

Survey for slickspot  
peppergrass (*Lepidium  
papilliferum*) on IDL parcels  
in Ada County, Idaho



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## **ABSTRACT**

Slickspot peppergrass (*Lepidium papilliferum*) is a rare annual or biennial species endemic to southwestern Idaho. Slickspot peppergrass has been a high priority conservation concern in Idaho for many years and has a conservation rank of G2/S2. In 2005, Idaho Department of Lands (IDL) and Office of Species Conservation collaboratively sponsored the Idaho Conservation Data Center to conduct slickspot peppergrass surveys on IDL parcels. The field survey targeted 5 IDL sections located about 24 km (15 mi) south of Boise.

We surveyed approximately 1,274 ha (3,148 ac) in five sections. Approximately 5,120 slickspots were searched. Only 18 (0.4%) slickspots were occupied by slickspot peppergrass. We discovered 1 new element occurrence (EO; EO 77) and extended 1 previously known EO (EO 72) with 3 new subpopulations. The 2005 survey will be useful to IDL for implementing and prioritizing management.

## **ACKNOWLEDGMENTS**

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## **INTRODUCTION**

Slickspot peppergrass (*Lepidium papilliferum*) is a rare annual or biennial mustard species endemic to southwestern Idaho (Moseley 1994). Slickspot peppergrass is highly specific to slickspots associated with shrub interspaces in sagebrush-steppe communities. Large portions of its range have been lost or degraded due to large, uncharacteristic wildfires and subsequent conversion to non-native annual grasslands, agricultural conversion, excessive livestock grazing, and rangeland rehabilitation practices (Whisenant 1990, Noss et al. 1995, Lesica and DeLuca 1996, U.S. Fish and Wildlife Service 2003). Slickspot peppergrass has been a high priority conservation concern in Idaho for many years and has a NatureServe conservation rank of G2/S2 (IDCDC Database 2006).

Declining slickspot peppergrass populations and habitat quality led to it being a candidate for federal endangered status in 2002 (U.S. Fish and Wildlife Service 2002). In January 2004, the U.S. Fish and Wildlife Service withdrew the proposed rule, in part based on “conservation efforts contained in formalized plans” (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), Idaho Department of Fish and Game (IDFG), Idaho Department of Lands (IDL), Idaho Army National Guard (IDANG), Office of Species Conservation (OSC), and non-government cooperators.

As a signatory of the Candidate Conservation Agreement, IDL has a legal obligation to manage slickspot peppergrass on IDL parcels. Conducting surveys for slickspot peppergrass is a priority for IDL because only a small proportion of IDL parcels had ever been surveyed. In 2005, IDL and OSC collaboratively sponsored the Idaho Conservation Data Center (IDCDC) to initiate slickspot peppergrass surveys on IDL parcels. This report details the results of surveys on IDL parcels for slickspot peppergrass.

## **STUDY AREA**

The field survey targeted 5 IDL sections located about 24 km (15 mi) south of Boise in southwestern Idaho, just north of the Orchard Training Area (OTA; Fig. 1; Table 1). The survey area was selected based on its proximity to known slickspot peppergrass element occurrences (EOs), no prior history of slickspot peppergrass field survey, and the likely presence of potential slickspot peppergrass habitat. An EO is defined as a specific geographic location where “a species or natural community is, or was, present” (NatureServe 2002:10).

## METHODS

Digital orthophotos quads were used to locate and prioritize unburned areas within the field survey area. Two to 3 field personnel searched for slickspot peppergrass by systematically following transects parallel to section boundaries. Field personnel were spaced 100 m apart and checked every visible slickspot for slickspot peppergrass <50 m. Personal digital assistants equipped with GPS units were used to follow the transect, know when the section boundary was reached, collect data on every 10<sup>th</sup> slickspot, and collect more specific data if slickspot peppergrass plants were encountered.

Collecting data on every 10<sup>th</sup> slickspot was used to keep track of the slickspots surveyed and measure general slickspot conditions within each section. The following attributes were recorded at every 10<sup>th</sup> slickspot: 1) presence of slickspot peppergrass; 2) slickspot size (<4, 4-20, and >20 m<sup>2</sup>); 3) cover of penetrating and non-penetrating livestock disturbance within slickspots; 4) evidence of off-road vehicle (ORV) use; 5) Cover of non-native annual and perennial species; 6) most dominant non-native species occurring within slickspot; and 7) location. These attributes were intended to be quickly recorded and consistent with past slickspot peppergrass survey and monitoring methodology (Mancuso 2005, Colket 2005).

