI); C/D= transitional class in between other 3 classes; E=burned and dominated by cheatgrass (*Bromus tectorum*; BROTEC); and F=burned and dominated by crested wheatgrass (*Agropyron cristatum*; AGRCRI; modified from Table 2 in Colket 2005). All HIP transects not located within 1 of the 3 polygons are in Class C/D. Plant species represented by 6 letter codes are in Appendix D.

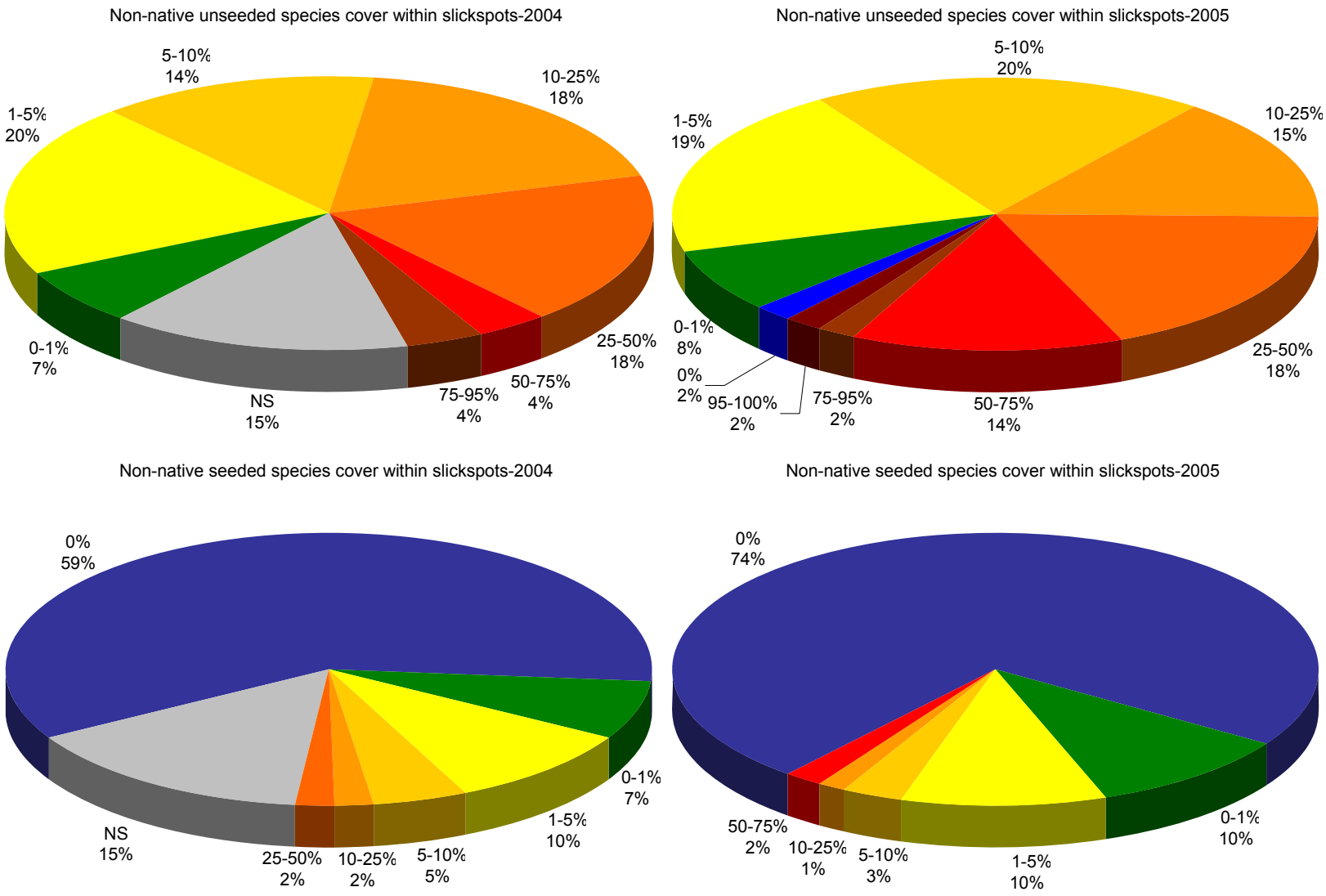

Figure 14. Proportion of slickspot peppergrass element occurrences (EOs) in terms of non-native unseeded (top) and seeded species cover (bottom) within slickspots in 2004 (left) and 2005 (right; n=53). Values are based on slickspot with greatest total non-native unseeded or seeded species cover along habitat integrity and population (HIP) transect. NS=not sampled in 2004.

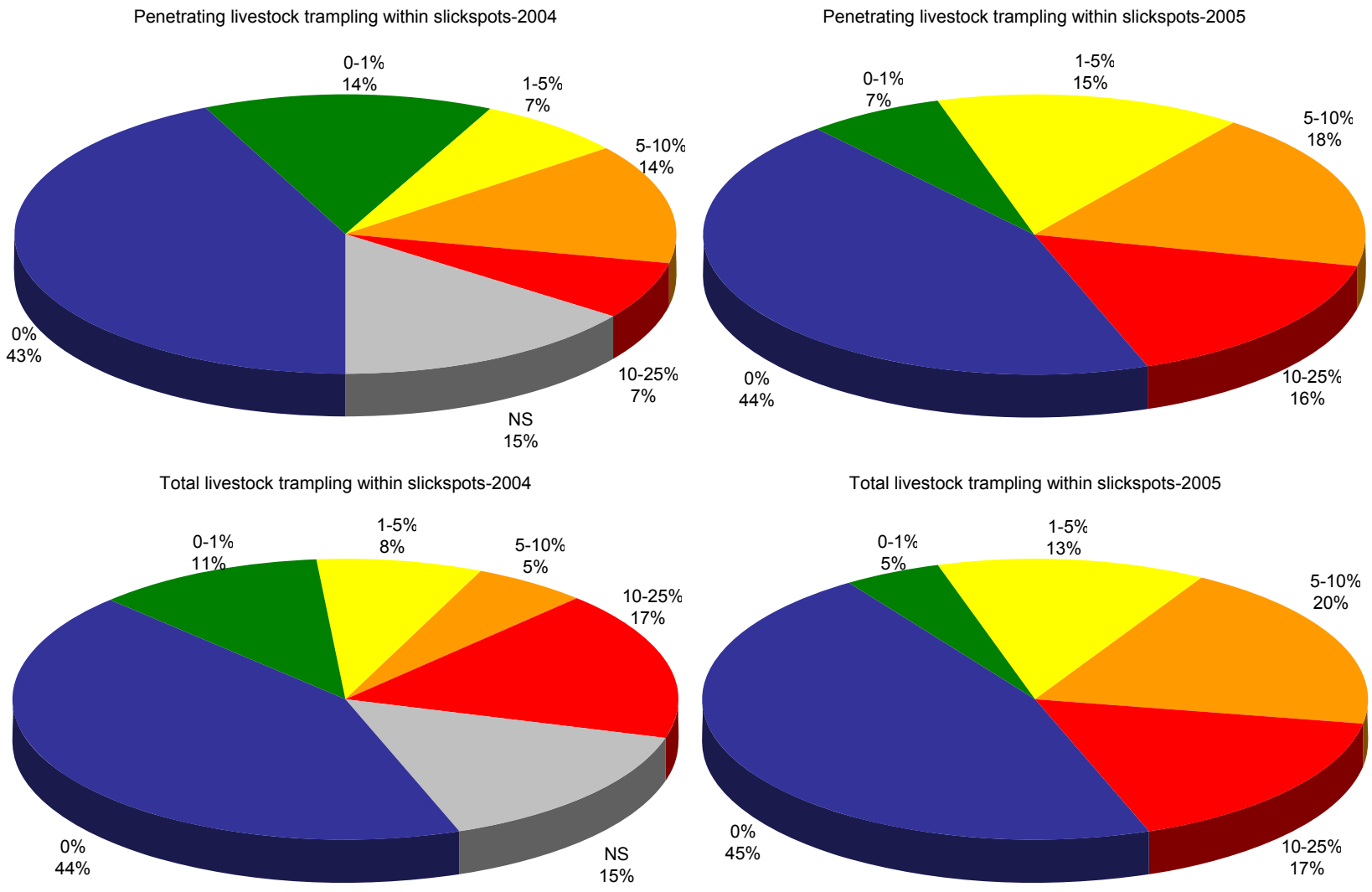

Figure 15. Proportion of slickspot peppergrass element occurrences (EOs) in terms of penetrating (top) and total livestock trampling (bottom) within slickspots in 2004 (left) and 2005 (right; n=53). Values are based on slickspot with greatest total livestock trampling along habitat integrity and population (HIP) transects. NS=not sampled in 2004.

