

A survey of carrion beetles on Seier National Wildlife Refuge (June 2011)

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Introduction

John and Louise Seier (brother and sister) donated their ranch located in the Sandhills of north central Nebraska to the U.S. Fish and Wildlife Service (USFWS) in October 1999.

Seier NWR personnel are conducting an inventory of flora and fauna found on the Refuge. Threatened and endangered species are of special interest to the USFWS.

The federally endangered American burying beetle (ABB; *Nicrophorus americanus*) has been documented in the Sandhills of Nebraska, but none have been documented at Seier NWR.

Methods

Seier NWR is 971 total hectares (2400 acres) divided into two parcels (Figure 1) that are several kilometers apart. The ecosystems found on the Refuge consist of meadows, woodlots, and sand hills with a small area of choppy sands.

Baited pitfall traps were set in each ecosystem. For the first trap night, the East (EU) and West Units (WU) each had one trap set in a meadow, one in the hills and one in the woodlot (Figure 1). The traps were 4 or 5 gallon buckets set in a hole dug to accommodate the insertion of the buckets in the ground, with the lip of the bucket approximately 1" above the ground surface. Sand was then placed around the outside of the bucket to create an inclined approach to the top of the bucket. Four to five inches of sand was placed in each bucket to allow the beetles to bury themselves and avoid conflicts with other beetles (Melvin Nenneman, personal communication). The buckets were covered with chicken wire to allow insects in but to keep mammalian/avian carnivores out. Two 1"x 2" boards 6" long were set on top of the chicken wire with masonite boards (14"x 14") set on top of the boards. This set up was to keep rain out of the bucket and to shade the contents of the trap from sunlight (Melvin Nenneman, personal communication).

A recently road-killed white-tailed deer (*Odocoileus virginianus*) was obtained to use as carrion beetle bait. The deer was cut into approximately 227 to 454 gram (0.5 to 1.0 lb) chunks of meat with the hide attached. These chunks of meat were placed in plastic bags and set on the south facing roof of the Seier house

for 2.5 days to allow the bait to ripen prior to the survey (Melvin Nenneman, personal communication).

Due to high rainfall amounts in the spring of 2011 the meadows were saturated. Finding a high dry spot in the meadows was difficult. After the first night of trapping, the sand in the two meadow pitfalls was saturated (ABB #3 and ABB #4). These two traps were moved to new locations. One was moved to a lower hill just adjacent to the meadow in the EU (ABB #7) and the second was moved to a different meadow in the WU that had a higher dry spot (ABB #8).

The WU and EU each had one additional trap established (ABB #9 and ABB #10, respectively) in the hills for the second night of trapping, for a total of eight baited pitfall traps.

Results

Minimum overnight air temperatures during trapping were 62°F and 72°F, both of which exceed the minimum recommended trapping temperature for American burying beetles (Kozal 1990). The traps were checked first thing in the morning of June 29th and 30th. Sand was removed from the pitfall trap and sifted onto the masonite board to allow carrion beetles to be identified and counted. Six species of *Nicrophorus* beetles were identified during the survey period. All burying beetles captured during the survey were in sand hills and woodlot sites, with none captured in meadows (Table 1). Captures of burying beetles were evenly split between these two habitat types, with 15 captures in woodlots and 16 captures in sand hills. *Nicrophorus carolinus* (42%) and *N. guttula* (36%) dominated the total burying beetle catch at Seier NWR. Two ABB were captured on the second night, documenting the presence of this species on the refuge. *Nicrophorus* beetles were captured at a rate of 2.21 beetles/trap-night in this survey, and ABB at 0.14 beetles/trap-night.

Discussion

This survey was successful in documenting the presence of American burying beetles (*N. americanus*) on the Seier NWR. The survey also documented 5 other burying beetles occurring on the refuge.

Surveys conducted on Valentine NWR for American burying beetles in 2005 and 2010 produced higher capture rates (1.9 ABB/trap-night and 0.27 ABB/trap-night in 2005 and 2010, respectively). Capture rates for all carrion beetles were also higher on Valentine NWR (36.7 carrion beetles/trap-night in 2005 and 66.7 carrion beetles/trap-night in 2010) when compared to the current survey results from Seier NWR. Since the surveys at Valentine and Seier were conducted in

different months and in different years, it is difficult to draw conclusions based on these observations. It is possible that there are enough differences between the two locations that burying beetle numbers are considerably lower in the area around Seier NWR (more center pivot irrigation, more farm/ranch buildings with lights?). A more comprehensive survey effort would be needed to draw any firm conclusions about differences in burying beetle abundance between the two refuges. If ABB and other carrion beetles are less common on the Seier NWR, it could be instructive to try to determine what habitat and landscape characteristics are driving the differences in abundance.

References

Kozol, A.J. 1990. Suggested survey protocol for *Nicrophorus americanus*, the American burying beetle. Report to the U.S. Fish and Wildlife Service. 5 pages.

Nenneman, Melvin. 2011. USFWS Wildlife Biologist. Valentine NWR, Nebraska.

Table 1. Results of two nights of carrion beetle trapping at Seier NWR in June of 2011. Six baited pitfall traps were used on 6/29, and eight were used on 6/30, for a total of 14 trap-nights.

