

**Surveys for the American Burying Beetle
(*Nicrophorus americanus*) in Southern Michigan**



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ABSTRACT

The objective of this project was to conduct methodical, prioritized status assessments for the federally endangered American burying beetle (*Nicrophorus americanus*) in southern Michigan to address significant information needs and data gaps critical for recovery planning and development of five-year reviews. Preliminary analysis of the Michigan natural heritage database (MNHD), which represents the most comprehensive state-wide distribution and status information for *Nicrophorus americanus*, confirmed the beetle has not been reported as occurring in Michigan since 1961. Few surveys specific to this species have occurred in Michigan and none in southern Michigan in the last 40 years or more. Owing to a lack of contemporary information, this project was designed to re-visit areas near known collection records in other potentially suitable habitats where permission could be secured.

A total of 16 sites and over 120 trap nights of survey effort were completed during the 2012 field season. Four historical sites and twelve *de novo* sites in southern Michigan were surveyed for the presence of American burying beetles through the use of pitfall traps. Traps were baited with aged laboratory rats and over 110 trap nights of survey effort was expended. Several hundred burying beetles in the genus *Nicrophorus* were collected, however no American burying beetles were found. The two most commonly encountered beetles were *Nicrophorus tomentosus* and *N. orbocollis*. It is unlikely that the American burying beetle occurs anywhere in southern Michigan. Surveys should be completed throughout the rest of the state to determine if the species occurs here or not and should focus on those areas with historical occurrences.

INTRODUCTION

The American burying beetle (ABB) is known from twelve historic Michigan records (Table 1). This beetle has never had a systematic, state-wide survey to determine if there are any remaining populations in the state. The only survey work in Michigan in the last 20 years has been our limited work during the summer of 1994 (Cuthrell and Legge, 1995). These surveys helped address one of the recovery actions, action 5 (page 35), “Conduct searches for additional populations throughout its historical range (U.S. Fish and Wildlife Service, 1991).” Additionally, we will begin to investigate (with Ohio) the possibility of re-introduction of the beetle after we have completed the state-wide surveys and feel satisfied that *Nicrophorus americanus* no longer occurs in the state of Michigan. The objectives of this project were to:

- Provide the Service with contemporary status information for the Federal and State Endangered American burying beetle by addressing critical data gaps and surveying and updating selected Michigan occurrences to facilitate recovery planning and five-year reviews
- Conduct *de novo* inventories in selected high potential habitats for the American burying beetle to identify new occurrences
- Provide information that can be used for a variety of recovery planning activities such as:
 - Determining when the species meets delisting criteria specified in recovery plans
 - Preparing five-year reviews and ascertaining population trend information
 - Reviewing permits and participating in section 6 consultations
 - Refining and/or developing species critical habitat designations

- Providing information for Habitat Conservation Plans (HCPs) and safe harbor agreements

EO Number	EO ID Number	Site Name	County	Year first observed	Year last observed	EO Rank
01	10579	Turkey Marsh	Kalamazoo	1957	1961	H
02	00312	Galesburg	Kalamazoo	unknown	unknown	H
03	09145	Midland County	Midland	1936	1944	H
04	07549	Bay County	Bay	1945	1945	H
05	03920	Ann Arbor	Washtenaw	1901	1916	H
06	08057	Portage Lake	Washtenaw	1917	1917	H
07	13164	Rochester	Macomb/ Okland	1934	1934	H
08	11633	Huron County	Huron	1908	1908	H
09	03506	Charity Island	Arenac	1910	1992	H
10	03505	Laughing Whitefish River	Marquette/ Alger	1916	1916	H
11	01315	Shakey Lakes	Menominee	1940	1940	H
12	06388	Paw Paw Lake	Berrien	1908	1908	H

Table 1. List of Element Occurrence Records for *Nicrophorus americanus* in the MNHD.