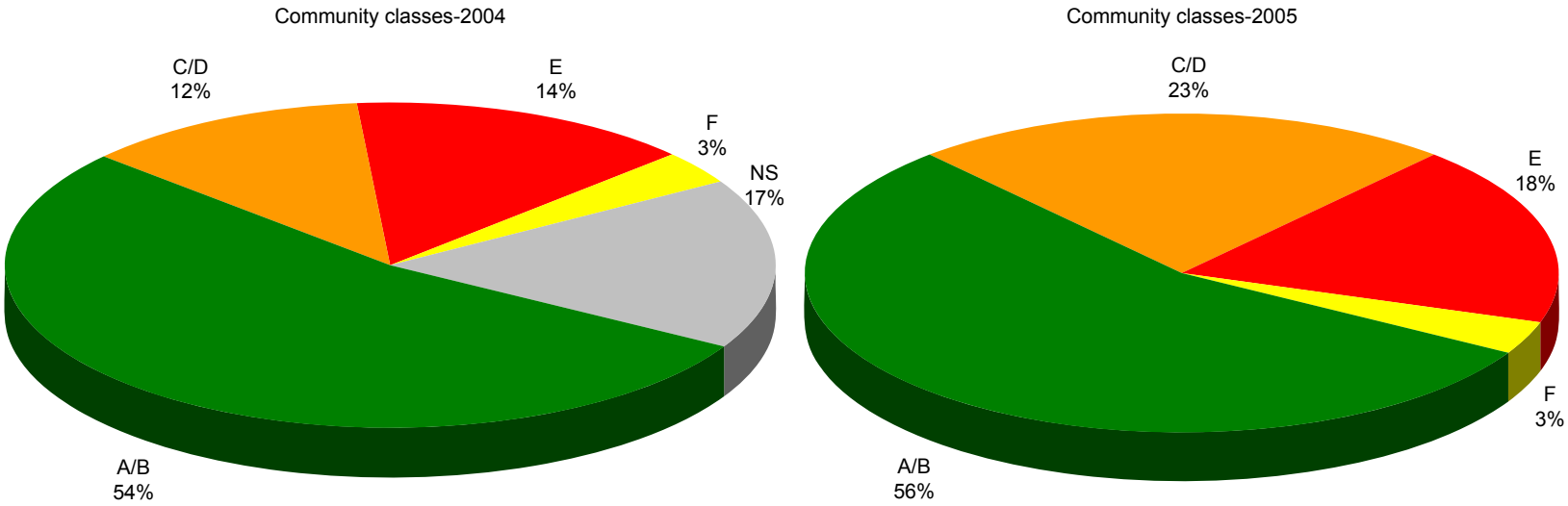

Figure 16. Proportion of slickspot peppergrass element occurrences (EOs) in terms of community classes in 2004 (left) and 2005 (right; n=52). Sorenson distance measures were used to classify HIP transects into the following 4 classes: A/B=unburned and dominated by big sagebrush (*Artemisia tridentata*); C/D= transitional class in between other 3 classes; E=burned and dominated by cheatgrass (*Bromus tectorum*); and F=burned and dominated by crested wheatgrass (*Agropyron cristatum*; modified from Table 2 in Colket 2005). NS=not sampled in 2004.

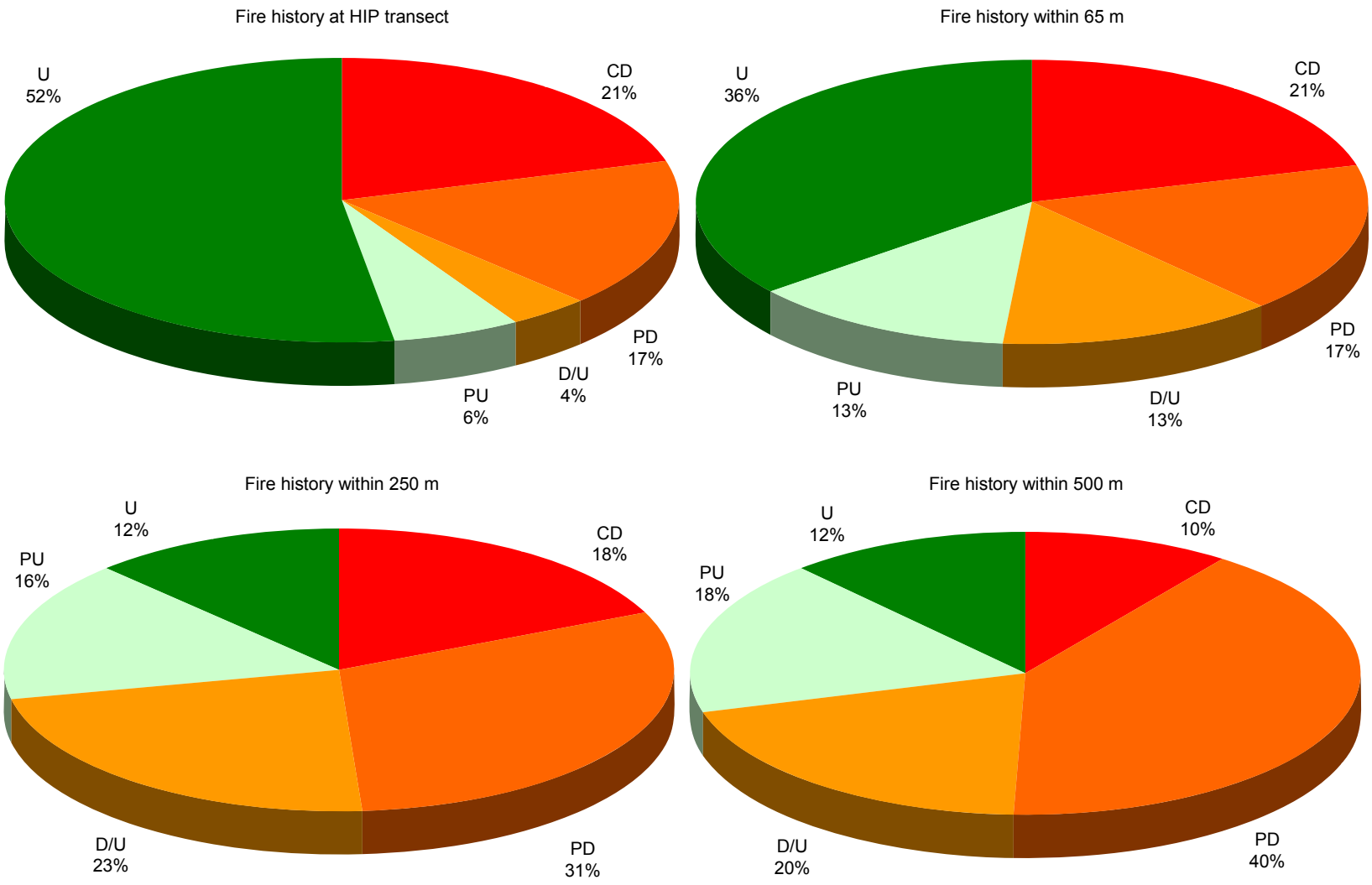

Figure 17. Proportion of slickspot peppergrass element occurrences (EOs) in terms of fire history at the habitat integrity and population (HIP) transect (upper left) and within 65 m (upper right), 250 m (lower left), and 500 m (lower right; U=undisturbed [1], PU=predominantly undisturbed [2], D/U=disturbed and undisturbed areas [3], PD=predominantly disturbed [4], and CD=completely disturbed [5]; n=53).

