

## AMERICAN BURYING BEETLE SURVEYS IN SOUTHWESTERN SOUTH DAKOTA

Molly Davis  
PO Box 171  
Fairburn, SD 57738

Final Report submitted to the South Dakota Department of Game, Fish, and Parks Wildlife Division  
on October 30, 2005

---

### Abstract

Surveys for the endangered American burying beetle (*Nicrophorus americanus*) were conducted in Custer and Fall River counties of South Dakota. No *N. americanus* were found. Due to the limited number of traps set, their presence in the area cannot be ruled out. If a population does exist, however, it is likely small.

---

### Introduction

The American burying beetle (*Nicrophorus americanus*), a federally-listed endangered species, once occurred throughout much of North America, including 35 states, the District of Columbia, and 3 Canadian provinces (Backlund and Marrone, 1997). It is currently known from only a few localized populations in Rhode Island, Oklahoma, Arkansas, Kansas, Nebraska, and south-central South Dakota. American burying beetles both historically and currently occupy a variety of habitat types. In Rhode Island, they are found in coastal scrub; in Oklahoma, in deciduous and coniferous forests; and in Nebraska and South Dakota, in mixed-grass prairie (U.S. Fish & Wildlife Service, 1991). Though the reasons for their decline are not known, signs point towards habitat fragmentation, a decline in carrion of the appropriate size (100-200g), and competition from mammalian scavengers and other burying beetle species as factors (U.S. Fish & Wildlife Service, 1991).

There are several historical records of American burying beetles in South Dakota. In 1945, six individuals were collected from Union and Brookings counties on the eastern edge of the state. An additional specimen from Haakon county (west of the Missouri river) was collected at an unknown date (Backlund and Marrone, 1997). In the early 1990s, American burying beetles were re-discovered in Nebraska, including six individuals found in from north-central Nebraska near Valentine (Ratcliffe and Jameson, 1992). Subsequently, an effort was made to locate beetles just north of Nebraska's state

border, and in 1995 the first American burying beetle specimens were documented in South Dakota since 1945 (Backlund and Marrone, 1997). In the current study, surveys for American burying beetles are continued in order to delineate their range in South Dakota, and to hopefully discover new populations.

### Methods

Three rounds of trapping were conducted in the summer of 2005. The first two rounds, from June 29-August 1 and July 6-8, were timed to coincide with the period when adult beetles would be mating and actively seeking out carrion in which to lay their eggs. After a break allowing for the larvae to pupate and adults to emerge, a third round of trapping was conducted on August 10-12. Fourteen traps were set in each of the first two trapping rounds, and 12 traps were set in the final trap round. A total of 40 traps were set, with each trap being checked for 3 days, giving a total of 120 trap nights.

General trap design was based on pitfall traps described in the U.S. Fish and Wildlife Service survey protocol (1991) and Bedick *et al* (1999). Bait consisted of walnut-sized pieces of beef kidney placed inside baby food jars with holes pierced in the top. The meat was allowed to sit outside in the sun for two to three days until rotten. At each trap location, a 5-quart plastic bucket was buried with its lip level to the ground. After the bait was placed inside, the bucket was covered with a piece of 1-inch mesh chicken wire and a 12"x12" cover of plywood on 4-inch legs. Each plywood cover was weighted down with a rock, and the trap location marked with an orange surveyor's flag. Starting the day after traps were set, the traps were checked and cleared of all insects on each of the next three mornings. Traps were checked early in the morning to reduce beetle heat stress, and were finished by 9:15 am. Weather during the trapping period consisted of typical warm summer temperatures, with two nights of thundershowers on July 5 and August 11.

All trap lines were set up in the public right-of-ways along secondary gravel roads. Traps were placed a minimum of 1 km apart. Refer to Appendix 1 for a map of trap locations, and to Appendix 2 for a list of UTM coordinates for each trap. A general description of trap locations is as follows: Trap Set 1 was located southwest of Oelrichs, with traps 1-10 being surrounded by a patchwork of cultivated and heavily grazed fields dominated by weedy *Bromus* species. Traps 11-14 were adjacent to taller stands of native mixed grass such as green needlegrass (*Stipa viridula*) and western wheatgrass (*Pascopyrum smithii*). Trap Set 2 was located north of Oelrichs and east of Smithwick and follows the same pattern, with the areas surrounding traps 15-24 showing a fair amount of human disturbance, compared to the more intact grasslands adjacent to traps 25-28. Trap Set 3 was located south of Fairburn and east of Buffalo Gap, and most of this route showed the effects of heavy grazing or crop cultivation, except for the hilly breaks around Trap 30.

