

**MONITORING HABITAT INTEGRITY FOR  
*LEPIDIUM PAPILLIFERUM* (SLICKSPOT PEPPERGRASS):  
2000 RESULTS**

by

Michael Mancuso  
Conservation Data Center

March 2001

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



Report prepared for  
State of Idaho, Military Division  
Task Order No. 001-FY-00

## **ABSTRACT**

*Lepidium papilliferum* (slickspot peppergrass) is one of Idaho's highest priority plant conservation concerns, and has been proposed for federal listing under the Endangered Species Act. In response to growing conservation problems, a Habitat Integrity Index monitoring protocol was developed to assess conditions and monitor the rangewide long-term ecological integrity of *Lepidium papilliferum* habitat. Baseline index and associated monitoring data were collected in 1998 at most extant occurrences located on public land. In 1999, a second year of sampling was completed. This report summarizes results from 2000, when a third consecutive year of monitoring was conducted. For most transects, habitat attribute scores were similar to previous years, indicating minimal change in ecological habitat integrity since monitoring was initiated. However, scores were indicative of decreased slickspot microsite integrity at several transects. Future monitoring will be required to substantiate a possible declining trend. The total number of *Lepidium papilliferum* plants tallied in 2000 was more than double 1999 results, but still less than half what was counted in 1998. Livestock disturbance tallies were similar to previous years at the majority of transects, but overall results indicate livestock disturbance was slightly less in 2000 compared to the previous two monitoring years, although this varied by area. Factors affecting occurrence viability and defensibility were also reassessed in 2000. One occurrence in the foothills near Emmett is likely extirpated, and a portion of another occurrence near Mountain Home has been destroyed. One transect was found to be on private land and had to be re-established at a location on adjoining public land.

## **ACKNOWLEDGMENTS**

I gratefully acknowledge the help of biologists who contributed their time in the field to help conduct the 2000 HII monitoring program. Specifically, I want to thank Jay Weaver with the Idaho Army National Guard; Valerie Geertson, Kendra Moseley, and Ann DeBolt with the Bureau of Land Management; Angelia Martin with Mountain Home Air Force Base; and Chris Murphy with the Conservation Data Center. The HII photo point documentation binders were put together by Terry Vernholm at the Idaho Department of Fish and Game, and Cyndi Coulter helped with some of the data entry. Funding for this project was provided by the Idaho Army National Guard, who continue to be leaders in supporting the conservation of *Lepidium papilliferum*.

## TABLE OF CONTENTS

ABSTRACT .....	i
ACKNOWLEDGEMENTS .....	i
TABLE OF CONTENTS .....	ii
LIST OF TABLES.....	iii
LIST OF APPENDICES .....	iii
INTRODUCTION .....	1
METHODS .....	1
RESULTS .....	3
Slickspot microsite attributes .....	5
Sagebrush-steppe attributes.....	5
Integrity condition rating.....	8
<i>Lepidium papilliferum</i> abundance .....	9
Livestock disturbance abundance.....	11
Occurrence viability rank.....	14
Vegetation sampling .....	17
Photo points .....	21
REFERENCES .....	21

## LIST OF TABLES

Table 1.	List of occurrences included in the HII monitoring program, 1998 - 2000 .....	2
Table 2.	Summary of HII monitoring scores, 1998 – 2000 .....	3
Table 3.	Summary of HII slickspot microsite attribute scores, 1998 – 2000 .....	6
Table 4.	Summary of HII sagebrush-steppe attribute scores, 1998 - 2000 .....	7
Table 5.	Integrity condition rating system for HII scores.....	8
Table 6.	HII Integrity condition ratings, 1998 – 2000 .....	8
Table 7.	Summary of abundance class data for <i>Lepidium papilliferum</i> , 1998 - 2000 .....	10
Table 8.	Summary of <i>Lepidium papilliferum</i> abundance by HII transect, 1998 - 2000 .....	10
Table 9.	Total number of <i>Lepidium papilliferum</i> plants at HII transects, 1998 – 2000.....	11
Table 10.	Summary of HII livestock sign abundance class data, 1998 - 2000 .....	12
Table 11.	Summary of livestock sign disturbance data, 1998 - 2000 .....	12
Table 12.	Livestock disturbance (hove prints/scats) tally for HII transects, 1998 – 2000.....	13
Table 13.	HII Occurrence Viability Ranks, 1998 - 2000 .....	15

## LIST OF APPENDICES

Appendix 1.	Map location and Transect location form for the new Soles Rest Creek (030B) Habitat Integrity Index transect.
Appendix 2.	GPS coordinate locations for Habitat Integrity Index transects.
Appendix 3.	Habitat Integrity Index questionnaire form.
Appendix 4.	2000 Habitat Integrity Index field data sheets.
Appendix 5.	2000 Habitat Integrity Index attribute scores data set.
Appendix 6.	Data set summary for Habitat Integrity Index attribute scores, 1998 - 2000.
Appendix 7.	Habitat Integrity Index sampling notes and observations for 2000.
Appendix 8.	<i>Lepidium papilliferum</i> abundance class data by transect, 1998 - 2000.
Appendix 9.	Livestock disturbance sign abundance class data by transect, 1998 - 2000.
Appendix 10.	Vegetation sampling plot data sheets for the new Soles Rest Creek (030B) Habitat Integrity Index transect.

## INTRODUCTION

*Lepidium papilliferum* (slickspot peppergrass) is a small annual/biennial plant species endemic to the sagebrush-steppe ecosystem of southwestern Idaho. It is restricted to sparsely vegetated, visually distinct, edaphically-controlled, small-scale openings in the sagebrush matrix. These microsite openings are called slickspots and their integrity appears to be susceptible to various disturbance factors. Like many short-lived plants of arid environments, the above-ground number of *Lepidium papilliferum* plants can fluctuate greatly from one year to the next.

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

Most early monitoring efforts concentrated on collecting demographic information for *Lepidium papilliferum* populations within the Idaho Army National Guard's (IDANG) Orchard Training Range, southeast of Boise (Quinney 1998). In light of a growing conservation concern for this species it became evident that a more comprehensive monitoring program was needed. To meet this need, the Idaho Conservation Data Center (CDC) collaborated with the IDANG to develop a Habitat Integrity Index (HII) to assess conditions and monitor the rangewide ecological integrity of *Lepidium papilliferum* habitat (Mancuso and Moseley 1998). Baseline index and associated monitoring data were collected at most occurrence located on public land in 1998 (Mancuso et al. 1998). In 1999, a second year of sampling was completed and several additional monitoring transects were established in the Inside Desert area (Mancuso 2000). This report summarizes results from 2000, when a third consecutive year of monitoring was conducted.

## METHODS

Background information and the HII methodology and associated plant community sampling, viability rank assignment, and photo documentation protocols have been explained in a previous report (Mancuso and Moseley 1998). Additional methodology information and refinement of the monitoring protocol has also been detailed in earlier reports (Mancuso 2000; Mancuso et al. 1998). These references should be consulted for a thorough review of the HII protocol because it will not be repeated in this report. Monitoring in 2000 consisted of resampling the HII transects, taking repeat photo-point photographs, reassessing Occurrence Viability ranks, and updating plant community plot information.

Presently, the HII monitoring program consists of 48 transects at 40 different occurrences. The occurrences are referenced by their Element Occurrence Record (EOR), a three-digit number assigned to each occurrence by the CDC for data base tracking purposes. Most occurrences have one HII transect, but eight have two transects. A new HII transect was established at Soles Rest Creek (030) in 2000 because the original transect was inadvertently placed on private land. The map location and a transect location form for this new HII transect are in Appendix 1. New GPS coordinates were obtained at most HII sites in 2000 and are listed in Appendix 2. A copy of the HII questionnaire used in 2000 is in Appendix 3. The occurrences included in the HII monitoring program are listed in Table 1, along with the years they were sampled.

Table 1. List of occurrences included in the HII monitoring program, 1999 - 2000.

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

<sup>1</sup>NS = not sampled. Transects for EOR's 704, 705, and 709 were established in 1999.

## RESULTS

Forty-six of the 48 transects were sampled between May 12<sup>th</sup> and September 6<sup>th</sup>, 2000. Monitoring data were not collected at the Fivemile Creek (049) and Juniper Butte North (704) occurrences due to lack of time or access. In 2000, a total of 429 slickspot microsite stations were sampled for the 46 transects. For comparison, monitoring data were collected at 45 transects and 408 slickspot microsities in 1998, and 47 transects and 433 slickspots microsities in 1999. Results from 1998 and 1999 have been summarized in previous reports (Mancuso 2000; Mancuso et al. 1998). Overall, HII results for 2000 were similar to previous years. With a couple of exceptions, the many wildfires, or other regional disturbances missed directly impacting occurrences of *Lepidium papilliferum*.

Slickspot microsite, sagebrush-steppe, and combined HII attribute scores for 2000 are listed in Table 2, along with 1998 and 1999 scores for comparison. Copies of the completed 2000 HII field form scorecards are in Appendix 4. A spreadsheet of the 2000 HII data set is in Appendix 5. Attribute scores for the three-year HII transect data set are summarized in Appendix 6. Field observations and other transect notes have been compiled in Appendix 7.

Table 2. Summary of HII monitoring scores, 1998 - 2000.

EOR	Slickspot microsite attributes average score			Sagebrush-steppe attributes average score			Combined average score		
	1998	1999	2000	1998	1999	2000	1998	1998	2000
Kuna/Boise area									
018A	2.5	2.1	3.4	16.5	15.3	15.0	19.0	17.4	18.4
018B	3.5	4.0	4.1	11.6	10.1	10.4	15.1	14.1	14.5
018	3.0	3.0	3.8	14.0	12.7	12.7	17.0	15.7	16.5
019A	6.7	5.6	5.8	20.0	18.0	16.7	26.7	23.6	22.5
019B	4.3	2.5	3.2	18.0	17.0	18.0	22.3	19.5	21.2
019	5.5	4.1	4.5	19.0	17.5	17.4	24.5	21.6	21.9
022A	5.9	4.8	4.8	16.1	16.8	14.4	22.0	21.6	19.2
022B	2.9	2.8	4.6	10.0	10.2	11.0	12.9	13.0	15.6
022	4.4	3.8	4.7	13.1	13.5	12.7	17.5	17.3	17.4
024	4.1	6.5	5.6	16.6	13.7	16	20.7	20.2	21.6
025	8.0	5.7	5.4	14.7	11.6	11.8	22.7	17.3	17.2
032	5.4	2.0	4.5	2.5	2.8	5	7.9	4.8	9.5
048	4.5	2.8	5.5	3.0	3.1	3.2	7.5	5.9	8.7
049	5.8	8.8	NS <sup>1</sup>	13.0	14.2	NS	18.8	23.0	NS
057	5.1	3.0	3.7	4.9	6.6	6.8	10.0	9.6	10.5
066	4.5	5.2	6.2	9.6	8.8	10	14.1	14.0	16.2
Boise/Eagle Foothills area									
012	5.0	7.0	5.0	19.0	16.0	16.0	24.0	23.0	21.0
038	2.0	4.0	4.8	15.0	13.0	13.0	17.0	17.0	17.8
040	4.7	5.2	5.3	4.0	3.7	8.0	8.7	8.9	13.3
047	5.2	5.6	7.0	20.0	17.7	19.0	25.2	23.3	26.0
052	3.4	3.1	5.2	14.0	12.0	13.0	17.4	15.1	18.2
056	5.7	5.3	7.6	14.8	14.0	15.0	20.5	19.3	22.6
065	3.0	2.7	6.2	8.0	9.2	10.0	11.0	11.9	16.2

