

Land Snail Survey within Father Marquette National Memorial



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Cover Photos: Inset left, Small spot (*Punctum minutissimum*); inset middle, High-spire column (*Columella simplex*); inset right, Dusky arion slug (*Arion subfuscus*); background, forested habitat within Father Marquette National Memorial.

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Introduction

Michigan Natural Features Inventory (MNFI) performed field surveys for rare land snail species within the Father Marquette National Memorial. Information on the presence/absence of these species is needed to help the Michigan Department of Natural Resources plan construction of a building and parking lot in the Memorial (Figure 1). Forty-three of the 124 species of land snails known to Michigan are state listed as threatened or endangered or are species of special concern. At least two of these, crested vertigo (*Vertigo cristata*) and widespread column (*Pupilla muscorum*), are thought to have potential to occur at the site based on proximity of documented occurrences to Father Marquette National Memorial and the potential for suitable habitat within the Memorial. Both species were documented within one mile of the Memorial in 1998. Of particular interest is whether or not these or other rare land snail species are present within the planned construction area. Several other rare land snail species are known from Mackinaw County but were thought to have less potential to occur at the site, based on habitat type. This work was done at the request of Beckett & Raeder, Inc. for Michigan Department of Natural Resources.



Figure 1. Map of project area, provided by Beckett & Raeder, Inc.

Methods

Known occurrences documented in the Natural Heritage Database were used to help determine which rare land snail species have the greatest potential to occur in the Memorial. The Database includes historical museum records as well as those from more recent surveys in Mackinaw County, e.g. those by Nekola (2003) and MNFI. An initial habitat assessment of the project area was made using aerial photos.

The construction project area is divided into sections B, C, and D (Figure 1). Surveys took place within Area B as requested by MDNR. Six sites distributed within Area B were surveyed for land snails (Figure 2). These sites were chosen based on the presence of downed logs, boulders, moss, or other microhabitat suitable for land snails. Surveys consisted of a short (10-15min.) visual search of the microhabitat at each site, followed