Penetrating livestock disturbance was measured by visually estimating the coverage of livestock prints that had a reddish color, indicating exposure of the argillic layer through the silt crust and restrictive layers (Colket 2005). The following Daubenmire cover class scale was used to estimate non-native species and livestock disturbance cover within each slickspot: 0%, 0-1%, 1-4.9%, 5-9.9%, 10-24.9%, 25-49.9%, 50-74.9%, 75-94.9%, and 95-100% (Bonham 1989). All plant nomenclature is based on the U.S. Department of Agriculture Plants Database (2006)

## RESULTS

We surveyed approximately 1,274 ha (3,148 ac) in 5 sections 15 June - 6 July 2005 (Table 1; Appendix A). Approximately 5,120 slickspots were searched. Only 18 (0.4%) slickspots were occupied by slickspot peppergrass (Table 2). The following plant communities occurred within the survey area: big sagebrush (*Artemisia tridentata*) with a cheatgrass (*Bromus tectorum*) and/or Sandberg bluegrass (*Poa secunda*) understory; green rabbitbrush (*Chrysothamnus viscidiflorus*) with a cheatgrass, Hooker's balsamroot (*Balsamorhiza hookeri*), or Sandberg bluegrass understory; and non-native annual grasslands. Much of sections 19, 20, 22, and 26 have burned in the past.

GPS locations of every 10<sup>th</sup> slickspot were collected, but incompletely recorded in sections 26 and 36 due to technical difficulties. The sparse spatial distribution of GPS points in parts of sections 26 and 36 do not signify a lack of slickspots. GPS locations of every 10<sup>th</sup> slickspot surveyed are in Appendix C.

### **Slickspot peppergrass**

A total of 359 slickspot peppergrass plants were observed occupying 11 slickspots in the northeastern corner of section 36 (Figs. 1 and 2; Table 3). This new location was assigned to EO 77 because the plants were sufficiently far away (>1.0 km) from the nearest known EOs (1.6 km from EO 72; 2.0 km from EO 67; Colket et al. 2006). A total of 29 plants were also found occupying seven slickspots along the southern boundary of section 19 (Figs. 1 and 2; Table 3). This new location was assigned as subpopulations 5, 6, and 7 of EO 72 because they were located <1 km north of the closest known subpopulation of EO 72.

Additional information about these EOs can be found in EO records 72 and 77 (Appendix A). The EO record includes the location, number of plants, habitat, threats, EO rank, and other information stored in the IDCDC Biotics Database (2006). GPS locations of EOs 72 and 77 are in Table 3 and Appendix B.

### **Slickspot size**

Most slickspots in the survey area were 4-20 m<sup>2</sup> in size (Table 2). Slickspots were common in sections 19, 20, 26, and 36. Slickspots were not as common in section 22, especially in the northern portion (Appendix C).

### **Livestock disturbance**

Livestock disturbance was based on the proportion of penetrating, non-penetrating, and total number of livestock prints within each slickspot. All livestock disturbance recorded was attributable to cattle. Section 22 had zero to trace evidence of any livestock disturbance (Table 4; Fig. 3). Section 26 also had low livestock disturbance cover within slickspots. Section 19 had low mean livestock disturbance within slickspots, but maximum penetrating and non-penetrating livestock disturbance cover was very high (10-25% and 25-49.9%, respectively). Sections 20 and 36 had the highest mean and maximum livestock disturbance within slickspots. Section 36, where most slickspot peppergrass plants were observed, had mean total livestock disturbance cover of 5.7%; and some slickspots had 50-74.9% penetrating livestock disturbance cover.

The proportion of slickspots with >10% penetrating livestock disturbance was 11% in Section 20 and 12% in Section 36 (Fig. 3). Only 1% of slickspots in Section 19 had >10% penetrating livestock disturbance. Sections 22 and 26 had zero observations of slickspots with >10% penetrating livestock disturbance.

### **Off-road vehicle use**

No evidence of ORV use was observed within slickspots in sections 19, 22, or 26. ORV tracks (source unrecorded) were observed within 1.1% of the slickspots in section 36. Low density ORV tracks (4WD) were also scattered across the non-native annual grasslands in section 20.