EOR	Slickspot microsite attributes average score			Sagebrush-steppe attributes average score			Combined average score		
	1998	1999	2000	1998	1999	2000	1998	1999	2000
Orchard area									
015	4.6	2.7	6.2	20.0	19.0	19.8	24.6	21.7	26.0
020A	7.7	5.4	6.7	18.0	15.8	16.8	25.7	21.2	23.5
020B	4.7	3.6	5.9	6.0	6.0	6.2	10.7	9.6	12.1
020	6.1	4.5	6.3	12.0	10.9	11.5	18.1	15.4	17.8
027A	6.1	4.5	3.7	1.0	1.0	1.5	7.1	5.5	5.2
027B	6.9	5.7	8.1	10.3	7.5	10.0	17.2	13.2	18.1
027	6.5	5.1	5.9	5.7	4.3	5.8	12.2	9.4	11.7
028A	6.1	3.4	5.0	1.4	1.0	2.8	7.5	4.4	7.8
028B	3.9	3.3	3.8	2.0	1.0	1.7	5.9	4.3	5.5
028	5.0	3.4	4.4	1.7	1.0	2.3	6.7	4.4	6.7
030	4.6	3.8	4.3	2.1	2.2	3.0	6.7	6.0	7.3
031	5.4	4.2	4.8	7.9	7.3	8.0	13.3	11.5	12.8
035A	3.7	2.3	5.7	5.2	5.4	12.8	8.9	7.7	18.5
035B	5.2	4.8	4.6	13.4	12.5	9.2	18.6	17.3	13.8
035	4.4	3.6	5.2	9.3	9.0	11.0	13.7	12.6	16.2
041	4.8	3.9	5.0	17.0	16.0	15.5	21.8	19.9	20.5
053	6.5	3.8	6.9	9.0	10.4	11.3	15.5	14.2	18.2
060	6.7	7.2	6.6	7.5	4.8	7.0	14.2	12.0	13.6
Mt. Home/Glenns Ferry area									
008A	5.0	4.1	4.3	9.5	8.4	8.0	14.5	12.5	12.3
008B	4.2	5.4	5.1	16.7	15.1	16.5	20.9	20.5	21.6
008	4.6	4.8	4.7	13.6	11.8	12.3	18.3	16.6	17.0
010	6.3	3.7	4.5	14.7	13.5	12.6	21.0	17.2	17.1
021	5.6	4.4	3.4	2.0	1.8	4.2	7.6	6.2	7.6
029	3.7	2.3	3.4	10.1	8.2	11.8	13.8	10.5	15.2
050	2.5	2.3	2.4	7.8	9.0	10.8	10.3	11.3	13.2
058	4.2	3.2	6.0	1.6	2.0	2.0	5.8	5.2	8.0
061	5.7	6.5	5.6	11.5	10.5	12.0	17.2	17.0	17.6
Inside Desert area									
701	3.3	NS	4.1	6.3	NS	6.4	9.6	NS	10.5
702	4.6	3.0	4.8	6.0	7.3	3.3	10.6	10.3	8.1
704	-	5.3	NS	-	12.6	NS	-	17.9	NS
707	-	6.6	4.9	-	8.7	8.8	-	15.3	13.7
708	6.5	6.5	5.4	18.7	16.0	17.2	25.2	22.5	22.6
709	-	4.2	4.7	-	7.4	7.0	-	11.6	11.7

<sup>1</sup> NS = Not sampled.

### Slickspot microsite attributes

The first eight attributes of the HII focus on the integrity of individual slickspot microsites. In 2000, the majority of 429 slickspots sampled had some level of organic material accumulation (81%; attribute #1); had some compromise to their perimeter (80%; attribute #2); had some level of weed invasion (84%; attribute #3); and had evidence of livestock disturbance (55%; attribute #7). In contrast, a minority of slickspot stations had evidence of shrub invasion (24%; attribute #5) or perennial forb/grass invasion (35%; attribute #6); or evidence of ORV disturbance (4%; attribute #8). These results follow the same general pattern as previous monitoring results. However, a greater percentage of slickspots had organic material accumulation and perimeters compromised in 2000 than in either of the two previous monitoring years. This resulted in higher scores for attributes #1 and #2, and accounts for the increase in slickspot microsite attribute average scores recorded at several transects (Table 2, column 4). These results may be indicative of decreased slickspot microsite integrity, but future monitoring will be required to substantiate a possible declining trend.

Table 3 summarizes the 2000 slickspot microsite data by individual slickspot sample station and by transect. The first series of columns lists the number of slickspot stations receiving a score of "0", "1", or "2". The second series lists the most common score recorded for each transect. Identical summaries were done for 1998 and 1999, and are included in the table for comparison.

### Sagebrush-steppe attributes

The second half of the HII protocol focuses on attributes related to the vegetation of the transect area. Attribute #9 looks at fire history. No new wildfires were observed at any of the occurrences in 2000. An exception was a previously burned segment of the Soles Rest Creek occurrence (020). Because this area was already burned, the HII fire history attribute score did not change for this transect. In theory, scores for attribute #9 should be the same from year to year if no change in the fire history has occurred at the transect site. However, inconsistent interpretation/application of the attribute criteria has resulted in some transects receiving slightly different scores from year to year despite there being no change in the fire history. The fire history attribute was reworded in 2000 to help clarify the scales involved in scoring the attribute and prevent future misinterpretation.

The majority (61%) of occurrences had evidence of livestock grazing (attribute #10). ORV use (attribute #11) was evident at the Simco Road (015), Kuna Butte (024), Willow Creek (047), and New Plymouth SW (066) occurrences in 2000. Invasive annual grasses (attribute #12) dominated the herbaceous vegetation at 16 (33%) transects. This is slightly fewer compared to previous monitoring years. Weedy forb cover (attribute #13) was widespread and abundant at eight transects (17%), about the same as in past years. Similar to past years, slightly more than half (54%) of the transects had high to moderate microbotic crust cover (attribute #14), while 20% had no more than a trace amount.

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

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

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

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

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

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

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

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

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

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

Attribute #8: 0 = no, 1 = yes

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

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

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

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

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

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

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

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

Integrity condition rating

The Integrity condition rating is a way to relate the HII scores to a relative habitat condition context. It rates occurrences into one of three broad categories - good, fair, or poor. The scoring parameters for each category are listed in Table 5. The Integrity condition ratings for each occurrence are provided in Table 6. The 2000 Integrity condition ratings are based on the HII scores listed in Tables 3 and 4. The way the HII is designed, the lower the score the higher the habitat integrity.

Table 5. Integrity condition rating system for HII scores.

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

Table 6. HII Integrity condition ratings, 1998 - 2000. For occurrences with two transects, the rating is based on the average scores of both transects.

EOR	Slickspot microsite rating	Sagebrush-steppe rating	HII combined score rating	EOR	Slickspot microsite rating	Sagebrush-steppe rating	HII combined score rating
Kuna/Boise area				Boise/Eagle Foothills			
018	Fair	Poor	Fair	012	Fair	Poor	Poor
019	Fair	Poor	Poor	038	Fair	Poor	Poor
022	Fair	Poor	Poor	040	Fair	Fair	Fair
024	Fair	Poor	Poor	047	Poor	Poor	Poor
025	Fair	Poor	Poor	052	Fair	Poor	Poor
032	Fair	Fair	Fair	056	Poor	Poor	Poor
048	Fair	Good	Fair	065	Fair	Fair	Fair
049	NS	NS	NS	Mt. Home/Glenns Ferry area			
057	Fair	Fair	Fair	008	Fair	Poor	Fair
066	Fair	Fair	Fair	010	Fair	Poor	Poor
Orchard area				021	Fair	Fair	Good
015	Fair	Poor	Poor	029	Fair	Poor	Fair
020	Fair	Fair	Poor	050	Good	Fair	Fair
027	Fair	Fair	Fair	058	Fair	Good	Good
028	Fair	Good	Good	061	Fair	Poor	Poor
030	Fair	Good	Good	Inside Desert area			
031	Fair	Fair	Fair	701	Fair	Fair	Fair
035	Fair	Fair	Fair	702	Fair	Good	Fair
041	Fair	Poor	Poor	704	NS	NS	NS
053	Poor	Fair	Poor	707	Fair	Fair	Fair
060	Poor	Fair	Fair	708	Fair	Poor	Poor
				709	Fair	Fair	Fair

<sup>1</sup>NS = not sampled.

In 2000, the combined slickspot microsite and sagebrush-steppe Integrity condition rating was “Good” for four (10%) occurrences, “Fair” for 17 (45%) occurrences, and “Poor” for 17 (45%) occurrences. Although most occurrences had the same combined rating in 2000 as in 1998 and/or 1999, three dropped to a lower rating. Two changed from the “Good” to the “Fair” category, and one from the “Fair” to “Poor” category. The three occurrences with changed combined ratings are briefly discussed.

**Tenmile Creek (032)** – a higher score for attribute #9d accounts for this occurrence moving from the “Good” to the “Fair” category, even though there was no change in the fire history. The transect is in unburned sagebrush habitat, but within 500 m of burned areas. As a result, attribute #9d was correctly scored a “2” in 2000, and not a “0” as incorrectly scored in previous monitoring years. This correction was sufficient to alter the Integrity condition rating.

**South Cole Road/Ten Mile Creek (048)** – higher scores for attributes #2 and #9 account for this occurrence moving from the “Good” to the “Fair” category. Again, a more consistent application of the ranking criteria and not a change in the fire history explains the higher scores for attribute #9. The higher scores for attribute #2 may be based more on sampler subjectivity than actual degradation of the slickspot perimeters because no disturbances were noted for the occurrence. These scoring changes nudged the Integrity condition rating into the “Fair” category.

**Christmas Mountain (053)** – higher scores for attributes #2, #7, and #13 account for this occurrence moving from the “Fair” to the “Poor” category. The increased scores for attributes #2 and #7 are linked to the heavy livestock grazing impacts observed in 2000. The amount of weedy forb cover was considerably greater in 2000 than previous years and resulted in higher scores for attribute #13.

#### *Lepidium papilliferum* abundance

The HII protocol includes a count or estimate of *Lepidium papilliferum* plants at each slickspot microsite station and assignment to one of four abundance class categories. A total of approximately 7,100 plants were tallied along the HII transects in 2000. This is less than half as many plants as 1998, but more than twice as many plants as 1999. In 2000, 29% of the slickspot microsites sampled had one or more *Lepidium papilliferum* plants, compared to 38% in 1998, and 26% in 1999. There were 13 (28%) transects with plants in at least half of the slickspot microsites, but only one (2%) had plants in all ten stations. Twelve (32%) transects had no *Lepidium papilliferum* in 2000. Seven of these have not had plants in any of the three monitoring years.

Although several transects had about the same number of plants as last year, counts in 2000 again demonstrated the wide annual site specific fluctuations that seem to be characteristic of *Lepidium papilliferum*. For example, the transect at Kuna Butte SW (018A) had no plants in 1999, but over 2,500 in 2000. Meanwhile, four miles further north, the transect at Kuna Butte NW (057) had 149 plants in 1999, but only 35 in 2000. Four transects had a greater number, and 15 transects a smaller number of plants in 2000 compared to either of the previous monitoring years. With over 2,500 plants, the transect at Kuna Butte SW (018A) accounted for approximately 35% of all the *Lepidium papilliferum* plants tallied in 2000.