## Results

American burying beetles (*Nicrophorus americanus*) were not found during this survey. *N. marginatus* was the most common species of burying beetle found, followed by *N. tomentosus*. The results of individual trap captures are shown in Tables 1-3.

Table 1: Number of *Nicrophorus marginatus* and (*N. tomentosus*) captured in each trap of Trap Set 1 on each day. No *N. americanus* were found in any traps.

Trap	6/29/05	6/30/05	7/1/05
1	0	0	5
2	1	1(1)	5
3	0	5(1)	10(1)
4	10(1)	16	16(1)
5	1	4	6(1)
6	3	12(1)	7
7	1	0	13(1)
8	8	5	1
9	0	0	0
10	0	5	4
11	0(2)	1	0
12	1	0	0
13	5(2)	0	2
14	0	0	1
Totals	30(5)	49(3)	106(4)

Table 2: Number of *Nicrophorus marginatus* captured in each trap of Trap Set 2 on each day. No *N. tomentosus* or *N. americanus* were found in any traps.

Trap	7/6/05	7/7/05	7/8/05
15	0	0	0
16	0	1	12
17	0	0	0
18	0	1	1
19	0	0	0
20	0	1	2
21	0	5	0
22	0	3	0
23	0	0	0
24	0	2	43
25	0	6	17
26	0	0	0
27	0	0	6
28	0	1	0
Totals	0	20	81

Table 3: Number of *Nicrophorus marginatus* and (*N. tomentosus*) captured in each trap of Trap Set 3 on each day. No *N. americanus* were found in any traps.

Trap	6/29/05	6/30/05	7/1/05
29	0	1(1)	1
30	4	4	0
31	0	1	0
32	3	10 (3)	0
33	0	2	66
34	0	0	13
35	0	0	6
36	0	0	5
37	0	31	58
38	6	14	18
39	0	0	0
40	11	5	0
<b>Totals</b>	<b>24</b>	<b>68(4)</b>	<b>167</b>

In addition to the two species of *Nicrophorus* found, ants, spiders, pillbugs, and other beetle species were common in the traps, and a frog was even caught in one trap twice. Most *Nicrophorus* adults seemed to be carrying phoretic mites as described in Anderson and Peck (1985). These mites are involved in an interesting symbiotic relationship with *Nicrophorus* beetles, whereby they feed on fly eggs that would otherwise compete with the *Nicrophorus* for carrion.

Table 4 summarizes the total number of *Nicrophorus* individuals caught at all traps. Since beetles were not marked prior to being released, the numbers almost certainly include individuals recaptured on consecutive nights.

Table 4: Total number of *Nicrophorus* species captured in each Trap Set, including recaptures.

Species	Trap Set 1	Trap Set 2	Trap Set 3	Total	Per Trap Night
<i>N. marginatus</i>	185	101	259	545	3.8929
<i>N. tomentosus</i>	12	0	4	16	0.1143

