2004 Habitat Integrity and Population Monitoring of Slickspot Peppergrass (*Lepidium papilliferum*)

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ABSTRACT

Slickspot peppergrass (*Lepidium papilliferum*) is an annual or biennial rare mustard species endemic to sagebrush steppe in southwestern Idaho. 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 rangeland rehabilitation practices. Concern for declining slickspot peppergrass population trends and habitat quality culminated in elevating slickspot peppergrass as a candidate for federal endangered status in 2002. In 2004, the U.S. Fish and Wildlife Service withdrew the proposed rule, partially because of the implementation of formalized plans to eliminate or reduce threats to slickspot peppergrass that would warrant future listing of the species under the Endangered Species Act. The objectives of this study were to evaluate: 1) the effectiveness of implementation measures; and 2) baseline slickspot peppergrass population, slickspot and habitat integrity, anthropogenic and non-anthropogenic disturbance, and plant community characteristics. Seventy-one habitat integrity and population (HIP) transects were established at slickspot peppergrass element occurrences (EOs) across the Consideration Zone. Slickspot peppergrass population, habitat, disturbance, and plant community attributes were sampled at each HIP transect. The plant community data were analyzed with a Sorensen classification and a nonmetric multidimensional scaling (NMS) ordination. Slickspot and plant community data results were summarized by HIP transect, EO, Management Area (MA), and for the Consideration Zone. Fewer than half of the EOs occurred in sagebrush steppe that still had a predominantly native understory. Many of the other EOs occurred in habitats so degraded they are likely in an irreversible state. Nearly all the EOs occurred in areas fragmented by fire, agricultural conversion, or urban development, or all three. Livestock disturbance was the most widespread anthropogenic disturbance within the Consideration Zone, and one-tenth of the EOs had livestock disturbance within slickspots over trigger thresholds. Roughly one-third of the EOs also had high introduced annual plant cover within slickspots, indicating poor slickspot integrity. These results represent the baseline to compare future monitoring results and should provide information to adaptively manage threats to slickspot peppergrass and objectively measure trends in future years.

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INTRODUCTION

Slickspot peppergrass (*Lepidium papilliferum*) is an annual or biennial mustard species endemic to sagebrush steppe in southwestern Idaho (Moseley 1994). The <4 dm (<16 in) tall plant has multi-flowered inflorescences terminating on highly divided branches. The flowers are small, white, and four-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). Gravity is thought to be the primary seed dispersal mechanism, although animals, water, and wind may have minor roles (Moseley 1994). Pollination is necessary for seed production, and the main pollinators include bees, flies, and some beetle species (Robertson and Klemash 2003). The annual form of slickspot peppergrass emerges in early spring, flowers in late-spring, and sets fruit during the summer. The biennial form germinates in early spring, over-winters as a basal rosette, and then flowers and sets fruit during the following year. Annual plants are usually more abundant than biennial plants, although it is difficult to distinguish between both forms in the field (Moseley 1994, Meyer 1995). High quality slickspot peppergrass habitat is characterized by intact sagebrush steppe, native perennial bunchgrasses, low abundance of non-native plant species, and low levels of anthropogenic disturbances (Moseley 1994, U.S. Fish and Wildlife Service 2003).

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 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 plant 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 former 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), contributing to the extirpation of 12 EOs (Idaho Conservation Data Center 2005). Many slickspot peppergrass populations 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). Slickspot peppergrass populations

are threatened by habitat loss and degradation, fragmentation, and population isolation resulting in loss of genetic fitness (Moseley 1994, Reed and Frankham 2003).

Concern for declining slickspot peppergrass population trends and habitat quality culminated in slickspot peppergrass being a candidate for federal endangered status 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 National Guard (ING), 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). The objectives of this study were to evaluate: 1) the effectiveness of implementation measures addressed by the Candidate Conservation Agreement; and 2) baseline slickspot peppergrass population, slickspot and habitat integrity, anthropogenic and non-anthropogenic disturbance, and plant community characteristics.

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 (Fig. 1). Elevation ranges from 765 m (2510 ft) on the lower Snake River Plain to 1650 m (5413 ft) on the Owyhee Plateau. The climate is semi-arid and mean annual temperature and precipitation are 11ºC (51ºF) and 302 mm (12 in), respectively. There are two main peaks of annual precipitation, a larger peak during November-January and a smaller peak during March-June (Fig. 10). Prevailing winds are northwesterly during April-August and southeasterly during September-March (Desert Research Institute 2004).

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 if present. Non-native species are abundant and often include cheatgrass (*Bromus tectorum*), clasping leaf pepperweed (*Lepidium perfoliatum*), crested wheatgrass (*Agropyron cristatum*), Russian thistle (*Salsola kali*), 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 (2004).

METHODS

In 2004, the habitat integrity and population (HIP) monitoring protocol was developed to monitor and assess slickspot peppergrass population, habitat integrity, and disturbance trends, for the purpose of evaluating and improving management actions implemented by the Candidate Conservation Agreement (2003). The HIP monitoring protocol replaces 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 population, habitat, and disturbance attributes at selected slickspots, 5) measure plant community attributes, and 6) analyze and describe the results.

One or more HIP transects were established within nearly all slickspot peppergrass element occurrences (EOs). An EO is a specific geographic location where "a species or natural community is, or was, present"(NatureServe 2002:10). Each EO is associated with a numerical identification code (e.g., 700) and survey site name (Appendix C). This information was also used for labeling HIP transects. Additional HIP transects were established within larger EOs (>1 km²; 250 ac) consisting of multiple, discrete subpopulations. Transects established as part of the HII monitoring protocol were also used to establish HIP transects, so data are comparable to information collected since 1998.

The HIP transect location was determined after surveying the general EO site 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 HIP transect azimuth was selected based upon the distribution of slickspots inhabited by slickspot peppergrass. The first ten 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 three-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 and will be stored in the Idaho Conservation Data Center Biotics database (Appendices C and H). The azimuths (always using 0º declination) and step counts were recorded between the red "potato digger" stake and the 1st slickspot, the 1st slickspot 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. Later in the season, the protocol was amended to also take photographs of slickspots that had attributes exceeding limits stated within the Candidate Conservation Agreement (2003; i.e., penetrating livestock prints). 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).

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 HIP and HII transect data, and to address additional concerns specified by the slickspot peppergrass technical committee before the 2004 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).

Most of the attributes were self-explanatory, although there were some questions about categorizing livestock prints as penetrating or non-penetrating. 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). Livestock prints with a reddish coloration (due to the exposed clay layer) were typically easy to identify when soils were dry. Livestock print penetration was difficult to discern within the Jarbridge MA (Fig. 9) because the reddish colors of the clay layer were not as obvious when moist (due to multiple precipitation events during both mid- and late-summer visits). The field technicians used previous experience (>2 months) categorizing livestock prints at completed HIP transects to estimate whether these livestock prints under moist conditions were penetrating or non-penetrating, particularly using livestock print depth as a guide to validate the decision. Fisher et al. (1996) found that mean clay layer depth at slickspots was 3.4 cm (1.3 in), consistent with 2004 penetrating livestock print estimates within the Jarbridge MA.

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 one slickspot, then all three vegetation transects were established at the one 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.

Shrub cover was estimated along the vegetation transects using the line-interception method (Canfield 1941). 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). The cover class scale was the same one noted earlier in this section. There were five 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 were summarized and analyzed based on the midpoint of Daubenmire cover classes by EO and MA. MA3 and MA5 were unintentionally lumped together because of errors that were discovered late, based on a previous report (Bureau of Land Management 2004). Plant cover data on the vegetation transects were relativized by their maximum value. HIP transect and vegetation transect substrate data were expressed in absolute terms. PC-ORD version 4.25 was used to classify, ordinate, and calculate Shannon-Weiner diversity index (H) from the HIP transect vegetation data (McCune and Mefford 1999, McCune and Grace 2002). One outlier (060) was removed from both analyses because it had burned just before it was monitored. 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. 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. Mean stress with the 3-D solution was 11.0 using real data, and 13.9 using randomized data for the Monte Carlo test (p=0.03). The final solution was 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). Photographs were not used in the analysis, but are included in Appendix E. Qualitative descriptions (i.e., fair, good) were based on relative abundance of attributes compared to the rest of the HIP transects.

RESULTS

RANGEWIDE HABITAT INTEGRITY AND POPULATION TRENDS

Slickspot peppergrass

In 2004, nearly 19,000 slickspot peppergrass plants were counted in the Consideration Zone, and 65% were rosettes (based on total number of plants; Tables 1 and 3). The largest proportion of the slickspot peppergrass plants occurred in MA1 (24%), MA6 (15%), MA7 (18%), and MA11 (16%). MA7B (6%), MA9 (6%), and MA10 (10%) also had a moderate number of plants. MA2 (3%), MA3/MA5 (<1%), and MA8 (1%) had the fewest slickspot peppergrass plants.

Biological soil crust

Biological soil crust cover within slickspots tended to be higher at MAs in the northern half of the Consideration Zone, except at MA9 (Table 3). Mean biological soil crust cover within slickspots was 21%, and ranged from 5% in MA11 to 57% in MA1.

Introduced plant species and restoration activities within slickspots

Introduced annual cover within slickspots was generally high at MA3/MA5, MA6, MA7B, and MA10 (>13%), and was lowest at MA7, MA8, MA9, and MA11 (<4%; Table 4). Common introduced annual species within slickspots included cheatgrass, clasping leaf pepperweed, Russian thistle, bur buttercup, and tall tumblemustard. Introduced perennial species were present within slickspots at MA1, MA6, MA7B, MA10, and MA11 (Table 4). Crested wheatgrass was the most frequently occurring introduced perennial species within slickspots, although prostrate kochia (*Kochia prostrata*), blue flax (*Linum lewisii*), and rush skeletonweed (*Chondrilla juncea*) also were present. Drill seeding within slickspots has occurred at MA6, MA7B, and MA11.

Off-highway vehicles (OHVs)

OHV tracks were detected within slickspots at MA6 and MA7 (Table 3). The OHV tracks appeared to be recent at MA6, but were old tank tracks at MA7. OHV disturbance was an infrequent occurrence throughout the Consideration Zone.

Livestock use

Livestock use within slickspots was highest in MA8, MA9, and MA11, based on mean livestock print cover and frequency of slickspots with >10% penetrating livestock print cover (Table 5). Approximately one-quarter (*n*=23) of the HIP transects had slickspots with at least 5-10% penetrating livestock print cover within slickspots; this occurred in MA6, MA7, MA7B, MA8, MA9, and MA11. MA10 had lower livestock use within slickspots, and no livestock prints were observed within slickspots at MA1, MA2, or MA3/MA5. Livestock feces were present within slickspots at all except MA2 and MA3/MA5. MA7B and MA11 had the greatest livestock feces cover within slickspots, indicating higher cumulative use in these areas. All livestock use was attributed to cattle.

Wildlife use

Wildlife use within slickspots was greatest at MA1, MA3/MA5, MA6, MA9, and MA10 (Table 3). Most wildlife use within slickspots consisted of trails, badger and ground squirrel diggings, divots or holes of unknown origin, and anthills. These trails were most common at MA3/MA5, MA9, and MA10, but occurred throughout the Consideration Zone. Badger and ground squirrel diggings were most common at MA1, MA2, and MA6, and were present everywhere except MA3/MA5. Non-livestock ungulate prints within slickspots were observed at MA2, MA6, MA7, MA8, MA9, MA10, and MA11. Non-livestock print cover occurred infrequently at all except MA11, nearly always a fraction of the total livestock print cover.

General occurrence area

Half of the HIP transects (*n*=36) had penetrating livestock prints within slickspots in the general occurrence area, and the livestock use was recent at 17 HIP transects (Table 5). Six HIP transects had OHV tracks in the general occurrence area (MA3/MA5, MA6, MA7, and MA8), although most OHV use was older (Table 3). MA7, MA9, and MA11 had evidence of firefighting disturbance (i.e., fire lines) within the general occurrence area (Table 3). MA1, MA6, MA7B, MA10, and MA11 had older restoration-related disturbances (i.e., drill seeding) within slickspots (Table 3). Noxious or aggressive introduced perennial species were found in the general occurrence area at MA1, MA2, MA3/MA5, and MA8 (Table 4). These species included rush skeletonweed, spotted knapweed (*Centaurea biebersteinii*), and St. Johnswort (*Hypericum perforatum*).

Fragmentation

Forty-five of the HIP transects (63%) were unburned, five had burned and unburned areas (7%), nine were predominantly burned (13%), and 12 were completely burned (17%; Table 4). Eleven of the unburned HIP transects were <65 m from a burned area, meaning that fewer than half (48%) were both unburned and >65 m from the nearest burned area. Twenty-one HIP transects (31%) were unburned and >250 m from the

nearest burned area. Only six HIP transects (8%) had no burned area visible <500 m away. Two EOs were burned in 2004 fires (024 and 060).

Plant community and habitat quality

The Sorensen dendrogram produced six distinct community classes. These community classes are summarized and described in Table 2. Forty-one HIP transects (58%) were classified having predominantly big sagebrush cover and less than one-third introduced annual cover (Class A). Seven HIP transects (10%) were classified having moderate big sagebrush cover with at least one-third introduced annual cover (Class B). Six HIP transects (8%) were classified having been burned with predominantly native vegetation, although introduced annual cover sometimes comprised up to half of the total plant cover (Class C). Two HIP transects (3%) were classified as burned with predominantly introduced annual cover (Russian thistle and bur buttercup) with low cheatgrass and some crested wheatgrass cover (Class D). Eleven HIP transects (14%) were classified as burned and dominated by cheatgrass (Class E). Four HIP transects (6%) were classified as burned and seeded with crested wheatgrass (Class F). HIP transect 060 was removed from the analysis because it had burned less than a month before sampling. Based on field observations, it was probably in Class E and included in the appropriate proportion calculation (Table 2 and Fig. 12).

The NMS ordination of 70 HIP transects (all but 060) is shown in Fig. 11. Axes 1 and 2 had a cumulative r^2 of 0.82 for the correlation between ordination distances and distances in original 3-D space, and shows the major vegetation patterns explained by the vegetation data. Axis 3 only had a cumulative r^2 of 0.12 and is not shown in this report. The NMS ordination shows HIP transects represented by three distinct groups: a crested wheatgrass group (*n*=4; 6%), a cheatgrass group (*n*=10; 14%), and a big sagebrush group (*n*=45; 64%). Again, 060 is not shown, but it probably placed in the cheatgrass group. There were also 11 HIP transects that did not fall directly into any one of these three groups (16%). All Class F HIP transects placed within the crested wheatgrass group. The HIP transects in the cheatgrass group aligned well with Class E, with few exceptions.

No Class A HIP transects occurred outside of the big sagebrush group, but four Class B HIP transects placed within the big sagebrush group. The big sagebrush group also had three main subgroups (Fig. 11). The largest subgroup (S1) had HIP transects with a high proportion of big sagebrush cover, low to moderate native perennial grass cover nearly entirely comprised of Sandberg bluegrass, and low introduced annual cover (*n*=31; 44%). HIP transects in the second largest subgroup (S3) generally had moderate big sagebrush and native perennial grass cover, comprised of Sandberg bluegrass and bottlebrush squirreltail, high native forb diversity, but usually had higher introduced annual cover (and cheatgrass cover) than most others in the big sagebrush group (*n*=5; 7%). The subgroup at the top of the big sagebrush group (S2) had HIP transects that usually had roughly equal proportions of big sagebrush and native perennial grass cover, mostly Sandberg bluegrass, and all but 018B had low introduced annual cover (*n*=3; 4%).

The eleven HIP transects that did not place into the three main groups appear to be on a trajectory, likely from the big sagebrush group to the crested wheatgrass or cheatgrass groups, or another low habitat integrity state. Although not in the big sagebrush group, a few (066 and 700) had fair habitat integrity, based on overall vegetation composition and low anthropogenic disturbance (Tables 3-6). The HIP transects outside of the big sagebrush group generally had poor habitat integrity (*n*=23; 33%). Most HIP transects that were in the largest (S1) or the smallest (S2) big sagebrush subgroups had good habitat integrity. The remaining big sagebrush HIP transects generally had higher introduced annual cover and reduced habitat integrity. The Sorensen community classification and NMS ordination were useful tools because they facilitate objective, replicable analyses of the plant communities associated with the HIP transects.

Triggers

The livestock grazing trigger was tripped in MA8 (*n*=1), MA9 (*n*=1), and MA11 (*n*=4). The fire trigger was tripped in MA8 (*n*=1). The OHV trigger was tripped in MA6 (*n*=1). Specific details are provided within each MA subsection.

HABITAT INTEGRITY AND POPULATION TRENDS BY GEOGRAPHIC LOCATION

New Plymouth Management Area (MA1)

Background

The New Plymouth MA (MA1) is located in Payette County (Figs. 1-2). HIP transects were completed at 066, 068, and 070 (*n*=3). EO 066 was the only one with a previously established HII transect. EO 069 was visited, but a HIP transect was not established due to time constraints. All four EOs are located on BLM lands.

Slickspot peppergrass

A total of 4426 slickspot peppergrass plants were found at the MA1 HIP transects, the highest number in the Consideration Zone (Table 1). HIP transect 066 had more plants than any other within the Consideration Zone, and 068 and 070 also both had a large number of plants (Tables 1 and 3). EOs 066 and 068 were already known to have a large number of plants, but 070 had more than previously found (170 plants in 2003; Idaho Conservation Data Center 2005). Rosettes comprised 73% of the total population at MA1. All had a greater proportion of rosettes than reproductive plants. Although not used in the analysis, four plants were also found in two slickspots at EO 069.

Biological soil crust

Biological soil crust cover within slickspots was nearly three times greater in MA1 compared to the Consideration Zone (Table 3), and was consistently high at 066, 068,

and 070. HIP transects 066 and 070 also had moderately high biological soil crust cover in the surrounding plant community, although it was low at 068.

Introduced plant species and restoration activities within slickspots

Introduced annual cover within slickspots was low at 066 and 070 (Table 4). At 068, introduced annual cover within slickspots was greater than twice the mean for the Consideration Zone, comprised mostly of tall tumblemustard. Crested wheatgrass was present within slickspots at 066 (1%), but no slickspots were drill seeded (Table 3).

Off-highway vehicles (OHVs)

No evidence of OHV use was found in slickspots within MA1 (Table 3).

Livestock use

Livestock prints were not found within slickspots in MA1 (Table 5). Livestock feces were found within slickspots at 066 and 068.

Wildlife use

Wildlife use within slickspots was moderately high, and there was more badger and ground squirrel evidence at 066 than anywhere else within the Consideration Zone (Table 3). Some trail cover was found within slickspots at 066 and 070.

General occurrence area

There was no evidence of penetrating livestock prints, OHV use, or firefighting disturbance within the general occurrence area of any MA1 HIP transect (Tables 3 and 5). At 068, <10% of the slickspots surveyed in the general occurrence area were drill seeded. Spotted knapweed was found <150 m south of 066, and has invaded the exclosure from nearby agricultural fields.

Fragmentation

The nearest burned area was >250 m away from 066, although agricultural fields are adjacent to the exclosure. HIP transect 068 was predominantly burned in 1996, and the fire burned the surrounding landscape for at least 500 m in every direction. HIP transect 070 has not burned yet and the closest burned area was <250 m away.

Plant community and habitat quality

All three MA1 HIP transects were in Class B communities (Table 2). The understory was predominantly sixweeks fescue at 066 and 070, but tall tumblemustard at 068 (Table 6). Native perennial grass cover was relatively low at all three HIP transects. Sandberg bluegrass was the main native perennial grass species at 066 and 068, but

was less abundant than other native perennial grass species at 070. HIP transect 070 was within the big sagebrush group, probably close to the border because of the high proportion of sixweeks fescue in the understory (Fig. 11). HIP transects 066 and 068 were between the big sagebrush and crested wheatgrass groups, indicating they have lower habitat integrity than 070. HIP transect 066 was dominated by native vegetation and had been excluded from livestock grazing. HIP transect 068 was functionally close to the cheatgrass group because of its fire history and the high introduced annual cover, even though cheatgrass was not encountered along the vegetation transects. Native forb diversity was high at 066 and 068, and zero at 070 (Table 6). Litter was high at 070, made up of multiple years' sixweeks fescue culms. Biological soil crust cover was much higher at 066 and 070 than at 068.

Triggers

No triggers were tripped in MA1 during 2004. The spotted knapweed observed near 066 should be treated to prevent it from invading the slickspots.

Boise Foothills/BLM Management Area (MA2)

Background

The Boise Foothills/BLM MA (MA2; includes MA2A and MA2B; Figs. 1-2) is located north of Eagle in Gem and Ada Counties. A HIP transect was completed at only EO 052 in MA2B (*n*=1). HIP transect 052 has had a HII transect since 1998. EO 056 was intensively surveyed (~ 4 hrs), but neither the previously established HII transect nor any slickspot peppergrass were found. EO 039 was not visited because it is on private land. The HII transect for EO 040 was found, but it also turned out to be on private land and was discontinued. Adjacent BLM land was surveyed, but slickspot peppergrass was not found and a HIP transect for EO 040 was not established. EO 052 is the only one completely on lands managed by the BLM; the rest are partially or wholly located on private lands.

Slickspot peppergrass

There were 498 plants observed at 052, higher than found in previous years (Table 1). Rosettes comprised 72% of the genets, slightly higher than average for the Consideration Zone (Table 3). Slickspot peppergrass was not found at the other EOs surveyed (040 and 056).

Biological soil crust

Biological soil crust cover within slickspots was high at 052 (Table 3) despite the high cheatgrass cover and fire history of the surrounding habitat.

Introduced plant species and restoration activities within slickspots

Introduced annual cover within slickspots was low at 052 (Table 4). Cheatgrass and common sunflower (*Helianthus annuus*) were the main weeds present. No introduced perennial plant species or drill seeding has occurred within the slickspots (Table 3).

Off-highway vehicles (OHVs)

No evidence of OHV use was found within slickspots (Table 3).

Livestock use

No livestock prints or feces were found within slickspots (Table 5).

Wildlife use

Wildlife use was low within slickspots at 052 (Table 3). Badger and ground squirrel diggings and trails comprised most wildlife use, although deer prints were observed.

General occurrence area

There was no evidence of penetrating livestock prints, OHV use, or firefighting or restoration-related disturbance within the general occurrence area of 052 (Table 3). St. Johnswort has invaded a gulch north of 052 (Table 4). Rush skeletonweed was observed at 052 in 2000 (Idaho Conservation Data Center 2005), although it was not found in 2004. Although not included in the analysis, rush skeletonweed has invaded EOs 040 and 056. Rush skeletonweed was invading from the drainage below EO 040, and includes areas managed by BLM. Rush skeletonweed was ubiquitous at EO 056.

Fragmentation

HIP transect 052 persists in a predominantly burned gray rabbitbrush fragment. Fires have burned through the surrounding landscape in every direction. Large, low density homes and a highway are <250 m from 052.

Plant community and habitat quality

HIP transect 052 was in the Class E community (Table 2) and did not place in any of the ordination groups, although it was near the cheatgrass group (Fig. 11). Cheatgrass made up half of the total plant cover at 052 (Table 6), lower than the other Class E HIP transects. Native perennial grass cover was very low, and consisted of purple threeawn (*Aristida purpurea*) and Sandberg bluegrass. Rubber rabbitbrush made up nearly one-third of the plant community, providing some vertical structure, possibly explaining why 052 has not yet made it to the cheatgrass group. Litter covered nearly three-quarters of the ground surface, indicating a continuous and flammable understory layer.