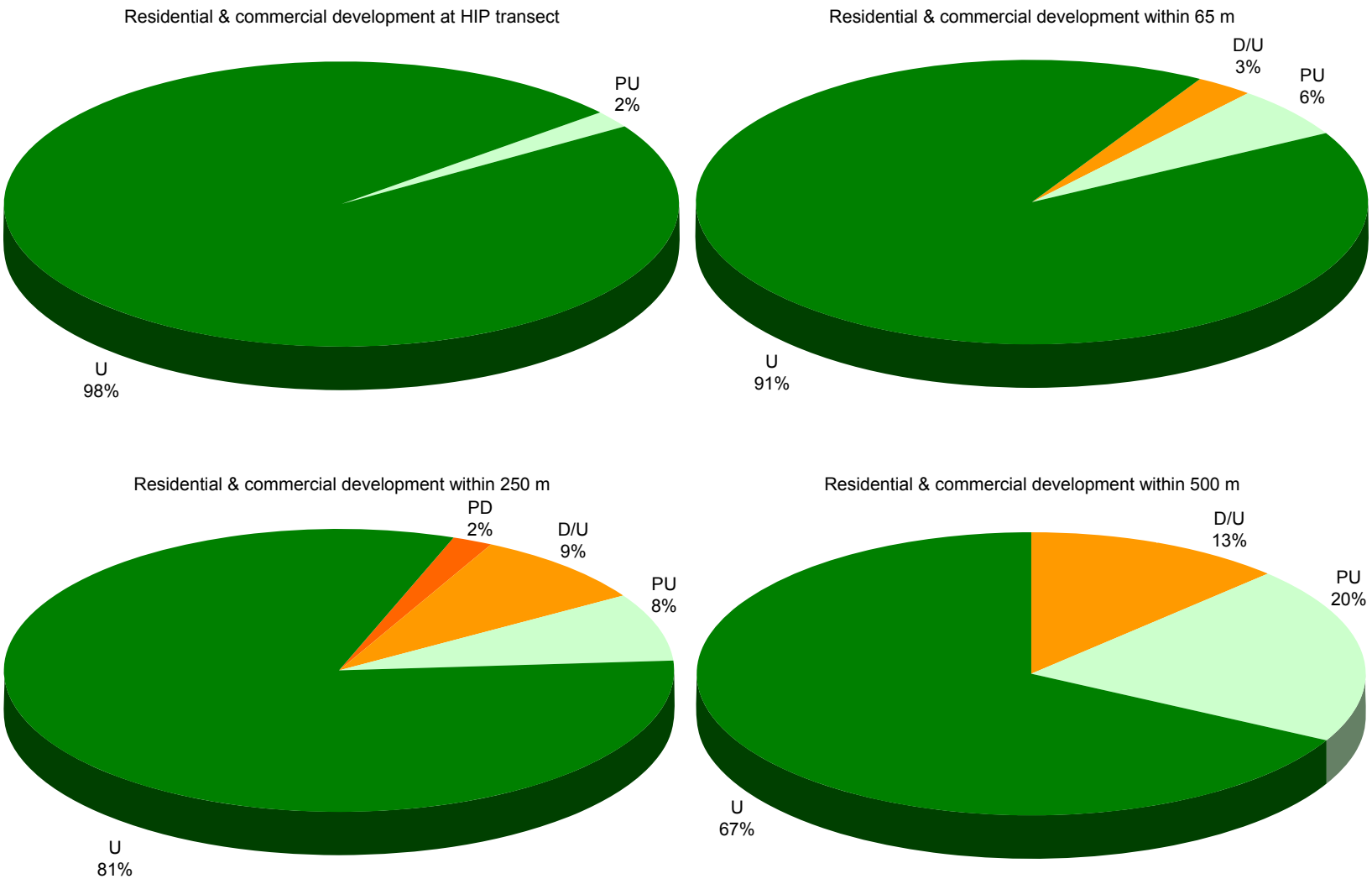

Figure 18. Proportion of slickspot peppergrass element occurrences (EOs) in terms of residential and commercial development at the habitat integrity and population (HIP) transect (upper left) and within 65 m (upper right), 250 m (lower left), and 500 m (lower right; U=undisturbed [1], PU=predominantly undisturbed [2], D/U=disturbed and undisturbed areas [3], PD=predominantly disturbed [4], and CD=completely disturbed [5]; n=53).

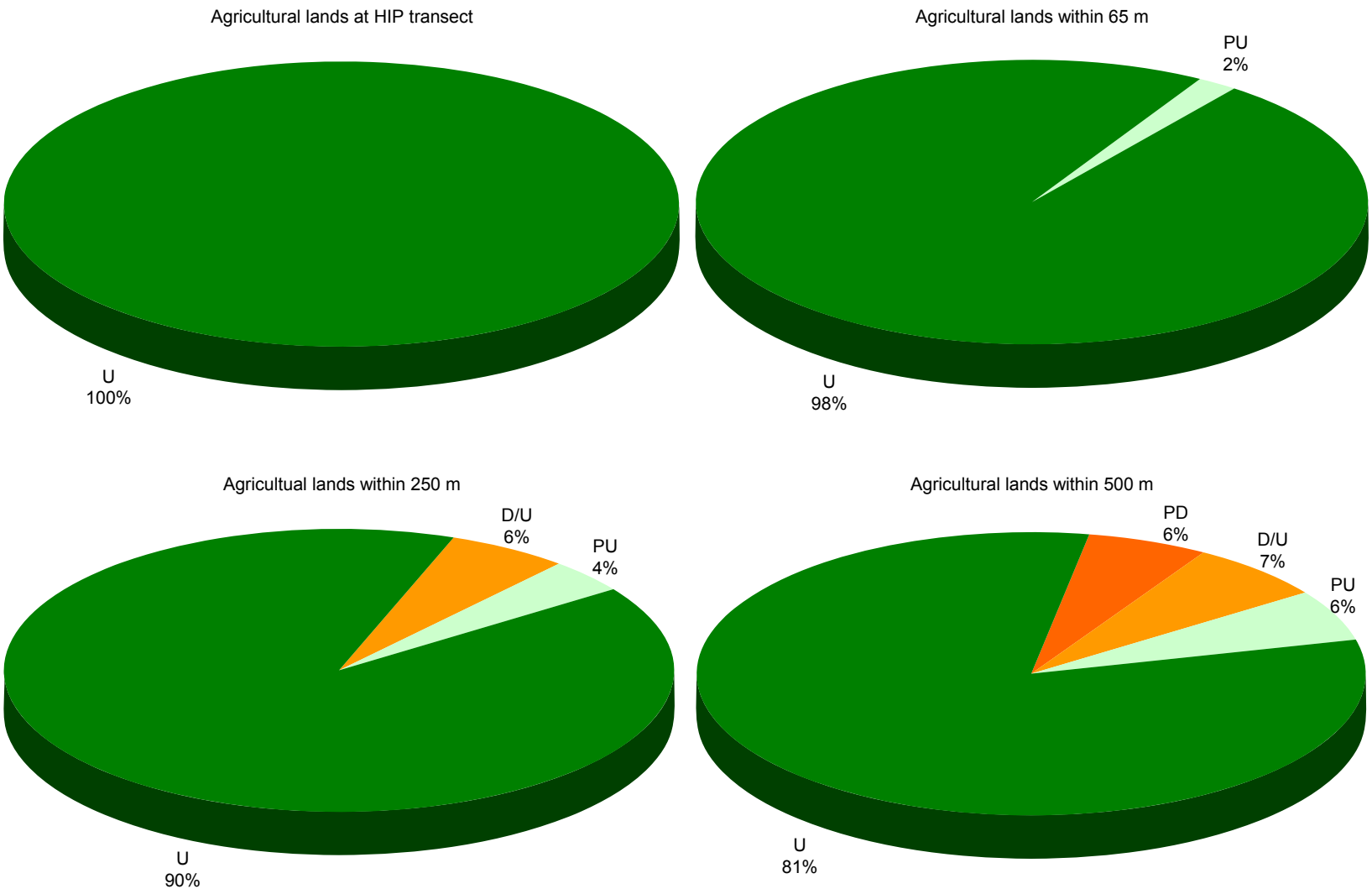

Figure 19. Proportion of slickspot peppergrass element occurrences (EOs) in terms of agricultural lands at the habitat integrity and population (HIP) transect (upper left) and within 65 m (upper right), 250 m (lower left), and 500 m (lower right; U=undisturbed [1], PU=predominantly undisturbed [2], D/U=disturbed and undisturbed areas [3], PD=predominantly disturbed [4], and CD=completely disturbed [5]; n=53).