Burying beetle species	6/29/2011			6/30/2011		
East Unit	Woods	Meadow	Hills	Woods	Meadow	Hills
<i>Nicrophorus americanus</i>	0	0	0	2	0	0
<i>Nicrophorus carolinus</i>	0	0	0	0	0	13
<i>Nicrophorus guttula</i>	9	0	0	0	0	1
<i>Nicrophorus orbicollis</i>	0	0	1	0	0	0
<i>Nicrophorus pustulatus</i>	0	0	1	0	0	0
<i>Nicrophorus tomentosus</i>	0	0	0	1	0	0
West Unit						
<i>Nicrophorus guttula</i>	1	0	0	0	0	0
<i>Nicrophorus orbicollis</i>	0	0	0	2	0	0

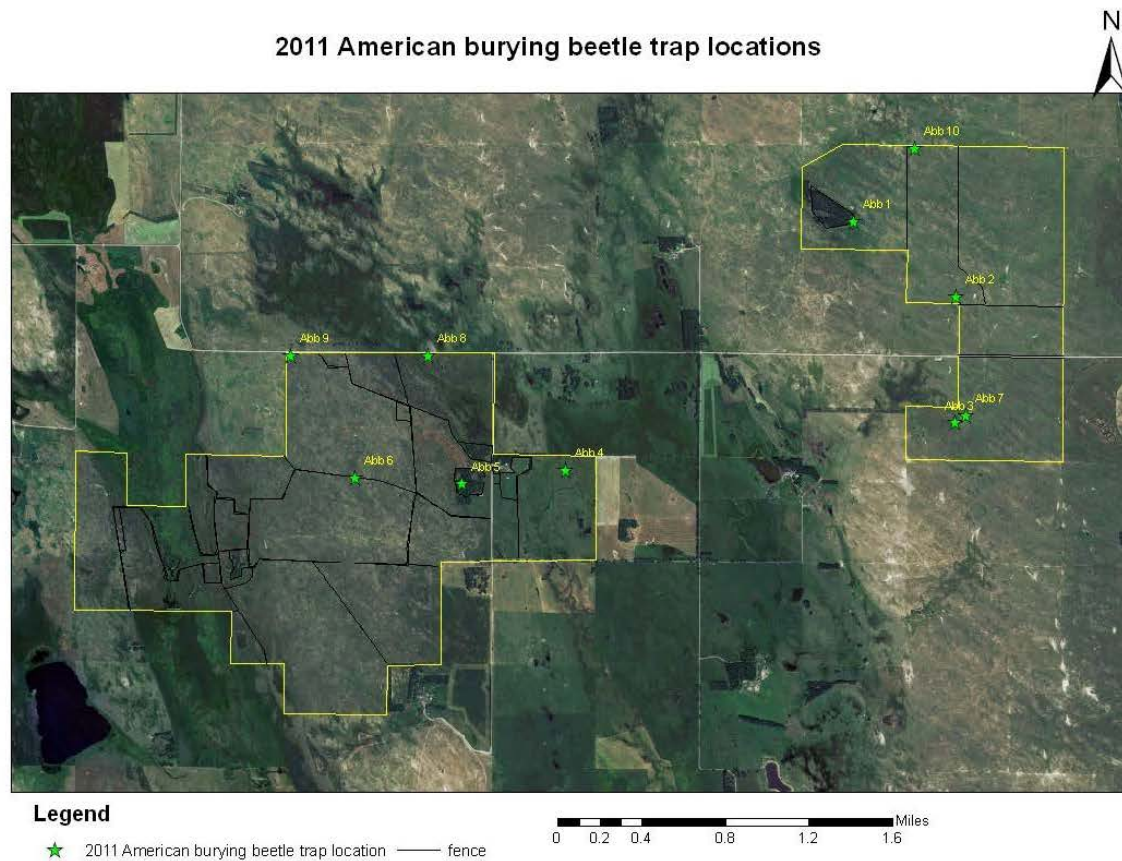


Figure 1. Location of carrion beetle traps on the Seier NWR. The Refuge headquarters is located 1.5 miles north of Rose, Nebraska, then four miles west and 0.5 miles south (near ABB #5).



Figure 2. American burying beetle (*Nicrophorus americanus*) found in ABB #1 after the second night of trapping. The trap was on the edge of a woodlot.

Appendix 1. Notes from burying beetle trapping 29-30 Jun 2011

The WU hills (ABB #6) did not have any burying beetles in the trap. The EU hills (ABB #2) had one *Nicrophorus orbicollis* and one *N. pustulatus*.

The WU woodlot (ABB #5) had one *N. guttula* and the EU woodlot had nine *N. guttula*.

The meadows (ABB #3 and ABB #4) had nothing in the traps as they were saturated with water.

The second night the minimum air temperature was 72° F. The two traps (ABB #6 and ABB #9) in the hills of the WU had no burying beetles the second day of trapping. New bait was used in these two buckets.

On the second day (June 30) two (ABB #7 and ABB #10) of the three sites in the hills of the EU had no burying beetles. One bucket (ABB #7) had bait from the first night and the other (ABB #10) had new bait.

The third site in the hills of the EU had bait from the first night. This site (ABB #2), the bait was buried the first night by *N. orbicollis* and *N. pustulatus*. The second day, thirteen *N. carolius* and one *N. guttula* were discovered in the bucket of ABB #2.

The lone meadow site (ABB #8) on the second day of trapping was in the WU. No burying beetles were found in the bucket. The bait was re-used from the first night of trapping (ABB #4).

The woodlot of the WU (ABB #5) had two *N. orbicollis*. The bait was re-used from the previous night of trapping.

The woodlot site in the EU (ABB #1) two *N. americanus* (Figure 2) and one *N. tomentosus* were found in the trap. The bait was re-used from the first night, which was buried that first night by nine *N. guttula*.