Abundance class data are summarized in Table 7 and transect abundance information in Table 8. The total number of *Lepidium papilliferum* plants for each transect is listed in Table 9. In 2000, most occurrences were characterized by very small plants. Many reproductive plants

were less than 10 cm tall with relatively few branches and most vegetative rosettes were less than 2 cm in diameter. The HII scorecards in Appendix 4 have a record of the number of plants observed at each microsite station, including notes about the number of flowering plants and vegetative rosettes. Appendix 8 details abundance class data by individual transect.

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

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

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

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

Table 9. Total number of *Lepidium papilliferum* plants for HII transects, 1998 – 2000.

Transect #	ca # of plants			Transect #	ca # of plants		
	1998	1999	2000		1998	1999	2000
008A	1640	2	236	035A	175	38	10+
008B	525	18	40	035B	30	0	1+
010	0	0	0	038	25	42	17
012	15	27	16	040	40	5	31
015	790	0	0	041	2	0	0
018A	448	0	2517	047	0	0	0
018B	845	50	402	048	0	0	0
019A	0	18	0	049	0	0	NS <sup>1</sup>
019B	30	3	6	050	265	86	16
020A	0	0	0	052	203	176	200
020B	288	43	44	053	0	3	192
021	385	19	1	056	1	0	0
022A	83	252	0	057	900	149	35
022B	0	0	0	058	138	0	0
024	1400	285	416	060	0	6	0
025	60	106	236	061	700	274	92
027A	1840	114	28	065	95	52	155
027B	0	0	0	066	2000	249	603
028A	1380	125	805	701	11	NS	2
028B	550	220	305	702	27	17	13
029	320	231	148	704	-	3	NS
030	142	3	84	707	-	204	12
031	570	0	330	708	0	0	0
032	500	230	118	709	-	10	2
Total					16,423	3,060	7,113

<sup>1</sup>NS = not sampled.

### Livestock disturbance abundance

Livestock trampling is one of the main disturbances to slickspot microsites. To help quantify this disturbance, the number of livestock prints and scats are counted/estimated at each slickspot station along the transect. Most livestock sign recorded in 2000 was from cattle. Horses or sheep evidence was restricted to a few transects. This is the same pattern observed in previous monitoring years. Of the 429 slickspot microsites sampled, 239 (56%) had some level of livestock-related disturbance. No livestock sign was recorded at 13 (28%) of the 46 transects sampled. In contrast, 14 (30%) had livestock sign in every microsite station. Results indicate that livestock disturbance was slightly less overall in 2000 than either of the previous two years. However, results varied by general area and site. Compared to 1999, many transects in the Kuna/Boise, Boise/Eagle Foothill, and Mountain Home/Glenns Ferry areas had fewer slickspots with livestock sign. This pattern was less prevalent in the Orchard and Inside Desert areas, where many transects had a higher number of slickspots with livestock sign compared to 1999. In 2000, three transects (027B, 035A, and 053) had greater than ten livestock prints/scat in every slickspot microsite station. All three of these heavily trampled transects are located within

the IDANG's Orchard Training Range. Several other transects in the Orchard area had high livestock disturbance sign counts. Fourteen HII transects have had no livestock disturbance at least one year, but only six can make this claim for all three monitoring years.

Tables 10 and 11 summarize the livestock disturbance abundance class data for 2000, and include 1998 and 1999 data for comparison. Table 12 provides an estimate of the total number of livestock hove prints and scats tallied at each transect for the three monitoring years. More detailed livestock abundance sign information is listed by transect in Appendix 9, while the HII scorecards in Appendix 4 have the tallies for each sample station.

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

Abundance class	Number of livestock tracks and scat in slickspot microsite	Number of slickspot microsites (%)		
		1998	1999	2000
0	0	146 (36)	176 (41)	190 (44)
1	1 –10	154 (38)	145 (33)	121 (28)
2	>10	108 (26)	112 (26)	118 (28)

Table 11. Summary of livestock sign disturbance data, 1998 - 2000.  
N = 408 slickspot stations and 45 transects for 1998; N = 433 slickspot stations and 47 transects for 1999; N = 429 slickspot station and 46 transects for 2000.

	1998	1999	2000
Number (%) of slickspot stations with livestock sign	262 (64)	257 (59)	239 (56)
% of slickspots with livestock sign – Kuna/Boise area	-	27	12
% of slickspots with livestock sign – Boise/Eagle Foothills area	-	34	27
% of slickspots with livestock sign – Orchard area	-	77	86
% of slickspots with livestock sign – Mt. Home/Glenns Ferry area	-	79	66
% of slickspots with livestock sign – Inside Desert area	-	81	96
Number (%) of transects with no livestock sign	10 (22)	9 (19)	12 (26)
Number (%) of transects with livestock sign in all slickspot stations	14 (31)	14 (30)	14 (30)
Number (%) of transects with 50% or more of slickspot stations with livestock sign	27 (60)	29 (62)	26 (57)

Table 12. Livestock disturbance (hove prints/scats) tally for HII transects, 1998 – 2000. Tallies are based on livestock disturbance sign counted or estimated at each slickspot microsite along the transect.

EOR	1998	1999	2000	EOR	1998	1999	2000
Kuna/Boise area				Boise/Eagle Foothills			
018A	0	0	0	012	0	0	0
018B	5	67	2	038	0	0	0
019A	4	15	0	040	0	0	0
019B	0	0	0	047	40	42	13
022A	4	3	0	052	5	3	16
022B	6	14	0	056	44	33	145
024	0	0	0	065	0	0	0
025	20	2	0	Mt. Home/Glenns Ferry area			
032	0	0	0	008A	48	281	46
048	0	2	0	008B	89	445	31
049	218	328	NS <sup>1</sup>	010	144+	20	25
057	2	1	1	021	39	112	3
066	20	0	4	029	36+	19	5
Orchard area				050	7	4	7
015	40	0	282	058	48	146	488
020A	76	19	55	061	249	133	65
020B	75	139	307	Inside Desert area			
027A	121	134	170	701	197	NS	283
027B	751	228	356	702	98	79	105
028A	113	74	28	704	-	95	NS
028B	65	39	24	707	-	956	83
030	99	49	40	708	2	60	34
031	179	336	266	709	-	127	170
035A	66	35	197				
035B	175	78	86	<b>Sum</b>	<b>3751</b>	<b>4703</b>	<b>3980</b>
041	0	0	2				
053	96	43	192				
060	750	542	449				

<sup>1</sup>NS = not sampled

Noteworthy, transect specific livestock-related disturbances and observations for 2000 are summarized below.

**Bennett Road (008A)** - many slickspots had old hove print marks in various stages of being filled back in.

**Chalk Flat (010)** - all cattle sign at this occurrence was over one-year old.

**Simco Road (015)** - recent sheep trailing was evident along the transect area and some slickspot had many prints. A few horse prints were also observed, but there was little if any evidence of grazing.

**Bowns Creek (031)** - cattle were present in the general area during the sampling period and most slickspots had some level of recent trampling disturbance.

**West Side Canal/Slade Flat W (050)** - evidence of light grazing by horse was evident.

**Christmas Mountain (053)** – heavy recent sheep use was evident at this occurrence.

**Glenns Ferry NW (058)** – deep and ubiquitous hove marks indicated cows were present in the transect area when the soils were saturated. All slickspots in the general area had some degree of cattle trampling.

**West of Squaw Creek (060)** – cattle trampling was evident in all slickspots. Depth of the prints indicated they were present during a period when the soils were saturated.

**SE of Reverse (061)** - livestock prints were observed throughout the transect area. Depth of the prints indicated cattle were present during a period when the soils were saturated.

**Post Office Reservoir (701)** - cattle use appeared to be moderate to heavy in the transect area.

**Juniper Butte South (707)** - cattle use appeared to be much lighter in the transect area compared to 1999.

**Poison Creek North (708)** – moderate to heavy cattle use was observed at the occurrence area.

**Juniper Butte West (709)** - cattle use appeared to be relatively light in the transect area.

#### Occurrence Viability Rank

The Occurrence Viability Rank (OVR) provides a scale to assess the prospects that the habitat supporting an occurrence will persist over time. It augments the HII by considering additional criteria important for conservation purposes. The ranks range from A (the highest) to D (the lowest). The viability of an A-ranked occurrence is judged to be relatively high and reflects good quality habitat with a minimum of serious and imminent threats. They tend to be large in extent and in good years probably support many *Lepidium papilliferum* plants. B- to D-ranked occurrences reflect habitat that is progressively more disturbed, threatened, and difficult to protect. A D-ranked occurrence is judged to have a very poor chance of persisting long-term. Occurrences with very strong evidence of being extirpated receive an X rank.

An OVR was assigned to each occurrence at the time the HII transect was originally established. In 2000, factors affecting viability and defensibility were reassessed for each occurrence. Most occurrences had minor or no changes to these factors. However, changes sufficient to modify the OVR were observed at two occurrences (Fraser Reservoir East, 021; Willow Creek, 047). Information about these two occurrences is provided below, along with some other noteworthy, transect specific threats, disturbances, and related observations made in 2000. The OVRs for each occurrence are listed in Table 13.

**Simco Road (015)** - slickspots appear to be more buff- or beige-colored than the “shiny” white from two years ago. It is unclear if this reflects a loss of slickspot integrity.

**Kuna Butte SW (018)** - a high level of ground squirrel and badger activity continues to occur in the transect area, including some digging in slickspots.

Table 13. HII Occurrence Viability Ranks, 1998 - 2000. Ranks that changed between years are highlighted.

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

**Kuna Butte SW (018B)** – several slickspots were disturbed by small animal scapping or digging activity.

**Initial Point (019A)** – all slickspots continued to show some level of disturbance from past post-fire seeding efforts.

**Initial Point (019B)** – *Kochia prostrata* (forage kochia) was seeded into this area several years ago as part of a post-fire restoration project. It is now well established in the non-seeded enclosure area where the transect is located, including along and within slickspot microsites. Ground squirrel and badger activity is high in the transect area and they have dug holes in several slickspots.

**Soles Rest Creek (020A)** - this transect was established south of Old Highway 20, in an area that burned a number of years ago and supported annual grassland vegetation. The transect area recently reburned, and it seems possible *Lepidium papilliferum* may have been extirpated from a portion of this occurrence.

**Fraser Reservoir East (021)** – during the spring 2000, a small burn occurred approximately one mile northeast of the occurrence, near the I-84 Mountain Home interchange. The gravel pit south of the transect was significantly expanded during the past year and very likely destroyed a portion of the *Lepidium* population. The edge of the pit has now encroached to within about 50 m of the monitoring transect. There are also two new small piles of gravel located approximately 50 m east of the transect stake. The Occurrence Viability Rank for this occurrence has been reduced in light of these new disturbances.

**Soles Rest Creek (030)** - development pressure is high around this occurrence, with several housing subdivisions underway or planned for the general area. A new house near the boundary fence is in close proximity to the new monitoring transect. A patch of the noxious weed *Cardaria draba* (hoary whitetop) was found along the gas pipeline access road, north of the BLM boundary fence, near the transect area.