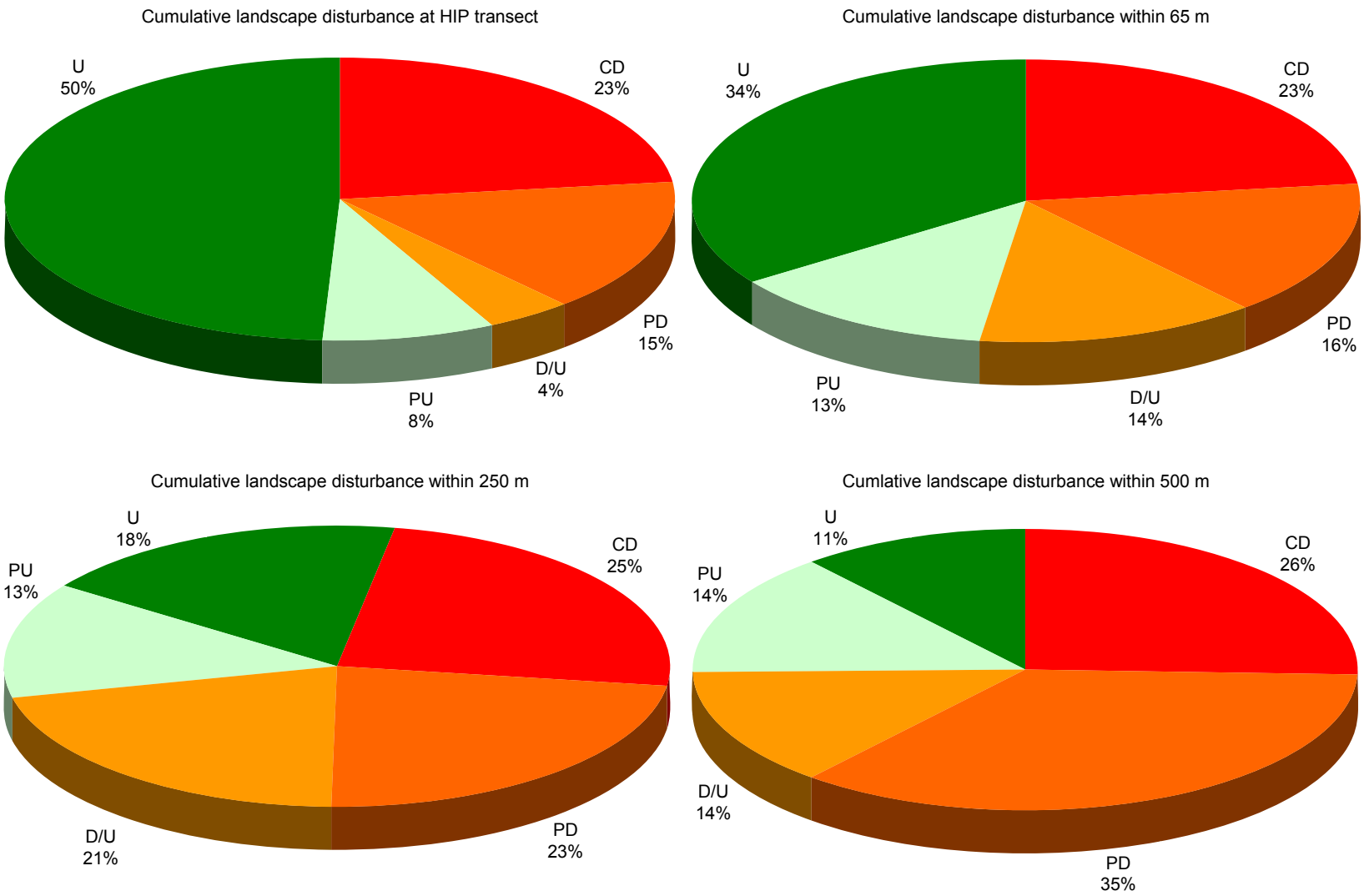

Figure 20. Proportion of slickspot peppergrass element occurrences (EOs) in terms of cumulative landscape disturbance (based on fire history, residential and commercial development, agricultural lands) at the habitat integrity and population (HIP) transect (upper left) and within 65 m (upper right), 250 m (lower left), and 500 m (lower right; U=undisturbed [1], PU=predominantly undisturbed [2], D/U=disturbed and undisturbed areas [3], PD=predominantly disturbed [4], and CD=completely disturbed [5]; n=53).

Appendix A. Lepidium papilliferum Habitat Integrity and Population (HIP) monitoring field form (revised 05/02/05). Unless noted otherwise, use the following cover class scale for scoring attributes: 0=0%, 1=<1%, 2=1-4.9%, 3=5-9.9%, 4=10-24.9%, 5=25-49.9%, 6=50-74.9%, 7=75-94.9%, and 8=95-100%.

Silt crust depth

1. What are the 3 silt crust depth measurements at the slickspot (SS)?
A) _____ B) _____ C) _____

Slickspot attributes

2. What are the approximate slickspot dimensions (i.e. length x width, in square meters)? _____ x _____

3. What percentage of the slickspot is disturbed by wildlife activity (i.e. ants, deer, elk, badgers, ground squirrels, other)? State animal type, appropriate cover class, and whether wildlife prints are penetrating.
A) _____ B) _____ C) _____ D) _____ E) _____

4. How much microbiotic crust cover is in the slickspot (including "bathtub" rim)? _____

5. List weed and seeded species and associated cover class (as applicable):
A) _____ B) _____ C) _____ D) _____ E) _____

6. A) Total weed cover class value = ____ B) Total seeded species cover class value = ____

Slickspot peppergrass

7. A) # of rosettes _____ B) # of reproductive plants _____ 8. Total # of plants _____

9. Total # of plants trampled by livestock _____

OHV use

10. Class of vehicle: _____

11. Answer the following questions using the appropriate cover classes:
   A) How much of the slickspot is disturbed by vehicle tracks that are broken through to the slickspot clay layer? _____
   B) How much of the slickspot is disturbed by vehicle tracks that are not broken through to the slickspot clay layer? _____
   C) What is the total area (%) of the slickspot disturbed by vehicle tracks (A + B)? _____

Restoration activities

12. How much of the slickspot has been disturbed by drill seeding or other restoration activities (i.e. chaining, raking)? _____

Livestock use

13. Class of livestock: _____

14. Answer the following questions using the appropriate cover classes:
   A) How much of the slickspot is disturbed by livestock tracks that are broken through to the slickspot clay layer?
   B) How much of the slickspot is disturbed by livestock tracks that are not broken through to the slickspot clay layer?
   C) What is the total area (%) of the slickspot disturbed by livestock tracks (A + B)?
   D) How much of the slickspot is covered by livestock feces?

15. Answer the following questions using the following categories:
   A) How many tracks within the slickspot are clearly attributable to livestock?
   B) How many of the definite livestock tracks are broken through to the slickspot clay layer?
   C) How many tracks were likely caused by livestock, but lack sufficient definition to be 100% certain?
   D) How many of these probable livestock tracks are broken through to the slickspot clay layer?