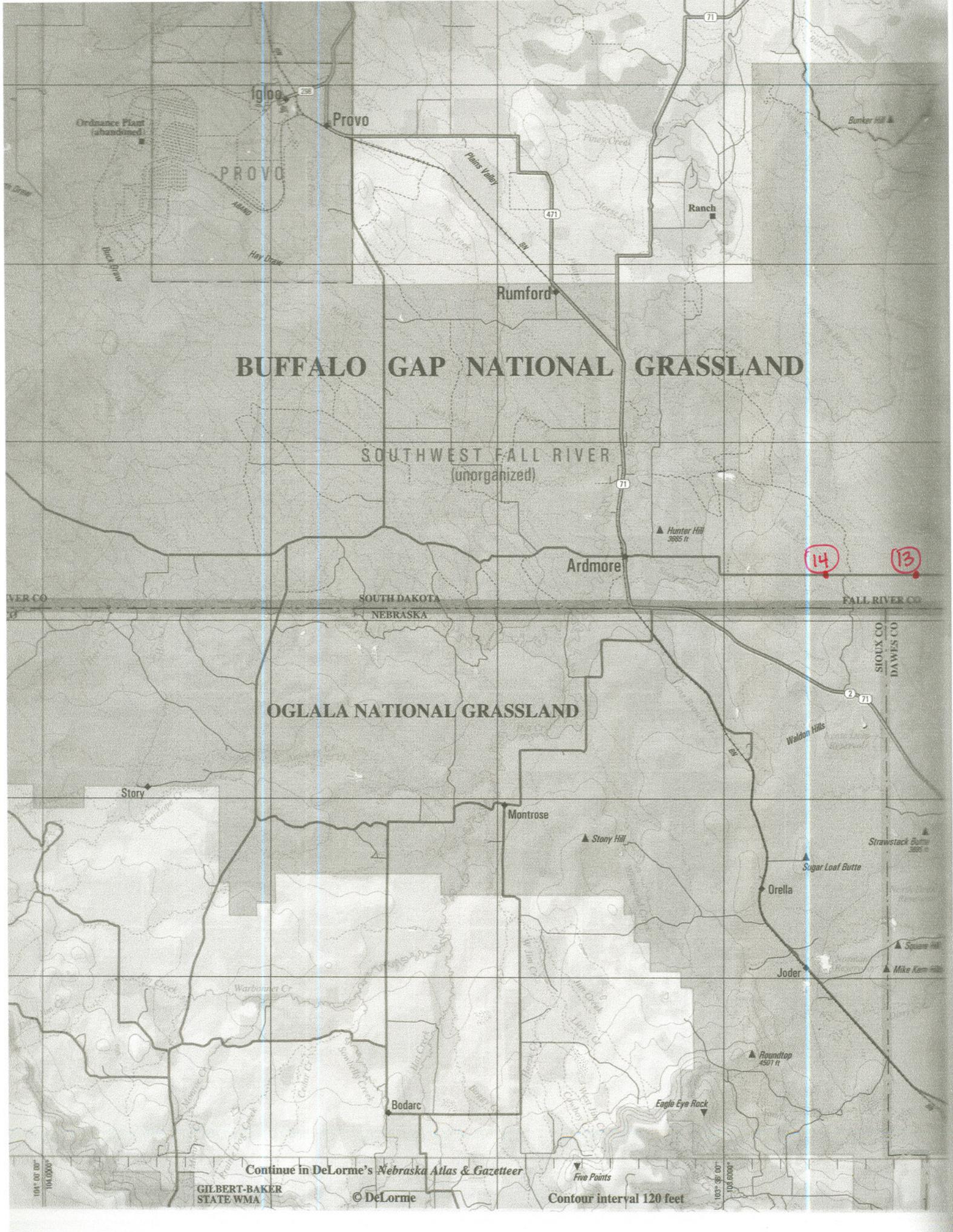
### Conclusion

This survey was capable of detecting two common *Nicrophorus* species, *N. marginatus* and *N. tomentosus*. However, the fact that it did not detect several other species that probably occur in the area (e.g. *N. carolinus* or *N. obscurus*) (Anderson and Peck, 1985) indicates that this was not an exhaustive survey. With only 40 traps and 120 trap nights, it is possible that a population of *N. americanus* was missed, especially if it were small. Nonetheless, it is recommended that future surveys canvas new areas.

### Literature Cited

- Anderson, R. S. and S. B. Peck. (1985) The carrion beetles of Canada and Alaska. Coleoptera: Silphida and Agyrtidae. The insects and arachnids of Canada, Part 13. 121pp. Biosystematics Research Institute, Research Branch, Agriculture Canada, Ottawa.
- Backlund, D. and Marrone, G. (1997) New records of the endangered American burying beetle, *Nicrophorus americanus* Oliver (Coleoptera: Silphidae) in South Dakota. *The Coleopterists Bulletin* 51(1): 53-58.
- Bedick, J.C., B. C. Ratcliffe, W. W. Hoback, and L. G. Higley. (1999) Distribution, ecology, and population dynamics of the American burying beetle [*Nicrophorus americanus* Oliver (Coleoptera, Silphidae)] in south-central Nebraska, USA. *Journal of Insect Conservation* 3: 171-181.
- DeLorme (2001) South Dakota Atlas and Gazetteer. 72pp. Yarmouth, Maine.
- Ratcliffe, B.C. and Jameson, M.L. (1992) New Nebraska occurrences of the endangered American burying beetle (Coleoptera: Silphidae). *The Coleopterists Bulletin* 46(4): 421-425.
- U.S. Fish and Wildlife Service (1991) American burying beetle (*Nicrophorus americanus*) recovery plan. 80pp. Newton Corner, Massachusetts.

Appendix 1: Map of trap locations. Traps 1-14 are part of Trap Set 1, traps 15-28 are part of Trap Set 2, and Traps 29-40 are part of Trap Set 3. Map scale is 1"=3.2 miles. Base maps are from South Dakota Atlas and Gazetteer (DeLorme, 2001).