## **Non-native species**

Non-native annual species cover within slickspots was high throughout the survey area, with a mean of 9.8% (Table 5). Clasping-leaf pepperweed (*Lepidium perfoliatum*) and cheatgrass were the most prevalent non-native species occurring within slickspots throughout the survey area. Other common species were prickly lettuce (*Lactuca serriola*), bulbous bluegrass (*Poa bulbosa*), prickly Russian thistle (*Salsola tragus*), tall tumbled mustard (*Sisymbrium altissimum*), and medusahead (*Taeniatherum caput-medusae*). Crested wheatgrass (*Agropyron cristatum*) was the only non-native perennial species observed within slickspots where attribute data was recorded. Rush skeletonweed (*Chondrilla juncea*) was present in Sections 19, 20, and 22, but not within slickspots where attribute data were recorded.

## **Survey descriptions**

The following survey descriptions include notes about each section that were taken in addition to general data collected about slickspot size, livestock disturbance, ORV use, and non-native species within slickspots.

**Section 19:** Communities present included big sagebrush/cheatgrass, non-native annual grasslands, and green rabbitbrush/Sandberg bluegrass. Rush skeletonweed was present. The southwest corner of the section fence was down.

**Section 20:** A green rabbitbrush/cheatgrass community dominated most of section; big sagebrush, gray rabbitbrush (*Ericameria nauseosa*), and Sandberg bluegrass also occurred. The only big sagebrush stand was in the southwest part of the section. Cheatgrass, crested wheatgrass, clasping-leaf pepperweed, and flixweed (*Descurainia sophia*) were all common non-native species. Most slickspots were degraded and rush skeletonweed was present within section. Some slickspots had high albedo and seemed like they could support slickspot peppergrass (especially in southwest corner of section), but there were no plants. Low density ORV tracks were scattered across section.

**Section 22:** We surveyed the entire section, except for a small area southwest of railroad tracks (which was surveyed by the IDARNG in September 2004). Soils and vegetation didn't seem right for slickspot peppergrass. Green rabbitbrush/Hooker's balsamroot community was present and forb diversity was relatively high. Bluebunch wheatgrass (*Pseudoroegneria spicata*) and Thurber needlegrass (*Achnatherum thurberianum*) were also present. Low density big sagebrush occurred as individuals, but not in stands. Medusahead, cheatgrass, and clasping-leaf pepperweed were prevalent in large patches all over the section. Rush skeletonweed was observed along the northern section boundary. Nearly zero livestock disturbance was observed in slickspots. Slickspots occurred infrequently in northern part of section, but there were some slickspots occurring in southern half of section.

**Section 26:** Green rabbitbrush/Sandberg bluegrass and non-native annual grasslands were dominant communities present. Medusahead was widespread in this section, along with cheatgrass. There were two stands of big sagebrush—one was along the south-central section boundary and the other was in the southwest part of the section. Hooker's balsamroot occurred frequently, but not as much as in section 22. There were a moderate number of slickspots. Some slickspots seemed right for supporting slickspot peppergrass, but no plants were seen. Very little livestock disturbance and a lot of badger disturbance were observed.

**Section 36:** A big sagebrush/cheatgrass community occurred across most of section. Some parts had large patches of cheatgrass. Surrounding landscape (especially towards north) was disturbed by past fires and weed invasion. Dry wetlands and a few willows (*Salix* sp.) indicated conditions were too moist for slickspot peppergrass in some areas. Heavy livestock disturbance occurred throughout much of section. Zero to low livestock disturbance cover occurred within slickspots occupied by slickspot peppergrass. Trace to high non-native species cover occurred within slickspots occupied by slickspot peppergrass, and was predominantly comprised of cheatgrass.

## DISCUSSION

EO 77 and the 3 subpopulations that extended EO 72 (subpopulations 5, 6, and 7) occurred in big sagebrush communities with a predominantly cheatgrass understory (Fig. 2). The 3 new EO 72 subpopulations have been fragmented by past fires that burned large blocks of land to the north. EO 77 occurs in a big sagebrush stand with high cheatgrass abundance throughout and some burned areas nearby. Neither had a large number of slickspot peppergrass plants compared to some other known EOs. Both EOs are highly susceptible to fire.