Triggers

No triggers were broken at 052 during 2004. Rush skeletonweed and St. Johnswort invasions threaten to further degrade habitat at EOs 040, 052, and 056.

Boise Foothills/County Landfill (MA3) and Boise Management Areas (MA5)

Background

The Boise Foothills/County Landfill (MA3) and Boise MAs (MA5) are located near Boise, Eagle, and Mora north and south of I-84, Ada County (Figs. 1 and 3). HIP transects were completed at EOs 032, 048, and 065 (*n*=3). HIP transects 032 and 065 had been monitored as HII transects since 1998. There was a HII transect at EO 048, but slickspot peppergrass had not been present for years so a HIP transect was relocated to another subpopulation. EOs 023, 036, 037, and 043 are located on privately owned land and HIP transects were not established. EOs 022 and 049 were abandoned previously due the absence of slickspot peppergrass and/or land ownership issues. Previously established HII transects at EOs 012 and 038 were visited, but neither had slickspot peppergrass in 2004 and HIP transects were not established. EOs 012, 038 and 065, and 032 and 048 are located on lands managed by City of Boise, Ada County, and BLM, respectively.

Slickspot peppergrass

A total of 82 slickspot peppergrass plants were found at the three HIP transects in 2004, the lowest in the Consideration Zone (Table 1). In 2004, 032 had four plants, 50% reproductive, and 065 only had 21 rosettes (Table 3), much lower than previous years, based on HII records (Table 1). HIP transect 048 had 57 plants, 58% rosettes. Rosettes comprised 69% of the total number of plants.

Biological soil crust

Biological soil crust cover within slickspots was more than twice the Consideration Zone average (Table 3). HIP transects 032 and 048 had a higher proportion of biological soil crust cover within slickspots than 065, but all were relatively high.

Introduced plant species and restoration activities within slickspots

Introduced annual cover within slickspots was nearly three times higher than the Consideration Zone average (Table 4). HIP transects 048 and 065 had much higher introduced annual cover within slickspots compared to 032. Cheatgrass was the most common weed species within slickspots, but clasping leaf pepperweed was also present at 032 and 048. There were no introduced perennial species or drill seeding evidence within slickspots.

Off-highway vehicles (OHVs)

No evidence of OHV use was found within slickspots (Table 3).

Livestock use

No livestock sign was found within slickspots (Table 5).

Wildlife use

Wildlife use within slickspots was variable (Table 3). HIP transects 032 and 065 had low wildlife use, and 048 had higher wildlife use, comprised mostly of trails.

General occurrence area

There was no evidence of penetrating livestock prints, firefighting disturbance, or restoration activities within the general occurrence area of any MA3/MA5 HIP transect (Tables 3 and 5). Older, low density OHV tracks were found in the general occurrence area of 048. Rush skeletonweed was prevalent within both slickspots and general occurrence area at 065 (Table 4).

Fragmentation

HIP transect 032 had burned and unburned areas at the HIP transect and at all landscape scales (Table 4). HIP transect 048 was not burned, although burned areas were visible <250 m away. HIP transect 065 also was not burned, although there was a burned area <65 m away. HIP transects 048 and 065 were close to housing developments and roads near the City of Boise.

Plant community and habitat quality

All three HIP transects were in Class B communities (Table 2). Big sagebrush cover was much higher at 032 and 048 than at 065, although antelope bitterbrush was also present at 065 (Table 6). Native perennial grass cover was low at all three HIP transects, and Sandberg bluegrass was less abundant compared to other species. Basin wildrye was the dominant native perennial grass species at 032, and bottlebrush squirreltail was most abundant at 048 and 065. Cheatgrass cover comprised one-fifth to two-fifths of the total plant cover at the three HIP transects, and 048 and 065 also had moderate sixweeks fescue cover. Rush skeletonweed was present at 065. HIP transects 032 and 048 were in big sagebrush communities with reduced habitat integrity (Fig. 11). HIP transect 065 did not place in any ordination group and appears to be on a trajectory towards the cheatgrass group. Native forb cover and diversity was higher at 065 than 032 or 048. Litter was consistently high, and biological soil crust cover was higher at 048 than 032 or 065.

Triggers

No triggers were broken in MA3/MA5 during 2004. The older OHV tracks in the general occurrence area of 048 indicate that future OHV use may occur. Rush skeletonweed threatens habitat integrity at 065.

Kuna Management Area (MA6)

Background

The Kuna MA (MA6) is located near Kuna, Melba, and Mora in Ada County (Figs. 1 and 4). HIP transects were completed at 018 (A:B), 019 (A:B), 024, 025, and 057 (*n*=7), and all had been HII transects since 1998. EO 042 was visited, but a HIP transect was not established because slickspot peppergrass was not found. All EOs are located on BLM land, except for a portion of EO 019 (private land).

Slickspot peppergrass

A total of 2898 slickspot peppergrass plants were observed at the MA6 HIP transects. The number of plants at most MA6 HIP transects was consistent with previous years, based on HII data since 1998 (Table 1). HIP transects 018A:B, 024, and 025 all had a moderately large number of plants, and 019A and 057 had very few plants. Since EO 019 burned in 1996, this formerly robust slickspot peppergrass population has been very low–019A had two flowering plants, and no plants were observed at 019B. In 2004, 025 had more than five times the plants ever found since 1998. HIP transect 057 has been on a declining population trend since 1998, although 15 plants remained in 2004. Rosettes comprised 48% of the plants (Table 3).

Biological soil crust

Biological soil crust cover within slickspots was variable at the MA6 HIP transects (Table 3). HIP transects 018B, 025, and 057 all had high levels of biological soil crust cover within slickspots, and 018A, 019A, 019B, and 024 all had moderately low levels.

Introduced plant species and restoration activities within slickspots

MA6 had the highest introduced annual cover within slickspots in the Consideration Zone (Table 4). HIP transects 019A and 019B both had moderate introduced annual cover within slickspots. Introduced annual cover was very high at 018A:B, 024, 025, and 057. Cheatgrass was the most common introduced annual species except at 018B, where Russian thistle was abundant. Clasping-leaf pepperweed and tall tumblemustard were also common weed species. MA6 also had the highest introduced perennial cover within slickspots, although none were present at 018A, 025, and 057 (Table 4). Crested wheatgrass was found within slickspots at 018B, 019A, and 024. Prostrate kochia was prevalent within slickspots at 019B. Drill seeding had occurred at 019A and 019B, and 80 and 90% of the slickspots had been affected, respectively (Table 3).

Off-highway vehicles (OHVs)

OHV tracks of unknown origin were found in 40% of the slickspots at 024, affecting 3% of the mean slickspot area (Table 3).

Livestock use

Livestock use was generally low at the MA6 HIP transects, and livestock prints were only found within slickspots at 019A and 024 (Table 5). Livestock feces were observed within slickspots at all except 019B, located within a livestock exclosure. HIP transect 019A had penetrating livestock prints at 70% of the slickspots, and one slickspot had 5-10% penetrating livestock print cover. HIP transect 024 had penetrating livestock prints at 60% of the slickspots, but none of the slickspots had >5% penetrating livestock print cover. HIP transect 024 also had 128 “probable” and “maybe” prints that were too degraded to identify, mostly penetrating, that were probably older livestock prints.

Wildlife use

Wildlife use within slickspots was moderately high, and included anthills, badger and ground squirrel diggings, and trails (Table 3). HIP transects 018B and 019A both had high wildlife use, and 018A, 025, and 057 had more moderate levels. HIP transects 019B and 024 had low wildlife use. Badger and ground squirrel diggings were common at 018A:B, 019A, and 019B. Trails were also common at 018B, 025, and 057. Anthills occurred at most MA6 HIP transects, but were most common at 019A.

General occurrence area

HIP transects 019A and 024 both had >10% older, penetrating livestock prints within slickspots in the general occurrence area (Table 5). OHV tracks (light to moderate) were also found in the general occurrence area of 019A and 024 (Table 3), but appeared to be older at 024. No firefighting disturbance was detected. More than 10% of the slickspots at 019A:B had older drill seeding disturbance.

Fragmentation

HIP transects 019A:B, 024, and 025 were completely burned and 018A was predominantly burned, mostly due a large fire in 1996 (Table 4). After it was monitored in 2004, a fire reburned part of EO 024 and may have also burned the HIP transect (Table 4). HIP transects 018B and 057 have not burned, and the nearest burned areas are <250 m away. Fires have burned much of MA6, and the landscape has become highly fragmented.

Plant community and habitat quality

Five MA6 HIP transects were in Class E communities, and had burned and were dominated by cheatgrass (018A, 019A:B, 024, and 025; Tables 2 and 6). Introduced

annuals, predominantly cheatgrass, comprised >65% of the total plant cover at these HIP transects. HIP transect 025 was the only one with any big sagebrush cover and also had moderate native perennial grass cover, made up of Sandberg bluegrass and bottlebrush squirreltail. Native perennial grass cover was low at the other four Class E HIP transects, mostly Sandberg bluegrass. Crested wheatgrass was present at 019A and 024, and prostrate kochia was present at 019B. These five HIP transects were all in the cheatgrass group (Fig. 11).

Two MA6 HIP transects were classified in Class A communities (018B and 057) and were predominantly comprised of big sagebrush and native perennial grass cover (Tables 2 and 6). HIP transect 057 had more big sagebrush cover than 018B, but both had moderate native perennial grass cover, mostly Sandberg bluegrass. Introduced annual cover made up one-quarter of the total plant cover at both 018B and 057, among the highest of the Class A HIP transects (Tables 2 and 6). HIP transect 018B placed within big sagebrush S2, and 057 was in S3, possibly because of the higher proportion of cheatgrass (Fig. 11). Native forb diversity was low overall. HIP transects 018A, 019A, 019B, 024, and 025 all had a high amount of litter, and biological soil crust cover was highest at 018B and 057 (Table 6).

Triggers

In 2004, fire and OHV use tripped triggers in MA6. In June 2004, part of EO 024 was burned, but the fire was <100 ac and the burned portion in the EO was <10% of the cumulative area of MA6 EOs, so the fire was not considered a trigger (Table 4; Candidate Conservation Agreement 2003). OHV tracks were also found within slickspots at 024 (Table 3). HIP transects 019A and 024 both had OHV tracks detected within their general occurrence area, but the trigger metrics only addresses OHV use within HIP transect slickspots.

Orchard Training Range Management Area (MA7)

Background

The Orchard Training Range MA (MA7) is located in Ada County (Figs. 1 and 5). HIP transects were completed at 027 (A:E), 028 (A: B), 035A, 041A, 053B, 059A, 067, and 071 (A:B; *n*=14). HIP transects 027A:E, 028A:B, 035A, 041A, 053B, and 059A had been monitored as HII transects, and 067 and 071A:B were newly established in 2004. HIP transects 027D and 071A are on state land and the rest are on BLM land.

Slickspot peppergrass

A total of 3414 slickspot peppergrass plants were found at the MA7 HIP transects. Slickspot peppergrass population data collected at MA7 HIP transects with previously established HII transects allowed a more accurate comparison because this was the only MA where the HII transect slickspots were already permanently marked (Table 1). In 2004, slickspot peppergrass plants were not found at 027B, 028B, 041A, and 059A,

even though they have been previously observed along the same transects. Records indicate the number of slickspot peppergrass plants has usually been low at 027B, 041A, and 059A since they were established. HIP transect 028A had a relatively large number of plants for four consecutive years (1998-2001), but none were observed in 2002 or 2004. The number of plants at 027A and 027E was similar to previous years. The number of plants at 027C:D and 053B was much higher, particularly at 027D, which had 1233 plants, nearly 10 times more compared to previous monitoring years. HIP transects 067 and 071A:B were established in 2004, and all had >100 plants. In 2004, the greatest number of plants were found at 027A and 027C:D, although moderate numbers were also found at 053B, 067, and 071A:B. Rosettes comprised only 27% of the total number of plants at the MA7 HIP transects (Table 3).

Biological soil crust

Biological soil crust cover within slickspots at MA7 HIP transects was near average for the Consideration Zone (Table 3). The highest biological soil crust cover occurred at 027A, 027C:E, 028A:B, 035A, 067, and 071A:B. The lowest biological soil crust cover occurred at 027B, 053B, and 059A.

Introduced plant species and restoration activities within slickspots

MA7 had the lowest mean introduced annual cover within slickspots in the Consideration Zone. There were no introduced perennial species or drill seeding found within any slickspots (Table 4). The highest introduced annual cover within slickspots occurred at 027B and 027E, predominantly made up of clasping-leaf pepperweed and cheatgrass. HIP transects 027C, 028A:B, 041A, 059A, and 067 had low introduced annual cover within slickspots, comprised of bur buttercup, clasping-leaf pepperweed, and cheatgrass. HIP transects 027A, 027D, 035A, 053B, and 071A:B all had very low introduced annual cover within slickspots, comprised of mostly bur buttercup.

Off-highway vehicles (OHVs)

HIP transects 027D and 071A had tank tracks found within slickspots, although they appeared to be of older origin (Table 3). At 027D, tank tracks were found in three slickspots and affected 1% of the mean slickspot area. At 071A, tank tracks were found in two slickspots, also affecting 1% of the mean slickspot area.

Livestock use

Livestock use was relatively low in MA7, and livestock prints were found within slickspots at 027A:E and 067 (Table 5). Livestock feces were observed at all HIP transects except 041A. HIP transects 027B, 027E, and 067 had penetrating livestock prints in 50% of the slickspots. HIP transect 067 was the only one with >5% penetrating livestock print cover within slickspots, and that occurred in one slickspot. HIP transects 027B and 067 each had two slickspots with 1-5% and two slickspots with <1% penetrating livestock print cover. The remaining HIP transects did not have any

slickspots with >1% penetrating livestock prints. HIP transects 027B (62), 027E (47), 028A (142), 067 (31) also had a number of “probable” and “maybe” prints that were too degraded to identify, predominantly penetrating, that were probably older livestock prints (number of questionable prints stated in parentheses). No definite livestock prints were found in slickspots at 028A, although livestock feces were present.

Wildlife use

Wildlife use within slickspots in MA7 was near average compared to the rest of the Consideration Zone, and included anthills, badger and ground squirrel diggings, and trails (Table 3). HIP transects 027A, 027D, 028B, 059A, 067, and 071B had moderate wildlife use, predominantly trails.

General occurrence area

HIP transects 027B, 027D:E, 028A, and 067 had >10% older, penetrating livestock prints within slickspots in the general occurrence area (Table 5). Light to moderate older OHV use (tank tracks) was observed in the general occurrence area at 027D and 071A (Table 3; Appendix A). Firefighting disturbance (a fire line) was found in the general occurrence area of 041A (Table 3). No evidence of drill seeding or other restoration-related disturbances or noxious weeds were found in the general occurrence area at any MA7 HIP transects (Table 4).

Fragmentation

HIP transect 041A was completely burned and for at least 0.5 km away in every direction (Table 4). No other MA7 HIP transects were burned. HIP transect 035A was <65 m from a burned area. HIP transects 027B, 053B, and 059A were <250 m from the nearest burned area. HIP transects 027D:E, 028A:B, 067, and 071A:B were <500 m from the nearest burned area. HIP transects 027A and 027C were the only ones >500 m from the nearest burned area. Landscape quality was high overall in MA7 because of the low proportion of HIP transects that have burned or are close to burned areas.

Plant community and habitat quality

Thirteen MA7 HIP transects were in Class A (027A:E, 028A:B, 035A, 053B, 059A, 067, and 071A:B) and one was in the Class C community (041A; Table 2). Big sagebrush made up greater than half the total plant cover at all Class A HIP transects except for 035A (Table 6). Big sagebrush cover was much lower at 035A, but native perennial grass cover made up nearly two-thirds of the total plant cover. Native perennial grass cover was typically low at most Class A HIP transects. Native perennial grass cover was very low at 053B, but native forb cover was very high. Native forb cover was generally low at the other HIP transects. Sandberg bluegrass was almost always the dominant or only native perennial grass species at the Class A HIP transects. Bottlebrush squirreltail was the dominant native perennial grass species at 027B, where Thurber needlegrass was also present in trace amounts. Introduced annual grass cover was low (<15%) at all

Class A HIP transects except 027B and 028A. Cheatgrass was very low at all MA7 HIP transects. HIP transect 041A was comprised of four-fifths native perennial grass cover and one-fifth introduced annual cover.

The Class A HIP transects in MA7 were also in the big sagebrush group (Fig. 11). HIP transects 027A, 027C:E, 028A:B, 059A, 067, and 071A:B were all in big sagebrush S1. HIP transect 035A was in big sagebrush S2, and 053B and 027B were not in any of the big sagebrush subgroups. HIP transect 041A was in the cheatgrass group even though it was in the Class C community and had low cheatgrass cover. Based on this information, 041A is probably not as degraded as the other HIP transects in the cheatgrass group and likely has fair habitat integrity. No introduced perennial species were encountered at any MA7 HIP transect. Biological soil crust cover was high at most MA7 HIP transects, except for 027B, 041A, and 053B.

Triggers

In 2004, no triggers occurred in MA7 HIP transects. Tank tracks were observed within slickspots at 027D and 071A, although they appeared to be older.

North of Orchard Training Range Management Area (MA7B)

Background

EOs 072A:C and 054 were assigned to the North of Orchard Training Range MA (MA7B) for this report. These EOs are located north of MA7 in Ada County (Figs. 1 and 5). MA7 and MA7B were not lumped for analysis because MA7B is managed by the BLM. HIP transects were completed at EOs 072A:C (*n*=3), all newly established in 2004. Slickspot peppergrass was not found at 054, so a HIP transect was not established.

Slickspot peppergrass

A total of 1203 slickspot peppergrass plants were counted at 072A:C. Of the three, 072A had the largest number of plants (Table 1). Rosettes comprised 84% of the plants (Table 3).

Biological soil crust

Biological soil crust cover within slickspots was moderately high in MA7B, particularly at 072A (Table 3).

Introduced plant species and restoration activities within slickspots

Introduced annual cover within slickspots was high at the MA7B HIP transects (Table 4). At 072A and 072C, cheatgrass and clasping-leaf pepperweed made up a large proportion of the introduced annual cover. At 072B, cheatgrass made up nearly all

introduced annual cover, and clasping-leaf pepperweed and other weedy species were also present. Crested wheatgrass occurred within 90% of the slickspots at 072C, and drill seeding was evident in 60% of the slickspots.

Off-highway vehicles (OHVs)

No OHV tracks were observed within slickspots at 072A:C (Table 3).

Livestock use

Livestock prints and feces were found within slickspots at 072A:C, and was greater at 072C than the others (Table 5). HIP transect 072A had <1% penetrating livestock print cover within two slickspots. HIP transect 072B had 1-5% penetrating livestock print cover within two slickspots. At 072C, 90% of the slickspots had penetrating livestock prints: 20% had 5-10% penetrating livestock print cover, 60% had 1-5% penetrating livestock print cover, and only 10% had <1% penetrating livestock print cover. HIP transect 072A had a relatively small number of “probable” and “maybe” prints that were too degraded to identify, and 072B had nearly 50 such prints. HIP transect 072C had a much larger number (142) of predominantly penetrating, “probable” and “maybe” prints that were probably older livestock prints.

Wildlife use

Wildlife use within slickspots was moderately low at MA7B, and included anthills, badger and ground squirrel diggings and trails (Table 3).

General occurrence area

The three HIP transects had >10% slickspots with recent, penetrating livestock use in the general occurrence area (Table 5). At 072C, >10% of the slickspots in the general occurrence area had been drill seeded (Table 4). Evidence of OHV use, firefighting disturbance, or noxious weeds were not found (Table 3).

Fragmentation

HIP transects 072A:B were predominantly burned and were surrounded by burned areas for at least 500 m. HIP transect 072C had burned and unburned areas at the HIP transect, and the landscape was predominantly unburned >65 m away. The overall landscape quality was poor at the MA7B HIP transects.

Plant community and habitat quality

HIP transects 072A:B were in the Class E community and 072C was in the Class C community (Table 2). Introduced annual cover, predominantly cheatgrass, made up approximately two-thirds of the total plant cover at 072A:B (Table 6). No shrubs were present at 072A, but shrub cover comprised one-third of the vegetation at 072B, nearly

equal amounts of big sagebrush and green rabbitbrush. Sandberg bluegrass and bottlebrush squirreltail occurred in near equal proportions at both 072A:B. Shrub cover made up one-third of the vegetation at 072C, mostly green rabbitbrush with some remnant big sagebrush. Native perennial grass cover made up another one-third of the vegetation, entirely Sandberg bluegrass. Crested wheatgrass cover was moderately high at 072C, but introduced annual cover, including cheatgrass, was much lower. HIP transect 072A placed in the cheatgrass group (Fig. 11). HIP transect 072B placed just outside of the cheatgrass group, possibly because of the shrub component. HIP transect 072C was not in any of the main groups and was between the crested wheatgrass and cheatgrass groups. Native forb cover was low or zero at all three HIP transects, but native forb diversity was higher at 072A (Table 6). HIP transect 072A had high litter cover and moderate biological soil crust cover. Litter made up >75% of the total ground cover at 072B. HIP transect 072C had a higher proportion of bare ground with near average biological soil crust cover and litter. All three MA7B HIP transects had poor habitat integrity, based on their fire history and fragmentation, livestock use, and high proportion of introduced species.

Triggers

In 2004, no triggers occurred in MA7B HIP transects. HIP transect 072C would have probably tripped the trigger that addresses penetrating livestock prints within slickspots (Candidate Conservation Agreement 2003) if the “probable” and “maybe” prints had been more discernable.

Orchard Management Area (MA8)

Background

The Orchard MA (MA8) is located near Orchard along both sides of I-84 in Elmore County (Figs. 1 and 6). HIP transects were completed at 015, 020B, 030B, 031, and 060 (*n*=5). HIP transects 020B and 030B were newly established in 2004, and the others had HII transects since 1998. All five EOs are on both BLM and private land.

Slickspot peppergrass

A total of 185 slickspot peppergrass plants were found at the MA8 HIP transects (Table 1). HIP transects 015 and 020B had the largest number of plants in MA8. The number of plants at 015 is lower than past years, but very few plants have been found since 1998 (Idaho Conservation Data Center 2005; Table 1). HIP transect 060 had zero plants, although no plants have been observed since 1999. HIP transect 031 had much fewer plants compared to previous years, although no plants had been observed during the previous visit. Only one reproductive plant was observed at 030B in 2004. Rosettes comprised 57% of the plants at the MA8 HIP transects (Table 3).

Biological soil crust

Biological soil crust cover within slickspots was low in MA8 (Table 3). HIP transects 030B and 031 had near average biological soil crust cover, and 015, 020B, and 060 all had a low proportion of biological soil crust within their slickspots.

Introduced plant species and restoration activities within slickspots

Introduced annual cover within slickspots at MA8 HIP transects was the lowest in the Consideration Zone (Table 4). Cheatgrass was present within slickspots at all five HIP transects, and clasping-leaf pepperweed was present at all but 031. Rush skeletonweed was present within 20% of the slickspots at 060. There was no evidence of drill seeding within slickspots at any MA8 HIP transect.

Off-highway vehicles (OHVs)

No OHV tracks were observed within slickspots at any MA8 HIP transect (Table 3).