**Goose Creek (038)** - weed species are slowly increasing in abundance in the general area. A small patch of the noxious weed *Cardaria draba* was observed about 15 m southwest of the transect marker stake.

**Woods Gulch (040)** - the noxious weed *Chondrilla juncea* (rush skeletonweed) is widely scattered in the area, but presently occurs in only trace amounts. However, plants were observed in the transect's vegetation plot for the first time.

**Willow Creek (047)** - a new home is being constructed along the ridge just upslope from the transect area. The transect area was bladed and portions of some slickspots were destroyed. This transect may be located on private land, not BLM as originally thought. There is a high likelihood that this occurrence of *Lepidium papilliferum* has been extirpated. To reflect this the OVR has been changed to "X".

**Woods Gulch (052)** - equestrian use occurs in the occurrence area and horse prints were observed in several slickspots.

**Kuna Butte NW (057)** - a small patch of the noxious weed *Cardaria draba* was found along the two-track road just southeast of the transect stake.

**West of Squaw Creek (060)** – *Chondrilla juncea* is established along the dirt road that accesses this occurrence. Plants are also scattered within the adjacent sagebrush matrix.

**Seaman Gulch (065)** - *Chondrilla juncea* is increasing in the general occurrence area.

**New Plymouth (066)** - *Centaurea diffusa* (diffuse knapweed) is increasing in the occurrence area and rosettes were observed along the monitoring transect for the first time. It remains most common on nearby hillsides.

#### Vegetation sampling

Plant community data were collected at each of the original transects in 1998 (Mancuso et al. 1998). Identical information was collected for the transects in the Juniper Butte area added to the HII monitoring program in 1999 (Mancuso 2000). The spring and summer of 2000 was relatively dry and the cover of native and non-native annual forbs was reduced at many transects. However, 13 transects had higher cover of *Bromus tectorum* (cheatgrass), while three had lower cover compared to baseline values. Noxious weed species were recorded at two transects for the first time – *Centaurea diffusa* at New Plymouth SW (066) and *Chondrilla juncea* at Woods Gulch (040). In addition, the cover of *Chondrilla juncea* increased slightly at two other occurrences (Goose Creek, 038 and Lower Seaman Gulch, 065).

A new vegetation plot was established at Soles Rest Creek (030) because a new HII monitoring transect had to be established for this occurrence. Field forms detailing plant community and other information at this transect site are in Appendix 10. Detailed vegetation data was not collected at any other transect in 2000 because no large-scale changes in vegetation pattern were observed. However, many transects did have one or more differences in plant species composition and/or cover value compared to baseline values. These differences are listed below for each transect.

**Bennett Road (008A)** - plant community attributes were similar to baseline conditions except (a) *Bromus tectorum* Canopy Cover (CC) = 1, versus not present in 1998; (b) *Vulpia microstachys* (annual fescue) was absent, compared to CC = 1 in 1998; (c) *Ranunculus testiculatus* (bur buttercup) CC = 3, compared to CC = 1 in 1998; (d) sagebrush cover was unchanged, but appeared to be closer to CC = 30, than the 40 originally estimated. A number of the *Poa secunda* (Sandberg's bluegrass) clumps in the transect area appeared to be dead.

**Bennett Road (008B)** - plant community attributes were similar to baseline conditions except (a) *Poa secunda* CC = 3, compared to CC = 10 in 1998. Many of the *Poa* clumps appeared dead or dormant; (b) *Ranunculus testiculatus* CC = 10, compared to CC = 3 in 1998; (c) *Sisymbrium altissimum* (tumblemustard) CC = 10, compared to CC = 20 in 1998; (d) Bryophyte/lichen CC = 3, compared to 1 in 1998; (e) no *Bromus tectorum* or *Descurainia richardsonii* (mountain tansymustard) were observed, while both had trace cover in 1998.

**Chalk Flat (010)** - plant community attributes were similar to baseline conditions except (a) *Bromus tectorum* CC = 80, compared to CC = 70 in 1998; (b) *Sisymbrium altissimum* CC = 1, compared to CC = 3 in 1998.

**Military Reserve (012)** - plant community attributes were similar to baseline conditions in 1998 except *Chrysothamnus nauseosus* (gray rabbitbrush) CC = 3, compared to CC = 1 in 1998.

**Simco Road (015)** - plant community attributes were similar to baseline conditions except (a) *Elymus caput-medusae* (medusahead rye) was not observed in 1998, but had CC = 1 in 2000; (b) several forbs were less common, including *Epilobium brachycarpum* (tall willow-weed) CC = 1, compared to CC = 3 in 1998; *Lepidium perfoliatum* (clasping pepperweed) CC = 1, compared to CC = 10 in 1998; *Sisymbrium altissimum* CC = 10, compared to CC = 30 in 1998; and *Macaeranthera canescens* (hoary aster) absent, compared to CC = 1 in 1998; (c) *Zigadenus venenosus* (death camas) was observed for the first time, with CC = 1.

**Kuna Butte SW (018)** - plant community attributes were similar to baseline conditions except *Bromus tectorum* CC = 80, compared to CC = 60 in 1998.

**Kuna Butte SW (018B)** - plant community attributes were similar to baseline conditions except (a) *Bromus tectorum* CC = 20, compared to CC = 70 in 1998; (b) *Macaeranthera canescens* CC = 1, compared to CC = 3 in 1998.

**Initial Point (019A)** - plant community plot attributes were similar to baseline conditions except (a) *Bromus tectorum* CC = 20, compared to CC = 3 in 1998; (b) *Sisymbrium altissimum* CC = 1, compared to CC = 40 in 1998.

**Initial Point (019B)** - plant community bunchgrass cover was significantly less compared to 1998 values: *Agropyron spicatum* (bluebunch wheatgrass) was not observed, compared to CC = 20 in 1998; *Elymus cinereus* (basin wildrye) CC = 1, compared to CC = 10 in 1998; and *Agropyron cristatum* (crested wheatgrass) CC = 1, compared to CC = 3 in 1998. In contrast, *Bromus tectorum* cover was much greater, with CC = 70, compared to CC = 30 in 1998. In addition, *Salsola iberica* (tumbleweed) had CC = 1, but was not observed in 1998.

**Soles Rest Creek (020A)** - the transect area reburned since it was originally established in 1998. The few scattered remnant sagebrush shrubs in the area were killed by this latest fire. Plant community attributes were similar to baseline conditions except (a) only skeletons of *Artemisia tridentata* ssp. *wyomingensis* (Wyoming big sagebrush) were present, compared to CC = 1 in 1998; (b) *Elymus cinereus* CC = 1, *Helianthus annuus* (sunflower) CC = 1, and *Amsinckia tessellata* (tessellate fiddleneck) CC = 1. None of these species were tallied in 1998; (c) four species reported in 1998 were not observed in the vegetation plot area in 2000, including *Chondrilla juncea*, *Macaeranthera canescens*, *Ranunculus testiculatus*, and *Tragopogon dubius* (salsify). However, all these species were observed elsewhere in the general area.

**Soles Rest Creek (020B)** - plant community attributes were similar to baseline conditions except (a) *Bromus tectorum* CC = 30, compared to CC = 10 in 1998; (b) *Cirsium canovirens* (gray-green thistle) was not recorded in 1998, but a single plant was observed in 2000.

**Fraser Reservoir East (021)** - plant community attributes were similar to baseline conditions except (a) *Ranunculus testiculatus* was more abundant, with CC = 10, compared to CC = 1 in 1998; (b) the original cover estimate for sagebrush was too high, and should be adjusted from CC = 40, to CC = 30. Also, *Poa secunda* and bryophyte/lichen cover values were less in most areas compared to the plot zone.

**Pleasant Valley North (022A and 022B)** - plant community attributes were similar to baseline conditions except (a) *Epilobium brachycarpum* CC = 1, compared to CC = 3 in 1998; (b) *Lepidium perfoliatum* was not recorded in 1998, but had CC = 1 in 2000.

**West of Orchard (027A and 027B)** - plant community attributes were largely similar to baseline conditions.

**Christmas Mountain North (028A)** - plant community attributes were similar to baseline conditions except (a) *Ranunculus testiculatus* was very common, with a CC = 3 (10 in some portions of occurrence), compared to CC = 1 in 1998; (b) *Poa secunda* cover was significantly reduced, with CC = 3, compared to CC = 20 in 1998. It looked like nearly every *Poa* clump was grazed to nubs by ground squirrels, and/or had poor vigor and may be dying.

**Christmas Mountain North (028B)** - plant community attributes were apparently largely similar to baseline conditions.

**Mountain Home SE (029)** - plant community attributes were similar to baseline conditions except (a) *Bromus tectorum* CC = 20, compared to CC = 30 in 1998; (b) no *Descurainia richardsonii*, *Epilobium brachycarpum*, or *Plectritis macrocera* (white plectritis) were observed in 2000. Each of these annual forbs were present in trace amounts in 1998.

**Soles Rest Creek (030)** - because a new monitoring transect was established for this occurrence in 2000, a new vegetation plot was also established (Appendix 9). Although it is in a different location, the vegetation plot occurs within the same sagebrush stand as the plot originally sampled in 1998.

**Bowns Creek (031)** - plant community attributes were similar to baseline conditions except *Bromus tectorum* CC = 30, compared to CC = 20 in 1998.

**Tenmile Creek (032)** - plant community attributes were similar to baseline conditions.

**Orchard Southwest (035A and B)** - plant community attributes were apparently largely similar to baseline conditions.

**Goose Creek (038)** - plant community attributes were similar to baseline conditions except (a) *Bromus tectorum* CC = 50, compared to CC = 1 in 1998; (b) *Chondrilla juncea* CC = 3, compared to CC = 1 in 1998; (c) four new species that must have been simply missed were observed in the plot zone, *Eriogonum ovalifolium* (cushion buckwheat) CC = 1, *Lomatium triternatum* (nine-leafed lomatium) CC = 1, *Phlox longifolia* (long-leafed phlox) CC = 3, and *Plantago patagonica* (Indian wheat) CC = 1.

**Woods Gulch (040)** - plant community attributes were similar to baseline conditions except (a) *Bromus tectorum* CC = 80, compared to CC = 30 in 1998; (b) *Lepidium perfoliatum* CC = 3, compared to CC = 1 in 1998; (c) *Poa secunda* was new to the plot zone, with CC = 1; (d) the noxious weed *Chondrilla juncea* with CC = 1 was also new to the plot area.

**Orchard SSW (041)** - plant community attributes were apparently similar to baseline conditions.

**Willow Creek (047)** - plant community attributes were similar to baseline conditions.

**South Cole Road/Tenmile Creek (048)** - plant community attributes were similar to baseline conditions except *Bromus tectorum* CC = 40, compared to CC = 30 in 1998.

**Fivemile Creek (049)** – this occurrence was not visited in 2000.

**West Side Canal/Slade Flat W (050)** - plant community attributes were similar to baseline conditions.

**Woods Gulch (052)** - plant community attributes were similar to baseline conditions except (a) *Bromus tectorum* CC = 80, compared to CC = 20 in 1998; (b) three weedy species that occur in the general area were observed within the plot zone for the first time – *Lactuca serriola* (prickly lettuce) CC = 1, *Hypericum perforatum* (Klamath weed) CC = 1, and *Verbascum thapsus* (moth mullein) CC = 1; (c) the original cover estimate for *Aristida longiseta* (red threeawn) was too high and should be adjusted from CC= 40, to CC = 30.