Based on rangewide monitoring of slickspot peppergrass (Colket 2005), 2005 seemed like a favorable year for conducting surveys. Favorable survey conditions and appropriate timing and intensity of the surveys indicate that no large EOs or subpopulations were missed within the survey area. Sections 19, 20, 22, and 26 should be a low priority for future re-survey because of degraded habitat conditions, especially where big sagebrush no longer occurs. Section 22 does not seem to have appropriate conditions (i.e. soils, vegetation) for supporting slickspot peppergrass and should be the lowest priority for any future re-survey.

The northern part of section 36 has moderate potential for locating minor extensions of EO 77. EO 77 occurs along the northern boundary of section 36 and potentially extends northward to section 25 on BLM land. BLM section 25 (T1N R2E S25) would probably benefit from future surveys for slickspot peppergrass.

The 2005 survey results and subsequent surveys will be useful in understanding the distribution of slickspot peppergrass on IDL parcels; and implementing and prioritizing

its management by IDL. Future surveys should target IDL parcels with unburned sagebrush steppe located near known slickspot peppergrass EOs.

## LITERATURE CITED

Bonham, C.D. 1989. Measurements for terrestrial vegetation. John Wiley & Sons, New York, NY. 338 pp.

Candidate Conservation Agreement. 2003. Candidate conservation agreement for slickspot peppergrass (*Lepidium papilliferum*), 12/05/2003. 194 p.

Colket, B. 2005. 2004 Habitat integrity and population monitoring of slickspot peppergrass (*Lepidium papilliferum*). Idaho Conservation Data Center, Idaho Department of Fish and Game, Boise. 79 pp. plus appendices.

Colket, B., Cooke, S., and M. Mancuso. 2006. Element occurrence review and update for slickspot peppergrass (*Lepidium papilliferum*) in the Idaho Conservation Data Center BIOTICS Database. Idaho Conservation Data Center, Idaho Department of Fish and Game, Boise. 40 pp. plus appendices. Draft.

Idaho Conservation Data Center. 2006. Idaho Conservation Data Center, Idaho Department of Fish and Game. BIOTICS data system database, Boise.

Lesica, P. and T.H. DeLuca. 1996. Long-term harmful effects of crested wheatgrass on Great Plains grassland ecosystems. *Journal of Soil and Water Conservation* 51:408-409.

Mancuso, M. 2005. Field survey for slickspot peppergrass (*Lepidium papilliferum*) on BLM lands in Ada County, Idaho. Idaho Conservation Data Center, Idaho Department of Fish and Game, Boise. 13 pp. plus appendices.

Moseley, R.K. 1994. Report on the conservation status of *Lepidium papilliferum*. Idaho Conservation Data Center, Idaho Department of Fish and Game. 35 pp.

NatureServe. 2002. Element occurrence data standard. NatureServe in cooperation with the Network of Natural Heritage Programs and Conservation Data Centers, Rosslyn, VA. 201 pp. Accessed at:  
<http://www.natureserve.org/prodServices/eodata.jsp>.

Noss, R.F., LaRoe III, E.T., and J.M. Scott. 1995. Endangered ecosystems of the United States: a preliminary assessment of loss and degradation. Biological Report 28. 58 pp.

- Whisenant, S.G. 1990. Changing fire frequencies on Idaho's Snake River Plains: ecological and management implications. Pages 4-10 in E.D. McArthur, E.M. Romney, S.D. Smith, and P.T. Tueller, compilers. Proceedings—Symposium on cheatgrass invasion, shrub die-off, and other aspects of shrub biology and management. General Technical Report INT-276. Intermountain Research Station, U.S.D.A. Forest Service, Ogden, UT. 351 pp.
- U.S. Department of Agriculture, NRCS. 2006. The PLANTS Database, Version 3.5 (<http://plants.usda.gov>). Data compiled from various sources by Mark W. Skinner. National Plant Center, Baton Rouge, LA 70874-4490 USA.
- U.S. Fish and Wildlife Service. 2002. 50 CFR 17. Endangered and threatened wildlife and plants; review of species that are candidates or proposed for listing as endangered or threatened. Notice of Review. Federal Register 67(114):40657-40679.
- U.S. Fish and Wildlife Service. 2003. The best available biological information for slickspot peppergrass (*Lepidium papilliferum*). Snake River Fish and Wildlife Office, Boise, ID. 32 pp.
- U.S. Fish and Wildlife Service. 2004. 50 CFR 17. Endangered and threatened wildlife and plants; review of species that are candidates or proposed for listing as endangered or threatened; annual notice of findings on resubmitted petitions; annual description of progress on listing actions; Notice of Review; Proposed Rule. Federal Register 69(86):24876-24904.