Livestock use

Livestock prints and feces were found within slickspots at all MA8 HIP transects (Table 5). HIP transect 060 had the most severe livestock use in the Consideration Zone during 2004, and 90% of the slickspots had >10% penetrating livestock prints; the remaining slickspot had 1-5% penetrating livestock print cover. There were an additional 386 predominantly penetrating “probable” or “maybe” prints at 060 that were probably livestock prints. At 031, 50% of the slickspots had 1-5% and 30% had <1% penetrating livestock print cover. At 030B, 10% of the slickspots had 1-5% and 50% of the slickspots had <1% penetrating livestock print cover. HIP transects 015 and 020B had lower livestock use and no slickspot had >1% penetrating livestock print cover. HIP transects 020B, 030B, and 031 had many mostly penetrating “probable” or “maybe” prints (109, 165, and 123 prints, respectively) that were probably livestock prints.

Wildlife use

Wildlife use within slickspots in MA8 HIP transects was low compared to the rest of the Consideration Zone, and was predominantly trails (Table 3). Wildlife use was high at 031 (mostly trails) and very low at the others.

General occurrence area

Greater than 10% penetrating livestock prints occurred within slickspots in the general occurrence area at 020B, 030B, 031, and 060 (Table 5). Livestock use was older at 031 and recent at 020B, 030B, and 060. Light to moderate, recent OHV use and rush skeletonweed were also observed in the general occurrence area of 060. There was no evidence of drill seeding or firefighting disturbances at the MA8 HIP transects (Table 3).

Fragmentation

HIP transects 015 and 060 were both completely burned and had partially unburned areas >65 m away (Table 4). HIP transect 031 was unburned, but was <65 m from the nearest burned area. HIP transects 030B and 020B were both also unburned, but had burned areas <250 m and <500 m away, respectively. HIP transect 060 burned on 06/23/04, just before visiting it.

Plant community and habitat quality

Three MA8 HIP transects were in Class A (020B, 030B, and 031) and one was in the Class E community (015; Table 2). HIP transect 015 had 98% introduced annual cover, almost entirely cheatgrass (Table 6), and was also in the cheatgrass group (Fig. 11). The vegetation data for 060 was skewed and non-representative because it had burned, and the plant fragments remaining were generally less flammable (i.e., Sandberg bluegrass and bottlebrush squirreltail) than cheatgrass. This means that cheatgrass probably comprised a much greater pre-fire proportion of the community. Rush skeletonweed was also detected, providing support that 060 is in a highly degraded state. Based on this information, 060 was added to the Class E community in Table 2, and was probably closest to the cheatgrass group in Fig. 11.

The three Class A HIP transects had high big sagebrush cover, although 020B had a lower proportion than 030B and 031. Native perennial grass cover made up roughly one-third of the total plant cover at 020B and 030B. HIP transect 020B had mostly Sandberg bluegrass and 030B had predominantly Idaho fescue (*Festuca idahoensis*). Native perennial grass cover was near average at 031, nearly all Sandberg bluegrass. Introduced annual cover was low at the Class A HIP transects and sixweeks fescue cover was moderately high at 020B. HIP transect 031 was in big sagebrush S1, and 020B was in S2 (Fig. 11). HIP transect 030B did not place in any of the big sagebrush subgroups, but was closest to S1 (functionally and spatially). Native forb cover was low at 020B, 030B, and 031, and no native forbs occurred at 015 or 060. Biological soil crust cover was low at 015 and 060, and average at 020B, 030B, and 031.

Triggers

HIP transect 060 was burned in 2004 and had >10% penetrating livestock prints in 90% of the slickspots, exceeding two trigger thresholds (Candidate Conservation Agreement 2003). At 060, rush skeletonweed was detected in two slickspots along the HIP transects, the vegetation transects, and in the general occurrence area. Recent OHV tracks were also observed in the general occurrence area of 060.

Mountain Home Management Area (MA9)

Background

The Mountain Home MA (MA9) is located near Mountain Home along both sides of I-84 in Elmore County (Figs. 1 and 7). HIP transects were completed at EOs 002, 021, 029, 050, and 051A:B (*n*=6). HIP transects 002 and 051A:B were newly established in 2004, and 021, 029, and 050 had been HII transects since 1998. EO 062 was intensively surveyed (~3 hours), but a HIP transect was not established after finding only a single rosette.

Slickspot peppergrass

A total of 1184 slickspot peppergrass plants were found at the MA9 HIP transects (Table 1). HIP transects 002, 029, 050, and 051A had had the largest number of plants in MA9. HIP transect 021 had zero plants, although plants were observed at the same site earlier in the year before sampling had begun. HIP transects 029 and 050 both seem to be following steady trends. Rosettes comprised 53% of the plants at the MA9 HIP transects (Table 3). HIP transect 029 was the only one with a greater proportion of reproductive plants than rosettes.

Biological soil crust

Biological soil crust cover within slickspots was moderately high at the MA9 HIP transects (Table 3). HIP transects 021, 029, 050, 051A:B all had high biological soil crust cover within slickspots, and 002 had moderately low biological soil crust cover.

Introduced plant species and restoration activities within slickspots

Introduced annual cover within slickspots was low at the MA9 HIP transects (Table 4). Introduced annual cover was moderately low at 002, 029, and 050, mostly cheatgrass, and very low at 021 and 051A:B. Clasping-leaf pepperweed occurred within slickspots at all MA9 HIP transects. Russian thistle, bur buttercup, and tall tumblemustard also occurred frequently at trace amounts. No introduced perennial species or drill seeding evidence occurred within slickspots at any MA9 HIP transect.

Off-highway vehicles (OHVs)

No OHV tracks were observed within slickspots at any MA9 HIP transect (Table 3).

Livestock use

Livestock feces were found at 002 and 021, and livestock prints were only found at 002. Penetrating livestock prints were observed within 100% of the slickspots at 002. One slickspot had >10% and two slickspots had 5-10% penetrating livestock print cover. Six slickspots had 1-5% penetrating livestock print cover, and only one slickspot had <1%

penetrating livestock print cover. There were an additional 83 predominantly penetrating "probable" or "maybe" prints at 002 that were probably livestock prints.

Wildlife use

Wildlife use within slickspots was moderately high at MA9 HIP transects, and was predominantly trails, badger and ground squirrel diggings, and anthills (Table 3). HIP transects 002 and 050 had high wildlife use, and 021, 029, and 051B had more moderate use. Wildlife use was low at 051A.

General occurrence area

HIP transect 002 was the only one in MA9 with penetrating livestock prints in >10% of its slickspots, although generally older (Table 5). No OHV use or restoration activities were evident at any MA9 HIP transect. Older firefighting activities have disturbed <10% of the slickspots in the general occurrence area of 002 (Table 3). No noxious weeds were present at the MA9 HIP transects (Table 4).

Fragmentation

None of the MA9 HIP transects have burned, although 002 and 029 were <65 m from the nearest burned area. HIP transects 021 and 050 were both <250 m from the nearest burned area, and 051A:B were <500 m from the nearest burned area. HIP transect 050 was also surrounded by nearby agricultural lands (Fig. 7)

Plant community and habitat quality

Five of the MA9 HIP transects were in Class A (002, 021, 050, and 051A:B) and one was in the Class B community (029; Table 2). The Class A HIP transects all had a high proportion of big sagebrush cover, but native perennial grass cover was low at all but 002 (Table 6). Sandberg bluegrass was the dominant native perennial grass species at the MA5 HIP transects. Native forb cover and diversity was generally very low, but was high at 002. Introduced annual cover was moderately low at 002, 021, and 050, and very low at 051A:B. Cheatgrass cover was also typically low, but higher at 050. HIP transect 029 had near equal proportions of big sagebrush and cheatgrass. All five Class A HIP transects were in the big sagebrush S1 (Fig. 11). HIP transect 029 was also in the big sagebrush group, but did not place in any of the subgroups and was close to the boundary. The spatial location and high cheatgrass cover at 029 indicates that it wason a trajectory towards the cheatgrass group. Litter was highest at 021 and 029 and more moderate at the others. Biological soil crust cover was very high at 051A:B, average at 021, and lower at 002, 029, and 050. No introduced perennial species were found.

Triggers

HIP transect 002 had >10% penetrating livestock prints in 10% of its slickspots, exceeding the livestock trigger threshold (Candidate Conservation Agreement 2003).

Glenns Ferry/Hammett Management Area (MA10)

Background

The Glenns Ferry/Hammett MA (MA10) is located near Hammett and Glenns Ferry in Elmore County (Figs. 1 and 8). HIP transects were completed at EOs 008A:B, 010, 026, 058, 061, and 063 (*n*=7). HIP transects 026 and 063 were newly established in 2004, and the rest had been HII transects since 1998 (Table 1). All EOs are located on BLM lands, although EOs 008 and 026 are also partially are on private land.

Slickspot peppergrass

A total of 1840 slickspot peppergrass plants were found in the MA10 HIP transects (Table 1). HIP transects 008A, 026, 058, 061, and 062 all had a moderate number of plants. HIP transect 008A had comparable numbers to past years with 519 plants, although about two-thirds less than 1998. The number of plants at 008B was nearly 10% of the number in 1998, and may be on a negative trend. Since 1998, no plants have been observed at 010. HIP transects 058 and 061 had populations that seemed to be following normal trends. HIP transects 026 and 063 were both established in 2004, and records indicate that the number of plants is similar to previous years (Idaho Conservation Data Center 2005). Rosettes comprised 53% of the total number of plants at the MA10 HIP transects (Table 3). All MA10 HIP transects that had plants had a greater proportion of rosettes than reproductive plants.

Biological soil crust

Biological soil crust cover within slickspots was generally low at the MA10 HIP transects (Table 3). HIP transects 008A and 058 had higher biological crust cover within slickspots than the others.

Introduced plant species and restoration activities within slickspots

Introduced annual cover within slickspots was moderately high at the MA10 HIP transects (Table 4). Introduced annual cover within slickspots was very high at 008A and 010, and moderate at 061. HIP transects 008A, 026, 058, and 063 had lower introduced annual cover within slickspots. No introduced perennial species or drill seeding occurred within any MA10 HIP transect.

Off-highway vehicles (OHVs)

No OHV tracks were observed within slickspots at any MA10 HIP transect (Table 3).

Livestock use

Livestock feces were found within slickspots at all MA10 HIP transects, but livestock prints were only found within slickspots at 008B and 063 (Table 5). HIP transect 008B

had one slickspot with 1-5% penetrating livestock print cover and a second slickspot with <1% penetrating livestock print cover. HIP transect 063 had one slickspot with <1% penetrating livestock print cover. There were additional, predominantly penetrating "probable" or "maybe" prints at 008B (41) and 063 (23) that were probably livestock prints. Livestock use was relatively low at the MA10 HIP transects.

Wildlife use

Wildlife use within slickspots at MA10 HIP transects was the highest in the Consideration Zone, and predominantly comprised trails (Table 3). HIP transects 008B and 026 had a high wildlife use within their slickspots, but was lower at 008A, 010, 058, 061, and 062.

General occurrence area

HIP transects 026 and 063 both had penetrating livestock prints in >10% of slickspots within the general occurrence area, although older (Table 5). No OHV use or firefighting disturbances were evident at any MA10 HIP transect. Less than 10% of the slickspots in the general occurrence area of 010 and 061 had been drill seeded in the past (Table 3). No noxious weeds were present at any MA10 HIP transect (Table 4).

Fragmentation

HIP transects 008B and 010 were predominantly burned, and 061 and 063 had burned and unburned areas at the HIP transect (Table 4). HIP transect 010 was surrounded by agricultural fields <500 m away (Fig. 8). HIP transect 008A was <250 m from the nearest burned area, and 058 was <500 m from the nearest burned area. HIP transect 026 was the only one that was unburned and had no burned areas within 500 m.

Plant community and habitat quality

Four MA10 HIP transects were in Class A (008A, 026, 058, and 063), two were in Class D (008B and 061), and one was in the Class E community (010; Table 2). The Class A HIP transects all had a very high proportion of big sagebrush (>70%; Table 6). Native perennial grass cover was moderate at 026 and 058, and low at 008A and 063. Sandberg bluegrass was the dominant native perennial grass species at all Class A HIP transects. Introduced annual cover was low at the Class A HIP transects, but 058 and 063 had greater proportions than the others. Cheatgrass cover was very low at 008A, 026, and 063, but higher at 058. HIP transects 008B and 061, both in the Class D community, were dominated by introduced annuals with some crested wheatgrass. Green rabbitbrush was present at 008B, and big sagebrush comprised nearly one-third of the total plant cover at 061. HIP transect 010 was nearly completely dominated by introduced annuals, mostly cheatgrass.

The four Class A HIP transects were also in big sagebrush S1 (Fig. 11). HIP transect 010 placed within the cheatgrass group, and 008B and 061 were not in any of the

ordination groups. Both 008B and 061 were located between the big sagebrush and crested wheatgrass groups, likely functionally closest to the cheatgrass group because of the high proportion of introduced annuals. Native forb diversity was highest at 026 and 058, and zero at the rest. HIP transects 010 and 063 had the highest litter and lowest biological soil crust cover at MA10. HIP transects 008A, 026, and 058 had higher biological soil crust cover within slickspots than the others.

Triggers

No triggers occurred at MA10 HIP transects in 2004.

Jarbridge Management Area (MA11)

Background

The Jarbridge MA (MA11) is located south of Bruneau and north of Murphy Hot Springs in Owyhee County (Figs. 1 and 9). HIP transects were completed at EOs 700, 701, 702, 703, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, and 722; *n*=22). All MA11 HIP transects except for 702, 707, 708, 709, and 719 were newly established in 2004. HIP transects 703, 707, and 720 are partially on state lands. The remainder of their distribution and the rest are on BLM lands.

Slickspot peppergrass

A total of 3063 slickspot peppergrass plants were found at the MA11 HIP transects (Table 1). HIP transects 701, 706, 710, 712, 713, 715, 716, and 718 had the largest number of plants (>100). Nine HIP transects had 25-100 plants, and only five had <25 plants. The five HIP transects that previously had HII transects do not appear to have substantially increased or decreased. The number of plants at the newly established HIP transects appear to be consistent with past survey data, with three exceptions. HIP transect 710 had 166 slickspot peppergrass plants, more than the 15 plants observed during a cursory survey in 1999. HIP transect 713 had 276 plants, also greater than the 61 plants surveyed in 2000. HIP transect 716 had 725 plants, much greater than the four plants observed in 2000 (Idaho Conservation Data Center 2005). Rosettes comprised 68% of the plants at the MA11 HIP transects (Table 3).

Biological soil crust

Biological soil crust cover within slickspots was consistently the lowest in the Consideration Zone (Table 3). The highest biological soil crust cover within slickspots was at 714, 717, and 722, but most had low biological soil crust cover within slickspots.

Introduced plant species and restoration activities within slickspots

Mean introduced annual cover within slickspots was low overall at the MA11 HIP transects (Table 4). HIP transects 703 and 716 had the highest proportion of introduced

annual cover within slickspots, mostly clasping-leaf pepperweed, halogeton, and Russian thistle. HIP transects 700 and 714 had moderate introduced annual cover, and the rest had low introduced annual cover within slickspots. Crested wheatgrass was present within slickspots at nearly 60% of the MA11 HIP transects. Crested wheatgrass cover within slickspots was very high at 701 and 717, and moderate at 705, 708, 711, 715, and 716. Crested wheatgrass cover within slickspots was relatively low at 706, 712, 714, 719, 720, and 721 (<1%). HIP transect 714 also had blue flax (<1%). Five had evidence of drill seeding within slickspots. At 701 and 716, 100% of the slickspots were drill seeded, and 80% of the slickspots were drill seeded at 717. At 708 and 715, 40% of the slickspots were drill seeded.

Off-highway vehicles (OHVs)

No OHV tracks were observed within slickspots at any MA11 HIP transect (Table 3).

Livestock use

Livestock feces were present within slickspots at all MA11 HIP transects (Table 5). HIP transect 710 was the only one in MA11 where there were no livestock prints found within slickspots. The most severe livestock disturbance within slickspots occurred at 709, 714, 717, and 720. HIP transect 709 had >10% penetrating livestock print cover in 20% of its slickspots and 5-10% penetrating livestock print cover in 30% of its slickspots. HIP transect 714 had >10% penetrating livestock print cover in 10% of its slickspots and 5-10% penetrating livestock print cover in 50% of its slickspots. HIP transect 717 had >10% penetrating livestock print cover in 10% of its slickspots and 5-10% penetrating livestock print cover in 20% of its slickspots. HIP transect 720 had >10% penetrating livestock print cover in 10% of its slickspots and 5-10% penetrating livestock print cover in 40% of its slickspots. There were an additional 197, 96, 45, and 69 predominantly penetrating “probable” or “maybe” prints at 709, 714, 717, and 720, respectively, probably livestock prints.

Moderately severe livestock disturbance also occurred within slickspots at 700, 701, 706, 707, 711, 715, and 722. HIP transect 706 had 5-10% penetrating livestock print cover in 50% of its slickspots, and 707 had 5-10% penetrating livestock print cover in 40% of its slickspots. HIP transect 722 had 5-10% penetrating livestock print cover in 30% of its slickspots, and 700, 701, 711, and 715 each had 5-10% penetrating livestock print cover in 10% of slickspots. HIP transects 706 and 707 both had a large number of predominantly penetrating, “probable” or “maybe” prints that were probably livestock prints (both had >350 prints), indicating that livestock disturbance was more severe than the data indicates. HIP transects 701 and 715 also both had a large number of predominantly penetrating, “probable” or “maybe” prints that were probably livestock prints (both had >150 prints). HIP transects 705, 708, and 719 each had several slickspots with 1-5% penetrating livestock print cover. The least severe livestock disturbance in the MA11 HIP transects occurred at 703, 712, 713, 716, 718, and 721, and none had >1% penetrating livestock print cover within any slickspot. The MA11 HIP

transects with less severe livestock disturbance generally had much fewer “probable” or “maybe” prints, indicating that actual livestock disturbance was also lower.

Wildlife use

Wildlife use within slickspots in the MA11 HIP transects was consistently low, and included anthills, badger and ground squirrel diggings, trails, and non-livestock ungulate prints (Table 3). HIP transects 703, 708, and 714 had moderate levels of wildlife use, and the others had low levels. Pronghorn antelope, mule deer, and elk represented the non-livestock ungulate use, and their prints were present at all except 706 and 707. Non-livestock ungulate prints were more prevalent than in the rest of the Consideration Zone, but their mean cover was still <10% of the mean total livestock print cover.

General occurrence area

Nearly all MA11 HIP transects had penetrating livestock prints in >10% of the slickspots in the general occurrence area, although some of the livestock disturbance was older (Table 5). HIP transects 716 and 722 had penetrating livestock prints in <10% of the slickspots. HIP transects 702, 703, and 710 had no penetrating livestock prints within slickspots in the general occurrence area. Penetrating livestock disturbance was recent at half of the MA11 HIP transects (701, 706, 707, 709, 711, 712, 713, 715, 717, 719, and 720). No OHV use or noxious weeds were observed (Tables 3 and 4). HIP transect 717 was the only one with firefighting disturbance, older disturbance that affected <10% of the slickspots (Table 3). Six HIP transects had evidence of past drill seeding within slickspots in the general occurrence area (701, 708, 714, 715, 716, and 717; Table 3).

Fragmentation

Five MA11 HIP transects were completely burned (701, 703, 708, 715, and 717), two were predominantly burned (705 and 716), and one had both burned and unburned areas (718; Table 4). Six were <65 m away from the nearest burned area (707, 709, 711, 714, 719, and 721). Two HIP transects had burned areas <250 m away (712 and 713), and three had burned areas <500 m away (702, 710, and 722). Only three had no burned areas visible within 500 m (700, 706, and 720).

Plant community and habitat quality

Fourteen MA11 HIP transects were in Class A (702, 706, 707, 709, 710, 711, 712, 713, 714, 718, 719, 720, 721, and 722), four were in Class C (700, 703, 705, and 715), and four were in the Class F community (701, 708, 716, and 717; Table 2). The Class A HIP transects all had high big sagebrush cover, but made up a lower proportion at 720 and 722 (Table 6). Gray rabbitbrush was also present at 706, 711, and 722. Native perennial grass cover was typically high at the Class A HIP transects, predominantly Sandberg bluegrass at all but 702, 720, 721, 720, and 707, where bluebunch wheatgrass or Idaho fescue were also prevalent. Native forb cover and diversity was higher at 710, 711, and 714 than the other Class A HIP transects. Introduced annual cover was typically very

low at the Class A HIP transects. Eleven Class A HIP transects were in big sagebrush S1 (702, 706, 707, 709, 710, 712, 713, 719, 720, and 721; Fig. 11). Two Class A HIP transects were in big sagebrush S3 (714 and 722). HIP transect 711 did not place within the three big sagebrush subgroups, but was closest to S3. HIP transects 711 and 714 had the highest introduced annual cover, possibly contributing to their ordination position.

The Class C HIP transects were in variable transitional states and distinct from each other. HIP transect 700 was dominated by gray rabbitbrush, and also had green rabbitbrush and big sagebrush cover (Table 6). HIP transect 705 was also dominated by gray rabbitbrush with no other shrub species present. HIP transects 703 and 715 had the highest introduced annual cover of the MA11 HIP transects and no shrub cover. Cheatgrass cover was near average at 715, and very low at all other MA11 HIP transects. Sandberg bluegrass was the dominant native perennial grass species at the Class C HIP transects, and crested wheatgrass was present at 705 and 715. HIP transect 700 was just outside of the big sagebrush group (Fig. 11). HIP transect 703 was in the cheatgrass group, probably because introduced annual cover made up half the total plant cover. HIP transect 715 was between the crested wheatgrass and cheatgrass groups, and 705 was close to the cheatgrass group. Of the four Class C HIP transects, 703 and 715 had poor habitat integrity and 700 and 705 had fair to good habitat integrity.

HIP transects 701, 708, 716, and 717 had been burned and seeded with crested wheatgrass (Table 6). HIP transect 716 was the only one in the crested wheatgrass group with shrub cover, comprised of fourwing saltbush (*Atriplex canescens*). The crested wheatgrass HIP transects had low introduced annual and perennial cover and variable native forb cover. HIP transects 708 and 717 higher native perennial grass cover, mostly made up of Sandberg bluegrass, than 707 and 718. All four Class F HIP transects were in the crested wheatgrass group (Fig. 11). The separation between 701 and 716 with 708 and 717 was likely because of the different proportions of native perennial grass cover.

Mean native forb diversity was higher than anywhere else in the Consideration Zone (Table 6). Nearly half the MA11 HIP transects had native forb diversity indices >1.0. Litter did not make up >30% of the ground substrate at any MA11 HIP transect, but was highest at 705, 707, 711, 715, and 718. Mean biological soil crust cover was low overall in MA11, and only 722 had moderate biological soil crust cover.

Triggers

HIP transects 709, 714, 717, and 720 all had >10% penetrating livestock prints in >10% of its slickspots, exceeding the penetrating livestock print trigger threshold (Candidate Conservation Agreement 2003). HIP transects 701, 706, 707, and 715 may have tripped the livestock trigger if the “probable” and “maybe” prints had been more discernable.

DISCUSSION

The HIP transect data were compiled so that dominant community and disturbance variables could be characterized for the EOs. As described in the methods, multiple HIP transects were established at large EOs with multiple slickspot peppergrass subpopulations. HIP transects representing several subpopulations at a single EO were compiled proportionately to EOs with one HIP transect. Figs. 12-16 show the proportion of EOs with different levels of dominant slickspot, community, and landscape variables.

The 2004 results were based on 59 extant slickspot peppergrass EOs and do not include what has happened at 12 extirpated EOs, eight EOs on private land, one EO on City of Boise land, one on Ada County land, and the seven remaining EOs on BLM lands that were not sampled. The extant EOs that were not monitored are generally characterized by having low habitat integrity, not to mention the current conditions at the extirpated EOs. This suggests that the conditions at all the EOs in the Consideration Zone are much worse than indicated by the 2004 results.