16. How much of the slickspot has been disturbed by livestock trailing?

Landscape pattern (recorded at slickspot station 5)

Describe the stated landscape attributes using the following scales (#15-19):
   A) Immediately adjacent to the monitoring transect
   B) Scale of surrounding 3 acres (ca 65 m radius)
   C) Scale of surrounding 3-50 acres (ca 250 m radius)
   D) Scale of surrounding 50-200 acres (ca 500 m radius)

17. What is the fire history pattern depicted by the vegetation at the 4 landscape scales?
   (1) Unburned
   (2) Predominantly unburned except for a few scattered, small burned islands
   (3) Distinct burned and unburned areas, roughly equal parts of each
   (4) Predominantly burned except for a few, scattered, small sagebrush islands
   (5) Completely burned

Appendix A (Continued)

18. A) and B) How long ago did fire occur at landscape scales A and B?
    (1) Burned <12 months ago
    (2) Burned >12 months ago
    (3) Not sure
    (4) Not applicable

19. What is the proportion of residential and/or commercial development at the 4 landscape scales?
    (1) No development
    (2) Predominantly undeveloped
    (3) Distinct developed and undeveloped areas, roughly equal parts of each
    (4) Predominantly developed
    (5) Completely developed

20. What is the proportion of agricultural lands at the 4 landscape scales?
    (1) No agricultural lands
    (2) Small proportion of agricultural lands
    (3) Roughly equal proportions of agricultural lands and non-agricultural lands
    (4) Predominantly agricultural lands
    (5) Completely agricultural lands

21. What is the cumulative proportion of anthropogenic-disturbed lands (i.e., fire, development, agriculture) at the 4 landscape scales?
    (1) No disturbance
    (2) Predominantly undisturbed
    (3) Roughly half disturbance
    (4) Predominantly disturbed
    (5) Completely disturbed

General occurrence area (5 minute walk around occurrence area using slickspot station 5 as a reference center)

22. Are there other slickspots in the general occurrence area with definite livestock tracks that have broken through to the clay layer? Indicate if livestock tracks are recent (R) or older (O).
    a) No slickspots with livestock tracks that have broken through to the clay layer
    b) <10% of slickspots encountered have livestock tracks broken through to the clay layer
    c) >10% of slickspots encountered have livestock tracks broken through to the clay layer

23. Is there livestock trailing in the general occurrence area? Indicate class unless livestock class is cattle.
    a) No livestock trailing
    b) Light to moderate trailing (low density, widely scattered trails)
    c) Heavy trailing (multiple crisscrossing tracks)

24. Is there evidence OHVs or other vehicles go off-road in cross-country fashion within the general occurrence area? Indicate if ORV disturbance is recent (R) or older (O).
    a) No evidence
    b) Light to moderate use (low density, widely scattered individual tracks)
    c) Heavy use (multiple crisscrossing tracks)

25. Is there evidence of fire-fighting disturbances within general occurrence area? Indicate if fire-fighting disturbances are recent (R) or older (O).
    a) No evidence
    b) Some evidence (<10%; i.e. one or only a few minor fires lines, or other related disturbances)
    c) Greater evidence (>10%; i.e. multiple or large fire lines, or widespread related disturbances)

26. Is there evidence of post-fire seeding or other restoration-related disturbances at other slickspots within the general occurrence area? Indicate if these disturbances are recent (R) or older (O).
    a) No evidence
    b) Yes, and <10% slickspots disturbed
    c) Yes, and >10% slickspots disturbed

27. The grass layer in the general occurrence area is dominated by:
    a) A mix of native bunchgrass species
    b) Poa secunda and with little or no other native bunchgrasses
    c) A mix of native bunchgrasses and exotic annual grasses
    d) Seeded grasses, with varying, subordinate amounts of native bunchgrass cover and little or no exotic annual grass cover
    e) A mix of seeded and exotic annual grasses
    f) Exotic annual grasses having at least twice the cover of native bunchgrasses
    g) Exotic annual grasses; native bunchgrasses reduced to remnant status or largely extirpated

28. Weedy forb species in the general occurrence area are:
    a) Sparse or absent
    b) Patchy, but not widespread
    c) Widespread but with low (<10%) cover
    d) Widespread and abundant

29. List noxious or other aggressive exotic weed species observed within the occurrence area and note relative abundance (as applicable).

Appendix B. Slickspot (SS) and vegetation transect (VT) relocation at habitat integrity and population (HIP) transects. SPATIAL DATA NOT SHOWN.

HIP#	EO/SUB-EO#	Main HIP	Stake-SS1*	SS1-SS2*	SS2-SS3*	SS3-SS4*	SS4-SS5*	SS5-SS6*	SS6-SS7*	SS7-SS8*	SS8-SS9*	SS9-SS10*	VT1**	VT2**	VT3**
002	2														
008A	8														
008B	8														
010	10														
012	12														
015	15														
018A	18														
018B	18														
019A	18														
019B	19														
020B	20														
021	21														
024	24														
025	25														
026	26														
027A	27														
027B	27														
027C	27														
027D	27														
027E	100														
028A	71														
028B	71														
029	29														
030B	30														
031	31														
032	32														
035A	35														
038	38														
041A	35														
042	42														
048	48														
050	50														
051A	51														
051B	51														
052	52														

Declination is 0º. *SS relocation information is in the format of xx/yyyº, where xx=# of steps and yyy=azimuth from originating to targeted location. ** VT re-location information is in the format of x/yyyº/z.z m, where x= SS number, yyyº=azimuth of VT, and z.z m=distance between metal stake in slickspot to VT start point

Appendix B (continued)

HIP#	EO/SUB-EO#	Main HIP	Stake-SS1*	SS1-SS2*	SS2-SS3*	SS3-SS4*	SS4-SS5*	SS5-SS6*	SS6-SS7*	SS7-SS8*	SS8-SS9*	SS9-SS10*	VT1**	VT2**	VT3**
053B	53														
054	54														
056	56														
057	24														
058	26														
059A	59														
060	60														
061	61														
062	62														
063	63														
065	65														
066	66														
067	67														
068	68														
069	69														
070	70														
071A	71														
071B	71														
072A	104														
072B	72														
072C	72														
076	76														
700	99														
701	96														
702	702														
703	703														
705	704														
706	88														
707	97														
708	708														
709	704														
710	84														
711	92														
712	712														
713	704														

Declination is 0º. *SS relocation information is in the format of xx/yyyº, where xx=# of steps and yyy=azimuth from originating to targeted location. ** VT re-location information is in the format of x/yyyº/z.z m, where x= SS number, yyyº=azimuth of VT, and z.z m=distance between metal stake in slickspot to VT start point

Appendix B. (continued) SPATIAL DATA NOT SHOWN.

HIP#	EO/SUB-EO#	Main HIP	Stake-SS1*	SS1-SS2*	SS2-SS3*	SS3-SS4*	SS4-SS5*	SS5-SS6*	SS6-SS7*	SS7-SS8*	SS8-SS9*	SS9-SS10*	VT1**	VT2**	VT3**
714	93														
715	715														
716	716														
717	717														
718	702														
719	95														
720	96														
721	96														
722	98														

Declination is 0º. *SS relocation information is in the format of xx/yyyº, where xx=# of steps and yyy=azimuth from originating to targeted location. ** VT re-location information is in the format of x/yyyº/z.z m, where x= SS number, yyyº=azimuth of VT, and z.z m=distance between metal stake in slickspot to VT start point

Appendix C. GPS location of habitat integrity and population (HIP) transects. SPATIAL DATA NOT SHOWN.