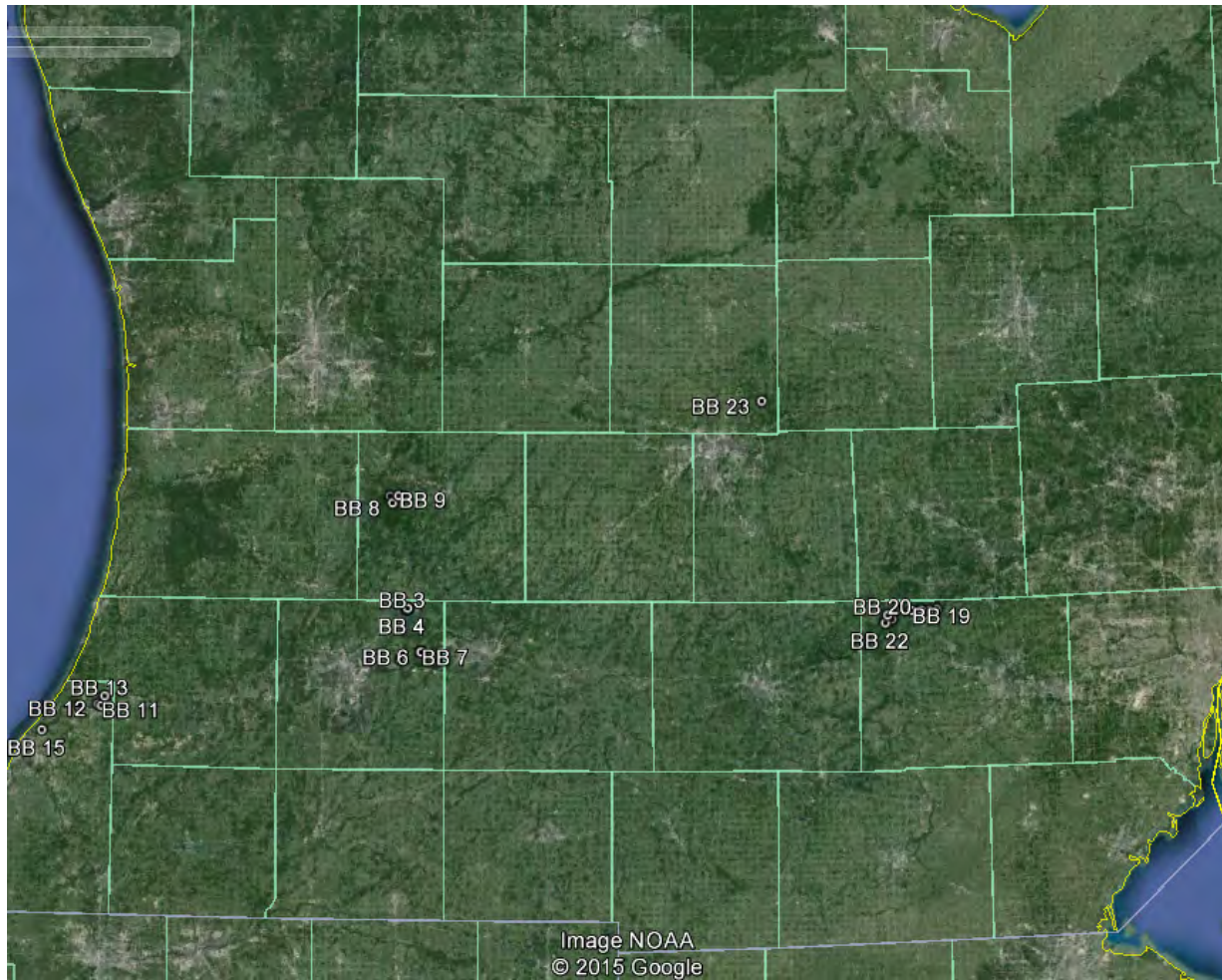
METHODS

Site Selection

The MNHD was used as the basis for site selection. *Nicrophorus americanus* occurrence polygon layers were overlaid on recent aerial imagery, topographic map layers, and ownership layers (plat maps) to assist navigation in the field. In addition, previously compiled site-specific reports, data forms, specimen notes, and other materials, where available, were included in the field packets. Some sites were chosen because they were located within large areas of lands that had largely intact forests.