Plant community and habitat quality

Class A communities were associated with over half the EOs (55%; Table 2 and Fig. 11). Class A represents the highest habitat quality for slickspot peppergrass, although the presence of up to 35% introduced annual cover indicates habitat quality was compromised. Class B and C communities were associated with roughly one-fifth of the EOs. These EOs tended to have poor or fair habitat quality typically more transitional in nature. Approximately one-quarter of the EOs were associated with Class D, E, and F communities, and had poor, likely irreversible habitat quality.

The ordination groups depicted a similar story as the community classes, although the ordination groups are more subdivided and descriptive. Ordination groups ARTTRI (big sagebrush) S1 and S2, representing the highest quality big sagebrush remaining, were associated with less than half of the EOs (45%). The remaining EOs in the big sagebrush ordination group generally had fair habitat quality, associated with nearly one-fifth of the EOs. Most of the EOs associated with the NON-GROUP (EOs not placed in a group) had poor habitat quality, comprising 16% of the EOs. The BROTEC (cheatgrass) and AGRCRI (crested wheatgrass) ordination groups were associated with nearly one-quarter of the EOs, and represented the poorest habitat quality.

The EOs that have burned and are dominated by crested cheatgrass or introduced annuals have crossed a threshold that is likely irreversible (Laycock 1991, Briske et al. 2005). EOs in Class B and C were typically in transition and had low to fair habitat quality. Some of these may have salvageable habitat quality if anthropogenic and fire disturbance are excluded in the future. Class A EOs usually had the high habitat quality—proper management and prioritization of these may be essential to the long-term viability of slickspot peppergrass.

Livestock use

Nearly half of the EOs had no livestock print cover within slickspots. Approximately one-quarter of the EOs had 0-1% mean penetrating livestock print cover within slickspots, indicating low livestock disturbance (Fig. 13). One-fifth had 1-5% mean penetrating livestock print cover within slickspots, suggesting low to moderate livestock disturbance. Most EOs with >1% mean penetrating livestock print cover had at least one slickspot with 5-10% penetrating livestock cover (Table 5). One-tenth of the EOs had 5-10% mean penetrating livestock print cover within slickspots, indicating severe livestock disturbance. Most EOs with >5% mean penetrating livestock print cover had at least one slickspot with >10% penetrating livestock cover, and were tripped by the livestock trigger (Candidate Conservation Agreement 2003). Total livestock print cover depicted a similar story, although the proportion of EOs with 5-10% and 10-25% mean total livestock print cover within slickspots was nearly 25% (Fig. 13). Seronko (pers. comm. 2004) described non-penetrating livestock print cover as “Level I Penetration” and has recommended that it should not occur on >10% of any slickspot because of the higher potential for reduced slickspot integrity—this type of disturbance occurred at 7% of the EOs. He also described penetrating livestock print cover as “Level II Penetration” and recommended that it should not occur on >5% of any slickspot—this type of livestock disturbance occurred at 25% of the EOs.

Livestock disturbance was the most widespread anthropogenic disturbance within the Consideration Zone, and one-tenth of the EOs had livestock disturbance within slickspots over trigger thresholds (Candidate Conservation Agreement 2003). One-quarter of the EOs had livestock disturbance within slickspots greater than thresholds recommended by Seronko. These levels of livestock disturbance may substantially degrade slickspot integrity through compaction and physical alteration of the slickspot soil structure (Moseley 1994, Meyer 1995:1996, U.S. Fish and Wildlife Service 2004, Seronko, pers. comm. 2004). High levels of penetrating livestock disturbance at MA11 have been attributed to seasonally uncharacteristic precipitation in July (Fig. 10; Binder pers. comm. 2005). However, penetrating livestock disturbance within slickspots was widespread across MA11 even though summer precipitation is often a localized event. High levels of penetrating and non-penetrating livestock disturbance within slickspots should be minimized in future years to prevent continued degradation of slickspot integrity.

Introduced plant cover within slickspots

Introduced annual species were present within slickspots at all EOs (Fig. 14). One-fifth of the EOs had <1% mean introduced annual cover within slickspots, indicating that slickspot integrity has not been compromised by weeds. Approximately two-fifths had 1-5% mean introduced annual cover within slickspots, still relatively low. One-sixth of the EOs had 5-10% mean introduced annual cover within slickspots. Approximately one-quarter of the EOs had >10% mean introduced annual cover within slickspots, indicating that the slickspots have been compromised by weeds. Introduced perennial cover was

not found within slickspots at two-thirds of the EOs. One-fifth of the EOs had <1% and one-sixth had >1% introduced perennial cover within slickspots.

Introduced species invasions are indicative of long-term slickspot integrity and slickspot peppergrass viability (Rosentreter 1994, Lesica and DeLuca 1996, U.S. Fish and Wildlife Service 2003). Introduced species may detrimentally affect the slickspot by altering nutrient cycling and siltation, and indirect competition with slickspot peppergrass (Rosentreter 1994, Belnap and Phillips 2001). Disturbance (i.e., fire, livestock grazing) may be a precursor to introduced species invasions within slickspots. Once introduced species comprise a large proportion of the slickspot, the invasion may be irreversible and have negative implications for the slickspot peppergrass population (Moseley 1994). Introduced species invasions should be prevented by carefully managing anthropogenic disturbances in slickspot peppergrass habitat.

Fire history and fragmentation

Nearly two-thirds of the EOs were not been burned along the HIP transect (Figs. 15-16). More than half were <65 m from the nearest burned area. Stepping out farther, only one-quarter of the EOs were >250 m from the nearest burned area, and less than one-tenth did not have a visible burned area <500 m. These results suggest the EOs have become highly fragmented and most are separated from each other by large burned areas. Sagebrush steppe habitat with little or no fragmentation is the most ideal for slickspot peppergrass viability and genetic flow. Widespread habitat fragmentation suggests that genetic diversity and gene flow will be detrimentally affected as populations and their pollinators become increasingly isolated (Moseley 1994, Kearns and Inouye 1997, U.S. Fish and Wildlife Service 2003, Robertson 2004). Fragmentation may detrimentally affect the habitat quality and dispersal of slickspot peppergrass and its genetic material, ultimately reducing fitness and resilience (Fahrig and Merriam 1994, Reed and Frankham 2003, Robertson 2004). The least fragmented EOs were located in MA7, MA10, and MA11. EOs with intact sagebrush steppe communities and low fragmentation should be prioritized for their high overall habitat and landscape quality.

MONITORING RECOMMENDATIONS

Results for 2004 represent baseline conditions so that future monitoring trends can be compared. The same methods should be continued to ensure accurate comparisons of habitat integrity and population trends. The following recommendations should improve future monitoring protocol:

- Measure depth to argillic horizon within select slickspots at HIP transects to help categorize penetrating vs. non-penetrating livestock prints when soils are moist
- Quality control procedures to ensure data collection is consistent
- Estimate litter, bare ground, and rocks and gravel cover within slickspots
- Differentiate between penetrating and non-penetrating non-livestock ungulate print cover
- Measure dead shrub species cover with line-interception method

- Lump “probable” and “maybe” print cover within slickspots into one category
- Estimate livestock trail cover within slickspots and general occurrence area
- Establish additional HIP transects at EOs that were not sampled in 2004, especially if slickspot peppergrass can be relocated

FUTURE TREND ANALYSIS

Several triggers require a specific change between sampling years to warrant management action (i.e., restoration activities, introduced plant species, habitat quality), and may occur in subsequent years (Candidate Conservation Agreement 2003). Other triggers require one year of data to warrant management action (i.e., fire, livestock prints, OHV use, military training), and trigger thresholds were surpassed at some EOs in 2004. The Sorensen community classification and NMS ordination results will be used to objectively analyzing future trends in habitat quality at the EOs and across the Consideration Zone.

CONCLUSIONS

Slickspot peppergrass is a sagebrush steppe obligate species threatened by fire, fragmentation (Noss et al. 1995, Knick 1999), introduced species invasions (Whisenant 1990, Peters and Bunting 1994, Rosentreter 1994), and anthropogenic disturbances, including livestock grazing, urban development, and military training (Moseley 1994, Mancuso and Moseley 1998, Mancuso et al. 1998, Mancuso 2000:2003, U.S. Fish and Wildlife Service 2003). Less than half of the EOs occurred in sagebrush steppe with a predominantly native understory. The remaining EOs occurred in poor to fair quality habitats, so degraded that many are in an irreversible state or on their way there. Two-thirds of the HIP transects have not burned, but only a small fraction are >500 m from the nearest fire, indicating most are susceptible to negative genetic effects associated with fragmentation. Livestock disturbance was the most widespread anthropogenic disturbance within the Consideration Zone, and one-tenth of the HIP transects had livestock disturbance within slickspots over predetermined trigger thresholds (Candidate Conservation Agreement 2003). Approximately one-third of the EOs also had high introduced annual cover within slickspots. The effectiveness of the Candidate Conservation Agreement ultimately depends upon the long-term survival of slickspot peppergrass populations and the integrity of the slickspots and sagebrush steppe that it depends on. These results represent the baseline for future monitoring years and should provide information to adaptively manage threats to slickspot peppergrass and objectively measure trends in future years.

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Table 1. Slickspot peppergrass population counts at habitat integrity index (HII; 1998-2002) and habitat integrity and population (HIP) transects (2004)*.

	HII/HIP transect	1998	1999	2000	2001	2002	2003	2004
	066	2000	249	603	ns	ns	ns	1984
	068	-	-	-	-	-	-	952
	070	-	-	-	-	-	-	1490
MA1	SUM	2000	249	603	ns	ns	ns	4426
	052	203	176	200	ns	ns	ns	498
MA2	SUM	203	176	200	ns	ns	ns	498
	032	500	230	118	3	0	ns	4
	048	-	-	-	-	-	-	57
	065	95	52	155	53	ns	ns	21
MA3&5	SUM	595	282	273	56	0	ns	82
	018A	448	0	2517	2155	ns	ns	653
	018B	845	50	402	535	ns	ns	420
	019A	0	18	0	29	ns	ns	2
	019B	30	3	6	7	ns	ns	0
	024	1400	285	416	76	ns	ns	509
	025	60	106	236	91	ns	ns	1299
	057	900	149	35	6	ns	ns	15
MA6	SUM	3683	611	3612	2899	ns	ns	2898
	027A	1840	114	28	70	30	ns	713
	027B	0	0	0	0	5	ns	0
	027C	-	-	-	112	29	ns	441
	027D	-	-	-	124	78	ns	1233
	027E	-	-	-	36	16	ns	38
	028A	1380	125	805	56	7	ns	25
	028B	550	220	305	104	0	ns	0
	035A	175	38	10	0	34	ns	23
	041A	2	0	0	0	4	ns	0
	053B	-	-	-	-	0	ns	224
	059A	-	-	-	15	0	ns	0
	067	-	-	-	-	-	-	101
	071A	-	-	-	-	-	-	307
	071B	-	-	-	-	-	-	309
MA7	SUM	3947	497	1148	517	203	ns	3414
	072A	-	-	-	-	-	-	887
	072B	-	-	-	-	-	-	98
	072C	-	-	-	-	-	-	218
MA7B	SUM	-	-	-	-	-	-	1203
	015	790	0	0	0	ns	ns	49
	020B	-	-	-	-	-	-	130
	030B	-	-	-	-	-	-	1
	031	570	0	330	25	0	ns	5
	060	0	6	0	0	ns	ns	0
MA8	SUM	1360	6	330	25	0	ns	185

* ns=not sampled and "-" not yet established

Table 1 (continued)

	HII/HIP transect	1998	1999	2000	2001	2002	2003	2004
	002	-	-	-	-	-	-	411
	021	385	19	1	0	ns	ns	0
	029	320	231	148	8	0	ns	260
	050	265	86	16	0	ns	ns	271
	051A	-	-	-	-	-	-	224
	051B	-	-	-	-	-	-	18
MA9	SUM	970	336	165	8	0	ns	1184
	008A	1640	2	236	0	110	ns	519
	008B	525	18	40	0	ns	ns	61
	010	0	0	0	0	0	ns	0
	026	-	-	-	-	-	-	252
	058	138	0	0	1	37	ns	127
	061	700	274	92	6	5	ns	591
	063	-	-	-	-	-	-	290
MA10	SUM	3003	294	368	7	152	ns	1840
	700	-	-	-	-	-	-	24
	701	-	-	-	-	-	-	456
	702	27	17	13	24	0	ns	44
	703	-	-	-	-	-	-	33
	705	-	-	-	-	-	-	37
	706	-	-	-	-	-	-	354
	707	-	204	12	12	3	ns	80
	708	0	0	0	0	0	ns	0
	709	-	10	2	5	11	ns	72
	710	-	-	-	-	-	-	166
	711	-	-	-	-	-	-	1
	712	-	-	-	-	-	-	146
	713	-	-	-	-	-	-	276
	714	-	-	-	-	-	-	12
	715	-	-	-	-	-	-	248
	716	-	-	-	-	-	-	725
	717	-	-	-	-	-	-	45
	718	-	-	-	-	-	-	178
	719	11	ns	2	0	6	ns	43
	720	-	-	-	-	-	-	43
	721	-	-	-	-	-	-	64
	722	-	-	-	-	-	-	16
MA11	SUM	38	231	29	41	20	ns	3063
	Grand total	15799	2682	6728	3553	375	ns	18793
	# Transects	31	32	33	35	23	ns	71

* ns=not sampled and "-" not yet established

Table 2. Community class descriptions at habitat integrity and population (HIP) transects. Data are based on relativized Daubenmire cover quadrat and line-interception data.

CLASS DESCRIPTION	HIP transects
CLASS A - Big sagebrush with introduced annual and/or native perennial grass understory. Big sagebrush typically comprises 35-90% cover. Mean native perennial grass cover is 19%, but may range from 0 to 60%. Sandberg bluegrass is usually the dominant or only native perennial grass species, but bottlebrush squirreltail, bluebunch wheatgrass, Thurber needlegrass, and thickspike wheatgrass may infrequently be present. Native forb cover is normally <3%. Introduced annual cover is usually <10%, but may be as high as 35%. Cheatgrass rarely makes up >10% cover.	002, 008A, 018B, 020B, 021, 026, 027A:E, 028A:B, 030B, 031, 035A, 050, 051A:B, 053B, 057, 058, 059A, 063, 067, 071A:B, 702, 706, 707, 709, 710, 711, 712, 713, 714, 718, 719, 720, 721, and 722
CLASS B - Big sagebrush with annual understory (introduced or native). Big sagebrush cover may be as low as 20% or as high as 60%. Introduced annual species (generally cheatgrass or tall tumblemustard) OR sixweeks fescue make up at least 1/3 but rarely >50% of total plant cover. Native perennial grass cover is typically low, and is comprised of Sandberg bluegrass and bottlebrush squirreltail, although Thurber needlegrass or basin wildrye may be present. Native forb cover is variable. Crested wheatgrass may be present.	029, 032, 048, 065, 066, 068, and 070
CLASS C - Burned, dominated by native plant cover with moderate introduced annual cover. Total native plant cover (shrub, grass, forb) comprises 50-100% of all vegetation. Green and/or gray rabbitbrush may comprise 1/3-2/3 of total plant cover, or not at all, but big sagebrush is rarely present. Mean native perennial grass cover is 37%, but ranges 14-80%. Sandberg bluegrass is the most prevalent native perennial grass species, but bottlebrush squirreltail, Thurber needlegrass, basin wildrye, and thickspike wheatgrass may also be present. Introduced annual cover is <50% but may be as low as 10%, and species include clasping leaf pepperweed, Russian thistle, tall tumblemustard, and cheatgrass. Crested wheatgrass may be present.	041A, 072C, 700, 703, 705, and 715
CLASS D - Burned, dominated by introduced annual species with low cheatgrass cover and some crested wheatgrass. Introduced annual cover is typically >50%, but cheatgrass cover is very low (<1%). Green rabbitbrush or big sagebrush may be subdominant species. Sandberg bluegrass cover is low (<10%). Native forb cover is very low or negligible (<1%).	008B and 061
CLASS E - Burned, cheatgrass monoculture. Cheatgrass cover is typically >50% and introduced annual cover may approach 100%. Green and/or gray rabbitbrush, or even solitary big sagebrush, may infrequently be present. Native perennial grass cover is normally very low (<10%), with few exceptions. Native forb cover is rarely >1%.	010, 015, 018A, 019A:B, 024, 025, 052, 060, 072A:B
CLASS F - Burned and seeded with crested wheatgrass. Crested wheatgrass cover is typically >50% and big sagebrush cover is very low if present (<3%), although other shrubs may be present. Native perennial grass cover is variable (7-44%), and is predominantly made up of Sandberg bluegrass. Native forb cover is also variable (2-15%). Introduced annual cover is very low (<1%).	701, 708, 716, and 717

Table 3. Slickspot attributes, slickspot peppergrass population, wildlife use, off-highway vehicle (OHV) tracks, firefighting, and restoration activities attributes at habitat integrity and population (HIP) transects.

Land unit		Attributes		Population			Wildlife use				OHV tracks			Firefighting			Restoration		
Management Area (MA)	EO/HIP transect	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 & ground squirrel cover	SS - M% trail cover	FREQ of SS w/ OHV tracks	OHV tracks in GOA (#18)**	Recent or older?	FREQ of SS w/ firefighting disturbance	Firefighting disturbance in GOA (#19)**	Recent or older?	FREQ of drill seeded SS	Drill seeded SS in GOA (#20)**	Recent or older?
	066	38	47.2	1984	62	38	12.3	0.0	11.0	0.2	0	A	NA	0	A	NA	0	A	NA
	068	20	64.5	952	70	30	5.4	0.0	3.0	0.0	0	A	NA	0	A	NA	0	B	O
	070	16	59.5	1490	88	12	4.8	0.0	0.6	2.0	0	A	NA	0	A	NA	0	A	NA
MA1	**M**	**25**	**57.1**	**1475**	**73**	**27**	**7.5**	**0.0**	**4.9**	**0.7**	**0.0**			**0**			**0.0**		
MA2	**052**	**17**	**53.0**	**498**	**72**	**28**	**3.2**	**0.1**	**1.1**	**1.9**	**0**	A	NA	**0**	A	NA	**0**	A	NA
	032	28	50.3	4	50	50	0.4	0.0	0.0	0.0	0	A	NA	0	A	NA	0	A	NA
	048	40	55.0	57	58	42	16.0	0.0	0.0	15.1	0	B	O	0	A	NA	0	A	NA
	065	2	37.5	21	100	0	2.0	0.0	0.0	0.0	0	A	NA	0	A	NA	0	A	NA
MA3&5	**M**	**23**	**47.6**	**27**	**69**	**31**	**6.1**	**0.0**	**0.0**	**5.0**	**0.0**			**0**			**0.0**		
	018A	22	13.8	653	99	1	4.4	0.0	2.3	1.2	0	A	NA	0	A	NA	0	A	NA
	018B	33	33.1	420	77	23	18.0	0.0	10.7	4.2	0	A	NA	0	A	NA	0	A	NA
	019A	21	20.2	2	0	100	10.0	0.0	1.8	0.0	0	A	NA	0	A	NA	8	C	O
	019B	28	14.7	0	0	0	2.3	0.0	1.1	0.0	0	A	NA	0	A	NA	9	C	O
	024	34	14.5	509	85	15	0.6	0.1	0.1	0.3	4	B	O	0	A	NA	0	A	NA
	025	32	39.3	1299	76	24	4.5	0.0	0.0	2.7	0	B	-1	0	A	NA	0	A	NA
	057	26	67.0	15	0	100	4.9	0.0	0.0	4.3	0	A	NA	0	A	NA	0	A	NA
MA6	**M**	**28**	**28.9**	**414**	**48**	**38**	**6.4**	**0.0**	**2.3**	**1.8**	**0.6**			**0**			**2.4**		
	027A	117	24.0	713	23	77	7.1	0.0	1.2	4.6	0	A	NA	0	A	NA	0	A	NA
	027B	34	8.4	0	0	0	4.1	0.0	0.0	3.0	0	A	NA	0	A	NA	0	A	NA
	027C	71	31.6	441	16	84	1.4	0.0	0.8	0.0	0	A	NA	0	A	NA	0	A	NA
	027D	86	28.5	1233	17	83	5.2	0.0	0.1	4.6	3	B	O	0	A	NA	0	A	NA
	027E	78	33.5	38	66	34	2.5	0.1	0.0	1.0	0	A	NA	0	A	NA	0	A	NA
	028A	31	27.8	25	96	4	1.7	0.0	0.1	0.4	0	A	NA	0	A	NA	0	A	NA
	028B	17	26.6	0	0	0	2.4	0.0	0.0	0.1	0	A	NA	0	A	NA	0	A	NA
	035A	51	24.1	23	68	32	2.3	0.0	0.0	0.0	0	A	NA	0	A	NA	0	A	NA
	041A	21	20.7	0	0	0	3.7	0.0	2.1	0.0	0	A	NA	0	B	O	0	A	NA
	053B	15	15.5	224	32	68	1.5	0.0	1.2	0.0	0	A	NA	0	A	NA	0	A	NA
	059A	11	12.2	0	0	0	4.2	0.0	0.1	0.0	0	A	NA	0	A	NA	0	A	NA
	067	39	42.5	101	5	95	10.5	0.0	0.3	8.4	0	A	NA	0	A	NA	0	A	NA
	071A	67	34.3	307	7	93	2.9	0.0	0.0	2.1	2	B	O	0	A	NA	0	A	NA
	071B	46	39.0	309	56	44	5.9	0.0	1.1	3.2	0	A	NA	0	A	NA	0	A	NA
MA7	**M**	**49**	**26.3**	**244**	**27**	**44**	**3.9**	**0.0**	**0.5**	**1.9**	**0.4**			**0**			**0.0**		
	072A	23	32.0	887	89	11	1.6	0.0	0.0	1.0	0	A	NA	0	A	NA	0	A	NA
	072B	23	21.0	98	82	18	3.6	0.0	0.3	0.8	0	A	NA	0	A	NA	0	A	NA
	072C	20	25.5	218	83	17	1.0	0.0	0.1	0.1	0	A	NA	0	A	NA	6	C	O
MA7B	**M**	**22**	**26.2**	**401**	**84**	**16**	**2.0**	**0.0**	**0.1**	**0.6**	**0.0**			**0**			**2.0**		
	015	40	5.3	49	18	82	0.6	0.0	0.2	0.0	0	A	NA	0	A	NA	0	A	NA
	020B	26	9.6	130	57	43	0.4	0.0	0.0	0.0	0	A	NA	0	A	NA	0	A	NA
	030B	48	19.1	1	0	100	0.0	0.0	0.0	0.0	0	A	NA	0	A	NA	0	A	NA
MA8	031	39	15.1	5	60	40	9.1	0.1	0.0	7.7	0	A	NA	0	A	NA	0	A	NA

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 (continued)