HIP#	EO/SUB-EO#	EO Name	Location	Date	GPS Accuracy	Easting NAD83 IDTM	Northing NAD83 IDTM	Easting NAD83 UTM	Northing NAD83 UTM
002	2	Crater Rings	start	8/2/2004	PDA/PDOP<5/30 pts.				
002	2	Crater Rings	end	8/2/2004	PDA/PDOP<5/30 pts.				
008A	8	Bennett Rd	start	6/30/2004	PDA/PDOP<5/30 pts.				
008A	8	Bennett Rd	end	6/30/2004	PDA/PDOP<5/30 pts.				
008B	8	Bennett Rd	start	6/30/2004	PDA/PDOP<5/30 pts.				
008B	8	Bennett Rd	end	6/30/2004	PDA/PDOP<5/30 pts.				
010	10	Chalk Flat	end	7/8/2004	PDA/PDOP<5/30 pts.				
010	10	Chalk Flat	start	7/8/2004	PDA/PDOP<5/30 pts.				
012	12	Military Reserve Park	start	6/25/2004	PDA/PDOP<5/30 pts.				
015	15	Simco Rd	start	6/3/2004	PDA/PDOP<5/30 pts.				
015	15	Simco Rd	end	6/3/2004	PDA/PDOP<5/30 pts.				
018A	18	S of Melba Butte/ W of Initial Pt	start	6/23/2004	PDA/PDOP<5/30 pts.				
018A	18	S of Melba Butte/ W of Initial Pt	end	6/23/2004	PDA/PDOP<5/30 pts.				
018B	18	S of Melba Butte/ W of Initial Pt	end	6/23/2004	PDA/PDOP<5/30 pts.				
018B	18	S of Melba Butte/ W of Initial Pt	start	6/23/2004	PDA/PDOP<5/30 pts.				
019A	18	S of Melba Butte/ W of Initial Pt	end	8/18/2004	PDA/PDOP<5/30 pts.				
019A	18	S of Melba Butte/ W of Initial Pt	start	8/18/2004	PDA/PDOP<5/30 pts.				
019B	19	N of Initial Point	start	8/16/2004	PDA/PDOP<5/30 pts.				
019B	19	N of Initial Point	end	8/16/2004	PDA/PDOP<5/30 pts.				
020B	20	Soles Rest Creek	start	6/3/2004	PDA/PDOP<5/30 pts.				
020B	20	Soles Rest Creek	end	6/3/2004	PDA/PDOP<5/30 pts.				
021	21	Fraser Reservoir E	start	7/29/2004	PDA/PDOP<5/30 pts.				
021	21	Fraser Reservoir E	end	7/29/2004	PDA/PDOP<5/30 pts.				
024	24	Kuna Butte	start	6/7/2004	PDA/PDOP<5/30 pts.				
024	24	Kuna Butte	end	6/7/2004	PDA/PDOP<5/30 pts.				
025	25	Melba Butte	end	6/10/2004	PDA/PDOP<5/30 pts.				
025	25	Melba Butte	start	6/10/2004	PDA/PDOP<5/30 pts.				
026	26	Alkali Creek	end	7/6/2004	PDA/PDOP<5/30 pts.				
026	26	Alkali Creek	start	7/6/2004	PDA/PDOP<5/30 pts.				
027A	27	Orchard Training Area	start	7/13/2004	PDA/PDOP<5/30 pts.				
027A	27	Orchard Training Area	end	6/2/2005	PDA/PDOP<5/30 pts.				
027B	27	Orchard Training Area	start	7/27/2004	PDA/PDOP<5/30 pts.				
027B	27	Orchard Training Area	end	7/27/2004	PDA/PDOP<5/30 pts.				
027C	27	Orchard Training Area	start	6/2/2005	PDA/PDOP<5/30 pts.				
027C	27	Orchard Training Area	end	6/2/2005	PDA/PDOP<5/30 pts.				
027D	27	Orchard Training Area	start	DNE	OLD NAD83				
027D	27	Orchard Training Area	end	7/13/2004	PDA/PDOP<5/30 pts.				
027E	100	Orchard NE	start	7/27/2004	PDA/PDOP<5/30 pts.				
027E	100	Orchard NE	end	7/27/2004	PDA/PDOP<5/30 pts.				
028A	71	Christmas Mountain NE	end	6/14/2004	PDA/PDOP<5/30 pts.				

Appendix C. (Continued) SPATIAL DATA NOT SHOWN.

HIP#	EO/SUB-EO#	EO Name	Location	Date	GPS Accuracy	Easting NAD83 IDTM	Northing NAD83 IDTM	Easting NAD83 UTM	Northing NAD83 UTM
028A	71	Christmas Mountain NE	start	6/14/2004	PDA/PDOP<5/30 pts.				
028B	71	Christmas Mountain NE	start	6/14/2004	PDA/PDOP<5/30 pts.				
028B	71	Christmas Mountain NE	end	6/14/2004	PDA/PDOP<5/30 pts.				
029	29	Mountain Home SE	end	7/28/2004	PDA/PDOP<5/30 pts.				
029	29	Mountain Home SE	start	7/28/2004	PDA/PDOP<5/30 pts.				
030B	30	Soles Rest Creek	end	6/1/2005	PDA/PDOP<5/30 pts.				
030B	30	Soles Rest Creek	start	6/2/2004	PDA/PDOP<5/30 pts.				
031	31	Bowns Creek	start	7/29/2004	PDA/PDOP<5/30 pts.				
031	31	Bowns Creek	end	7/29/2004	PDA/PDOP<5/30 pts.				
032	32	Tenmile Creek	end	6/4/2004	PDA/PDOP<5/30 pts.				
032	32	Tenmile Creek	start	6/4/2004	PDA/PDOP<5/30 pts.				
035A	35	Orchard SW	start	8/8/2005	PDA/PDOP<5/30 pts.				
038	38	Goose Creek	start	6/17/2005	PDA/PDOP<5/30 pts.				
038	38	Goose Creek	end	6/17/2005	PDA/PDOP<5/30 pts.				
041A	35	Orchard SW	start	7/7/2005	PDA/PDOP<5/30 pts.				
041A	35	Orchard SW	end	7/7/2005	PDA/PDOP<5/30 pts.				
042	42	E of Kuna Butte	end	5/25/2005	PDA/PDOP<5/30 pts.				
048	48	East Kuna Rd	end	6/24/2004	PDA/PDOP<5/30 pts.				
048	48	East Kuna Rd	start	6/24/2004	PDA/PDOP<5/30 pts.				
050	50	West Side Canal/ Slade Flat W	end	6/17/2004	PDA/PDOP<5/30 pts.				
050	50	West Side Canal/ Slade Flat W	start	6/17/2004	PDA/PDOP<5/30 pts.				
051A	51	Hot Creek Rd	end	6/9/2004	PDA/PDOP<5/30 pts.				
051A	51	Hot Creek Rd	start	6/9/2004	PDA/PDOP<5/30 pts.				
051B	51	Hot Creek Rd	start	6/9/2004	PDA/PDOP<5/30 pts.				
051B	51	Hot Creek Rd	end	6/9/2004	PDA/PDOP<5/30 pts.				
052	52	Woods Gulch	start	6/8/2004	PDA/PDOP<5/30 pts.				
052	52	Woods Gulch	end	6/8/2004	PDA/PDOP<5/30 pts.				
053B	53	Christmas Mountain	start	7/5/2005	PDA/PDOP<5/30 pts.				
053B	53	Christmas Mountain	end	7/5/2005	PDA/PDOP<5/30 pts.				
054	54	SW of Indian Creek Reservoir	start	6/27/2005	PDA/PDOP<5/30 pts.				
054	54	SW of Indian Creek Reservoir	end	6/27/2005	PDA/PDOP<5/30 pts.				
056	56	Willow Creek	start	7/8/2005	PDA/PDOP<5/30 pts.				
056	56	Willow Creek	end	7/8/2005	PDA/PDOP<5/30 pts.				
057	24	Kuna Butte	start	6/7/2004	PDA/PDOP<5/30 pts.				
057	24	Kuna Butte	end	6/7/2004	PDA/PDOP<5/30 pts.				
058	26	Alkali Creek	start	7/8/2004	PDA/PDOP<5/30 pts.				
058	26	Alkali Creek	end	7/8/2004	PDA/PDOP<5/30 pts.				
059A	59	Fake Raptor Rock	start	7/7/2005	PDA/PDOP<5/30 pts.				
059A	59	Fake Raptor Rock	end	7/7/2005	PDA/PDOP<5/30 pts.				
060	60	W of Squaw Creek	start	8/2/2004	PDA/PDOP<5/30 pts.				