Table 1. IDL sections surveyed in 2005.

<b>Section</b>	<b>Date</b>	<b>USGS 7.5' quadrangle</b>	<b>Legal description</b>
<b>19</b>	6/22/2005	Owyhee	T1N R3E
<b>20</b>	6/29/2005	Indian Creek Reservoir, Owyhee	T1N R3E
<b>22</b>	6/30/2005	Indian Creek Reservoir	T1N R3E
<b>26</b>	7/6/2005	Indian Creek Reservoir	T1N R3E
<b>36</b>	6/15/2005	Owyhee, Christmas Mountain	T1N R2E

Table 2. Slickspot size attributes and proportion of slickspots occupied by slickspot peppergrass in survey area.

<b>Section</b>	<b># of slickspots surveyed</b>	<b>Occupied slickspots (%)</b>	<b>Slickspot size (%)</b>		
			<b>&lt;4 m<sup>2</sup></b>	<b>4-20 m<sup>2</sup></b>	<b>&gt;20 m<sup>2</sup></b>
<b>19</b>	1240	0.6	23.4	56.5	18.5
<b>20</b>	1310	0.0	26.0	53.4	16.8
<b>22</b>	550	0.0	29.1	45.5	25.5
<b>26</b>	1090	0.0	13.8	59.6	25.7
<b>36</b>	930	1.2	15.1	64.5	20.4
<b>Overall</b>	5120	0.4	21.1	56.6	20.7

Table 3. Slickspot peppergrass abundance and associated GPS locations at new EO 72 subpopulations and new EO 77 (NAD83 UTM Zone 11).

EO	Subpopulation	Date	# of plants	% Rosettes	% Reproductive	Easting	Northing
72	5	6/22/2005	9	80	20		
			2	0	100		
			3	0	100		
	6		8	10	90		
			5	0	100		
			1	0	100		
	7		1	0	100		
<b>TOTAL</b>			<b>29</b>	<b>28</b>	<b>72</b>		
77	N/A	6/15/2005	30	5	95		
			8	15	85		
			32	15	85		
			33	30	70		
			99	13	87		
			13	50	50		
			5	40	60		
			68	15	85		
			30	34	66		
			33	30	70		
			8	0	100		
<b>TOTAL</b>			<b>359</b>	<b>19</b>	<b>81</b>		

Table 4. Livestock disturbance cover within slickspots in the survey area.

Section	Mean livestock disturbance cover within slickspots (%)			Maximum livestock disturbance cover within any slickspot (%)		
	Penetrating	Non-penetrating	Total	Penetrating	Non-penetrating	Total
19	1.5	0.7	2.1	10-25	25-49.9	25-49.9
20	3.9	1.5	5.4	25-49.9	25-49.9	50-74.9
22	0.0	0.0	0.0	<1	<1	<1
26	0.2	0.0	0.3	1-4.9	<1	1-4.9
36	5.3	0.7	5.7	50-74.9	1-4.9	50-74.9
<b>Overall</b>	2.4	0.7	3.0	50-74.9	25-49.9	50-74.9

Table 5. Annual and perennial non-native species cover within slickspots in the survey area. Dominant non-native species refers to frequency that species was most prevalent within slickspots.

Section	Mean non-native species cover within slickspots (%)		Dominant non-native species (%)							
	Annual	Perennial	Crested wheatgrass	Cheatgrass	Prickly lettuce	Clasping-leaf pepperweed	Bulbous bluegrass	Russian thistle	Tall tumblemustard	Medusahead
19	13.4	0.2	1.6	44.4	0.0	50.8	0.0	0.0	0.8	2.4
20	5.8	0.7	3.8	28.2	0.0	66.4	0.0	0.8	0.0	0.8
22	12.7	0.0	0.0	25.5	0.0	72.7	0.0	0.0	0.0	1.8
26	8.8	0.3	0.0	37.6	0.9	49.5	9.2	0.0	0.0	2.8
36	10.3	0.0	0.0	50.0	0.0	50.0	0.0	0.0	0.0	0.0
<b>Overall</b>	9.8	0.3	1.4	37.8	0.2	56.7	2.0	0.2	0.2	1.6

Figure 1. Map showing slickspot peppergrass EOs within western portion of Orchard Management Area (MA 8B).

