

## Executive Summary, Research Readiness Level Assessment, and Technology Transfer

# Minimizing Take of Threatened Rattlesnakes and Optimizing Project Review in SE Nebraska

### Research Objectives

- Identify precise locations of western massasauga brumation sites.
- Map travel corridors from brumation site to active (summer) sites and explore how they relate to NDOT ROW.
- Develop standardized survey/search protocols.
- Document materials used by snakes as basking and/or refuge locations.
- Provide recommendations to avoid or minimize impacts to protected snakes for future NDOT maintenance and construction practices.

### Research Benefits

This research will result in the immediate benefits of increased knowledge of protected snake locations; thus, those data will immediately benefit project reviews, minimize the need for conservation conditions in some areas, and reduce the chances of take. Standardized protocols, recommended materials and construction practices will all be provided by Quarter 8 (see Schedule below) and can quickly be implemented into NDOT review process.

### Principal Investigator

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NE Game and Parks

### NDOT Lead TAC Member

**Ben Trenne, PE, Highway**

Environmental Supervisor

**Matthew Greiner, PE, Highway**

Environmental Biologist

### Background

The western massasauga (*Sistrurus tergeminus*) and the timber rattlesnake (*Crotalus horridus*) are listed threatened snake species occurring in the southeast portion of Nebraska and protected under Neb. Stat. 37-801-811. A thorough review of the massasauga's life history can be found in Patten 2006 and Patten et al. 2016. Recent studies (e.g., Fogell 2011) have shown these species are using green spaces in the right-of-way along several roads in Jefferson, Gage, Pawnee, and Richardson Counties which necessitates the need for added Environmental Review from Nebraska Department of Transportation (NDOT) staff and onsite surveys prior and during maintenance and construction to roadways.

### Conclusion

The western massasauga (*Sistrurus tergeminus*) and the timber rattlesnake (*Crotalus horridus*) are protected under Nebraska Statute 37-801-811 and listed as threatened species. These species occur in the right-of-way (ROW) along several roads in Jefferson, Gage, Pawnee, and Richardson Counties which necessitates the need for added Environmental Review (ER) from Nebraska Department of Transportation (NDOT) staff and onsite surveys prior and during maintenance and construction to roadways. This project sought to minimize ER time, staff time, and increase the knowledge of these species in southeast Nebraska by:

- Identifying precise locations of western massasauga brumation sites;
- Mapping travel corridors from brumation site to active (summer) sites and explore how they relate to NDOT ROW;
- Developing standardized survey/search protocols;
- Documenting materials used by snakes as basking and/or refuge locations;
- Providing recommendations to avoid or minimize impacts to protected snakes for future NDOT maintenance and construction practices.

Only western massasaugas were captured during this project and were tagged with GPS and radio transmitters to elucidate their movements through NDOT ROW. Thirteen massasaugas were captured and tagged with transmitters; one individual was never recovered so we only have data for 12 snakes. Overall, the massasaugas stayed very close to their capture location and only moved into surrounding fields occasionally and we rarely noted them on NDOT materials (besides the road itself). To limit take of these species, NDOT should clear vegetation the winter before work begins, ensure water connectivity and wetlands are maintained, ensure NDOT and contractor vehicles/equipment only drive and park on the staging area – which needs to be included in the pre-construction surveys, erect signage warning drivers of snakes on the road and continue to work closely with NGPC biologists.

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### NDOT Recommendations Based Off Research Project – 2025 – RRL4

This research has proven valuable in enhancing the understanding of snake behavior and habitat use, specifically concerning the western massasauga (*Sistrurus tergeminus*) and the timber rattlesnake (*Crotalus horridus*). Previous assumptions suggested that these snakes could inhabit any area within grasslands or rights-of-way, which often led to an overestimation of the area requiring surveys. The findings from this study will enable the Nebraska Department of Transportation (NDOT) to focus conservation and survey efforts on higher-risk regions, thereby improving efficiency and effectiveness. Implementing these findings will require coordination with the Nebraska Game and Parks Commission to update conservation strategies and survey protocols accordingly. Additionally, the NDOT’s planned transition from plastic to biodegradable erosion control netting, set to begin in July 2025, is further supported by the outcomes of this research, reinforcing the ecological benefits of this initiative.

- *As provided by Matthew Greiner and Ronald Poe, Lead TAC Members*

### Research Readiness Level (RRL) Assessment

#### Level 4: Implementation

Research/Technology refined. Follow up within 1 year.

**RRL 4**

### Technology Transfer

#### Webinars/Presentations

- Dunn, S., and Fogell, D., (2023). “Minimizing Take of Threatened Rattlesnakes and Optimizing Project Review in SE Nebraska”, The Nebraska Natural Legacy Conference, North Platte, Nebraska.

**This brief summarizes Project SPR-FY23(019)  
“Minimizing Take of Threatened Rattlesnakes and Optimizing Project Review in SE Nebraska”  
Nebraska Department of Transportation Research Program**