Land unit		Attributes		Population			Non-livestock use				OHV tracks			Firefighting			Restoration		
Management Area (MA)	EO/HIP transect	M SS size (m²)	SS - M biological soil crust cover	Total # plants	% Rosettes*	% Reproductive*	SS - M% non-L animal use cover	SS - M% Non-L UNG print cover	SS - M% badger & ground squirrel cover	SS - M% trail cover	FREQ of SS w/ OHV tracks	OHV tracks in GOA (#18)**	Recent or older?	FREQ of SS w/ firefighting disturbance	Firefighting disturbance in GOA (#19)**	Recent or older?	FREQ of drill seeded SS	Drill seeded SS in GOA (#20)**	Recent or older?
MA8	060	41	5.6	0	0	0	1.0	0.1	0.0	0.3	0	B	R	0	A	NA	0	A	NA
cont.	**M**	**39**	**10.9**	**37**	**27**	**53**	**2.2**	**0.0**	**0.0**	**1.6**	**0.0**			**0**			**0.0**		
	002	16	17.5	411	77	23	16.8	0.0	0.8	0.4	0	A	NA	0	B	O	0	A	NA
	021	31	41.8	0	0	0	5.8	0.0	0.1	4.5	0	A	NA	0	A	NA	0	A	NA
	029	26	33.5	260	33	67	8.7	0.0	0.0	7.3	0	A	NA	0	A	NA	0	A	NA
	050	36	27.0	271	87	13	11.1	0.0	3.8	6.5	0	A	NA	0	A	NA	0	A	NA
	051A	74	52.8	224	64	36	1.5	0.2	0.0	0.3	0	A	NA	0	A	NA	0	A	NA
	051B	50	53.3	18	56	44	6.0	0.0	0.0	5.0	0	A	NA	0	A	NA	0	A	NA
MA9	**M**	**39**	**37.6**	**197**	**53**	**30**	**8.3**	**0.0**	**0.8**	**4.0**	**0.0**			**0**			**0.0**		
	008A	35.2	21.5	519	62	38	5.9	0.1	0.4	2.8	0	A	NA	0	A	NA	0	A	NA
	008B	33	4.2	61	82	18	14.0	0.0	0.4	11.4	0	A	NA	0	A	NA	0	A	NA
	010	25	3.1	0	0	0	5.3	0.0	0.0	3.6	0	A	NA	0	A	NA	0	B	O
	026	36	14.1	252	64	36	19.0	0.0	0.7	17.1	0	A	NA	0	A	NA	0	A	NA
	058	13	29.0	127	79	21	8.0	0.0	0.0	7.2	0	A	NA	0	A	NA	0	A	NA
	061	36	10.8	591	60	40	6.0	0.0	0.9	3.8	0	A	NA	0	A	NA	0	B	O
	063	31	6.1	290	62	38	4.1	0.1	1.1	1.0	0	A	NA	0	A	NA	0	A	NA
MA10	**M**	**29**	**12.7**	**263**	**58**	**27**	**8.9**	**0.0**	**0.5**	**6.7**	**0.0**			**0**			**0.0**		
	700	11	8.1	24	96	4	2.1	0.2	0.0	0.0	0	A	NA	0	A	NA	0	A	NA
	701	33	0.5	456	96	4	0.3	0.3	0.0	0.0	0	A	NA	0	A	NA	10	C	O
	702	26	4.7	44	66	34	0.6	0.2	0.0	0.3	0	A	NA	0	A	NA	0	A	NA
	703	75	0.4	33	98	2	5.6	0.4	1.8	0.0	0	A	NA	0	A	NA	0	A	NA
	705	36	5.3	37	59	41	1.9	0.0	0.0	0.0	0	A	NA	0	A	NA	0	A	NA
	706	94	1.0	354	98	2	0.8	0.0	0.0	0.0	0	A	NA	0	A	NA	0	A	NA
	707	89	3.2	80	99	1	2.7	0.1	0.0	1.2	0	A	NA	0	A	NA	0	A	NA
	708	9	0.0	0	0	0	6.3	0.1	0.1	1.7	0	A	NA	0	A	NA	4	C	O
	709	24	3.0	72	71	29	0.7	0.1	0.0	0.0	0	A	NA	0	A	NA	0	A	NA
	710	34	7.9	166	65	35	1.3	0.2	0.0	0.0	0	A	NA	0	A	NA	0	A	NA
	711	32	8.1	1	0	100	2.6	1.0	0.0	0.0	0	A	NA	0	A	NA	0	A	NA
	712	167	2.5	146	48	52	1.4	0.1	0.0	0.0	0	A	NA	0	A	NA	0	A	NA
	713	144	4.4	276	87	13	2.6	0.1	0.1	0.7	0	A	NA	0	A	NA	0	A	NA
	714	20	18.1	12	1	99	4.6	1.4	0.4	0.0	0	A	NA	0	A	NA	0	B	O
	715	39	0.1	248	92	8	1.4	0.1	0.0	0.0	0	A	NA	0	A	NA	4	C	O
	716	83	0.4	725	53	47	1.6	0.1	0.2	0.0	0	A	NA	0	A	NA	10	C	O
	717	16	17.1	45	76	24	2.3	1.2	0.0	0.0	0	A	NA	0	B	O	8	C	O
	718	31	2.0	178	97	3	0.8	0.2	0.0	0.0	0	A	NA	0	A	NA	0	-1	-1
	719	14	6.0	43	84	16	2.1	0.1	0.0	0.0	0	A	NA	0	A	NA	0	A	NA
	720	46	1.8	43	81	19	3.3	1.8	0.0	0.0	0	A	NA	0	A	NA	0	A	NA
	721	48	3.0	64	46	54	1.0	0.1	0.0	0.0	0	A	NA	0	A	NA	0	A	NA
	722	40	12.5	16	75	25	1.6	0.5	0.0	0.0	0	A	NA	0	A	NA	0	A	NA
MA11	**M**	**50**	**5.0**	**139**	**68**	**28**	**2.1**	**0.4**	**0.1**	**0.2**	**0.0**			**0**			**1.6**		
MEAN		**40**	**21.1**	**265**	**54**	**33**	**4.5**	**0.1**	**0.7**	**2.0**	**0.1**			**0**			**0.8**		

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 4. Weed cover and fire history pattern attributes at habitat integrity and population (HIP) transects.

Land unit		Weed cover*										Fire history pattern					
Management Area (MA)	EO/HIP transect	SS - M% INT annual cover	SS - M% BROTEC cover	SS - M% LEPPER cover	SS - M% HALGLO cover	SS - M% CERTES cover	SS - M% SALKAL cover	SS - M% SISALT cover	SS - M% INT perennial cover	SS - M% AGRCRI cover	Noxious or aggressive species in GOA (#23)**	2004 fire size (ac)	LEPA-occupied habitat burned in 2004 (ac)	At HIP transect (#15A)**	Within 65 m (#15B)**	Within 250 m (#15C)**	Within500 m (#15D)**
	066	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.9	0.9	cenbie	NA	NA	U	U	U	B/U
	068	21.3	0.2	0.1	0.0	0.1	0.0	20.5	0.0	0.0	0	NA	NA	PB	CB	PB	PB
	070	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	NA	NA	U	U	PU	B/U
MA1	**M**	**7.2**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**6.9**	**0.3**	**0.3**							
MA2	**052**	**8.1**	**4.7**	**0.5**	**0.0**	**0.0**	**0.0**	**0.1**	**0.0**	**0.0**	hypper	NA	NA	PB	PB	PB	PB
	032	4.2	2.5	1.6	0.0	0.0	0.0	0.1	0.0	0.0	0	NA	NA	B/U	B/U	B/U	B/U
	048	39.4	38.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0	NA	NA	U	U	B/U	B/U
	065	29.0	27.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	chojun	NA	NA	U	PU	PU	PU
MA3&5	**M**	**24.2**	**22.8**	**0.8**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**							
	018A	36.9	34.5	0.0	0.0	0.0	0.1	2.3	0.0	0.0	0	NA	NA	PB	PB	PB	PB
	018B	24.4	6.6	0.0	0.0	0.0	17.5	0.2	0.8	0.8	0	NA	NA	U	U	PU	B/U
	019A	10.1	7.0	0.2	0.0	0.0	2.9	0.0	0.3	0.3	0	NA	NA	CB	CB	CB	CB
	019B	10.1	7.0	0.2	0.0	0.0	2.9	0.0	26.8	0.3	0	NA	NA	CB	CB	CB	CB
	024	39.9	31.4	4.8	0.0	0.0	1.2	2.3	0.1	0.1	0	83	40	CB	CB	PB	PB
	025	31.8	24.1	7.1	0.0	0.0	0.0	0.6	0.0	0.0	0	NA	NA	CB	CB	B/U	B/U
	057	60.3	52.0	8.3	0.0	0.0	0.0	0.0	0.0	0.0	0	NA	NA	U	U	PU	PU
MA6	**M**	**30.5**	**23.2**	**2.9**	**0.0**	**0.0**	**3.5**	**0.8**	**4.0**	**0.2**							
	027A	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0	NA	NA	U	U	U	U
	027B	10.6	1.3	8.5	0.0	0.8	0.0	0.2	0.0	0.0	0	NA	NA	U	U	PU	PU
	027C	2.5	0.1	0.2	0.0	2.0	0.0	0.0	0.0	0.0	0	NA	NA	U	U	U	U
	027D	1.1	0.1	0.1	0.0	1.0	0.0	0.0	0.0	0.0	0	NA	NA	U	U	U	B/U
	027E	9.1	4.0	5.0	0.0	0.1	0.1	0.0	0.0	0.0	0	NA	NA	U	U	U	PU
	028A	6.4	0.0	0.1	0.0	6.3	0.0	0.0	0.0	0.0	0	NA	NA	U	U	U	B/U
	028B	4.6	0.0	0.0	0.0	4.6	0.0	0.0	0.0	0.0	0	NA	NA	U	U	U	PU
	035A	1.6	0.0	1.1	0.0	0.4	0.1	0.0	0.0	0.0	0	NA	NA	U	PU	PU	PU
	041A	4.5	0.0	3.2	0.0	0.8	0.4	0.1	0.0	0.0	0	NA	NA	CB	CB	CB	CB
	053B	1.5	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0	NA	NA	U	U	B/U	B/U
	059A	2.9	0.2	2.0	0.0	0.7	0.1	0.0	0.0	0.0	0	NA	NA	U	U	CB	CB
	067	2.8	1.7	0.1	0.0	1.0	0.0	0.0	0.0	0.0	0	NA	NA	U	U	U	B/U
	071A	1.4	0.0	0.4	0.0	1.0	0.0	0.0	0.0	0.0	0	NA	NA	U	U	U	B/U
	071B	1.9	0.0	0.2	0.0	1.7	0.0	0.0	0.0	0.0	0	NA	NA	U	U	U	B/U
MA7	**M**	**3.7**	**0.5**	**1.5**	**0.0**	**1.6**	**0.0**	**0.0**	**0.0**	**0.0**							
	072A	22.0	12.1	9.5	0.0	0.0	0.0	0.0	0.0	0.0	0	NA	NA	PB	PB	PB	PB
	072B	19.7	16.5	2.6	0.0	0.0	0.1	0.1	0.0	0.0	0	NA	NA	PB	B/U	B/U	B/U
	072C	13.1	8.7	4.1	0.0	0.0	0.0	0.4	1.9	1.9	0	NA	NA	B/U	B/U	PU	PU
MA7B	**M**	**18.2**	**12.4**	**5.4**	**0.0**	**0.0**	**0.0**	**0.1**	**0.6**	**0.6**							
	015	3.8	1.0	0.4	0.0	0.6	1.5	0.3	0.0	0.0	0	NA	NA	CB	CB	B/U	B/U
	020B	0.8	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0	NA	NA	U	U	U	B/U
	030B	1.5	1.2	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0	NA	NA	U	U	B/U	B/U
MA8	031	1.9	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	NA	NA	U	B/U	B/U	B/U

Abbreviations are: SS=slickspot, GOA=general occurrence area, M=mean, NA=not applicable, INT=introduced, LEPA=slickspot peppergrass, U=unburned, PU=predominantly unburned, B/U=burned and unburned areas, PB=predominantly burned, and CB=completely burned. *Six-letter plant codes are referenced in Appendix D. **Number in parentheses refers to Appendix A: Habitat Integrity and Population Monitoring Field Form.

Table 4 (continued)

Land unit		Weed cover*										Fire history pattern					
Management Area (MA)	EO/HIP transect	SS - M% INT annual & biennial cover	SS - M% BROTEC cover	SS - M% LEPPER cover	SS - M% HALGLO cover	SS - M% CERTES cover	SS - M% SALKAL cover	SS - M% SlSALT cover	SS - M% INT perennial cover	SS - M% AGRCRI cover	Noxious or aggressive species in GOA (#23)**	2004 fire size (ac)	LEPA-occupied habitat burned in 2004 (ac)	At HIP transect (#15A)**	Within 65 m (#15B)**	Within 250 m (#15C)**	Within 500 m (#15D)**
MA8	060	0.8	0.2	0.6	0.0	0.0	0.0	0.0	0.1	0.0	chojun	537	8	CB	CB	PB	B/U
cont.	**M**	**1.7**	**0.8**	**0.3**	**0.0**	**0.1**	**0.3**	**0.1**	**0.0**	**0.0**							
	002	5.6	3.2	0.6	0.0	0.0	1.9	0.0	0.0	0.0	0	NA	NA	U	PU	PU	B/U
	021	1.5	0.0	0.2	0.0	1.3	0.0	0.0	0.0	0.0	0	NA	NA	U	U	PU	B/U
	029	8.2	7.7	0.2	0.0	0.0	0.2	0.2	0.0	0.0	0	NA	NA	U	B/U	PB	B/U
	050	6.6	5.3	0.4	0.0	0.0	0.4	0.1	0.0	0.0	0	NA	NA	U	U	PB	PB
	051A	1.4	0.0	0.6	0.0	0.8	0.0	0.0	0.0	0.0	0	NA	NA	U	U	U	B/U
	051B	1.3	0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0	NA	NA	U	U	U	B/U
MA9	**M**	**4.1**	**2.7**	**0.4**	**0.0**	**0.3**	**0.4**	**0.0**	**0.0**	**0.0**							
	008A	2.9	0.0	0.1	0.0	0.9	1.1	0.7	0.1	0.1	0	NA	NA	U	U	B/U	B/U
	008B	30.3	0.0	0.0	0.0	15.7	14.2	0.4	0.1	0.1	0	NA	NA	PB	PB	PB	B/U
	010	34.8	13.1	0.3	0.0	0.0	17.1	4.3	0.0	0.0	0	NA	NA	PB	B/U	B/U	AG
	026	1.4	1.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0	NA	NA	U	U	U	U
	058	7.1	6.3	0.8	0.0	0.1	0.0	0.0	0.0	0.0	0	NA	NA	U	U	U	B/U
	061	12.2	0.6	0.1	1.8	3.2	6.2	0.1	0.6	0.6	0	NA	NA	B/U	B/U	PB	PB
	063	6.6	0.1	0.3	0.0	2.4	2.5	0.7	0.0	0.0	0	NA	NA	B/U	B/U	B/U	PB
MA10	**M**	**13.6**	**3.0**	**0.2**	**0.3**	**3.2**	**5.9**	**0.9**	**0.1**	**0.1**							
	700	7.8	0.1	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0	NA	NA	U	U	U	U
	701	0.8	0.2	0.1	0.4	0.1	0.0	0.0	10.2	10.2	0	NA	NA	CB	PB	PB	PB
	702	0.6	0.0	0.4	0.0	0.2	0.0	0.0	0.0	0.0	0	NA	NA	U	U	U	PU
	703	18.6	0.3	10.9	3.0	0.4	4.0	0.0	0.0	0.0	0	NA	NA	CB	CB	CB	PB
	705	2.6	0.0	1.0	0.1	1.3	0.2	0.0	2.8	2.8	0	NA	NA	PB	PB	PB	B/U
	706	2.9	0.0	2.3	0.0	0.5	0.0	0.0	0.2	0.2	0	NA	NA	U	U	U	U
	707	1.1	0.0	1.0	0.0	0.1	0.0	0.0	0.0	0.0	0	NA	NA	U	PU	PU	PU
	708	0.8	0.3	0.1	0.0	0.1	0.4	0.0	6.6	6.6	0	NA	NA	CB	CB	CB	PB
	709	1.2	0.4	0.7	0.0	0.2	0.0	0.0	0.0	0.0	0	NA	NA	U	PU	B/U	B/U
	710	0.6	0.0	0.2	0.0	0.4	0.0	0.0	0.0	0.0	0	NA	NA	U	U	U	PU
	711	4.6	0.7	2.1	0.0	0.0	1.8	0.0	4.4	4.4	0	NA	NA	U	B/U	PB	PB
	712	0.6	0.5	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0	NA	NA	U	U	B/U	B/U
	713	1.1	0.5	0.2	0.1	0.4	0.0	0.0	0.0	0.0	0	NA	NA	U	U	B/U	B/U
	714	8.9	0.6	7.3	0.3	0.1	0.7	0.1	0.4	0.1	0	NA	NA	U	B/U	PB	PB
	715	5.9	0.9	2.9	0.6	0.0	0.6	0.2	5.0	5.0	0	NA	NA	CB	CB	CB	CB
	716	13.4	1.4	1.4	10.1	0.5	0.0	0.0	6.3	6.3	0	NA	NA	PB	PB	B/U	B/U
	717	3.9	0.6	2.6	0.3	0.0	0.4	0.1	10.3	10.3	0	NA	NA	CB	CB	CB	CB
	718	2.6	0.5	2.1	0.1	0.0	0.0	0.0	0.0	0.0	0	NA	NA	B/U	B/U	B/U	B/U
	719	0.3	0.1	0.1	0.0	0.1	0.0	0.0	0.4	0.4	0	NA	NA	U	PU	B/U	B/U
	720	4.6	0.0	4.1	0.1	0.3	0.1	0.0	0.5	0.5	0	NA	NA	U	U	U	U
	721	0.3	0.0	0.3	0.0	0.0	0.0	0.0	1.0	1.0	0	NA	NA	U	PU	B/U	B/U
	722	1.7	0.0	1.7	0.0	0.1	0.0	0.0	0.0	0.0	0	NA	NA	U	U	U	B/U
MA11	**M**	**3.8**	**0.3**	**2.2**	**0.7**	**0.2**	**0.4**	**0.0**	**2.2**	**2.2**							
MEAN		**8.9**	**4.6**	**1.6**	**0.2**	**0.7**	**1.1**	**0.5**	**1.1**	**0.7**							

Abbreviations are: SS=slickspot, GOA=general occurrence area, M=mean, NA=not applicable, INT=introduced, LEPA=slickspot peppergrass, U=unburned, PU=predominantly unburned, B/U=burned and unburned areas, PB=predominantly burned, and CB=completely burned. *Six-letter plant codes are referenced in Appendix D. **Number in parentheses refers to Appendix A: Habitat Integrity and Population Monitoring Field Form.

Table 5. 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?
	066	0.0	0.0	0.0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	068	0.0	0.0	0.0	0.7	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	070	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
MA1	**M**	**0.0**	**0.0**	**0.0**	**0.3**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**		
MA2	**052**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	A	NA
	032	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	048	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	065	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
MA3&5	**M**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**		
	018A	0.0	0.0	0.0	0.5	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	018B	0.0	0.0	0.0	0.5	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	019A	1.6	0.0	1.6	1.2	0	1	3	7	0	0	0	0	0	1	3	7	C	O
	019B	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	024	0.6	0.4	0.6	0.1	0	0	1	7	0	0	1	3	0	0	1	6	C	O
	025	0.0	0.0	0.0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	057	0.0	0.0	0.0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
MA6	**M**	**0.3**	**0.1**	**0.3**	**0.3**	**0.0**	**0.1**	**0.6**	**2.0**	**0.0**	**0.0**	**0.1**	**0.4**	**0.0**	**0.1**	**0.6**	**1.9**		
	027A	0.1	0.3	0.3	0.2	0	0	0	2	0	0	0	5	0	0	0	5	A	NA
	027B	0.8	0.2	0.8	0.4	0	0	2	5	0	0	0	3	0	0	2	6	C	O
	027C	0.1	0.1	0.1	0.2	0	0	0	1	0	0	0	1	0	0	0	1	A	NA
	027D	0.1	0.0	0.1	0.1	0	0	0	1	0	0	0	0	0	0	0	1	C	O
	027E	0.3	0.0	0.3	0.6	0	0	0	5	0	0	0	0	0	0	0	5	C	O
	028A	0.0	0.0	0.0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	C	O
	028B	0.0	0.0	0.0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	035A	0.0	0.0	0.0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	041A	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	053B	0.0	0.0	0.0	0.4	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	059A	0.0	0.0	0.0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	067	1.2	0.7	2.7	0.2	0	1	2	5	0	0	2	4	1	2	2	5	C	O
	071A	0.0	0.0	0.0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	071B	0.0	0.0	0.0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
MA7	**M**	**0.2**	**0.1**	**0.3**	**0.2**	**0.0**	**0.1**	**0.3**	**1.4**	**0.0**	**0.0**	**0.1**	**0.9**	**0.1**	**0.1**	**0.3**	**1.6**		
	072A	0.1	0.0	0.1	0.5	0	0	0	2	0	0	0	0	0	0	0	2	C	R
	072B	0.6	0.3	0.6	0.6	0	0	2	2	0	0	1	1	0	0	2	2	C	R
	072C	2.9	0.2	2.9	3.1	0	2	6	9	0	0	0	4	0	2	6	9	C	R
MA7B	**M**	**1.2**	**0.2**	**1.2**	**1.4**	**0.0**	**0.7**	**2.7**	**4.3**	**0.0**	**0.0**	**0.3**	**1.7**	**0.0**	**0.7**	**2.7**	**4.3**		
	015	0.1	0.1	0.1	0.2	0	0	0	2	0	0	0	2	0	0	0	2	A	NA
	020B	0.3	0.3	0.3	0.7	0	0	0	6	0	0	0	6	0	0	0	6	C	R
	030B	0.5	0.5	1.0	0.5	0	0	1	5	0	0	1	5	0	1	1	5	C	R
MA8	031	1.7	0.5	1.9	0.7	0	0	5	8	0	0	1	5	0	0	6	8	C	O

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 (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?
MA8 cont.	060	16.1	0.9	16.1	1.0	9	9	10	10	0	0	2	7	9	9	10	10	C	R
	M	**3.7**	**0.5**	**3.9**	**0.6**	**1.8**	**1.8**	**3.2**	**6.2**	**0.0**	**0.0**	**0.8**	**5.0**	**1.8**	**2.0**	**3.4**	**6.2**		
	002	5.1	0.6	6.0	0.6	1	3	9	10	0	0	1	7	1	5	9	10	C	O
	021	0.0	0.0	0.0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	029	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	050	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	051A	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	051B	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
MA9	**M**	**0.9**	**0.1**	**1.0**	**0.1**	**0.2**	**0.5**	**1.5**	**1.7**	**0.0**	**0.0**	**0.2**	**1.2**	**0.2**	**0.8**	**1.5**	**1.7**		
	008A	0.0	0.0	0.0	0.4	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	008B	0.4	0.0	0.4	0.3	0	0	1	2	0	0	0	0	0	0	1	2	A	NA
	010	0.0	0.0	0.0	0.7	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	026	0.0	0.0	0.0	0.8	0	0	0	0	0	0	0	0	0	0	0	0	C	O
	058	0.0	0.0	0.0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	061	0.0	0.0	0.0	0.7	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	063	0.1	0.0	0.1	0.9	0	0	0	1	0	0	0	0	0	0	0	1	C	O
MA10	**M**	**0.1**	**0.0**	**0.1**	**0.5**	**0.0**	**0.0**	**0.1**	**0.4**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**	**0.4**		
	700	2.6	9.0	14.4	1.0	0	1	7	8	2	5	9	10	5	7	9	10	C	O
	701	2.0	0.8	4.1	2.4	0	1	4	10	0	0	1	8	1	3	5	10	C	R
	702	0.0	0.0	0.0	1.0	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	703	0.2	1.7	2.9	1.7	0	0	0	4	0	1	3	9	1	1	4	9	A	NA
	705	1.2	0.2	1.2	0.3	0	0	3	8	0	0	0	3	0	0	3	9	C	O
	706	5.0	0.2	5.0	0.8	0	5	9	10	0	0	0	3	0	5	9	10	C	R
	707	4.6	0.4	5.6	0.5	0	4	9	10	0	0	0	7	1	4	9	10	C	R
	708	1.5	4.4	6.4	1.2	0	0	5	5	0	5	7	8	2	5	7	8	C	O
	709	5.5	0.5	5.7	2.6	2	3	5	7	0	0	1	4	2	4	6	8	C	R
	710	0.0	0.0	0.0	0.8	0	0	0	0	0	0	0	0	0	0	0	0	A	NA
	711	3.2	2.7	6.7	1.8	0	1	9	10	0	1	7	10	1	6	10	10	C	R
	712	0.3	0.4	0.9	2.2	0	0	0	5	0	0	0	7	0	0	2	7	C	R
	713	0.5	0.0	0.5	0.7	0	0	0	9	0	0	0	0	0	0	0	9	C	R
	714	5.4	6.1	11.9	4.9	1	5	7	7	2	5	6	6	4	7	9	9	C	O
	715	1.7	6.9	11.5	3.0	0	1	4	5	3	4	7	7	3	4	9	9	C	R
	716	0.1	0.2	0.3	0.8	0	0	0	2	0	0	0	4	0	0	0	5	B	O
	717	3.8	4.1	8.8	8.8	1	2	6	7	0	3	9	9	2	4	10	10	C	R
	718	0.3	0.9	1.4	2.5	0	0	0	6	0	0	2	7	0	0	4	7	C	NA
	719	0.7	0.0	0.7	1.0	0	0	2	4	0	0	0	0	0	0	2	4	C	R
	720	5.6	0.3	5.6	0.4	1	4	9	10	0	0	0	5	1	4	9	10	C	R
	721	0.3	0.2	0.5	0.9	0	0	0	5	0	0	0	3	0	0	1	5	C	NA
	722	3.1	4.1	7.0	0.5	0	3	5	10	1	3	5	10	2	5	9	10	B	O
MA11	**M**	**2.1**	**1.9**	**4.6**	**1.8**	**0.2**	**1.4**	**3.8**	**6.5**	**0.4**	**1.2**	**2.6**	**5.5**	**1.1**	**2.7**	**5.3**	**7.7**		
MEAN		**1.1**	**0.7**	**1.9**	**0.8**	**0.2**	**0.6**	**1.8**	**3.3**	**0.1**	**0.4**	**0.9**	**2.4**	**0.5**	**1.1**	**2.3**	**3.7**		

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 6. Mean relative vegetation and absolute substrate cover (%) at habitat integrity and population (HIP) transects. Data are mean Daubenmire cover quadrat and line interception values.