**Christmas Mountain (053)** - plant community attributes were similar to baseline conditions except *Ranunculus testiculatus* was more abundant and all other forbs were less abundant – *Descurainia pinnata* CC = 1, compared to CC = 3 in 1998; *Epilobium brachycarpum* CC = 1, compared to CC = 10 in 1998; *Sisymbrium altissimum* was absent, compared to CC = 3 in 1998. It should also be noted that bunchgrass cover was much lower along most of the transect than the vegetation plot area. *Poa secunda* cover averages CC = 3 in most places along the transect.

**Willow Creek (056)** - plant community attributes were similar to baseline conditions.

**Kuna Butte NW (057)** - plant community attributes were similar to baseline conditions.

**Glenns Ferry NW (058)** - plant community attributes were similar to baseline conditions except (a) *Epilobium brachycarpum* CC = 1, compared to CC = 3 in 1998; (b) *Vulpia microstachys* was not observed, compared to CC = 1 in 1998.

**West of Squaw Creek (060)** - plant community attributes were similar to baseline conditions in 1998 except *Bromus tectorum* CC = 80, compared to CC = 50 in 1998.

**SE of Reverse (061)** - plant community attributes were similar to baseline conditions except *Oryzopsis hymenoides* (Indian ricegrass) was observed with CC = 1 for the burn area vegetation plot. This species was not tallied in 1998.

**Seaman Gulch (065)** - plant community attributes were similar to baseline conditions except (a) *Bromus tectorum* was much more abundant, with CC = 80, compared to CC = 20 in 1998; (b) the noxious weed *Chondrilla juncea* is increasing in the general area, with CC = 3, compared to CC = 1 in 1998; (c) *Plantago patagonica* CC = 3, compared to CC = 20 in 1998; (d) *Epilobium brachycarpum* CC = 1, versus CC = 20 in 1998.

**New Plymouth (066)** - this occurrence was visited too late in the season to fully assess and compare species composition and cover attributes to baseline conditions. Overall, the vegetation appeared similar to baseline conditions except (a) *Bromus tectorum* was more abundant; (b) late-season annuals such as *Epilobium brachycarpum* and *Helianthus annuus* were less abundant; (c) the noxious weed *Centaurea diffusa* now occurs in the transect area.

**Post Office Reservoir (701)** - although this occurrence was visited too late in the season to fully assess species composition and cover attributes, the vegetation appeared similar to 1998 baseline conditions.

**Three Creek Well (702)** - although this occurrence was visited too late in the season to fully assess species composition and cover attributes, the vegetation appeared similar to 1998 baseline conditions.

**Juniper Butte North (704)** – this occurrence was not visited in 2000.

**Juniper Butte South (707)** - although this occurrence was visited too late in the season to fully assess species composition and cover attributes, the vegetation appeared similar to 1999 baseline conditions.

**Poison Creek North (708)** - forb diversity and abundance appeared to be much less than in 1998, but this occurrence was visited too late in the season to fully assess the differences.

**Juniper Butte West (709)** - although this occurrence was visited too late in the season to fully assess species composition and cover attributes, the vegetation appeared similar to 1999 baseline conditions.

#### Photo points

A third year of photo point photographs were taken at most transects in 2000. Photographs were not taken for one of the Kuna Butte SW (018B) transects due to a camera malfunction. The photographs are on file at the CDC office in Boise, along with a duplicate set at the Army National Guard's Boise office.

#### **REFERENCES**

- Mancuso, M. 2000. Monitoring habitat integrity for *Lepidium papilliferum* (slickspot peppergrass): 1999 results. Unpublished report prepared for the State of Idaho Military Division, Boise ID. 16 p., plus appendices.
- Mancuso, M. and R.K. Moseley, 1998. An ecological integrity index to assess and monitor *Lepidium papilliferum* (slickspot peppergrass) habitat in southwestern Idaho. Unpublished report prepared for the State of Idaho Military Division, Boise ID. 15 p., plus appendices
- Mancuso, M., C. Murphy, and R.K. Moseley. 1998. Assessing and monitoring habitat integrity for *Lepidium papilliferum* (slickspot peppergrass) in the sagebrush-steppe of southwestern Idaho. Unpublished report prepared for the State of Idaho Military Division, Boise ID. 28 p., plus appendices.
- Moseley, R.K. 1994. Report on the conservation status of *Lepidium papilliferum*. Unpublished report prepared for the Idaho Department of Parks and Recreation, Boise, ID. 35 p., plus appendices.
- Quinney, D. 1998. LEPA (*Lepidium papilliferum*). Booklet produced by the Natural Resources Group, Environmental Management Office, Idaho Army National Guard, Boise, ID. 25 p.

U.S. Fish and Wildlife Service. 1999. Endangered and threatened wildlife and plants; review of plant and animal taxa that are candidates or proposed for listing as Endangered or Threatened; annual notice of findings on recycled petitions; and annual description of progress and listing actions. Federal Register Vol. 64, No. 205 (Monday, October 25, 1999).

Appendix 1.

Map location and Transect location form for the new Soles Rest Creek (030B) Habitat Integrity Index transect.

Appendix 2.

GPS coordinate locations for Habitat Integrity Index transects.

GPS coordinates taken in year 2000 at the transect marker stake for Habitat Integrity Index transects. Map Datum NAD27; UTM coordinates 11T.

<b>EOR #</b>	<b>Name of Occurrence</b>	<b>GPS coordinates</b>
Boise/Eagle Foothills		
012	Military Reserve Park	0566088 4830112
038	Goose Creek	0557147 4840330
040	Woods Gulch	0553137 4842525
047	Willow Creek	0544251 4845582
052	Woods Gulch	0551788 4844484
056	Willow Creek	No GPS for 2000
065	Lower Seaman Gulch	0558249 4837834
Kuna/Boise area		
018	Kuna Butte SW	(A) 0542422 4804490 (B) 0541555 4803683
019	Initial Point	(A) 0546824 4801238 (B) 0550345 4802056
022	Pleasant Valley North	(A) and (B) 0561598 4812263
024	Kuna Butte	0546633 4809875
025	Melba Butte	0541759 4806429
032	Tenmile Creek	0558477 4817145
048	South Cole Road/Tenmile Ck.	No GPS for 2000
049	Fivemile Creek	Not visited in 2000
057	Kuna Butte Northwest	0543451 4810622
066	New Plymouth SW	No GPS for 2000
Orchard area		
015	Simco Road	0584987 4799144
020	Soles Rest Creek	(A) 0589823 4793505 (B) 0589855 4794031
027	West of Orchard	(A) and (B) IDANG
028	Christmas Mountain N	(A) 0564936 4795724 (B) IDANG
030	Soles Rest Creek	(B) 0590732 4795426
031	Bowns Creek	0588753 4800129
035	Orchard Southwest	(A) and (B) IDANG
041	Orchard SSW	IDANG
053	Christmas Mountain	0564006 4792278
060	West of Squaw Creek	0588765 4791049
Mt. Home/Glenns Ferry area		
008	Bennett Road	(A) 0628307 4762950 (B) 0628263 4762963
010	Chalk Flat	0618076 4757394
021	Fraser Reservoir East	0600388 4779371
029	Mountain Home SE	0611067 4773500
050	West Side Canal/Slade Flat W	0608543 4769483
058	Glenns Ferry NW	0635167 4759649
061	SE of Reverse	0614869 4761917
Inside Desert area		
701	Post Office Reservoir	0629450 4672290

<b>EOR #</b>	<b>Name of Occurrence</b>	<b>GPS coordinates</b>
702	Three Creek Well	0633842 4678134
704	Juniper Butte North	Not visited in 2000
707	Juniper Butte South	0637361 4678346
708	Poison Creek North	0624213 4679676
709	Juniper Butte West	0634496 4680886

Appendix 3.

Habitat Integrity Index questionnaire form.

## LEPIDIUM PAPILLIFERUM HABITAT INTEGRITY INDEX

modified Feb., 2000

### Slickspot microsite attributes

- |   |  |
|---|--|
| 1. Is organic debris or soil being deposited and accumulating within the slickspot?                 | 0 (none)<br>1 (minimal; <10%)<br>2 (yes; >10%)                             |
| 2. Are the slickspot boundaries (perimeter) compromised?  | 0 (no)<br>1 (minimal; <10%)<br>2 (yes; >10%)                               |
| 3. Are weedy annual species present in the slickspot?   | 0 (none, or <5 individual plants)<br>1 (one or more)                       |
| 4. What is the average density of weedy annual species?   | 0 (<10 plants/sq. ft.)<br>1 (10-25 plants/sq.ft.)<br>2 (>25 plants/sq.ft.) |
| 5. Are rabbitbrush or other shrub species established within the slickspot? Do not count seedlings. | 0 (2 or fewer plants)<br>1 (>2 plants)                                     |
| 6. Are perennial forbs or grasses established within the slickspot?                                 | 0 (3 or fewer plants)<br>1 (> 3 plants)                                    |
| 7. How much livestock disturbance sign (tracks/scat) is present within the slickspot?               | 0 (none)<br>1 (1-10 tracks/scat)<br>2 (>10 tracks/scat)                    |
| 8. Are ORV or other vehicle tracks present across the slickspot?                                    | 0 (no)<br>1 (yes)  |

### Sagebrush-steppe attributes

- |   |   |
|---|---|
| 9. Fire History   | 0 (unburned)  |
| a) immediately adjacent to slickspot (ca 10m radius)  | 2 (mosaic burn, or distinct burned/unburned areas)<br>3 (burned)  |
| b) scale of surrounding 3 acres (ca 65m radius)   | 0 (unburned)<br>2 (mosaic burn, or distinct burned/unburned areas)<br>3 (burned)  |
| c) scale of surrounding 3-50 acres (ca 250m radius)   | 0 (unburned)<br>2 (mosaic burn, or distinct burned/unburned areas)<br>3 (burned)  |
| d) scale of surrounding 50-200 acres (ca 500m radius)   | 0 (unburned)<br>2 (mosaic burn, or distinct burned/unburned areas)<br>3 (burned)  |
| 10. What is the level of livestock use in the area near (ca 20m radius) the slickspot station?                  | 0 (no evidence)<br>1 (light to moderate use)<br>2 (heavy use)   |
| 11. Do ORV's or other vehicles go off-road in cross-country fashion near (ca 20m radius) the slickspot station? | 0 (no, or rare)<br>1 (light to moderate use)<br>2 (heavy use)   |
| 12. The grass layer near (ca 20m radius) the slickspot station is?  | 0 (clearly dominated by native bunchgrasses)<br>1 (both bunchgrasses and exotic annual grasses common)<br>3 (clearly dominated by exotic annual or seeded grasses; native bunchgrasses reduced to remnant status or largely extirpated) |
| 13. Are weedy annual forbs present near (ca 20m radius) the slickspot station?                                  | 0 (sparse or absent)<br>1 (patchy)<br>2 (widespread and abundant)   |
| 14. How much microbial crusts cover is there near (ca 20m radius) the slickspot station?                        | 0 (high/moderate; >10%)<br>1 (low; 1-10%)<br>2 (trace or absent; <1%)   |

Appendix 4.

2000 Habitat Integrity Index field data sheets.

Appendix 5.