Appendix C. (Continued) SPATIAL DATA NOT SHOWN.

HIP#	EO/SUB-EO#	EO Name	Location	Date	GPS Accuracy	Easting NAD83 IDTM	Northing NAD83 IDTM	Easting NAD83 UTM	Northing NAD83 UTM
060	60	W of Squaw Creek	end	8/2/2004	PDA/PDOP<5/30 pts.				
061	61	SE of Reverse	start	7/13/2005	PDA/PDOP<5/30 pts.				
062	62	SW of Eureka Cave	start	6/21/2005	PDA/PDOP<5/30 pts.				
062	62	SW of Eureka Cave	end	6/21/2005	PDA/PDOP<5/30 pts.				
063	63	Bennett Creek	start	7/28/2004	PDA/PDOP<5/30 pts.				
063	63	Bennett Creek	end	7/28/2004	PDA/PDOP<5/30 pts.				
065	65	Lower Seaman Gulch	end	8/4/2004	PDA/PDOP<5/30 pts.				
065	65	Lower Seaman Gulch	start	8/4/2004	PDA/PDOP<5/30 pts.				
066	66	New Plymouth SW	start	6/15/2004	PDA/PDOP<5/30 pts.				
066	66	New Plymouth SW	end	6/15/2004	PDA/PDOP<5/30 pts.				
067	67	N edge of OTA	start	8/3/2004	PDA/PDOP<5/30 pts.				
067	67	N edge of OTA	end	8/3/2004	PDA/PDOP<5/30 pts.				
068	68	S of New Plymouth/ I-84	start	6/16/2004	PDA/PDOP<5/30 pts.				
068	68	S of New Plymouth/ I-84	end	6/16/2004	PDA/PDOP<5/30 pts.				
069	69	E of Ashlock Gulch	start	6/23/2005	PDA/PDOP<5/30 pts.				
069	69	E of Ashlock Gulch	end	6/23/2005	PDA/PDOP<5/30 pts.				
070	70	W of Graveyard Gulch	start	6/15/2004	PDA/PDOP<5/30 pts.				
070	70	W of Graveyard Gulch	end	6/15/2004	PDA/PDOP<5/30 pts.				
071A	71	Christmas Mountain NE	start	6/28/2004	PDA/PDOP<5/30 pts.				
071A	71	Christmas Mountain NE	end	6/28/2004	PDA/PDOP<5/30 pts.				
071B	71	Christmas Mountain NE	end	7/1/2004	PDA/PDOP<5/30 pts.				
071B	71	Christmas Mountain NE	start	7/1/2004	PDA/PDOP<5/30 pts.				
072A	104	S of Leone	start	6/21/2004	PDA/PDOP<5/30 pts.				
072A	104	S of Leone	end	6/21/2004	PDA/PDOP<5/30 pts.				
072B	72	SW of Leone	start	6/21/2004	PDA/PDOP<5/30 pts.				
072B	72	SW of Leone	end	6/21/2004	PDA/PDOP<5/30 pts.				
072C	72	SW of Leone	start	6/22/2004	PDA/PDOP<5/30 pts.				
072C	72	SW of Leone	end	6/22/2004	PDA/PDOP<5/30 pts.				
076	76	Big Gulch/ N Hartley Rd	start	6/7/2005	PDA/PDOP<5/30 pts.				
076	76	Big Gulch/ N Hartley Rd	end	6/7/2005	PDA/PDOP<5/30 pts.				
700	99	Mosquito Lake Reservoir	start	9/23/2004	PDA/PDOP<5/30 pts.				
700	99	Mosquito Lake Reservoir	end	9/23/2004	PDA/PDOP<5/30 pts.				
701	96	SE Post Office Reservoir/ NW Middle Butte	start	8/2/2005	PDA/PDOP<5/30 pts.				
701	96	SE Post Office Reservoir/ NW Middle Butte	end	8/2/2005	PDA/PDOP<5/30 pts.				
702	702	Three Creek Well	start	7/19/2004	PDA/PDOP<5/30 pts.				
702	702	Three Creek Well	end	7/19/2004	PDA/PDOP<5/30 pts.				
703	703	Flat Draw Reservoir	end	9/22/2004	PDA/PDOP<5/30 pts.				
703	703	Flat Draw Reservoir	start	9/22/2004	PDA/PDOP<5/30 pts.				
705	704	Juniper Butte N	start	7/20/2004	PDA/PDOP<5/30 pts.				
705	704	Juniper Butte N	end	7/20/2004	PDA/PDOP<5/30 pts.				

Appendix C. (Continued) SPATIAL DATA NOT SHOWN.

HIP#	EO/SUB-EO#	EO Name	Location	Date	GPS Accuracy	Easting NAD83 IDTM	Northing NAD83 IDTM	Easting NAD83 UTM	Northing NAD83 UTM
706	88	Juniper Lake	start	7/21/2004	PDA/PDOP<5/30 pts.				
706	88	Juniper Lake	end	7/21/2004	PDA/PDOP<5/30 pts.				
707	97	Juniper Butte S	end	7/21/2004	PDA/PDOP<5/30 pts.				
707	97	Juniper Butte S	start	7/21/2004	PDA/PDOP<5/30 pts.				
708	708	Poison Creek N	start	9/22/2004	PDA/PDOP<5/30 pts.				
708	708	Poison Creek N	end	9/22/2004	PDA/PDOP<5/30 pts.				
709	704	Juniper Butte N	start	7/23/2004	PDA/PDOP<5/30 pts.				
709	704	Juniper Butte N	end	7/23/2004	PDA/PDOP<5/30 pts.				
710	84	Three Creek Well S	start	7/23/2004	PDA/PDOP<5/30 pts.				
710	84	Three Creek Well S	end	7/23/2004	PDA/PDOP<5/30 pts.				
711	92	W of Clover Butte	end	9/20/2004	PDA/PDOP<5/30 pts.				
711	92	W of Clover Butte	start	9/20/2004	PDA/PDOP<5/30 pts.				
712	712	Clover Butte S	start	7/20/2004	Garmin/FOM=15ft				
712	712	Clover Butte S	end	7/20/2004	Garmin/FOM=15ft				
713	704	Juniper Butte N	end	7/20/2004	PDA/PDOP<5/30 pts.				
713	704	Juniper Butte N	start	7/20/2004	PDA/PDOP<5/30 pts.				
714	93	Clover Butte W	start	9/24/2004	PDA/PDOP<5/30 pts.				
714	93	Clover Butte W	end	9/24/2004	PDA/PDOP<5/30 pts.				
715	715	Leo Waterhole	start	7/19/2004	PDA/PDOP<5/30 pts.				
715	715	Leo Waterhole	end	7/19/2004	PDA/PDOP<5/30 pts.				
716	716	Leo Waterhole NW	start	9/21/2004	PDA/PDOP<5/30 pts.				
716	716	Leo Waterhole NW	end	9/21/2004	PDA/PDOP<5/30 pts.				
717	717	NW of Valley Waterhole	start	9/23/2004	PDA/PDOP<5/30 pts.				
717	717	NW of Valley Waterhole	end	9/23/2004	PDA/PDOP<5/30 pts.				
718	702	Flat Draw Reservoir/ Three Creek Well	start	8/2/2005	PDA/PDOP<5/30 pts.				
718	702	Flat Draw Reservoir/ Three Creek Well	end	8/2/2005	PDA/PDOP<5/30 pts.				
719	95	Post Office Reservoir N	start	7/22/2004	PDA/PDOP<5/30 pts.				
719	95	Post Office Reservoir N	end	7/22/2004	PDA/PDOP<5/30 pts.				
720	96	SE Post Office Reservoir/ NW Middle Butte	start	7/22/2004	PDA/PDOP<5/30 pts.				
720	96	SE Post Office Reservoir/ NW Middle Butte	end	7/22/2004	PDA/PDOP<5/30 pts.				
721	96	SE Post Office Reservoir/ NW Middle Butte	start	7/23/2004	Garmin/FOM=15ft				
721	96	SE Post Office Reservoir/ NW Middle Butte	end	7/23/2004	Garmin/FOM=13ft				
722	98	Burnt Butte N	start	9/24/2004	PDA/PDOP<5/30 pts.				
722	98	Burnt Butte N	end	9/24/2004	PDA/PDOP<5/30 pts.				