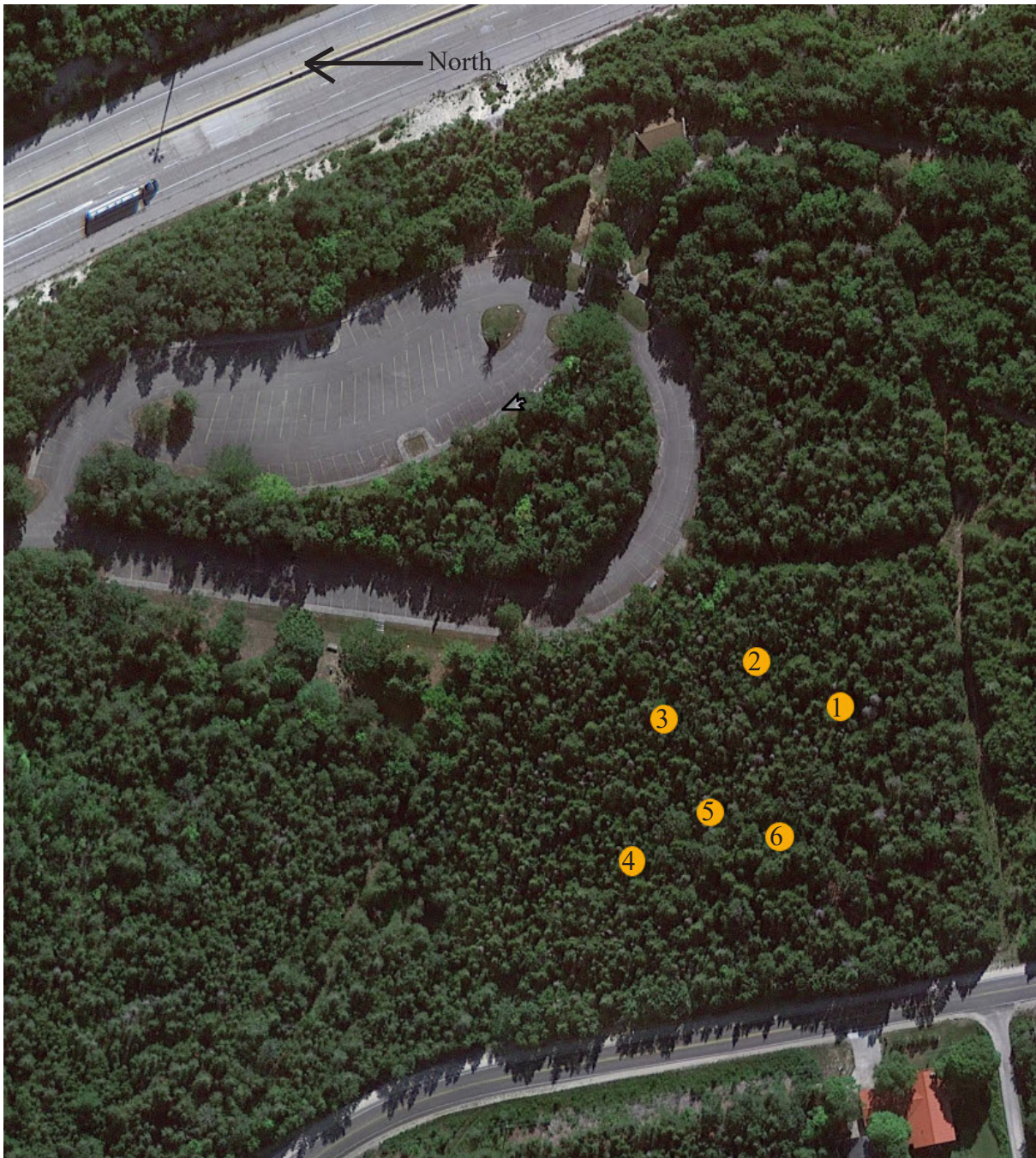


Figure 2. Location of the six sample sites within the survey area.

by collection of a ground litter sample. Approximately 0.75L of material including leaves, twigs, moss, soil, and bark were placed in a paper bag and labeled at each site. Any snails found during the visual search were photographed and identified on the spot or placed in the paper sample bag for later identification. Slugs were identified on the spot and photographed to document the species found. Coordinates of each sample site were recorded with a handheld GPS, and air temperature and humidity measurements were taken at each site. A state threatened and endangered species permit held by MNFI covered potential handling of listed snail species.

Bags containing sample material were dried at 170 degrees for 1-3 hours depending on moisture content. Snail shells were then sorted from organic and inorganic particles under a stereo microscope at 10x magnification. This level of magnification was needed due to the small size (down to 0.5mm) of some of the shells. Each shell was then identified to species under 10-50x magnification, and the number of individuals of each species was recorded.

Results

The project area was first visited on June 3, 2021, but due to unusually dry conditions in the Spring of 2021, it was decided that a resurvey would take place after a period with significant rainfall to allow for more favorable conditions for land snails. Surveys took place on July 13, 2021 at six sites within Area B. Air temperature ranged from 71-72.5 degrees F and humidity was between 86-91% (Table 1). A total of seven gastropod species were identified, including six land snail species and one slug species (Table 2). Small spot (*Punctum minutissimum*) was the most common and abundant land snail found. One species with a beehive shaped shell (high-spire column, *Columella simplex*) was found at two of the six sites. The shell of this species is superficially similar to crested vertigo (*Vertigo cristata*) and widespread column (*Pupilla muscorum*). None of the species found are listed as threatened or endangered or are species of special concern. All species are native to Michigan except for dusky arion slug (*Arion subfuscus*), which is a non-native invasive species. Photographs of the microhabitat at each sample site are provided in Appendix A, and photographs of individuals representing the seven species found are in Appendix B.

Table 1. Coordinates of land snail collection sites within Father Marquette National Memorial and conditions at the time of collection.

Site	Latitude	Longitude	Air Temp.	Humidity %
1	45.85354	-84.72789	71.8	86
2	45.85369	-84.72764	71.4	88
3	45.85392	-84.72783	71.0	86
4	45.85397	-84.72832	71.6	88
5	45.85384	-84.72807	72.5	91
6	45.85366	-84.72821	71.4	91

Table 2. Land snail and slug species found in leaf litter samples collected from Father Marquette National Memorial on July 13, 2021.

Species	Common Name	Collection Site					
		1	2	3	4	5	6
<i>Anguispira alternata</i>	flamed tiger snail		1				
<i>Arion subfuscus</i>	dusky arion slug	1	1	1		1	1
<i>Cochlicopa lubrica</i>	glossy pillar					2	
<i>Columella simplex</i>	high-spire column				1		3
<i>Punctum minutissimum</i>	small spot	13	17	7	7	6	29
<i>Strobilops labyrinthicus</i>	maze pinecone		1		1	3	
<i>Zoogenetes harpa</i>	boreal top					1	

Literature Cited

Nekola, J.C. 2003. Terrestrial gastropod fauna of Northeastern Wisconsin and the Southern Upper Peninsula of Michigan. *American Malacological Bulletin* 18:21-44.

Acknowledgments

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Appendix A. Microhabitat at each of the six land snail collection sites.



Site 1.



Site 2.



Site 3.



Site 4.



Site 5.



Site 6.

Appendix B. Photographs of individuals representing all land snail/slug species found.



Flamed tiger snail (*Anguispira alternata*) from site 2.



Dusky arion slug (*Arion subfuscus*), a non-native invasive species, found at Site 1.



Glossy pillar (*Cochlicopa lubrica*) from Site 5. Bar in photo is 0.5mm wide.



High-spire column (*Columella simplex*) from Site 6. Bar in photo is 0.5mm wide.



Small spot (*Punctum minutissimum*) from Site 5. Bar in photo is 0.5mm wide.



Maze pinecone (*Strobilops labyrinthicus*) from Site 5. Bar in photo is 0.5mm wide.



Boreal top (*Zoogenetes harpa*) from Site 5.