SEE DISC 1



Figure 2. Photographs showing occupied slickspots at EO 72 subpopulations 5 (upper left), 6 (upper right), 7 (bottom left), and EO 77 (bottom right).

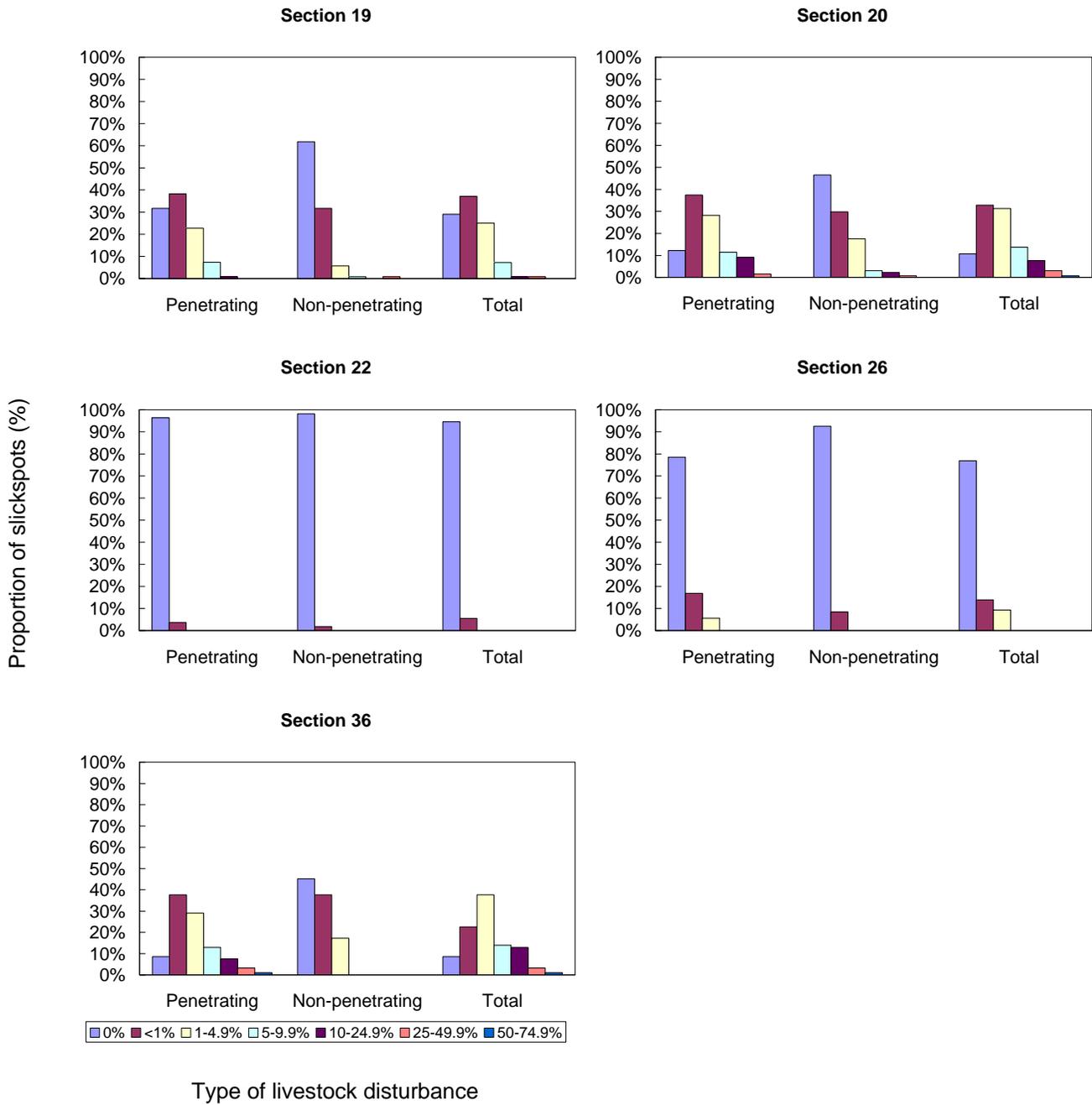


Figure 3. Proportion of slickspots with penetrating, non-penetrating, and total livestock disturbance. Cover classes were: 0, <1, 1-4.9, 5-9.9, 10-24.9, 25-49.9, and 50-74.9%. Cover classes show the proportion of each slickspot with penetrating, non-penetrating, and total livestock disturbance

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