Land unit		Functional groups and selected species cover													Substrate cover			H
Management Area (MA)	HIP transect	INT annuals	BROTEC	INT perennial grasses	AGRCRI	CHOJUN	NAT forbs	Shrubs	ARTTRI	NAT perennial grasses	POASAN	ELYELY	PSESPI	NAT annual grasses	Bare ground	Litter	Biological soil crust	NAT forb diversity index
	066	1.8	0.3	19.5	19.5	0.0	2.7	26.6	26.6	12.2	12.2	0.0	0.0	37.2	26.7	30.2	31.5	1.0
	068	63.2	0.0	0.0	0.0	0.0	6.7	21.0	21.0	5.7	5.7	0.0	0.0	3.4	57.9	31.3	6.7	1.2
	070	0.0	0.0	0.0	0.0	0.0	0.0	55.9	55.9	5.0	1.2	1.1	0.0	39.0	5.0	59.0	33.6	0.0
MA1	**M**	**21.7**	**0.1**	**6.5**	**6.5**	**0.0**	**3.1**	**34.5**	**34.5**	**7.7**	**6.4**	**0.4**	**0.0**	**26.5**	**29.9**	**40.1**	**23.9**	**0.7**
MA2	**052**	**48.2**	**47.7**	**0.0**	**0.0**	**0.0**	**7.7**	**27.6**	**0.0**	**1.6**	**0.7**	**0.0**	**0.0**	**14.9**	**8.2**	**75.8**	**7.0**	**0.4**
	032	33.8	33.7	0.0	0.0	0.0	0.4	56.5	56.5	8.1	0.7	1.2	0.0	1.2	6.1	64.5	15.8	0.4
	048	22.8	22.8	0.0	0.0	0.0	0.0	54.1	54.1	13.7	2.3	11.4	0.0	9.4	7.8	53.0	23.3	0.0
	065	39.1	37.2	6.3	0.0	6.3	2.6	37.3	26.6	6.1	0.2	5.9	0.0	8.6	3.3	71.5	10.4	1.3
MA3&5	**M**	**31.9**	**31.3**	**2.1**	**0.0**	**2.1**	**1.0**	**49.3**	**45.7**	**9.3**	**1.1**	**6.2**	**0.0**	**6.4**	**5.7**	**63.0**	**16.5**	**0.6**
	018A	93.9	88.3	0.0	0.0	0.0	0.0	0.0	0.0	5.7	4.7	1.0	0.0	0.4	8.5	76.0	2.0	0.0
	018B	24.8	8.3	0.1	0.1	0.0	0.6	44.8	44.8	28.1	28.1	0.0	0.0	1.6	37.9	27.1	21.4	0.0
	019A	97.1	47.2	0.7	0.7	0.0	0.0	0.0	0.0	1.7	1.7	0.0	0.0	0.5	22.5	49.5	12.1	0.0
	019B	92.8	84.5	0.6	0.0	0.0	5.3	0.0	0.0	0.9	0.9	0.0	0.0	0.4	12.7	48.7	8.0	0.0
	024	88.3	83.2	2.7	2.7	0.0	0.2	0.0	0.0	8.7	3.4	0.1	5.2	0.2	5.8	74.3	3.2	0.0
	025	67.8	56.5	0.0	0.0	0.0	0.6	10.2	10.2	21.3	19.8	1.5	0.0	0.1	4.2	77.5	5.9	0.7
	057	23.7	18.5	0.0	0.0	0.0	1.2	53.4	53.4	20.4	17.4	3.0	0.0	1.3	17.1	36.3	28.6	0.6
MA6	**M**	**69.8**	**55.2**	**0.6**	**0.5**	**0.0**	**1.1**	**15.5**	**15.5**	**12.4**	**10.8**	**0.8**	**0.7**	**0.6**	**15.5**	**55.6**	**11.6**	**0.2**
	027A	11.5	0.0	0.0	0.0	0.0	0.2	77.8	77.8	9.7	8.8	0.9	0.0	0.8	34.2	17.6	31.6	0.0
	027B	35.1	6.4	0.0	0.0	0.0	0.3	58.0	58.0	6.6	0.1	6.5	0.0	0.0	34.3	50.5	2.4	0.0
	027C	4.4	0.0	0.0	0.0	0.0	0.6	80.1	80.1	14.2	12.5	1.7	0.0	0.7	43.2	14.6	25.6	0.6
	027D	6.7	0.0	0.0	0.0	0.0	0.0	70.3	70.3	22.3	21.7	0.5	0.0	0.8	20.1	30.8	29.0	0.0
	027E	6.0	5.2	0.0	0.0	0.0	5.7	55.0	55.0	18.3	17.0	1.3	0.0	15.1	13.7	25.1	27.1	0.8
	028A	28.8	0.0	0.0	0.0	0.0	0.0	61.8	61.8	9.4	9.0	0.4	0.0	0.0	38.9	23.0	22.7	0.0
	028B	14.1	0.0	0.0	0.0	0.0	0.0	65.4	65.4	20.2	15.1	5.0	0.0	0.4	21.7	33.0	19.5	0.0
	035A	3.9	0.0	0.0	0.0	0.0	0.1	36.7	36.7	58.3	54.5	3.9	0.0	1.0	36.4	8.9	27.6	0.0
	041A	17.4	2.3	0.0	0.0	0.0	1.2	0.0	0.0	80.0	28.4	14.1	0.0	1.4	17.1	48.1	5.3	0.4
	053B	12.3	0.0	0.0	0.0	0.0	15.4	72.0	72.0	0.1	0.0	0.1	0.0	0.3	33.8	46.0	6.5	0.0
	059A	2.5	0.8	0.0	0.0	0.0	0.0	85.1	69.8	11.6	9.4	2.3	0.0	0.8	21.2	8.3	50.7	0.0
	067	1.7	0.3	0.0	0.0	0.0	0.2	73.0	73.0	9.3	7.0	2.3	0.0	15.8	14.5	28.5	39.6	0.0
	071A	2.4	0.1	0.0	0.0	0.0	0.0	85.7	85.7	10.5	9.8	0.7	0.0	1.4	20.9	18.6	48.5	0.0
	071B	9.7	0.0	0.0	0.0	0.0	0.3	85.4	85.4	4.1	3.9	0.2	0.0	0.5	12.0	33.3	28.7	0.0
MA7	**M**	**11.2**	**1.1**	**0.0**	**0.0**	**0.0**	**1.7**	**64.7**	**63.6**	**19.6**	**14.1**	**2.8**	**0.0**	**2.8**	**25.9**	**27.6**	**26.1**	**0.1**
	072A	65.9	58.1	0.0	0.0	0.0	0.5	0.0	0.0	32.1	15.8	15.6	0.1	1.5	7.5	58.7	21.5	0.7
	072B	57.5	57.0	0.0	0.0	0.0	0.1	32.6	15.3	9.7	3.9	5.7	0.0	0.1	7.3	82.0	1.6	0.0
	072C	10.7	4.9	19.3	19.3	0.0	1.4	37.0	4.9	29.5	29.5	0.0	0.0	2.2	41.2	21.6	17.4	0.0
MA7B	**M**	**44.7**	**40.0**	**6.4**	**6.4**	**0.0**	**0.6**	**23.2**	**6.7**	**23.7**	**16.4**	**7.1**	**0.0**	**1.3**	**18.7**	**54.1**	**13.5**	**0.2**
	015	97.6	91.2	0.0	0.0	0.0	0.0	0.0	0.0	2.4	2.1	0.3	0.0	0.0	21.9	27.6	0.5	0.0
	020B	6.7	6.1	0.0	0.0	0.0	1.4	42.9	42.9	37.2	32.9	2.0	0.0	11.8	33.3	23.4	14.2	0.6
	030B	1.2	0.6	0.0	0.0	0.0	0.2	65.3	65.3	33.3	5.5	9.9	0.0	0.0	28.2	21.4	27.5	0.0
	031	2.8	2.4	0.0	0.0	0.0	0.3	77.4	77.4	16.0	15.9	0.0	0.0	3.6	24.0	25.0	22.9	0.6
	060	16.2	10.8	2.7	0.0	2.7	0.0	0.0	0.0	81.1	62.2	18.9	0.0	0.0	36.2	43.0	2.2	0.0
MA8	**M**	**24.9**	**22.2**	**0.5**	**0.0**	**0.5**	**0.4**	**37.1**	**37.1**	**34.0**	**23.7**	**6.2**	**0.0**	**3.1**	**28.7**	**28.1**	**13.5**	**0.3**

Abbreviations are: INT=introduced, NAT=native, and M=mean. *Six-letter plant codes are referenced in Appendix D.

Table 6 (continued)

Land unit		Functional groups and selected species cover													Substrate cover			H
Management Area (MA)	HIP transect	INT annuals	BROTEC	INT perennial grasses	AGRCRI	CHOJUN	NAT forbs	Shrubs	ARTTRI	NAT perennial grasses	POASAN	ELYELY	PSESPI	NAT annual grasses	Bare ground	Litter	Biological soil crust	NAT forb diversity index
	002	11.0	6.0	0.0	0.0	0.0	9.0	62.2	62.2	17.2	17.2	0.0	0.0	0.6	37.7	33.4	3.6	0.8
	021	9.6	0.0	0.0	0.0	0.0	0.1	82.0	82.0	8.3	8.1	0.2	0.0	0.0	12.2	44.4	23.3	0.0
	029	48.1	47.2	0.0	0.0	0.0	0.1	51.0	51.0	0.8	0.8	0.0	0.0	0.1	13.3	48.0	11.7	0.0
	050	16.4	15.8	0.0	0.0	0.0	0.0	78.0	78.0	3.8	3.8	0.0	0.0	1.6	49.4	31.4	15.0	0.0
	051A	4.7	0.9	0.0	0.0	0.0	2.6	87.7	87.7	4.3	3.6	0.7	0.0	0.6	37.9	24.0	47.7	0.4
	051B	2.6	0.2	0.0	0.0	0.0	1.0	91.3	91.3	4.8	2.9	2.0	0.0	0.3	34.0	36.1	36.4	0.5
MA9	**M**	**15.4**	**11.7**	**0.0**	**0.0**	**0.0**	**2.1**	**75.4**	**75.4**	**6.5**	**6.1**	**0.5**	**0.0**	**0.6**	**30.7**	**36.2**	**23.0**	**0.3**
	008A	2.8	0.1	0.1	0.1	0.0	1.5	87.0	87.0	7.8	7.8	0.0	0.0	0.8	29.2	31.6	30.7	0.0
	008B	82.6	0.0	1.3	1.3	0.0	0.0	15.1	0.0	1.0	1.0	0.0	0.0	0.0	58.8	12.4	10.7	0.0
	010	86.0	63.6	0.0	0.0	0.0	1.3	5.6	0.0	7.1	3.8	0.1	0.0	0.1	30.0	48.0	2.0	0.0
	026	1.9	1.8	0.0	0.0	0.0	3.3	75.0	75.0	15.3	15.3	0.0	0.0	4.5	28.5	25.4	31.5	0.7
	058	16.1	16.1	0.0	0.0	0.0	0.4	70.1	70.1	13.3	10.7	2.6	0.0	0.1	19.6	30.4	33.3	0.7
	061	55.9	0.3	0.4	0.4	0.0	0.1	36.6	32.4	6.5	6.5	0.0	0.0	0.5	49.5	18.5	21.4	0.0
	063	13.9	2.8	0.0	0.0	0.0	0.6	82.4	82.4	1.7	1.7	0.1	0.0	1.3	24.6	53.4	5.9	0.0
MA10	**M**	**37.0**	**12.1**	**0.2**	**0.2**	**0.0**	**1.0**	**53.1**	**49.6**	**7.5**	**6.7**	**0.4**	**0.0**	**1.0**	**34.3**	**31.4**	**19.4**	**0.2**
	700	0.1	0.1	0.0	0.0	0.0	2.1	82.3	23.7	15.6	15.5	0.1	0.0	0.0	54.5	11.4	14.4	1.2
	701	0.1	0.0	74.3	74.3	0.0	14.5	0.0	0.0	11.1	10.0	1.1	0.0	0.0	58.0	11.9	1.4	0.4
	702	0.7	0.1	0.0	0.0	0.0	4.5	67.0	67.0	27.7	13.5	0.6	13.6	0.0	36.7	18.5	23.1	1.7
	703	51.8	3.3	0.0	0.0	0.0	19.9	0.0	0.0	28.1	22.1	2.6	0.0	0.0	58.4	5.7	0.5	0.9
	705	2.6	0.2	14.8	14.8	0.0	11.0	57.4	0.0	14.1	14.0	0.0	0.0	0.0	27.6	28.5	24.5	1.2
	706	0.9	0.0	0.0	0.0	0.0	1.4	84.1	72.8	13.6	11.1	0.5	0.0	0.0	49.4	14.3	21.3	1.3
	707	0.3	0.0	0.0	0.0	0.0	1.3	71.5	71.5	26.9	14.6	1.1	0.0	0.0	38.6	29.6	9.5	0.4
	708	2.1	0.7	48.3	48.3	0.0	5.5	0.0	0.0	44.1	43.4	0.7	0.0	0.0	74.5	9.2	0.0	0.0
	709	0.8	0.3	0.0	0.0	0.0	6.6	68.2	68.2	24.4	22.2	1.8	0.3	0.0	33.7	15.3	18.8	1.2
	710	2.2	0.1	0.0	0.0	0.0	10.6	59.9	59.9	27.3	21.8	0.7	3.7	0.0	31.1	13.8	26.7	1.3
	711	10.0	2.0	1.0	1.0	0.0	14.3	64.7	47.6	9.9	9.6	0.3	0.0	0.0	40.9	29.1	12.6	0.8
	712	0.1	0.0	0.0	0.0	0.0	4.6	55.7	55.7	39.6	35.3	4.3	0.0	0.0	45.4	15.4	20.9	0.2
	713	2.9	1.0	0.0	0.0	0.0	5.0	74.3	74.3	17.9	14.7	3.1	0.0	0.0	47.4	12.4	24.2	1.1
	714	15.0	0.4	0.0	0.0	0.0	12.0	47.9	47.9	25.1	13.0	9.0	0.0	0.0	34.9	10.5	26.6	1.4
	715	31.4	13.6	16.1	16.1	0.0	0.0	0.0	0.0	52.5	52.3	0.2	0.0	0.0	41.4	25.2	1.4	0.0
	716	1.8	0.9	50.3	50.3	0.0	1.6	39.4	2.2	7.0	6.8	0.1	0.0	0.0	58.3	10.6	0.7	1.0
	717	0.0	0.0	63.7	63.7	0.0	6.0	0.0	0.0	30.3	25.1	5.2	0.0	0.0	37.5	11.8	24.6	0.8
	718	1.5	1.5	0.0	0.0	0.0	2.0	73.8	73.8	22.3	19.2	1.7	0.0	0.0	52.7	25.3	7.6	0.6
	719	0.0	0.0	0.0	0.0	0.0	4.9	78.7	78.7	16.4	12.2	1.9	2.3	0.0	40.5	17.3	22.0	1.1
	720	0.8	0.0	0.3	0.0	0.0	4.0	45.0	45.0	49.9	19.4	2.6	25.6	0.0	62.0	14.0	3.6	0.9
	721	0.0	0.0	0.0	0.0	0.0	3.6	55.7	55.4	40.7	29.3	1.4	9.9	0.0	35.6	18.7	15.6	0.9
	722	0.0	0.0	0.0	0.0	0.0	13.0	47.2	38.4	39.9	19.0	8.9	12.0	0.0	39.5	11.5	34.5	0.7
MA11	**M**	**5.7**	**1.1**	**12.2**	**12.2**	**0.0**	**6.7**	**48.8**	**40.1**	**26.6**	**20.2**	**2.2**	**3.1**	**0.0**	**45.4**	**16.4**	**15.2**	**0.9**
MEAN		**22.4**	**13.4**	**4.5**	**4.4**	**0.1**	**3.2**	**48.5**	**44.0**	**18.8**	**14.0**	**2.4**	**1.0**	**2.6**	**31.1**	**31.8**	**18.2**	**0.4**

Abbreviations are: INT=introduced, NAT=native, and M=mean. *Six-letter plant codes are referenced in Appendix D.

Figure 1. Map of Management Areas (MAs) and habitat integrity and population (HIP) transects within the Consideration Zone.

SPATIAL DATA NOT SHOWN.

Figure 2. Map of New Plymouth (MA1) and Boise Foothills Management Areas (MA2A, MA2B, MA3, MA4).

SPATIAL DATA NOT SHOWN.

Figure 3. Map of Boise Management Area (MA5).

SPATIAL DATA NOT SHOWN.

Figure 4. Map of Kuna Management Area (MA6).

SPATIAL DATA NOT SHOWN.

Figure 5. Map of Orchard Training Range (MA7) and North of Orchard Training Range Management Areas (MA7B; boundaries not defined). Habitat integrity and population (HIP) transect 041A is not shown.

SPATIAL DATA NOT SHOWN.

Figure 6. Map of Orchard Management Area (MA8).

SPATIAL DATA NOT SHOWN.

Figure 7. Map of Mountain Home Management Area (MA9).

SPATIAL DATA NOT SHOWN.

Figure 8. Map of Glenns Ferry/Hammett Management Area (MA10).

SPATIAL DATA NOT SHOWN.

Figure 9. Map of Jarbridge Management Areas (MA11 and MA12).

SPATIAL DATA NOT SHOWN.

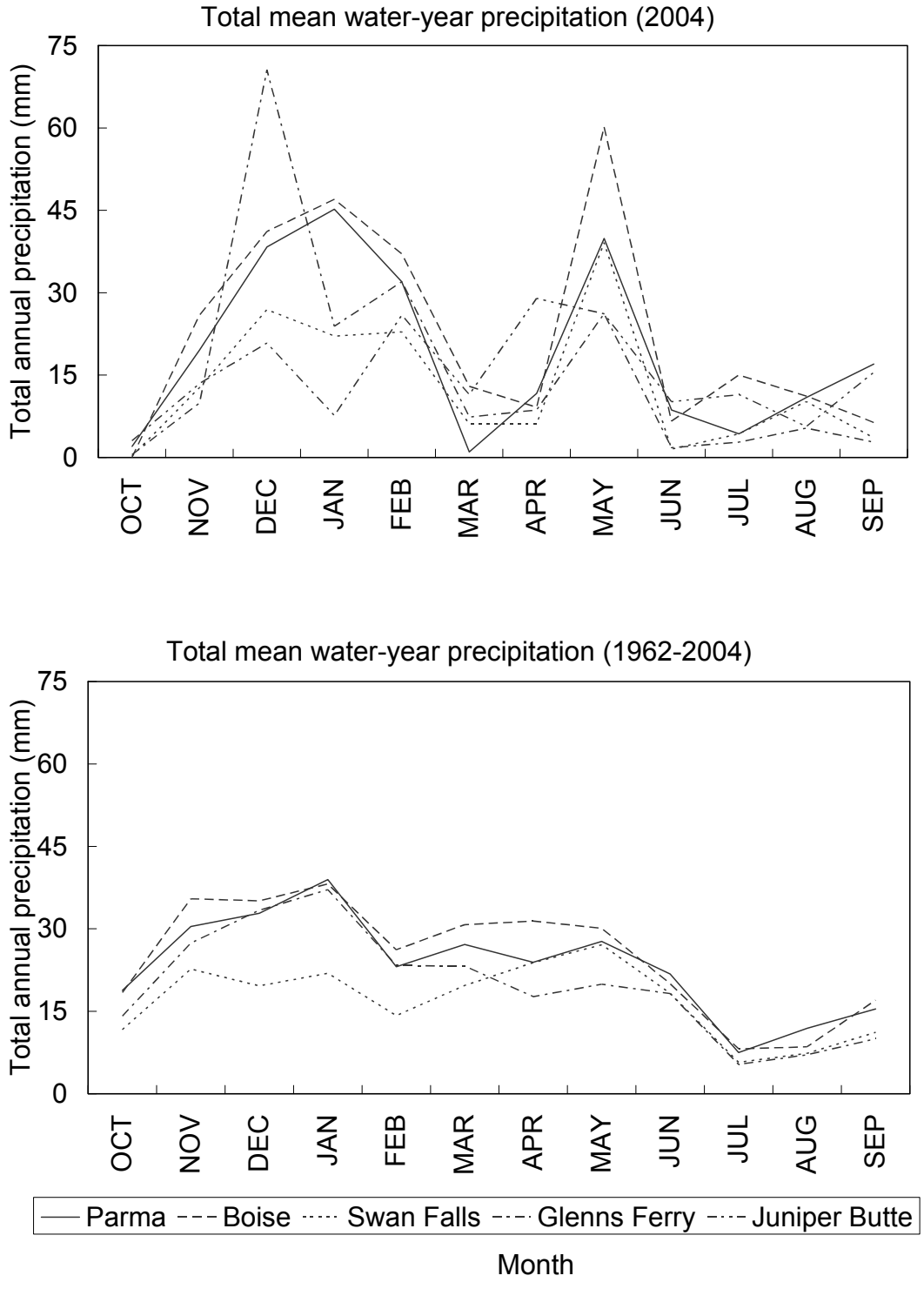


Figure 10. Total mean water-year precipitation (October-September) for 2004 (above) and 1962-2004 (below; Jarbridge data are not available). Parma is closest to MA1; Boise, MA2, MA3, MA4, and MA5; Swan Falls, MA6, MA7, MA7B, and MA8; Glenns Ferry, MA9 and MA10; and Juniper Butte, MA11 and MA12. Weather data were from Western Regional Climate Center (2004) and Binder (Juniper Butte; pers. comm. 2004).