2000 Habitat Integrity Index attribute scores data set.

Appendix 6.

Data set summary for Habitat Integrity Index attribute scores, 1998 – 2000.

Habitat Integrity Index attribute mean scores for 1998, 1999, 2000																					
		Slickspot microsite attributes									Sagebrush-steppe attributes										
EOR	Year	1	2	3	4	5	6	7	8	Sum	9a	9b	9c	9d	10	11	12	13	14	Sum	Combined
008A	1998	0.9	0.6	1	0.2	1	0.5	0.8	0	5	0.2	0.8	1.6	2	1	0	3	0	0.9	9.5	14.5
008A	1999	0.6	0.6	0.6	0	0.1	0.2	2	0	4.1	0	1.4	2	2	2	0	1	0	0	8.4	12.5
008A	2000	0.9	0.9	0.9	0.1	0.5	0.1	1	0	4.3	0	2	2	2	1	0	0	1	0	8	12.3
008B	1998	0.7	0.4	1	0.6	0	0.2	1.3	0	4.2	3	3	2	2	1	0	3	2	0.7	16.7	20.9
008B	1999	1.1	1.1	1	0.1	0.3	0	1.8	0	5.4	3	3	2	2	2	0	1	2	0.1	15.1	20.5
008B	2000	1	1.4	1	0.5	0.2	0.1	0.9	0	5.1	3	2.5	2	2	1	0	3	2	1	16.5	21.6
010	1998	1	1.1	1	0.5	0.5	0.2	2	0	6.3	2.2	2.2	2	2	2	0.3	2.8	0	1.2	14.7	21
010	1999	0.9	0.5	1	0.4	0	0	0.9	0	3.7	2.5	2	2	2	0	0	3	0	2	13.5	17.2
010	2000	1	0.6	1	0.9	0	0.3	0.7	0	4.5	2.2	2	2	2	0	0	2.2	0.7	1.5	12.6	17.1
012	1998	2	0	1	2	0	0	0	0	5	3	3	3	3	0	0	3	2	2	19	24
012	1999	2	2	1	2	0	0	0	0	7	3	3	3	3	0	0	1	1	2	16	23
012	2000	2	0	1	2	0	0	0	0	5	3	3	3	2	0	0	1	2	2	16	21
015	1998	1	0.7	1	0.7	0	0.1	1.1	0	4.6	3	3	3	3	1	0	3	2	2	20	24.6
015	1999	1.2	0.2	0.9	0	0	0.3	0	0.1	2.7	3	3	3	3	0	1	3	1	2	19	21.7
015	2000	1.3	1.2	1	0.5	0	0.4	1.7	0.1	6.2	3	3	3	3	1	0.8	3	1	2	19.8	26
018A	1998	0.5	0.7	0.8	0.5	0	0	0	0	2.5	3	3	2.5	2	1	0	3	1	1	16.5	19
018A	1999	1.1	0.1	0.7	0.2	0	0	0	0	2.1	3	3	2.3	2	0	0	3	0	2	15.3	17.4
018A	2000	1.2	0.8	0.8	0.6	0	0	0	0	3.4	3	2.5	2	2	0	0	3	0.5	2	15	18.4
018B	1998	0.4	0.5	1	0.1	0.9	0.3	0.3	0	3.5	1.8	2	2	2	1	0	1.5	0.9	0.4	11.6	15.1
018B	1999	1.3	0.9	0.4	0	0.3	0	1.1	0	4	1.8	2	2	2	1	0	1.1	0	0.2	10.1	14.1
018B	2000	1	1.3	0.6	0.2	0.5	0.4	0.1	0	4.1	2	2	2	2	0	0	0.8	0.8	0.8	10.4	14.5
019A	1998	1.8	1.9	1	0.8	0	1	0.2	0	6.7	3	3	3	3	1	1	3	1	2	20	26.7
019A	1999	1.5	1.6	0.3	0	0	0.8	0.4	1	5.6	3	3	3	3	1	0	3	0	2	18	23.6
019A	2000	1.4	2	1	0.4	0	1	0	0	5.8	3	3	3	3	0	0	3	0.3	1.4	16.7	22.5
019B	1998	0.7	1.1	1	0.6	0	0.7	0	0.2	4.3	3	3	3	3	0	0	3	1	2	18	22.3
019B	1999	0.7	0.2	0.8	0.2	0	0.6	0	0	2.5	3	3	3	3	0	0	3	0	2	17	19.5
019B	2000	0.4	1.1	0.9	0	0	0.8	0	0	3.2	3	3	3	3	0	0	3	1	2	18	21.2
020A	1998	1.7	1.7	1	0.9	0.4	0.7	1.2	0	7.6	3	3	3	3	1	0	3	1	1	18	25.6
020A	1999	1.8	1.2	1	0.6	0.1	0	0.7	0	5.4	3	3	2.8	2	1	0	3	0	1	15.8	21.2
020A	2000	2	1.5	1	1	0	0.4	0.9	0	6.7	3	3	2	2	1	0	2.8	1	2	16.8	23.5
020B	1998	0.8	0.8	1	0	0.8	0.1	1.2	0	4.7	0	0	2	2	1	0	1	0	0	6	10.7
020B	1999	0.6	0.3	0.9	0	0.3	0.1	1.4	0	3.6	0	0	2	2	1	0	1	0	0	6	9.6
020B	2000	1	0.9	1	0	0.7	0.5	1.8	0	5.9	0	0	2	2	1	0.2	1	0	0	6.2	12.1

021	1998	0.9	0.4	1	0.8	0.8	0.7	1	0	5.6		0	0	0	0	1	1	0	0	0	2	7.6
021	1999	0.4	0.4	1	0.4	0.4	0.2	1.6	0	4.4		0	0	0	0	1	0	0	0.7	0.1	1.8	6.2
021	2000	0.7	0.8	0.9	0.1	0.5	0	0.3	0.1	3.4		0	0	0	2	0.6	0.1	0	1.3	0	4.2	7.6
022A	1998	1.5	1.4	1	0.8	0.7	0.2	0.3	0	5.9		2.4	2.3	2.5	3	1	0	3	1.1	0.8	16.1	22
022A	1999	1.4	1.6	1	0	0.1	0	0.2	0.4	4.8		2.9	2.3	2	3	1	0.6	3	1	1	16.8	21.6
022A	2000	1.1	1.1	1	1.2	0.3	0.1	0	0	4.8		2.5	2	2	2	0	0	3	1.9	1	14.4	19.2
022B	1998	0.7	0.2	1	0.2	0.6	0	0.2	0	2.9		0	2	2	2	1	0	2.8	0	0.2	10	12.9
022B	1999	0.4	0.6	1	0	0.2	0	0.5	0.2	2.8		0	2	2	2	1	0.2	3	0	0	10.2	13
022B	2000	1.2	1.21	1	0.7	0.5	0	0	0	4.6		1	2	2	2	0	0.2	3	0.6	0.2	11	15.6
024	1998	1.2	1	1	0.6	0	0.3	0	0	4.1		3	3	2	2	0	0	3	2	1.6	16.6	20.7
024	1999	1.7	1.7	1	0.9	0	0.4	0	0.8	6.5		3	3	2	2	0	1	1	0	1.7	13.7	20.2
024	2000	1.1	1.6	1	1.4	0	0.3	0	0.2	5.6		3	3	2	2	0	0.7	3	1	1	16	21.6
025	1998	1.7	1.7	1	1.6	0.3	1	0.7	0	8		2	2.2	2	2	1	0.8	3	0.7	1	14.7	22.7
025	1999	1.7	1.3	1	1.1	0	0	0.2	0.4	5.7		1.5	1.3	2	2	0	0.5	3	0.3	0.6	11.6	17.3
025	2000	1.3	1.7	1	1.2	0	0.2	0	0	5.4		1.2	1.3	2.1	2	0	0	3	1.2	1	11.8	17.2
027A	1998	0.8	0.3	1	1.3	0.7	0.2	1.4	0.4	6.1		0	0	0	0	1	0	0	0	0	1	7.1
027A	1999	0.8	0.1	0.9	0.5	0.3	0.2	1.5	0.2	4.5		0	0	0	0	1	0	0	0	0	1	5.5
027A	2000	0.2	0.8	1	0	0.1	0	1.6	0	3.7		0	0	0	0	1	0	0	0.5	0	1.5	5.2
027B	1998	1.8	0.9	1	0.7	0.4	0.2	1.9	0	6.9		0.2	1	1.6	0	2	0	3	1.4	1.1	10.3	17.2
027B	1999	1.1	0.7	1	0.7	0.3	0.1	1.7	0.1	5.7		0	0.8	1.4	0	1	0	3	0	1.3	7.5	13.2
027B	2000	1.5	2	1	1	0.5	0.1	2	0	8.1		0.2	1	2	2	2	0	1	1.8	0	10	18.1
028A	1998	0.1	0.2	1	0.9	1	0.9	1.3	0.7	6.1		0	0	0	0	1	0	0	0.4	0	1.4	7.5
028A	1999	0.3	0.1	1	0.1	0.2	0.1	1.3	0.2	3.4		0	0	0	0	1	0	0	0	0	1	4.4
028A	2000	1	0.4	1	1.2	0.3	0.2	0.9	0	5		0	0	0	0	1	0	0	1.8	0	2.8	7.8
028B	1998	0.9	0.3	0.8	0.3	0.3	0.1	1.2	0	3.9		0	0	0	0	1	1	0	0	0	2	5.9
028B	1999	0.8	0.3	0.8	0.2	0.2	0.1	0.9	0	3.3		0	0	0	0	1	0	0	0	0	1	4.3
028B	2000	0.7	0.9	1	0	0	0	0.8	0.3	3.8		0	0	0	0	1	0	0	0.7	0	1.7	5.5
029	1998	0.5	0.8	1	0.3	0.4	0.1	0.6	0	3.7		0	2	2	2	1.1	0	3	0	0	10.1	13.8
029	1999	0.7	0.6	0.3	0	0	0	0.7	0	2.3		0.2	1.2	2	2	1	0	3	0	0	8.2	10.5
029	2000	0.9	1.2	0.5	0	0.2	0.3	0.3	0	3.4		0.8	2	2	2	1	0	3	0	1	11.8	15.2
030	1998	0.2	0.5	1	0	1	0.7	1.2	0	4.6		0	0	0	0	1	0	1	0	0.1	2.1	6.7
030	1999	0.2	0.4	1	0.1	0.5	0.4	1	0.2	3.8		0	0	0	0	1	0.2	1	0	0	2.2	6
030	2000	0.6	0.3	1	0.1	0.8	0.8	0.7	0	4.3		0	0	0	0.8	1	0	1.2	0	0	3	7.3
031	1998	0.4	0.2	1	0.1	0.9	0.9	1.9	0	5.4		0	0.6	1.8	2	2	0	1	0	0.5	7.9	13.3
031	1999	0.3	0.1	0.3	0.1	0.4	1	2	0	4.2		0	0.8	2	2	1	0	1	0	0.5	7.3	11.5
031	2000	0.5	0.4	0.9	0.3	0.2	0.8	1.9	0	4.8		0.2	1.4	2	2	1	0	1	0	0.4	8	12.8

