

Project Summary

Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: The Land Snails of Devils Tower National Monument

Discipline: Natural Resources
Type of Project: Technical Assistance
Funding Agency: National Park Service
Other Partners/Cooperators: University of Wyoming
Effective Dates: 5/1/2010 - 6/30/2012
Funding Amount: \$6,000

Investigators and Agency Representative:

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Project Abstract: Invertebrates compose 99% of the species on earth (Ponder and Lunney 1999). Despite the fact that most animals lack a backbone, far less is known about these animals compared to their vertebrate counterparts. Non-marine mollusks are a diverse group of invertebrates composed of terrestrial and freshwater snails and bivalves. Non-marine mollusks are one of the most critically impaired groups of animals on earth (Lydeard et al. 2004). Unfortunately, the highest number of recorded extinctions occurred within the mollusk group. About 24,000 terrestrial mollusks are described, and an estimated 11,000 to 40,000 terrestrial mollusks are currently undescribed (Lydeard et al. 2004). Of the described species, 1,222 (5%) were on the 2002 International Union for Conservation of Nature Red List of Threatened Species (www.redlist.org; Lydeard et al. 2004).

Land snails are particularly threatened because of several life history traits. First, snails move small distances each year, making dispersal extremely limited (Overton et al. 2009). Because few individuals immigrate to new colonies, gene flow is probably limited. For these reasons, local endemic species may arise. Second, climate change may have the greatest effect on high elevation species, such as snails in the genus *Oreohelix* (mountain snails). Species ranges may shift to higher elevations as climate warms; however, species that live at high elevations may be in jeopardy. High elevation species will have less area at higher elevations and a limited distance to move (Muller et al. 2009).

The land snails at Devils Tower National Monument (NM) are unknown, but the monument has ideal habitat for land snail: rock outcrops, moist area (e.g., springs), leaf litter, etc. Endemic mountains snails (*Oreohelix* sp.) have been found east (Black Hills National Forest) and west (Bighorn National Forest) of Devils Tower, but I am not aware of any surveys at Devils Tower NM. Other land snail species most likely inhabit the monument as well. The objective of the study is to inventory the land snails of Devils Tower National Monument. Understanding what species are at the monument will help inform management decisions, and advance the knowledge of these unique species.

Proposed Scope of Work: To survey the land snails at Devils Tower NM, areas with suitable habitat will be selected prior to field work. Predictive distribution models for 5 land snail species will help select areas most likely to contain land snails based on presence and absence data from the adjacent Black Hills National Forest to the east (Frest and Johannes 2002). Using these models, I will search the selected areas for land snails during 4 days at Devils Tower NM. Snails will be preserved in ethanol and later identified to the lowest practical taxonomic unit at the University of Wyoming-Wyoming Natural Diversity Database using a dissecting microscope and available keys (Pilsbry 1939, Burch and Pearce 1990). To identify many species, dissection to examine the internal anatomy is required. Finally, a report will be written detailing the species found, locations, and photos of the species. Collected specimens will be accessioned into the park collection which is housed at Mount Rushmore National Memorial.

Outcomes with Completion Dates: December 31, 2011

Keywords: land snails, survey, Devils Tower National Monument, University of Wyoming