Field Surveys

We conducted baited pitfall trapping surveys for American burying beetles in southern Michigan during August of 2012 at four historical sites (10 traps) and 12 additional sites (13 traps) (Figure 1). Surveys were timed to coincide with the adult beetle activity period. At each site, a hole was dug and a five gallon bucket was placed flush with the ground. Within the bucket one dead, aged laboratory rat was placed as bait (Figure 2). The rats were aged by placing in sealed plastic bags and left in the sun for a day or two. A large animal guard (wire mesh) was placed over the bucket and then a rain guard which consisted of plywood and two-by-fours to elevate the top off the ground was placed over the top of the bucket and wire, and was anchored into the ground with small fiberglass posts (Figure 3). Traps once baited were visited daily before 11am. Contents were collected and placed in to 70% ethanol and brought back to the laboratory for sorting and species identifications.



Map Label	Site Name	Latitude	Longitude	County	Map Label	Site Name	Latitude	Longitude	County
BB1	Gull Lake 1	42.40657	-85.40079	Kalamazoo	BB13	Paw Paw Lake	42.21501	-86.2452	Berrien
BB2	Gull Lake 2	42.40673	-85.40001	Kalamazoo	BB14	Coloma NW	42.19384	-86.31625	Berrien
BB3	Gull Lake 3	42.40687	-85.39928	Kalamazoo	BB15	Sarett Nature Center	42.14158	-86.42073	Berrien
BB4	Gull Lake 4	42.40744	-85.39854	Kalamazoo	BB16	Stinchfield Woods Road 1	42.406802	-83.938752	Washtenaw
BB5	Galesburg	42.30094	-85.41671	Kalamazoo	BB17	Stinchfield Woods Road 2	42.408782	-83.917206	Washtenaw
BB6	Fort Custer 1	42.31768	-85.36097	Kalamazoo	BB18	Dexter Townhall Road	42.406985	-83.960255	Washtenaw
BB7	Fort Custer 2	42.31715	-85.35991	Kalamazoo	BB19	Hankerd Road	42.406111	-83.987802	Washtenaw
BB8	Barry SGA 1	42.6245	-85.44456	Barry	BB20	Embury Road	42.396911	-84.054616	Washtenaw
BB9	Barry SGA 2	42.63957	-85.42737	Barry	BB21	Joslin Lake Road	42.38866	-84.042524	Washtenaw
BB10	Barry SGA 3	42.63886	-85.45143	Barry	BB22	Park Lyndon North	42.38085	-84.061321	Washtenaw
BB11	Watervliet 1	42.19492	-86.25486	Berrien	BB23	Upton Road	42.839341	-84.40766	Clinton
BB12	Watervliet 2	42.19777	-86.26272	Berrien					

Figure 1. Baited pitfall sampling locations in southern Michigan, summer 2012.



Figure 2. The remains of a large laboratory rat (after two weeks) placed as bait in a five gallon bucket along with the nightly catch of *Nicrophorus* beetles.



Figure 3. Baited pitfall trap showing animal enclosure (wire mesh), rain cover, and fiberglass anchors.

RESULTS AND DISCUSSION

Over the course of several nights in August 2012, 16 sites (23 traps) were surveyed for ABB. Over 120 trap nights of effort collected several hundred beetles in the genus *Nicrophorus*, but no ABB were found. The two most commonly encountered beetles were two very common burying beetles, *Nicrophorus tomentosus* and *N. orbicollis* (Hanley and Cuthrell 2008). *N. tomentosus* is a much smaller beetle than the ABB and is easily identified by the pronotum covered with a dense yellow pubescence. It is a generalist species and can be found in a wide variety of habitat types. *N. orbicollis* is one of the larger burying beetles and is oftentimes reported as the ABB by the general public. This species occurs more frequently in woodland habitat but can also be found in more open or prairie like habitats. It almost overlaps in size (10-22 mm) with the ABB (25-45 mm) but it does not have a red pronotum or red on the head. It also has sparse, long hairs on the elytra (although sometimes worn off) and therefore, can be easily differentiated from the ABB.

No ABBs were encountered by our surveys and while it is very unlikely any populations still occur in southern Michigan, there are other historic collection locations throughout Michigan. While the original intent of the project, as it was conceived, was to visit all the historic sites in addition to trapping surveys throughout the state, project funding was re-allocated to Pitcher's thistle surveys (Slaughter and Cuthrell, 2014). Additional ABB surveys should focus around historical collection locations throughout the rest of the state. Upon completion of this state-wide survey, we can then re-examine the possibility of re-introducing this beetle to the state.

ACKNOWLEDGMENTS

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