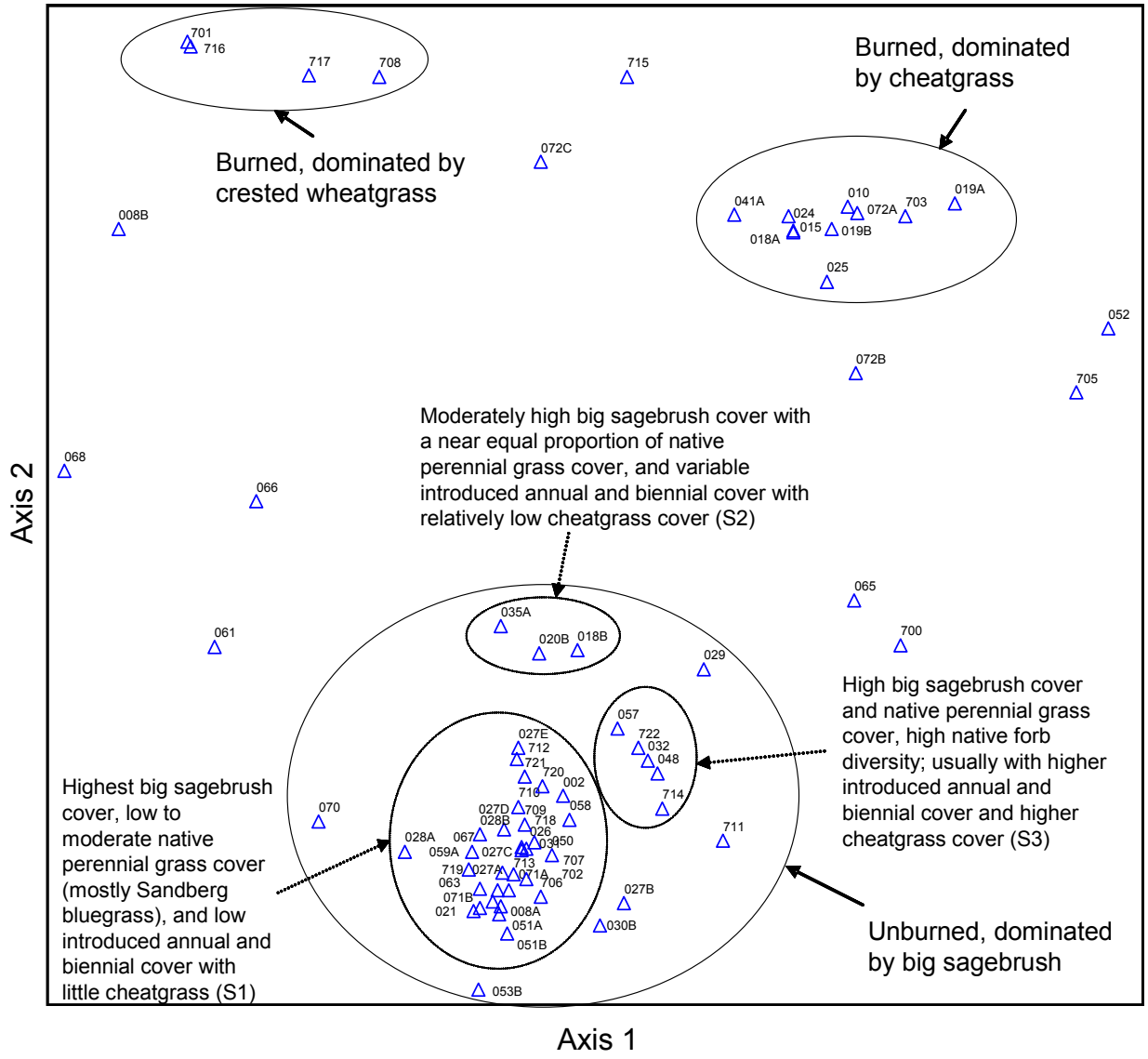


Figure 11. Nonmetric multidimensional scaling (NMS) community ordination of habitat integrity and population (HIP) transects. Data are based on mean relativized Daubenmire cover quadrat and line-interception values.

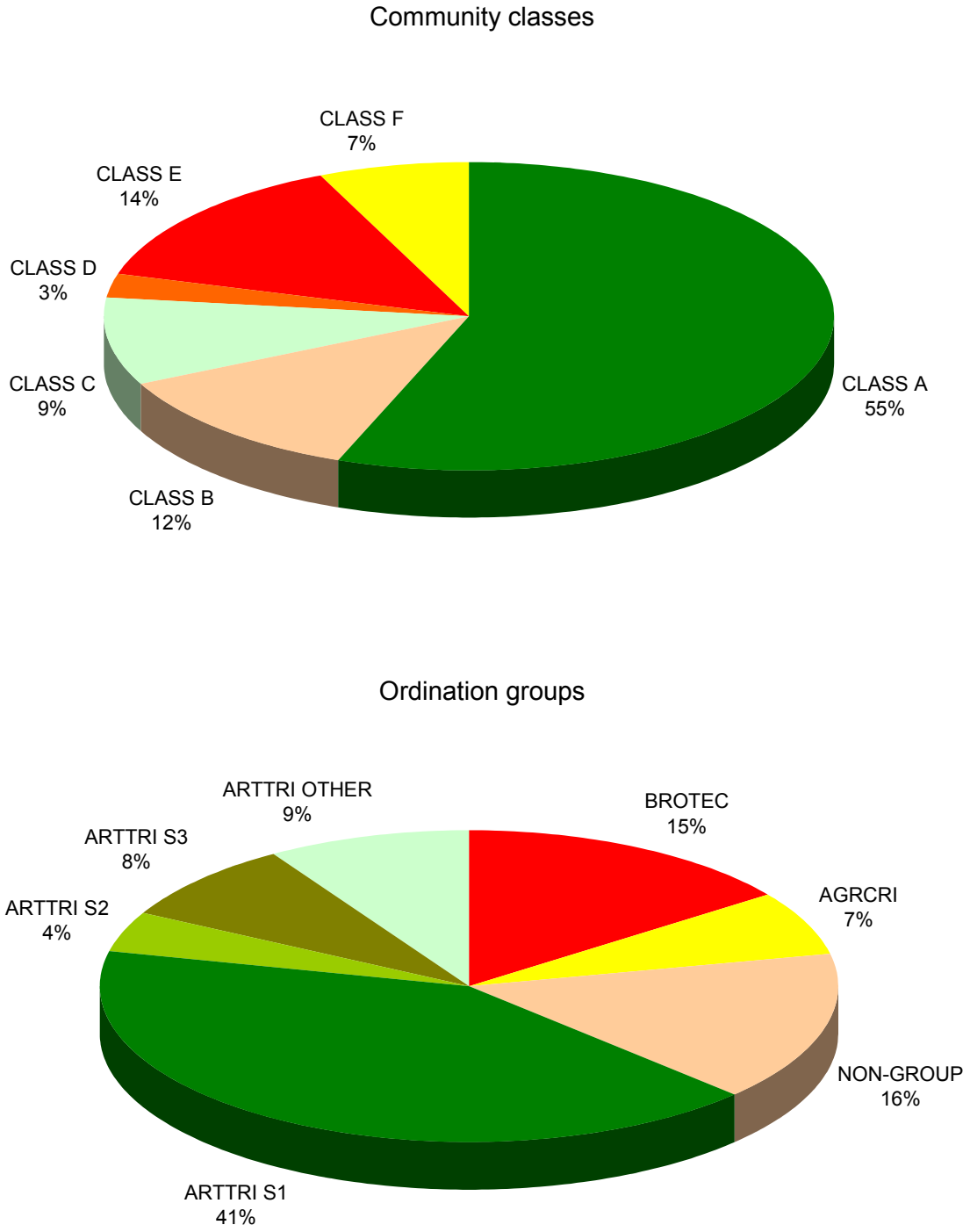
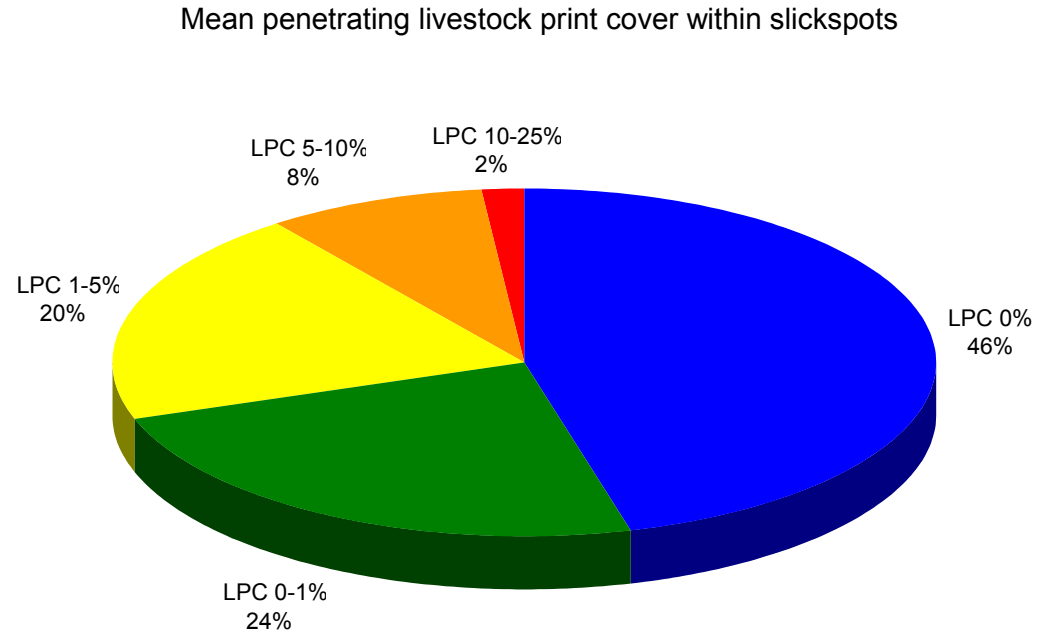


Figure 12. Proportion of community classes (above; see Table 2) and ordination groups (below; ARTTRI=big sagebrush, BROTEC=cheatgrass, AGRCRI=crested wheatgrass, S=subgroup; NON-GROUP refers those not in any group; see Figure 11) associated with element occurrences (EOs).



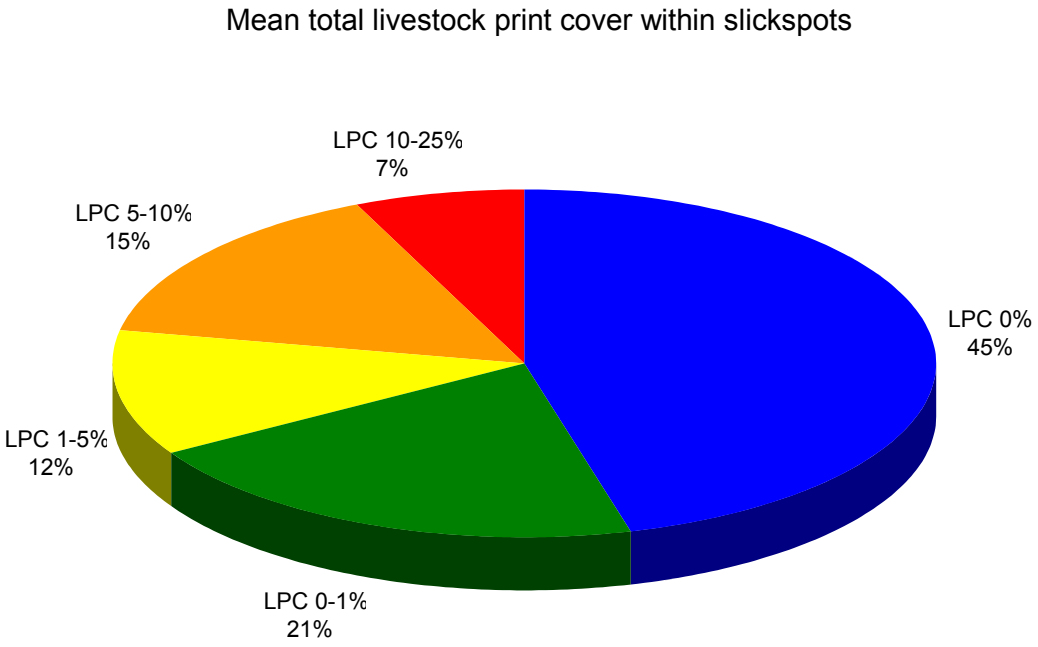


Figure 13. Proportion of mean penetrating (above) and total (below) livestock print cover within slickspots (LPC=livestock print cover) at element occurrences (EOs).

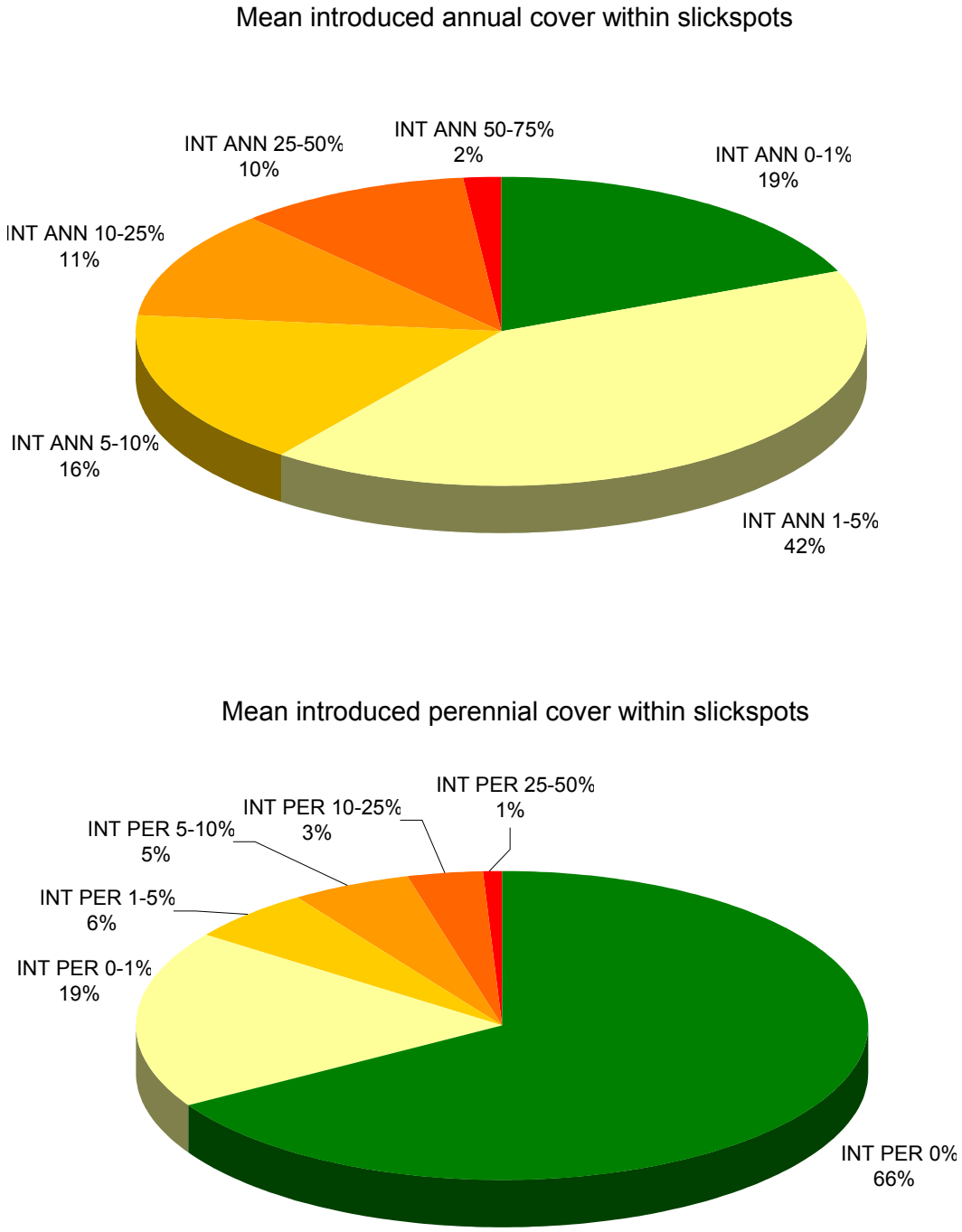
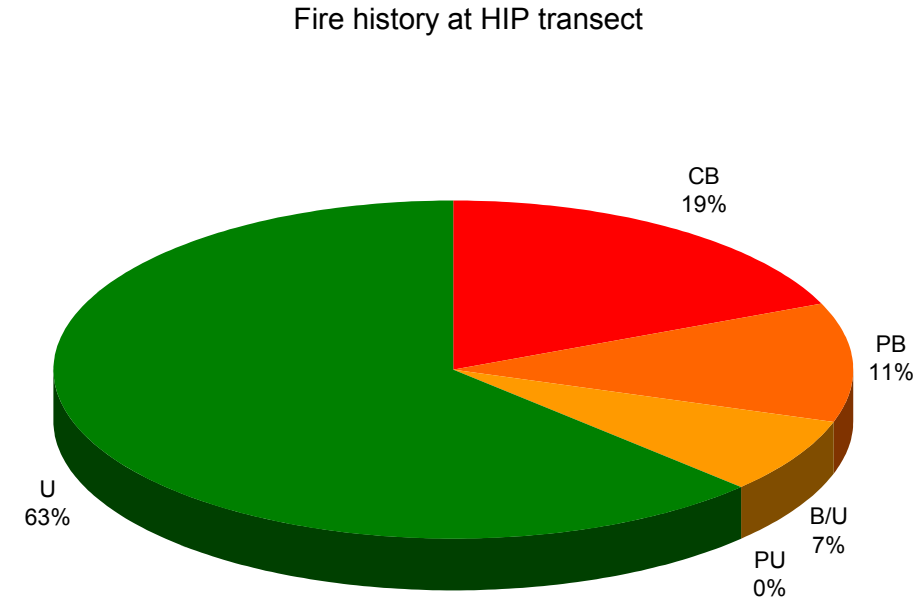


Figure 14. Proportion of mean introduced annual (above) and perennial (below) cover within slickspots (INT=introduced, ANN=annuals, and PER=perennials) at element occurrences (EOs).



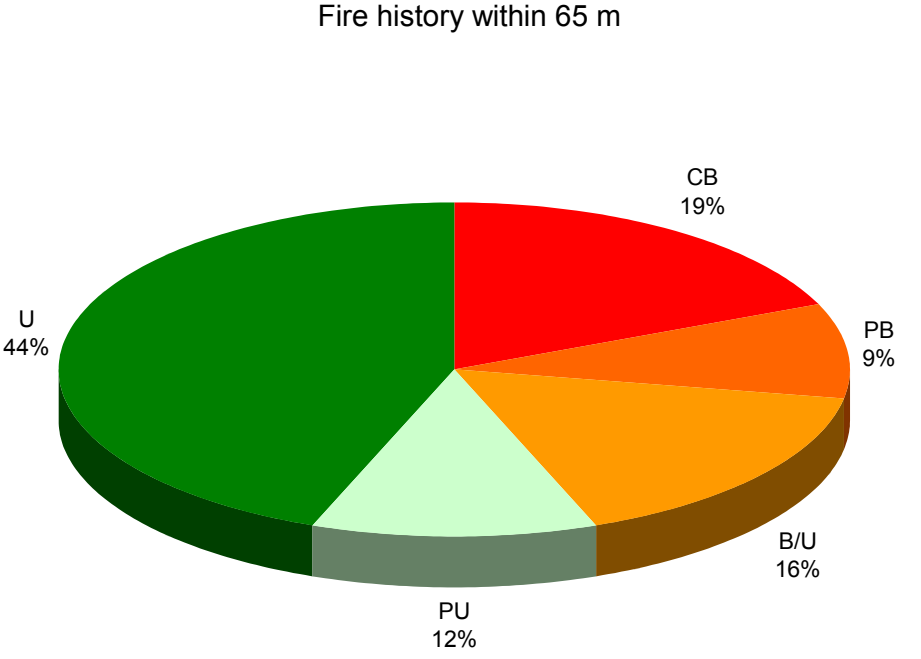
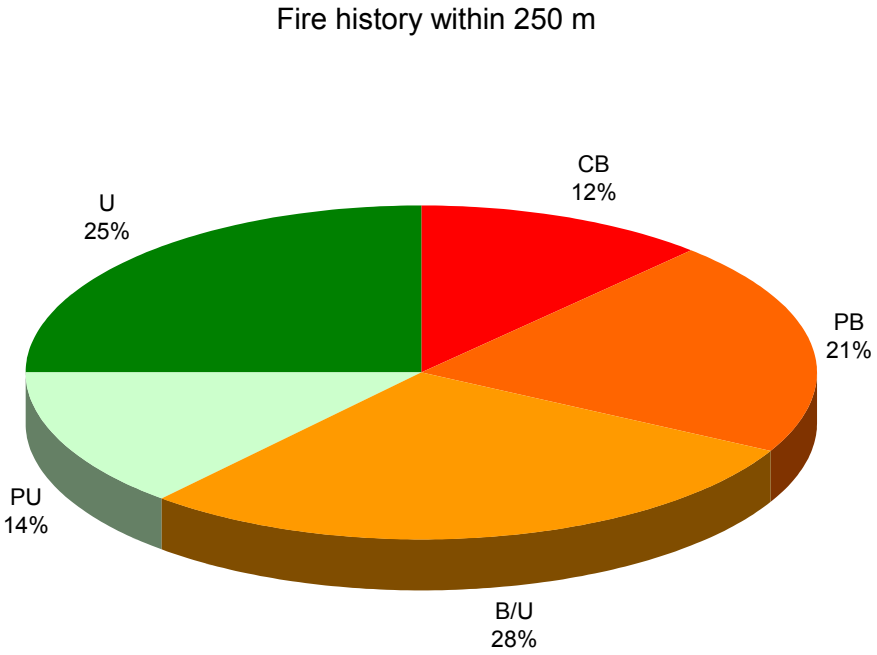


Figure 15. Proportion of element occurrences (EOs) in terms of fire history at the habitat integrity and population (HIP) transect (above) and within 65 m (below; U=unburned, PU=predominantly unburned, B/U=burned and unburned areas, PB=predominantly burned, and CB=completely burned).