Appendix D. Plant species at habitat integrity and population (HIP) transects. A "-1" indicates information is unknown.

Scientific name	Common name	Life form	Origen	Growth form	Code
Achillea millefolium	western yarrow	perennial	native	forb	ACHMIL
Achnatherum hymenoides	Indian ricegrass	perennial	native	grass	ACHHYM
Achnatherum occidentale	western needlegrass	perennial	native	grass	ACHOCC
Achnatherum thurberianum	Thurber needlegrass	perennial	native	grass	ACHTHU
Agropyron cristatum	crested wheatgrass	perennial	non-native	grass	ACRCRI
Allium acuminatum	tapertip onion	perennial	native	forb	ALLACU
Amsinckia menziesii	Menzies' fiddleneck	annual	native	forb	AMSMEN
Antennaria dimorpha	low pussytoes	perennial	native	forb	ANTDIM
Aristida purpurea	purple threeawn	perennial	native	grass	ASTPUR
Artemisia tridentata	big sagebrush	perennial	native	shrub	ARTTRI
Astragalus atratus	mourning milkvetch	perennial	native	forb	ASTATR
Astragalus curvicarpus	curvepod milkvetch	perennial	native	forb	ASTCUR
Astragalus filipes	basalt milkvetch	perennial	native	forb	ASTFIL
Astragalus purshii	woollypod milkvetch	perennial	native	forb	ASTPUR
Astragalus species	milkvetch	perennial	native	forb	ASTSPP
Atriplex canescens	fourwing saltbush	perennial	native	shrub	ATRCAN
Balsamorhiza sagittata	arrowleaf balsamroot	perennial	native	forb	BALSAG
Bromus hordeaceus	soft brome	annual	non-native	grass	BROHOR
Bromus arvensis	field brome	annual	non-native	grass	BROARV
Bromus tectorum	cheatgrass	annual	non-native	grass	BROTEC
Cardaria draba	whitetop	perennial	non-native	forb	CARDRA
Caryophyllaceae species	pink family	annual	-1	forb	UF01
Centaurea cyanus	garden cornflower	annual	non-native	forb	CENCYA
Centaurea diffusa	diffuse knapweed	perennial	non-native	forb	CENDIF
Ceratocephala testiculata	bur buttercup	annual	non-native	forb	CERTES
Chenopodium species	goosefoot	annual	non-native	forb	CHESPP
Chondrilla juncea	rush skeletonweed	perennial	non-native	forb	CHOJUN
Chrysothamnus viscidiflorus	green rabbitbrush	perennial	native	shrub	CHRVIS
Collinsia parviflora	maiden blue eyed Mary	annual	native	forb	COLPAR
Cryptantha scoparia	Pinyon Desert cryptantha	annual	native	forb	CRYSCO
Descurainia pinnata	western tansymustard	annual	native	forb	DESPIN
Descurainia sophia	herb sophia	annual	non-native	forb	DESSOP
Draba verna	spring draba	annual	non-native	forb	DRAVER
Elymus elymoides	bottlebrush squirreltail	perennial	native	grass	ELYELY
Elymus lanceolatus	thickspike wheatgrass	perennial	native	grass	ELYLAN
Epilobium brachycarpum	tall annual willowherb	annual	native	forb	EPIBRA
Ericameria nauseosa	rubber rabbitbrush	perennial	native	shrub	ERINAU
Erigeron pumilus	shaggy fleabane	perennial	native	forb	ERIPUM
Erodium cicutarium	redstem stork's bill	annual	non-native	forb	EROCIC
Gayophytum ramosissimum	pinyon groundsmoke	annual	native	forb	GAYRAM
Halogeton glomeratus	halogeton	annual	non-native	forb	HALGLO
Helianthus annuus	sunflower	annual	native	forb	HELANN
Hesperostipa comata	needle and thread	perennial	native	grass	HESCOM
Holosteum umbellatum	jagged chickweed	annual	non-native	forb	HOLUMB
Hordeum species	barley species	annual	non-native	grass	HORSPP
Hypericum perforatum	St. Johnswort	perennial	non-native	forb	HYPPER
Kochia prostrata	prostrate kochia	perennial	non-native	forb	KOCPRO
Kochia scoparia	Mexican-fireweed	annual	non-native	forb	KOCSCO
Lactuca serriola	prickly lettuce	annual	non-native	forb	LACSER
Lappula occidentalis	flatspine stickseed	annual	native	forb	LAPOCC

Appendix D. (Continued)

Scientific name	Common name	Life form	Origen	Growth form	Code
Lepidium papilliferum	slickspot peppergrass	annual	native	forb	LEPPAP
Lepidium perfoliatum	clasping leaf pepperweed	annual	non-native	forb	LEPPER
Leymus cinereus	basin wildrye	perennial	native	grass	LEYCIN
Linum lewisii	blue flax	perennial	native	forb	LINLEW
Lithophragma parviflorum	smallflower woodland-star	perennial	native	forb	LITPAR
Lomatium species	desertparsley	perennial	native	forb	LOMSPP
Machaeranthera canescens	hoary tansyaster	biennial	native	forb	MACCAN
Madia species	tarweed	perennial	native	forb	MADSPP
Medicago sativa	alfalfa	perennial	non-native	forb	MEDSAT
Melica species	melicgrass	perennial	native	grass	MELSPP
Myosotis laxa	bay forget-me-not	annual	native	forb	MYOLAX
Nothocalais troximoides	weevil prairie-dandelion	perennial	native	forb	NOTTRO
Onopordum acanthium	scotch cottonthistle	biennial	non-native	forb	ONOACA
Pascopyrum smithii	western wheatgrass	perennial	native	grass	PASSMI
Penstemon species	penstemon	perennial	native	forb	PENSPP
Phlox aculeata	sagebrush phlox	perennial	native	forb	PHLACU
Phlox gracilis	slender phlox	annual	native	forb	PHLGRA
Phlox hoodii	Hood's phlox	perennial	native	forb	PHLHOO
Phlox longifolia	longleaf phlox	perennial	native	forb	PHLLON
Plantago patagonica	woolly plantain	annual	native	forb	PLAPAT
Poa bulbosa	bulbous bluegrass	perennial	non-native	grass	POABUL
Poa secunda	Sandberg bluegrass	perennial	native	grass	POASEC
Polygonum aviculare	prostrate knotweed	annual	non-native	forb	POLAVI
Pseudoroegneria spicata	bluebunch wheatgrass	perennial	native	grass	PSESPI
Purshia tridentata	antelope bitterbrush	perennial	native	shrub	PUTTRI
Salsola tragus	prickly Russian thistle	annual	non-native	forb	SALKAL
Secale cereale	cereal rye	annual	non-native	grass	SECSER
Sisymbrium altissimum	tall tumblemustard	annual	non-native	forb	SISALT
Sphaeralcea grossulariifolia	gooseberryleaf globemallow	perennial	native	forb	SPHGRO
Sphaeralcea munroana	Munro's globemallow	perennial	native	forb	SPHMUN
Taeniatherum caput-medusae	medusahead	annual	non-native	grass	TAECAP
Tetradymia glabrata	littleleaf horsebrush	perennial	native	shrub	TETGLA
Thinopyrum intermedium	intermediate wheatgrass	perennial	non-native	grass	THIINT
Tragopogon dubius	yellow salsify	biennial	non-native	forb	TRADUB
unknown annual forb	N/A	annual	-1	forb	UAF
unknown annual grass	N/A	annual	-1	grass	UAG
Ventenata dubia	North Africa grass	perennial	non-native	grass	VENDUB
Vulpia octoflora	sixweeks fescue	annual	native	grass	VULOCT
Zigadenus venenosus	deathcamas	perennial	native	forb	ZIGVEN