032	1998	1.2	1.2	1	0.8	0.7	0.5	0	0	5.4		0.3	0.2	0.4	0	0	0.2	1.2	0.1	0.1	2.5	7.9
032	1999	0.1	0.9	0.9	0	0	0.1	0	0	2		0	0.2	0.4	0	0	0	2.2	0	0	2.8	2.8
032	2000	0.7	1.21	1	0.8	0.4	0.4	0	0	4.5		0.2	0.6	0.6	2	0	0	1.2	0.3	0.1	5	9.5
035A	1998	0.1	0.4	0.7	0.1	0.8	0.4	1.2	0	3.7		0	0.6	1.6	2	1	0	0	0	0	5.2	8.9
035A	1999	0.5	0.1	0.6	0	0.1	0	1	0	2.3		0	0.8	1.6	2	1	0	0	0	0	5.4	7.7
035A	2000	1	0.8	1	1.2	0.2	0	1.6	0.1	5.7		2	2	2	2	1.7	0	1	2	0.1	12.8	18.5
035B	1998	0.6	0.4	1	0.9	0.3	0.6	1.4	0	5.2		2.1	2	2	2	1	0	1.7	2	0.6	13.4	18.6
035B	1999	1	0.8	1	0.4	0	0	1.4	0.2	4.8		2	2	2	2	1	0	2.8	0	0.7	12.5	17.3
035B	2000	0.7	0.9	1	0.5	0.2	0	1.3	0	4.6		1.1	1.8	2	2	1	0	0.2	1.3	0	9.2	13.8
038	1998	1	1	0	0	0	0	0	0	2		3	3	3	2	0	0	1	2	1	15	17
038	1999	1.2	1.5	0.8	0.5	0	0	0	0	4		3	3	3	2	0	0	1	1	0	13	17
038	2000	1.75	1	1	1	0	0	0	0	4.75		3	3	3	2	0	0	1	1	0	13	17.75
040	1998	2	0.7	1	1	0	0	0	0	4.7		0	0	0	0	0	0	1	1	2	4	8.7
040	1999	1.3	1.3	1	1.3	0	0.3	0	0	5.2		0	0	0	0	0	0	1.7	0.7	1.3	3.7	8.9
040	2000	1.75	1.5	1	1	0	0	0	0	5.25		0	0	2	2	0	0	2	0	2	8	13.25
041	1998	1.4	0.9	1	0.9	0.2	0.4	0	0	4.8		3	3	3	3	0	0	3	1	1	17	21.8
041	1999	1.4	1.1	1	0.2	0.1	0.1	0	0	3.9		3	3	3	3	0	0	3	0	1	16	19.9
041	2000	1.1	1.2	1	1.2	0.1	0.4	0	0	5		3	3	2.7	2	2.8	0	1	2	0	15.5	20.5
047	1998	1	1.1	1	0.7	0	0	1	0.4	5.2		3	3	3	3	1	1	3	1	2	20	25.2
047	1999	1	1.3	1	1	0	0	0.7	0.6	5.6		3	3	3	3	0	0.7	3	0	2	17.7	23.3
047	2000	1.8	1.7	1	1.3	0	0	0.4	0.8	7		3	3	3	3	0	1	3	1	2	19	26
048	1998	1.2	0.5	1	0.9	0.8	0.1	0	0	4.5		0	0	0	0	0	0	3	0	0	3	7.5
048	1999	0.8	0.8	1	0	0.1	0	0.1	0	2.8		0	0	0	0	0.1	0	3	0	0	3.1	5.9
048	2000	1.1	1.7	1	1	0.3	0.4	0	0	5.4		0	0.2	0.4	1	0	0	1	0.3	0.1	3	8.4
049	1998	0.6	0.9	1	0.5	0.7	0.1	2	0	5.8		1.8	1.4	2	2	1	1	3	0.2	0.6	12	18.8
049	1999	1.8	1.9	1	1.4	0.1	0.4	2	0.1	8.8		1.6	1.6	2	2	2	1.1	3	0.8	0.1	14.2	23
049	2000									ns											ns	ns
050	1998	0.8	0.3	0.8	0	0.2	0	0.4	0	2.5		0	0.8	1	0	1	0	3	0	2	7.8	10.3
050	1999	0.6	0.5	0.6	0	0.2	0	0.4	0	2.3		0	0	2	2	0	0	3	0	2	9	11.3
050	2000	0.9	0.5	0.4	0	0.3	0	0.3	0	2.4		0	1.9	2	2	1	0	3	0	1	10.8	13.2
052	1998	1	0.8	1	0.2	0.1	0	0.3	0	3.4		3	3	2	2	0	1	1	1	1	14	17.4
052	1999	1.1	0.4	1	0.4	0	0	0.2	0	3.1		3	3	3	2	0	0	1	0	0	12	15.1
052	2000	1.2	1	1	1	0.2	0.2	0.4	0	5.2		3	3	3	2	0	0	1	0	1	13	18.2
053	1998	0.4	0.8	1	1.3	0.7	1	0.9	0.4	6.5		1.5	2	2	2	1	0	0.2	0.1	0.2	9	15.5
053	1999	1.3	0.6	0.6	0.2	0	0.1	0.8	0.2	3.8		1.6	2	2	2	2	0	0.6	0.1	0.1	10.4	14.2
053	2000	1.2	1.5	1	1.3	0.1	0	1.7	0.1	6.9		1.5	2	2	2	1.9	0.1	0.2	1.6	0	11.3	18.2

056	1998	1.3	1.5	0.9	0.6	0.1	0.2	1.1	0	5.7		2	2	2	2	1	0	1.8	2	2	14.8	20.5
056	1999	1.1	1.7	1	0.5	0.1	0.1	0.8	0	5.3		2	2	2	2	1	0	1	2	1	14	19.3
056	2000	1.8	1.9	1	0.8	0.1	0.6	1.4	0	7.6		2	2	2	2	1	0	2	2	2	15	22.6
057	1998	0.7	1.1	1	1.4	0.5	0.3	0.1	0	5.1		0.4	0.4	0.4	2	0	0.3	1.4	0	0	4.9	10
057	1999	1	0.2	1	0.5	0.1	0.1	0.1	0	3		0	0.4	2	2	0	0	2.2	0	0	6.6	9.6
057	2000	0.8	0.8	1	1	0.1	0	0.1	0	3.7		0	0.8	2	2	0	0	1.8	0	0.2	6.8	10.5
058	1998	0.2	0.4	1	0.3	0.9	0.4	1	0	4.2		0	0	0	0	1	0.1	0.5	0	0	1.6	5.8
058	1999	0.5	0.2	0.4	0	0.4	0	1.7	0	3.2		0	0	0	0	1	0	1	0	0	2	5.2
058	2000	0.6	1.5	1	0.3	0.4	0.2	2	0	6		0	0	0	0	1	0	1	0	0	2	8
060	1998	1	1	1	0.3	1	0.4	2	0	6.7		0.2	0.6	0.6	0	2	0	3	0.1	1	7.5	14.2
060	1999	1	1.3	1	0.9	0.9	0.1	2	0	7.2		0	0	0	0	1	0	3	0	0.8	4.8	12
060	2000	1	0.9	1	0.4	0.6	0.7	2	0	6.6		0	0	0	2	1	0	3	0	1	7	13.6
061	1998	0.8	0.6	1	0.3	0.6	0.5	1.9	0	5.7		1.4	2	2	2	1	0.7	1.9	0	0.5	11.5	17.2
061	1999	1.1	0.9	1	1.1	0.2	0.7	1.6	0	6.5		1.1	2	2	2	1	0	1	0.4	1	10.5	17
061	2000	0.9	1.7	1	0.4	0.1	0.4	1.1	0	5.6		1.2	2	2	2	1	0	2.8	0.5	0.7	12	17.6
065	1998	1	1	1	0	0	0	0	0	3		0	2	2	2	0	0	1	1	0	8	11
065	1999	0.7	1.3	0.7	0	0	0	0	0	2.7		1.3	1.3	2	2	0	0	1.6	0	1	9.2	11.9
065	2000	1.4	1.6	1	1	0	0	0	0	5		1.6	2	2	2	0	0	1.4	0.2	0	9.2	14.2
066	1998	0.6	0.8	1	0.1	0.9	0.2	0.8	0.1	4.5		1.2	1.6	2	2	0	0	2.1	0.7	0	9.6	14.1
066	1999	1.5	1.2	1	0.7	0.1	0.2	0	0.1	5.2		1.1	2	2	2	0	0.3	0.9	0.6	0	8.8	14
066	2000	1.5	1.5	1	0.8	0.4	0.5	0.2	6.2	6.2		1.4	1.8	2	2	0	0.5	1	0.9	0	10	16.2
701	1998	0.1	0.2	0.2	0	0.3	1	1.5	0	3.3		0	1	2	2	1	0	0	0	0.3	6.3	9.6
701	1999									ns											ns	ns
701	2000	0.4	0.6	0	0	0.1	1	2	0	4.1		0	1.4	2	2	1	0	0	0	0	6.4	10.5
702	1998	0	0.3	1	0.3	0.7	1	1.2	0.1	4.6		0	1.2	1.8	0	2	1	0	0	0	6	10.6
702	1999	0.1	0.3	0.3	0	0.1	1	1.2	0	3		0	2	2	2	1	0	0.3	0	0	7.3	10.3
702	2000	0.8	0.3	0.7	0.1	0.2	1	1.7	0	4.8		0	0	0	2	1	0	0.3	0	0	3.3	8.1
704	1998									ns											ns	ns
704	1999	1.1	0.3	0.9	0.4	0.3	0.9	1.4	0	5.3		2.8	2.1	2	2	1	0.1	1.2	0	1.4	12.6	17.9
704	2000									ns											ns	ns
707	1998									ns											ns	ns
707	1999	0.1	1.4	0.9	0	1	1	2	0	6.6		1	2	2	2	1	0	0.6	0	0	8.7	15.3
707	2000	0.1	1	0.7	0	0.8	1	1.3	0	4.9		1.6	2	2	2	1	0	0.1	0	0	8.8	13.7
708	1998	2	2	1	0	0	1	0.5	0	6.5		3	3	3	3	1	0	3	0.7	2	18.7	25.2
708	1999	1	2	0.5	0	0	1	2	0	6.5		3	3	3	3	1	0	1	0	2	16	22.5
708	2000	0.8	2	0.8	0	0	0.7	1	0	5.4		2.8	3	3	3	1	0	2.6	0	1.8	17.2	22.6

709	1998									ns											ns	ns
709	1999	0.6	0.4	0.8	0	0	1	1.4	0	4.2		0	2	2	2	1	0	0.4	0	0	7.4	11.6
709	2000	0.7	0.2	0.9	0	0	1	1.7	0	4.7		0	2	2	2	1	0	0	0	0	7	11.7

ns = not sampled

Appendix 7.

Habitat Integrity Index sampling notes and observations for 2000.

## Habitat Integrity Index sampling notes and observations for 2000

**Bennett Road (008B)** - the marker stake was moved about 1 m north of its original location. It was too close to the two-track pipeline road, making it too easy to see and disturb. It was also being covered by dirt. The stake is now located approximately 1.7 m north of the two-track dirt pipeline access road. The azimuth from the reference orange petroleum pipeline post along the road, to the stake, is now  $298^{\circ}$ .

**Chalk Flat (010)** - *Poa secunda* is invading a few of the slickspot microsites.

**Military Reserve (012)** – the single slickspot at this site is difficult to discern from the surrounding habitat. The absence of *Elymus caput-medusae* and the short stature of the *Bromus tectorum* within the slickspot help pick it out from the surrounding vegetation.