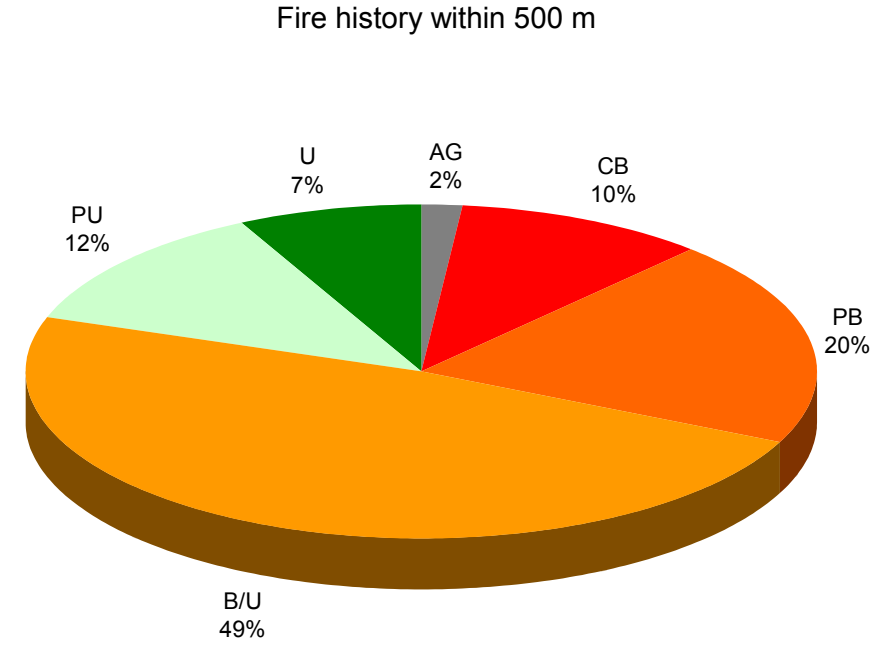


Figure 16. Proportion of element occurrences (EOs) in terms of fire history within 250 m (above) and 500 m (below; U=unburned, PU=predominantly unburned, B/U=burned and unburned areas, PB=predominantly burned, and CB=completely burned).

Appendix A. Habitat integrity and population (HIP) monitoring field form.

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%.

Slickspot attributes

1. What are the approximate slickspot dimensions (i.e., longest length x longest width, in square meters)? ____ x ____

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

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

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

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

Slickspot peppergrass population

6. Total # of plants Counted number up to 50 ____ 51-100 101-300 301-500 >500

7. % of plants by life stage: A) Rosette _____ B) Reproductive _____

8. Total # of plants trampled by livestock _____

Off-highway vehicle (OHV) use

9. Class of vehicle: _____

10. 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)? __

Appendix A (continued)

Restoration activities

11. Does the slickspot have evidence of drill seeding or other restoration activities (i.e., chaining, raking)? ___

Livestock use

12. Class of livestock: _____

13. 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?

14. Answer the following questions using the following categories:

Counted number (up to 10) _____ 11-20 21-50 >50

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 prints are broken through to the slickspot clay layer?
E) How many tracks are not discernable enough to know if livestock caused them?
F) How many of these indiscernible tracks are broken through to the slickspot clay layer?

Fire history (recorded at slickspot station 5)

Describe the fire history pattern for the following landscape scales (15A-D and 16A-B):

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)

Appendix A (continued)

15. What is the fire history pattern depicted by the vegetation at the four 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

16. 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

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

17. 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

18. Is there evidence OHVs or other vehicles go off-road in cross-country fashion within the general occurrence area? Indicate if OHV 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)

19. Is there evidence of fire-fighting disturbances within the 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)

Appendix A (continued)

20. 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

21. 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

22. 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

23. 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.

HIP transect	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														
008A														
008B														
010														
015														
018A														
018B														
019A														
019B														
020B														
021														
024														
025														
026														
027A														
027B														
027C														
027D														
027E														
028A														
028B														
029														
030B														
031														
032														
035A														
041A														
048														
050														
051A														
051B														
052														
053B														
057														
058														

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 transect	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**
060														
061														
063														
065														
066														
067														
068														
070														
071A														
071B														
072A														
072B														
072C														
700														
701														
702														
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705														
706														
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712														
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717														
718														
719														
720														
721														
722														

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 locations of habitat integrity and population (HIP) transects.*

HIP transect	EO name	Location	Date	GPS accuracy	IDTM Easting	IDTM Northing	UTM Easting	UTM Northing
002	Crater Rings	start	8/2/2004	PDA/PDOP<5/30 ave. pts.				
002	Crater Rings	end	8/2/2004	PDA/PDOP<5/30 ave. pts.				
008A	Bennett Road	start	6/30/2004	PDA/PDOP<5/30 ave. pts.				
008A	Bennett Road	end	6/30/2004	PDA/PDOP<5/30 ave. pts.				
008B	Bennett Road	start	6/30/2004	PDA/PDOP<5/30 ave. pts.				
008B	Bennett Road	end	6/30/2004	PDA/PDOP<5/30 ave. pts.				
010	Chalk Flat	start	7/8/2004	PDA/PDOP<5/30 ave. pts.				
010	Chalk Flat	end	7/8/2004	PDA/PDOP<5/30 ave. pts.				
012	Military Reserve Park	start	6/25/2004	PDA/PDOP<5/30 ave. pts.				
015	Simco Road	start	6/3/2004	PDA/PDOP<5/30 ave. pts.				
015	Simco Road	end	6/3/2004	PDA/PDOP<5/30 ave. pts.				
018A	Kuna Butte SW	start	6/23/2004	PDA/PDOP<5/30 ave. pts.				
018A	Kuna Butte SW	end	6/23/2004	PDA/PDOP<5/30 ave. pts.				
018B	Kuna Butte SW	start	6/23/2004	PDA/PDOP<5/30 ave. pts.				
018B	Kuna Butte SW	end	6/23/2004	PDA/PDOP<5/30 ave. pts.				
019A	Initial Point	start	8/18/2004	PDA/PDOP<5/30 ave. pts.				
019A	Initial Point	end	8/18/2004	PDA/PDOP<5/30 ave. pts.				
019B	Initial Point	start	8/16/2004	PDA/PDOP<5/30 ave. pts.				
019B	Initial Point	end	8/16/2004	PDA/PDOP<5/30 ave. pts.				
020A	Soles Rest Creek	start	DNE	OLD NAD83				
020B	Soles Rest Creek	start	6/3/2004	PDA/PDOP<5/30 ave. pts.				
020B	Soles Rest Creek	end	6/3/2004	PDA/PDOP<5/30 ave. pts.				
021	Fraser Reservoir East	start	7/29/2004	PDA/PDOP<5/30 ave. pts.				
021	Fraser Reservoir East	end	7/29/2004	PDA/PDOP<5/30 ave. pts.				
022A	Pleasant Valley North	start	DNE	OLD NAD83				
022B	Pleasant Valley North	start	DNE	OLD NAD83				
024	Kuna Butte	start	6/7/2004	PDA/PDOP<5/30 ave. pts.				
024	Kuna Butte	end	6/7/2004	PDA/PDOP<5/30 ave. pts.				
025	Melba Butte	start	6/10/2004	PDA/PDOP<5/30 ave. pts.				
025	Melba Butte	end	6/10/2004	PDA/PDOP<5/30 ave. pts.				
026	Alkali Creek	start	7/6/2004	PDA/PDOP<5/30 ave. pts.				
026	Alkali Creek	end	7/6/2004	PDA/PDOP<5/30 ave. pts.				
027A	West of Orchard	start	7/13/2004	PDA/PDOP<5/30 ave. pts.				
027B	West of Orchard	start	7/27/2004	PDA/PDOP<5/30 ave. pts.				
027B	West of Orchard	end	7/27/2004	PDA/PDOP<5/30 ave. pts.				
027C	West of Orchard	start	6/1/2004	Garmin/accuracy unk.				

*GPS locations are given in both IDTM NAD83 and UTM NAD83.

Appendix C (continued)

HIP transect	EO name	Location	Date	GPS accuracy	IDTM Easting	IDTM Northing	UTM Easting	UTM Northing
027D	West of Orchard	start	DNE	OLD NAD83				
027D	West of Orchard	end	7/13/2004	PDA/PDOP<5/30 ave. pts.				
027E	West of Orchard	start	7/27/2004	PDA/PDOP<5/30 ave. pts.				
027E	West of Orchard	end	7/27/2004	PDA/PDOP<5/30 ave. pts.				
028A	Christmas Mountain N	start	6/14/2004	PDA/PDOP<5/30 ave. pts.				
028A	Christmas Mountain N	end	6/14/2004	PDA/PDOP<5/30 ave. pts.				
028B	Christmas Mountain N	start	6/14/2004	PDA/PDOP<5/30 ave. pts.				
028B	Christmas Mountain N	end	6/14/2004	PDA/PDOP<5/30 ave. pts.				
029	Mountain Home SE	start	7/28/2004	PDA/PDOP<5/30 ave. pts.				
029	Mountain Home SE	end	7/28/2004	PDA/PDOP<5/30 ave. pts.				
030B	Soles Rest Creek	start	6/2/2004	PDA/PDOP<5/30 ave. pts.				
031	Bowns Creek	start	7/29/2004	PDA/PDOP<5/30 ave. pts.				
031	Bowns Creek	end	7/29/2004	PDA/PDOP<5/30 ave. pts.				
032	Tenmile Creek	start	6/4/2004	PDA/PDOP<5/30 ave. pts.				
032	Tenmile Creek	end	6/4/2004	PDA/PDOP<5/30 ave. pts.				
035A	Orchard Southwest	start	6/4/2004	Garmin/accuracy unk.				
038	Goose Creek	start	DNE	OLD NAD83				
040	Woods Gulch	start	6/8/2004	PDA/PDOP<5/30 ave. pts.				
047	Willow Creek	start	DNE	OLD NAD83				
048	South Cole Road/ Tenmile Ck.	start	6/24/2004	PDA/PDOP<5/30 ave. pts.				
048	South Cole Road/ Tenmile Ck.	end	6/24/2004	PDA/PDOP<5/30 ave. pts.				
050	West Side Canal/ Slade Flat W	start	6/17/2004	PDA/PDOP<5/30 ave. pts.				
050	West Side Canal/ Slade Flat W	end	6/17/2004	PDA/PDOP<5/30 ave. pts.				
051A	Hot Creek Road	start	6/9/2004	PDA/PDOP<5/30 ave. pts.				
051A	Hot Creek Road	end	6/9/2004	PDA/PDOP<5/30 ave. pts.				
051B	Hot Creek Road	start	6/9/2004	PDA/PDOP<5/30 ave. pts.				
051B	Hot Creek Road	end	6/9/2004	PDA/PDOP<5/30 ave. pts.				
052	Woods Gulch	start	6/8/2004	PDA/PDOP<5/30 ave. pts.				
052	Woods Gulch	end	6/8/2004	PDA/PDOP<5/30 ave. pts.				
053A	Christmas Mountain	start	DNE	OLD NAD83				
053B	Christmas Mountain	start	DNE	OLD NAD83				
057	Kuna Butte Northwest	start	6/7/2004	PDA/PDOP<5/30 ave. pts.				
057	Kuna Butte Northwest	end	6/7/2004	PDA/PDOP<5/30 ave. pts.				
058	Glenns Ferry NW	start	7/8/2004	PDA/PDOP<5/30 ave. pts.				
058	Glenns Ferry NW	end	7/8/2004	PDA/PDOP<5/30 ave. pts.				
059A	Fake Raptor Rock	start	DNE	OLD NAD83				

*GPS locations are given in both IDTM NAD83 and UTM NAD83.

Appendix C (continued)

HIP transect	EO name	Location	Date	GPS accuracy	IDTM Easting	IDTM Northing	UTM Easting	UTM Northing
060	West of Squaw Creek	start	8/2/2004	PDA/PDOP<5/30 ave. pts.				
060	West of Squaw Creek	end	8/2/2004	PDA/PDOP<5/30 ave. pts.				
061	SE of Reverse	start	DNE	OLD NAD83				
063	Bennett Creek	start	7/28/2004	PDA/PDOP<5/30 ave. pts.				
063	Bennett Creek	end	7/28/2004	PDA/PDOP<5/30 ave. pts.				
065	Lower Seaman Gulch	start	8/4/2004	PDA/PDOP<5/30 ave. pts.				
065	Lower Seaman Gulch	end	8/4/2004	PDA/PDOP<5/30 ave. pts.				
066	New Plymouth SW	start	6/15/2004	PDA/PDOP<5/30 ave. pts.				
066	New Plymouth SW	end	6/15/2004	PDA/PDOP<5/30 ave. pts.				
067	N edge of OTA	start	8/3/2004	PDA/PDOP<5/30 ave. pts.				
067	N edge of OTA	end	8/3/2004	PDA/PDOP<5/30 ave. pts.				
068	S of New Plymouth/ I-84	start	6/16/2004	PDA/PDOP<5/30 ave. pts.				
068	S of New Plymouth/ I-84	end	6/16/2004	PDA/PDOP<5/30 ave. pts.				
070	W of Graveyard Gulch	start	6/15/2004	PDA/PDOP<5/30 ave. pts.				
070	W of Graveyard Gulch	end	6/15/2004	PDA/PDOP<5/30 ave. pts.				
071A	Christmas Mountain NE	start	6/28/2004	PDA/PDOP<5/30 ave. pts.				
071A	Christmas Mountain NE	end	6/28/2004	PDA/PDOP<5/30 ave. pts.				
071B	Christmas Mountain NE	start	7/1/2004	PDA/PDOP<5/30 ave. pts.				
071B	Christmas Mountain NE	end	7/1/2004	PDA/PDOP<5/30 ave. pts.				
072A	SW of Leone	start	6/21/2004	PDA/PDOP<5/30 ave. pts.				
072A	SW of Leone	end	6/21/2004	PDA/PDOP<5/30 ave. pts.				
072B	SW of Leone	start	6/21/2004	PDA/PDOP<5/30 ave. pts.				
072B	SW of Leone	end	6/21/2004	PDA/PDOP<5/30 ave. pts.				
072C	SW of Leone	start	6/22/2004	PDA/PDOP<5/30 ave. pts.				
072C	SW of Leone	end	6/22/2004	PDA/PDOP<5/30 ave. pts.				
700	Mosquito Lake Reservoir	start	9/23/2004	PDA/PDOP<5/30 ave. pts.				
700	Mosquito Lake Reservoir	end	9/23/2004	PDA/PDOP<5/30 ave. pts.				
701	Post Office Reservoir	start	7/22/2004	Garmin/FOM=14ft				
701	Post Office Reservoir	end	7/22/2004	Garmin/FOM=23ft				
702	Three Creek Well	start	7/19/2004	PDA/PDOP<5/30 ave. pts.				
702	Three Creek Well	end	7/19/2004	PDA/PDOP<5/30 ave. pts.				
703	Flat Draw Reservoir	start	9/22/2004	PDA/PDOP<5/30 ave. pts.				
703	Flat Draw Reservoir	end	9/22/2004	PDA/PDOP<5/30 ave. pts.				
704	Juniper Butte North	start	DNE	OLD NAD83				
705	Clover Three Creek Road	start	7/20/2004	PDA/PDOP<5/30 ave. pts.				
705	Clover Three Creek Road	end	7/20/2004	PDA/PDOP<5/30 ave. pts.				

*GPS locations are given in both IDTM NAD83 and UTM NAD83.

Appendix C (continued)

HIP transect	EO name	Location	Date	GPS accuracy	IDTM Easting	IDTM Northing	UTM Easting	UTM Northing
706	Juniper Lake	start	7/21/2004	PDA/PDOP<5/30 ave. pts.				
706	Juniper Lake	end	7/21/2004	PDA/PDOP<5/30 ave. pts.				
707	Juniper Butte South	start	7/21/2004	PDA/PDOP<5/30 ave. pts.				
707	Juniper Butte South	end	7/21/2004	PDA/PDOP<5/30 ave. pts.				
708	Poison Creek North	start	9/22/2004	PDA/PDOP<5/30 ave. pts.				
708	Poison Creek North	end	9/22/2004	PDA/PDOP<5/30 ave. pts.				
709	Juniper Butte West	start	7/23/2004	PDA/PDOP<5/30 ave. pts.				
709	Juniper Butte West	end	7/23/2004	PDA/PDOP<5/30 ave. pts.				
710	Three Creek Well South	start	7/23/2004	PDA/PDOP<5/30 ave. pts.				
710	Three Creek Well South	end	7/23/2004	PDA/PDOP<5/30 ave. pts.				
711	W of Clover Butte	start	9/20/2004	PDA/PDOP<5/30 ave. pts.				
711	W of Clover Butte	end	9/20/2004	PDA/PDOP<5/30 ave. pts.				
712	Clover Butte South	start	7/20/2004	Garmin/FOM=15ft				
712	Clover Butte South	end	7/20/2004	Garmin/FOM=15ft				
713	Clover Butte	start	7/20/2004	PDA/PDOP<5/30 ave. pts.				
713	Clover Butte	end	7/20/2004	PDA/PDOP<5/30 ave. pts.				
714	Clover Butte	start	9/24/2004	PDA/PDOP<5/30 ave. pts.				
714	Clover Butte	end	9/24/2004	PDA/PDOP<5/30 ave. pts.				
715	Leo Waterhole	start	7/19/2004	PDA/PDOP<5/30 ave. pts.				
715	Leo Waterhole	end	7/19/2004	PDA/PDOP<5/30 ave. pts.				
716	Leo Waterhole (NW)	start	9/21/2004	PDA/PDOP<5/30 ave. pts.				
716	Leo Waterhole (NW)	end	9/21/2004	PDA/PDOP<5/30 ave. pts.				
717	NW of Valley Waterhole	start	9/23/2004	PDA/PDOP<5/30 ave. pts.				
717	NW of Valley Waterhole	end	9/23/2004	PDA/PDOP<5/30 ave. pts.				
718	Flat Draw Reservoir	start	7/21/2004	Garmin/FOM=12ft				
718	Flat Draw Reservoir	end	7/21/2004	Garmin/FOM=13ft				
719	Post Office Reservoir North	start	7/22/2004	PDA/PDOP<5/30 ave. pts.				
719	Post Office Reservoir North	end	7/22/2004	PDA/PDOP<5/30 ave. pts.				
720	Post Office Reservoir East	start	7/22/2004	PDA/PDOP<5/30 ave. pts.				
720	Post Office Reservoir East	end	7/22/2004	PDA/PDOP<5/30 ave. pts.				
721	Middle Butte	start	7/23/2004	Garmin/FOM=15ft				
721	Middle Butte	end	7/23/2004	Garmin/FOM=13ft				
722	Burnt Butte North	start	9/24/2004	PDA/PDOP<5/30 ave. pts.				
722	Burnt Butte North	end	9/24/2004	PDA/PDOP<5/30 ave. pts.				

*GPS locations are given in both IDTM NAD83 and UTM NAD83.

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

Scientific name	Common name	Life form	Origin	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
Agoseris glauca	pale agoseris	perennial	native	forb	agogla
Agropyron cristatum	crested wheatgrass	perennial	introduced	grass	agrcri
Allium acuminatum	tapertip onion	perennial	native	forb	allacu
Amsinckia menziesii	Menzies' fiddleneck	annual	native	forb	amsmen
Antennaria dimorpha	low pussytoes	perennial	native	forb	antdim
Arabis species	rockcress	perennial	native	forb	araspp
Arenaria congesta	ballhead sandwort	perennial	native	forb	arecon
Aristida purpurea	purple threeawn	perennial	native	grass	astpur
Artemisia tridentata	big sagebrush	perennial	native	shrub	arttri
Astragalus purshii	woollypod milkvetch	perennial	native	forb	astpur
Astragalus species	milkvetch	perennial	native	forb	astspp
Atriplex canescens	fourwing saltbush	perennial	native	shrub	atrcan
Balsamorhiza hookeri	Hooker's balsamroot	perennial	native	forb	balhoo
Bromus tectorum	cheatgrass	annual	introduced	grass	brotec
Caryophyllaceae species	pink family	annual	-1	forb	uf01
Castilleja species	Indian paintbrush	perennial	native	forb	casspp
Centaurea biebersteinii	spotted knapweed	perennial	introduced	forb	cenzie
Ceratocephala testiculata	bur buttercup	annual	introduced	forb	certes
Chenopodium species	goosefoot	annual	-1	forb	chespp
Chondrilla juncea	rush skeletonweed	perennial	introduced	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 species	tansymustard	annual	-1	forb	desspp
Draba verna	spring draba	annual	native	forb	draver
Elymus elymoides	bottlebrush squirreltail	perennial	native	grass	elyely
Epilobium brachycarpum	tall annual willowherb	annual	native	forb	epibra
Ericameria nauseosa	gray rabbitbrush	perennial	native	shrub	erinau
Erigeron bloomeri	scabland fleabane	perennial	native	forb	eriblo
Erigeron pumilus	shaggy fleabane	perennial	native	forb	eripum
Erigeron species	fleabane	perennial	native	forb	erispp
Erodium cicutarium	redstem stork's bill	annual	introduced	forb	erocic
Festuca idahoensis	Idaho fescue	perennial	native	grass	fesida
Halogeton glomeratus	halogeton	annual	introduced	forb	halglo
Helianthus annuus	sunflower	annual	native	forb	helann
Hesperostipa comata	needle and thread	perennial	native	grass	hescom
Hypericum perforatum	St. Johnswort	perennial	introduced	forb	hypper
Kochia prostrata	prostrate kochia	perennial	introduced	forb	kocpro
Kochia scoparia	Mexican-fireweed	annual	introduced	forb	kocsco
Lactuca serriola	prickly lettuce	annual	introduced	forb	lacser
Lappula occidentalis	flatspine stickseed	annual	native	forb	lapocc
Lepidium papilliferum	slickspot peppergrass	annual	native	forb	leppap
Lepidium perfoliatum	clasping leaf pepperweed	annual	introduced	forb	lepper
Leymus cinereus	basin wildrye	perennial	native	grass	leycin
Linum lewisii	blue flax	perennial	introduced	forb	linlew
Lithophragma parviflorum	smallflower woodland-star	perennial	native	forb	litpar

Appendix D (continued)

Scientific name	Common name	Life form	Origin	Growth form	Code
Lomatium species	desertparsley	perennial	native	forb	lomspp
Machaeranthera canescens	hoary tansyaster	biennial	native	forb	maccan
Madia species	tarweed	-1	native	forb	madspp
Medicago sativa	alfalfa	perennial	introduced	forb	medsat
Melica species	melicgrass	perennial	native	grass	melspp
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 secunda	Sandberg bluegrass	perennial	native	grass	poasec
Pseudoroegneria spicata	bluebunch wheatgrass	perennial	native	grass	psespi
Purshia tridentata	antelope bitterbrush	perennial	native	shrub	puttri
Salsola kali	Russian thistle	annual	introduced	forb	salkal
Sisymbrium altissimum	tall tumblemustard	annual	introduced	forb	sisalt
Sphaeralcea grossulariifolia	gooseberryleaf globemallow	perennial	native	forb	sphgro
Sphaeralcea munroana	Munro's globemallow	perennial	native	forb	sphmun
Stenotus acaulis	stemless mock goldenweed	perennial	native	forb	steaca
Taeniatherum caput-medusae	medusahead	annual	introduced	grass	taecap
Tetradymia glabrata	littleleaf horsebrush	perennial	native	shrub	tetgla
Tragopogon dubius	yellow salsify	biennial	introduced	forb	tradub
unknown annual forb	N/A	annual	-1	forb	uaf
Ventenata dubia	North Africa grass	annual	introduced	grass	vendub
Vulpia octoflora	sixweeks fescue	annual	native	grass	vuloct
Zigadenus venenosus	deathcamas	perennial	native	forb	zigven

IDAHO DEPARTMENT OF FISH AND GAME

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