

**The Friends of Nachusa Grasslands
2014 Scientific Research Project Grant Report
Due June 30, 2015**

Name: Kimberly Schmidt

2014 grant amount: \$800

Please answer the following questions with 1- to 2- sentence summaries:

Research Project Topic: Population characteristics and habitat use of ornate box turtles (*Terrapene ornata ornata*) was studied in restored tallgrass and remnant prairie via radio-telemetry surveys.

Research Project Purpose: The primary purpose of the project was to identify habitat selection during the breeding and nesting season (May-June), determine summer use (June-August), and brumation (September-November) of *T. ornata*. The second purpose is to understand population demographics of the ornate box turtle population protected at Nachusa Grasslands.

Research Project Outcomes to date: From June 2011-July 2014, we captured 153 individuals (48 female (F), 58 male (M), and 47 undetermined (U)). Between sites, the Headquarter Prairie (HQ) had fewer turtle captures than the Orland Tract (OT). OT had 6 additional F, 16 additional M, and 7 additional U. Twenty-five carcasses were collected at Nachusa Grasslands from June 2011-July 2014, 4 of which were transmittered individuals, and 1 of which was marked with a FLOY tag. Mortality resulted from unknown natural causes (n=8), depredation (n=7), road-kill (n=4), boom sprayer (n=1), overwintering (n=1), burn damage (n=2), heat exposure (n=1), and disease control (n=1). I am still in the process of analyzing overall turtle survivorship and habitat data (movement, home range, and habitat selection). Overwintering results imply turtles have site fidelity and use remnant prairie more often than other land cover types.

Two noteworthy observations occurred this data collection season. We finally documented juvenile turtles using restorations at the Headquarter Prairie. Most observations of juveniles were only on remnant hills. We also observed mating in restorations at the Headquarter Prairie. All observations were in Al Meier's newer restorations.

The second noteworthy observation occurred on July 24, 2014. We excavated turtle 012 to retrieve her transmitter and carcass. We assumed she had not survived the overwintering process, but she was alive! She was 6 cm below the surface. It was not clear if excavation was impeded by a tussock of little bluestem. Her transmitter was removed since it had already surpassed its expiration date. The turtle was placed in a bucket with a few inches of water for her to drink. She needed to be rehydrated since she was so lethargic. She was fed a frozen mouse and was

released where she was extracted. We left a thawed, road-killed snake for her to feed on later. It was not clear why she did not emerge, but it is doubtful that she would have survived had she not been excavated. The turtle was observed 3 more occasions in 2014. Her photos were submitted to me this past spring in 2015, so she survived the winter; pretty remarkable considering her condition.

Describe how the grant funds you have received from the Friends of Nachusa Grasslands have been used in regard to the above topic, purpose, and/or outcomes: Funding for this period allowed Kim and her technicians (Adam and Jessica) to travel to and from the field location. Each site visit allowed more movement data to be collected on transmittered animals. Transmitters were removed from turtles as the data collection period culminated for the study. Four transmitters could not be removed (3 Orland Tract, 1 Headquarter Prairie). Weekend monitoring in the spring served as observation points for emergence times which will develop better models to help managers create prescribed fire plans that benefit the turtle population on the site.

Travel funds allowed us to continue monitoring the potential disease threat that was observed spring and summer 2013. No transmittered animals were found in 2014 with symptoms of a flesh-eating bacterial infection. The female turtle that had flesh-eating bacteria on her tail survived the overwintering process from 2013-2014. Her wound appeared to have healed and her transmitter was removed before it expired.

Describe how your project has benefited the work and goals of Nachusa Grasslands: Nachusa may be home to the largest or second largest population of state-threatened ornate box turtles in the state of Illinois. My work has shed light to management practices that may impact the future population of these animals.

Describe how your findings can be applied to challenges in management practices for restoration effectiveness and species of concern” The ornate box turtle is a state-threatened reptile. Management activities can interfere with the survivorship of these animals. Roughly 36% of turtle mortality could be attributed to human activity. Slower speeds or short-term road closures may prevent fall and spring migration mortality from vehicle strikes. Herbicide application on remnant prairie should be avoided during early mornings and early evenings in May and June to minimize the disturbance of nesting turtles. Potential road closures would minimize risk of female nesting or hatchling emergence mortality on two-tracks. Removal of invasive shrubs should be followed by the replacement of native shrubs to provide key cover components. Broadcast seeding of native shrub plant would not be sufficient to provide the structure cover lost during removal of the invasive shrubs. Results suggest turtles display overwintering site fidelity. To prevent mortality prior to submergence or emergence, prescribed fire should be timed when turtles are underground.

Optional: Offer suggestions for improving the application and award process for future Friends of Nachusa Grasslands Scientific Research Grantt