**Simco Road (015)** – the azimuth from the red-painted fencepost used to help relocate the transect, to the marker stake, is  $199^{\circ}$ , not  $189^{\circ}$  as originally stated in the Transect location form in 1998. Several *Elymus cinereus* clumps are established along the margin of the slickspot that has the marker stake. This slickspot is not counted as one of the transect stations. The transect is about 80 m in length.

**Kuna Butte SW (018)** - several transect slickspot stations were formerly part of another research project and marked and labeled by stakes and wands. The colored plastic pin flags have largely disintegrated, although the rusted and often bent wire wands remain in place. It is just a matter of time before other marker stakes are lost or tags become non-legible.

**Soles Rest Creek (020A)** – the following measurements should help make relocating the marker stake for this transect easier: (a) from the first orange and white-colored gas pipeline post north of the freeway fence it is about 15 m @  $27^{\circ}$  to the stake (this is the stake referenced in the original Transect location form in 1998; (b) from the next gas pipeline post it is about 20 m @  $350^{\circ}$ . The transect may overlap an area of former BLM? monitoring plots, as evidenced by metal pins and wood stakes encountered towards the end of the transect.

**Fraser Reservoir East (021)** – the large cinder/gravel pit south of the transect has substantially expanded since 1999. The pit overburden has encroached to within about 45 m of the transect. The road to the new pit expansion has been overlain with black cinder. This road was dirt in 1999.

**Mountain Home SE (029)** - an alternative way to access this transect is from the east. From the southern part of Mountain Home, take 18<sup>th</sup> Street South east until it ends at the BLM boundary fence. A two-track dirt road leads southeast into the public land. Hike uphill to the USGS "Stone triangulation point" (see topographic quadrangle). The transect is located approximately 0.3 mile east of this high point. This route has the benefit of not having to park and leave a vehicle along I-84.

The fiber-optic wand used to help relocate the transect marker stake has faded from its original bright yellow to a dull orange-yellow color. Loss of the wand would make relocating the stake more difficult. However, there are two free-standing fenceposts in the general transect area. From the marker stake to the more eastern of the two posts it is about 40 m @  $96^{\circ}$ . To the other post it is about 100 m @  $295^{\circ}$ .

**Kuna Butte (024)** - it is approximately 195 paces from the road to the transect marker stake. Most transect stations represent slickspot plots that were staked and labeled for another research project. Sampling these labeled slickspots in order requires regular deviation from the  $144^{\circ}$  transect azimuth.

**Soles Rest Creek (030)** - the original transect was inadvertently located on private land, about 50 m south of the BLM boundary line. For this reason it was abandoned in 2000, and a new transect

established approximately 50 m further north on BLM land (Appendix 1). The new transect requires less than 100 m sample the ten slickspot stations.

**Tenmile Creek (032)** – the last slickspot station (#10) for the transect is located within 10 m of burned habitat that extends towards the south.

**Goose Creek (038)** - slickspot station #1 had a new ant colony on it in 2000. The ants have deposited a layer of organic litter (mainly cheatgrass seed heads) that covered about 50% of the slickspot. Slickspot station #2 is a small, distinct slickspot located about 7 m southeast of #1, along the ridgeline. Stations #3 and #4 are located further down the ridge and are more or less unrecognizable as slickspots if *Lepidium* were not present

**Woods Gulch (040)** - an additional slickspot station was added to the monitoring transect in 2000. Station #4 is located about 15 m from station #3. To access this occurrence it is necessary to hike along a recreation trail that begins near the junction of Holl Drive and Holl Way. To relocate the transect, follow the sandy trail for approximately 600 m. If one reaches the trail's high point, backtrack about 40 paces. The transect is located along an upper slope position.

**Willow Creek (047)** - the transect marker stake missed being destroyed by inches when the slope contour was bladed as part of a nearby home construction project. The stake was in place along the edge of the blade cut, but may not be long for this world.

**West Side Canal/Slade Flat W (050)** - an alternative and easier route to access this isolated BLM tract and occurrence was found in 2000. From Mountain Home, take Old Highway 20 south for approximately 3.5 miles to Hamilton Road; turn west; almost immediately, turn south onto Groefema Road; continue on this road for 0.5 mile; at this point there is a fenceline and associated two-track dirt road heading west; turn onto this dirt road and follow it for about 0.3 mile to the fenced BLM parcel. Hike about 0.25 mile at 220° azimuth to the transect area. It is not necessary to wade the ditch using this route.

**Christmas Mountain (053)** - it is necessary to walk approximately 250 m to sample the ten stations for this transect, which passes through unburned, mosaic burn, and burned areas.

**SE of Reverse (061)** - this transect is about 200 m long.

**Seaman Gulch (065)** - A hole about 10 cm in diameter by 5 cm deep was observed along the east edge of the slickspot border for station #1. It was unclear if it was from an animal print. Rabbit pellets are sprinkled in an around this slickspot. This transect was originally comprised of a single slickspot, but now has five stations following the discovery of additional *Lepidium papilliferum* further up the gentle ridge. Sample stations two to five occur in close proximity to each other and are located an estimated 70 m southeast (ca 120°) of the transect stake. Station #2 is a small, narrow, smile-shaped slickspot; #3 is long and narrow, and would be difficult to discern if *Lepidium* were not present; #4 is a small slickspot a few feet upslope from #3; and #5 has a fairly long, narrow shape, and is also not very easy to discern.

**Post Office Reservoir (701)** - it is 5.5 miles from Three Creek Well to the turnoff/ junction at the water pipeline that provides access to the Post Office Reservoir area. The distance was erroneously reported as 6.4 miles in an earlier report.

**Poison Creek North (708)** - it is 5.5 miles from Three Creek Well to the turnoff/ junction at the water pipeline that provides access for this occurrence. The distance was erroneously reported as 6.4 miles in an earlier report.

Appendix 8.

*Lepidium papilliferum* abundance class data by transect, 1998 – 2000.

***Lepidium papilliferum* HII abundance class data and estimated transect tally - 2000**

EO	Class 0			Class 1			Class 2			Class 3			ca # of plants		
	1998	1999	2000	1998	1999	2000	1998	1999	2000	1998	1999	2000	1998	1999	2000
008A	2	8	2		2	2	2		6	6			1640	2	236
008B	4	7	7	1	2	2	3	1	1	2			525	18	40
010	10	10	10										0	0	0
012							1	1	1				15	27	16
015		10	10	3			5			2			790	0	0
018A	3	10		1		2	4		2	2		6	448	0	2517
018B	1	4	3	1	5	1	4	1	4	4		2	845	50	402
019A	10	8	10		1			1					0	18	0
019B	8	9	8		1	2	2						30	3	6
020A	10	10	10										0	0	0
020B	5	5	6	2	2	2	1	3	2	2			288	43	44
021	7	8	9		1	1	2	1		1			385	19	1
022A	7	7	10	1			2	3					83	252	0
022B	10	10	10										0	0	0
024		3	2		1	2	3	5	5	7	1	1	1400	285	416
025	6	6	2	1	2	1	3	2	6			1	60	106	236
027A	4	6	6		2	2	4	1	1	2	1	1	1840	114	23+
027B	10	10	10										0	0	0
028A	6	9	6				1		1	3	1	3	1380	125	805+
028B	3	5	2		1	4	5	4	2	2		2	550	220	305
029	3	6	5	1		1	5	3	4	1	1		320	231	148
030*	3	8	5	3	2	2	4		3				142	3	84
031	7	10	8							3		2	570	0	330
032	8	8	8						2	2	2		500	230	118
035A	8	8	9		1		1	1	1	1			175	38	10+
035B	7	10	9	2	1	1	1						30	0	1+
038		1	1			3	1	3					25	42	17
040	2	2	3		1		1		1				40	5	31
041	9	10	10	1									2	0	0
047	10	10	10										0	0	0
048	10	10	10										0	0	0
049	10	10											0	0	ns
050	7	5	8		3	1	2	2	1	1			265	86	16

052	5	6	5	1	1	1	4	3	4				203	176	200
053	10	9	10		1								0	3	192
056	9	10	10	1									1	0	0
057	3	5	5	2	1	4	3	4	1	2			900	149	35
058	6	10	10	1			3						138	0	0
060	10	8	10		2								0	6	0
061	3	4	6		2		4	2	4	3	2		700	274	92
065		1	3				1	2	1			1	95	52	155
066	3	5	5		1	1		3		7	1	4	2000	249	603
701 (051)	7		9	3		1							11	ns	2
702 (063)	4	3	6	6	7	4							27	17	13
704 (64A)		7			3								ns	3	ns
707		1	4		6	6		2			1		ns	204	12
708 (059)	2	2	5										0	0	0
709 (64B)		6	9		4	1							ns	10	2
<b>Sum</b>	252	320	306	31	56	47	72	48	53	53	10	23	<b>16423</b>	<b>3060</b>	<b>7108+</b>
<b>%</b>	62	74	71	8	13	11	17	11	12	13	2	5			

ns = not sampled

\* = 030 in 1998 and 1999; 030B in 2000

Appendix 9.

Livestock disturbance sign abundance class data by transect, 1998 – 2000.

*Lepidium papilliferum* HII livestock abundance class data, 1998 - 2000

EOR	Class 0			Class 1			Class 2		
	1998	1999	2000	1998	1999	2000	1998	1999	2000
008A	3		1	6		8	1	10	1
008B			2	7	2	7	3	8	1
010		1	3		9	7	10		
012	1	1	1						
015		10		10		3			7
018A	10	10	10						
018B	7	1	9	3	7	1		2	
019A	8	6	10	2	4				
019B	10	10	10						
020A		3	2	8	7	7	2		1
020B	1			6	5	1	3	5	9
021			7	10	4	3		6	
022A	7	7	10	3	3				
022B	8	5	10	2	5				
024	10	10	10						
025	3	8	10	7	2				
027A				4	4	2	6	6	8
027B				1	3		9	7	10
028A		1	1	7	5	9	3	4	
028B	1	2	2	6	7	8	3	1	
029	5	3	7	4	7	3	1		
030	1	1	3	6	8	6	3	1	1
031				1		1	9	10	9
032	10	10	10						
035A		1		8	8	5	2	1	5
035B	1	1		4	4	7	5	5	3
038	1	4	4						
040	3	3	4						
041	10	10	9			1			
047	2	5	6	6	3	4	2	2	
048	10	9	10		1				
049							10	10	
050	6	6	7	4	4	3			
701		ns		5	ns		5	ns	10
052	7	8	7	3	2	2			1
053	4	3		3	6	4	3	1	6
056		3	2	10	7	2			6
057	10	9	9		1	1			
058	2	4		6	6		2		10
708	1		1	1		3		2	1
060							10	10	10
061				1	5	9	9	5	1

707	ns		1	ns		5	ns	10	4
702	1	1		6	7	3	3	2	7
704	ns	7		ns	3		ns		
709	ns			ns	6	3	ns	4	7
065	1	3	5						
066	2	10	7	8		3			
<b>Sum</b>	146	176	190	158	145	121	104	112	118
<b>% by year</b>	35	41	44	39	33	28	26	26	28

ns = transect not sampled

## Appendix 10.

Vegetation sampling plot data sheets for the new Soles Rest Creek (030B) Habitat Integrity Index transect.