# BUFFALO GAP NATIONAL GRASSLAND

SOUTHWEST FALL RIVER  
(unorganized)

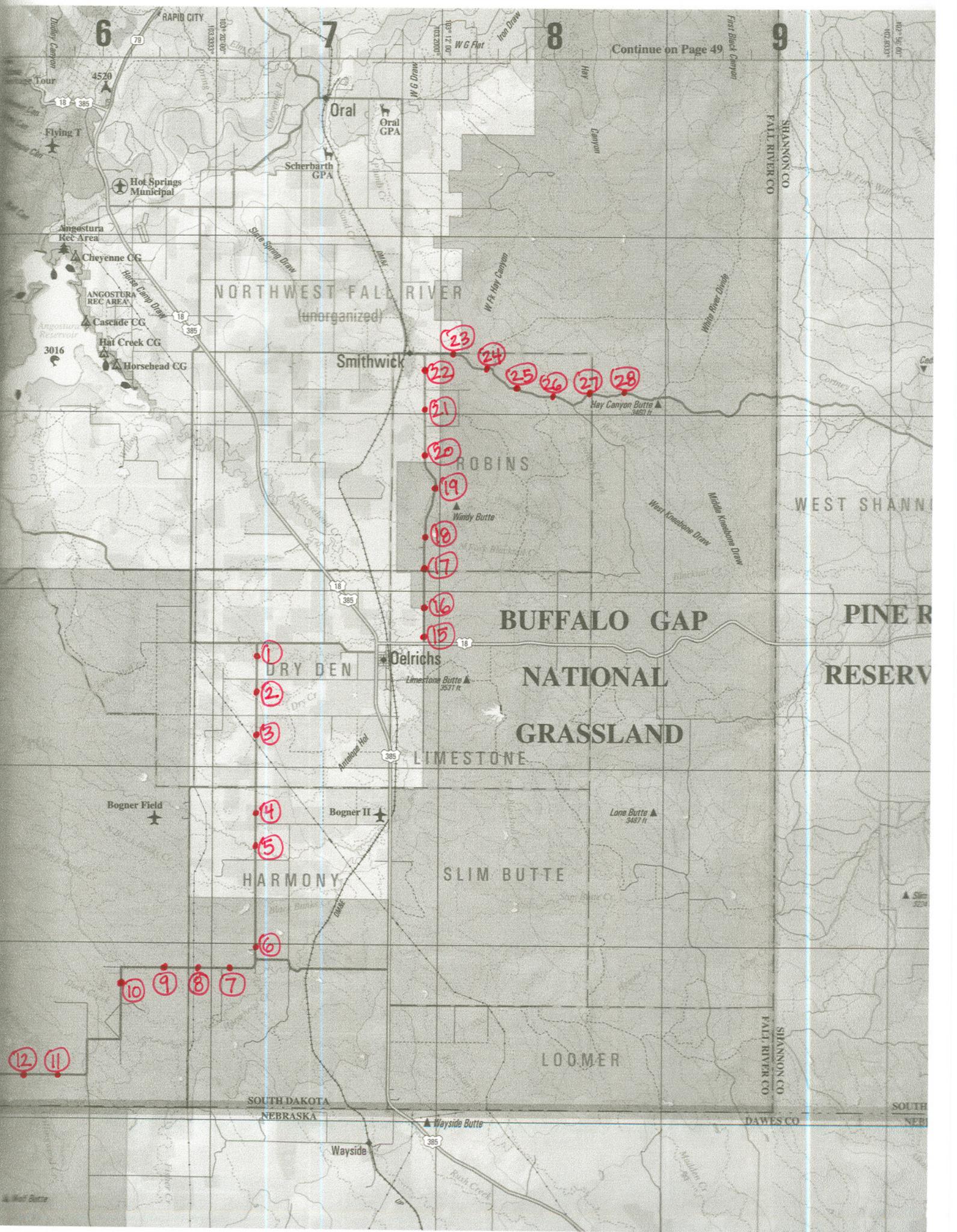
# OGLALA NATIONAL GRASSLAND

Continue in DeLorme's *Nebraska Atlas & Gazetteer*

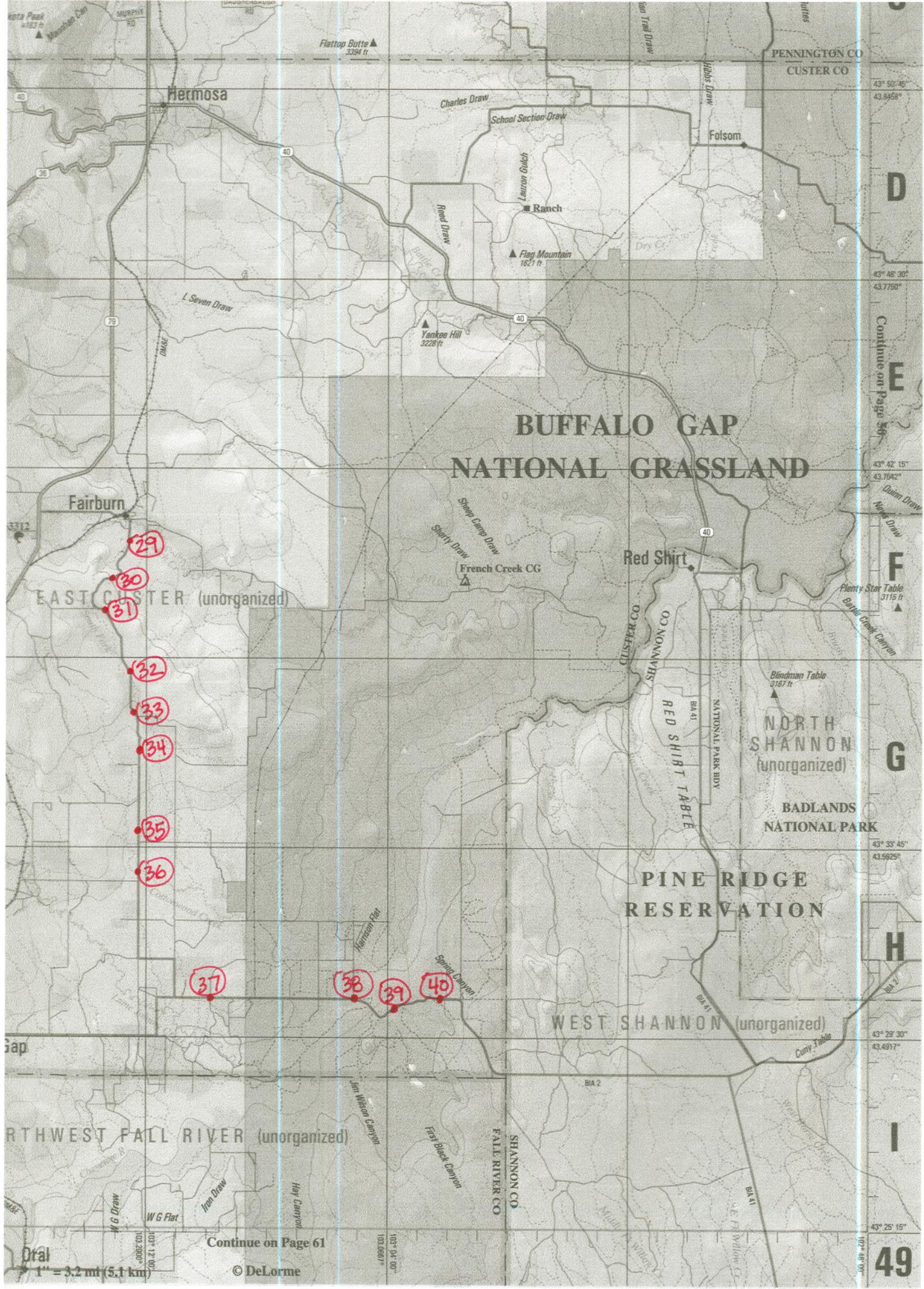
GILBERT-BAKER  
STATE WMA

© DeLorme

Contour interval 120 feet



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25
- 26
- 27
- 28



# BUFFALO GAP NATIONAL GRASSLAND

29

30

31

32

33

34

35

36

37

38

39

40

Continue on Page 61

© DeLorme

Appendix 2: UTM coordinates for all trap locations. All coordinates are in zone 13T and were collected using a handheld GPS unit (Garmin GPS 38) using map datum WGS84.

Trap	Easting coordinate	Northing coordinate	Trap	Easting coordinate	Northing coordinate	Trap	Easting coordinate	Northing coordinate
1	637517	4782530	15	645528	4783423	29	644247	4837279
2	637559	4780814	16	645491	4785081	30	643714	4836018
3	637572	4778898	17	645459	4786771	31	643312	4834621
4	637641	4775642	18	645491	4788359	32	644426	4832169
5	637681	4774350	19	645848	4789808	33	644692	4830429
6	637783	4770109	20	645349	4791283	34	644978	4828667
7	636858	4768538	21	645297	4793667	35	645012	4825622
8	635181	4768501	22	645266	4795415	36	645049	4823934
9	633554	4768403	23	646790	4796040	37	648579	4818637
10	631417	4767886	24	648240	4795452	38	654808	4818791
11	629175	4763578	25	649763	4794593	39	656552	4818392
12	626770	4763543	26	651388	4794324	40	658502	4818905
13	624167	4763497	27	652914	4794210			
14	619821	4763431	28	654911	4794555			