

Species Status Assessment

Class: Insecta
Family: Silphidae
Scientific Name: *Nicrophorus americanus*
Common Name: American Burying Beetle

Species synopsis:

The American burying beetle was recorded historically from at least 150 counties in 35 states and three Canadian provinces extending from southern Maine westward across the Great Lakes states to South Dakota, and southward to Texas and Florida. Populations declined severely in the early 1900s and at the time of federal listing as an endangered species in 1989 it was known from just two locations: a small, but apparently stable population on Block Island off the coast of Rhode Island and a lower density, but more widespread population in eastern Oklahoma (USFWS 1991).

East of the Appalachian Mountains, records indicate that the species declined in a generally north to southward direction, and the decline was well underway, if not complete by the early 1920s. West of the Appalachians, the decline occurred later. In the Midwest, the decline appears to have proceeded from the center of the range outward. While American burying beetle is now known to occur in Nebraska, South Dakota, Kansas, Arkansas and Texas, these locations are rediscoveries or discoveries within the known historical range, and do not indicate an increasing trend.

Reintroduction efforts have taken place in Massachusetts and Ohio, and were planned for Missouri (USFWS 1991, 2008).

In New York, there is a total of 14 historical occurrences from eight counties (Suffolk, Nassau, Kings, Richmond, Bronx, Westchester, Monroe, and Erie), but the most recent record was from 1956 and the species is currently believed to be extirpated from the state (NYNHP 2012).

This species was last collected in NY in 1965 and is considered extirpated (NYSDEC SGCN Expert Meeting).

I. Status

a. Current Legal Protected Status

- i. Federal Endangered Candidate: N/A
- ii. New York Endangered; SGCN

b. Natural Heritage Program Rank

- i. Global G2G3
- ii. New York SH Tracked by NYNHP? Yes

Other Rank:

COSEWIC: Extirpated (November 2011)

IUCN Red List: Critically Endangered

Status Discussion:

American burying beetle was last collected in New York in 1956 at Westbury in Nassau County (NYNHP 2012). It is considered to be extirpated although the current Natural Heritage rank is shown as State Historical (SH).

II. Abundance and Distribution Trends

a. North America

i. Abundance

 declining increasing stable X unknown

ii. Distribution:

 declining increasing stable X unknown

Time frame considered: Since 1991

b. Regional (e.g., Atlantic Flyway, USFWS Region 5 – Northeast, Watershed, Hydrologic Unit)

i. Abundance

declining increasing stable unknown

ii. Distribution:

declining increasing stable unknown

Regional Unit Considered: Northeast

Time Frame Considered: 1990-2008

c. Adjacent States and Provinces

CONNECTICUT **Not Present** **No data**

i. Abundance

declining increasing stable unknown

ii. Distribution:

declining increasing stable unknown

Time frame considered: _____

Listing Status: Special Concern/Extirpated

MASSACHUSETTS **Not Present** **No data**

i. Abundance

declining increasing stable unknown

ii. Distribution:

declining increasing stable unknown

Time frame considered: Since 1980 due to reintroduction program

Listing Status: Endangered

Monitoring in New York.

There are no extant occurrences known in New York and no regular surveys are conducted. The last surveys conducted for American burying beetle in New York were on Shelter Island, Suffolk County in 1991 and failed to locate the species (USFWS 2008).

Trends Discussion:

Despite the recent rediscovery of this species since 1989 in a number of states, overall this beetle has exhibited a dramatic range collapse, having been reduced to less than 10% of its original range and probably much less than 1% of its original occupied habitat (NatureServe 2011). While there have been a large number of surveys and new occurrences discovered, only a small number of populations are monitored annually or biennially. Whether populations and its range are expanding, stable, or contracting is virtually unknown for American burying beetles in much of Arkansas, Kansas, and parts of Nebraska and Oklahoma. And while the Penikese Island restoration attempt in Massachusetts persisted for about nine generations, none were found during surveys from 2003-2006.

The population on Block Island, RI has been monitored annually since 1991. The number of beetles captured varies considerably from year to year due to weather factors. While population estimates have increased over the 16-year period, a program to provision the beetles with carrion to increase reproduction was put in place in 1994. Biologists studying that population caution that their data provide no clear indication about the long-term viability of the population if carrion provisioning were to be discontinued (USFWS 2008).

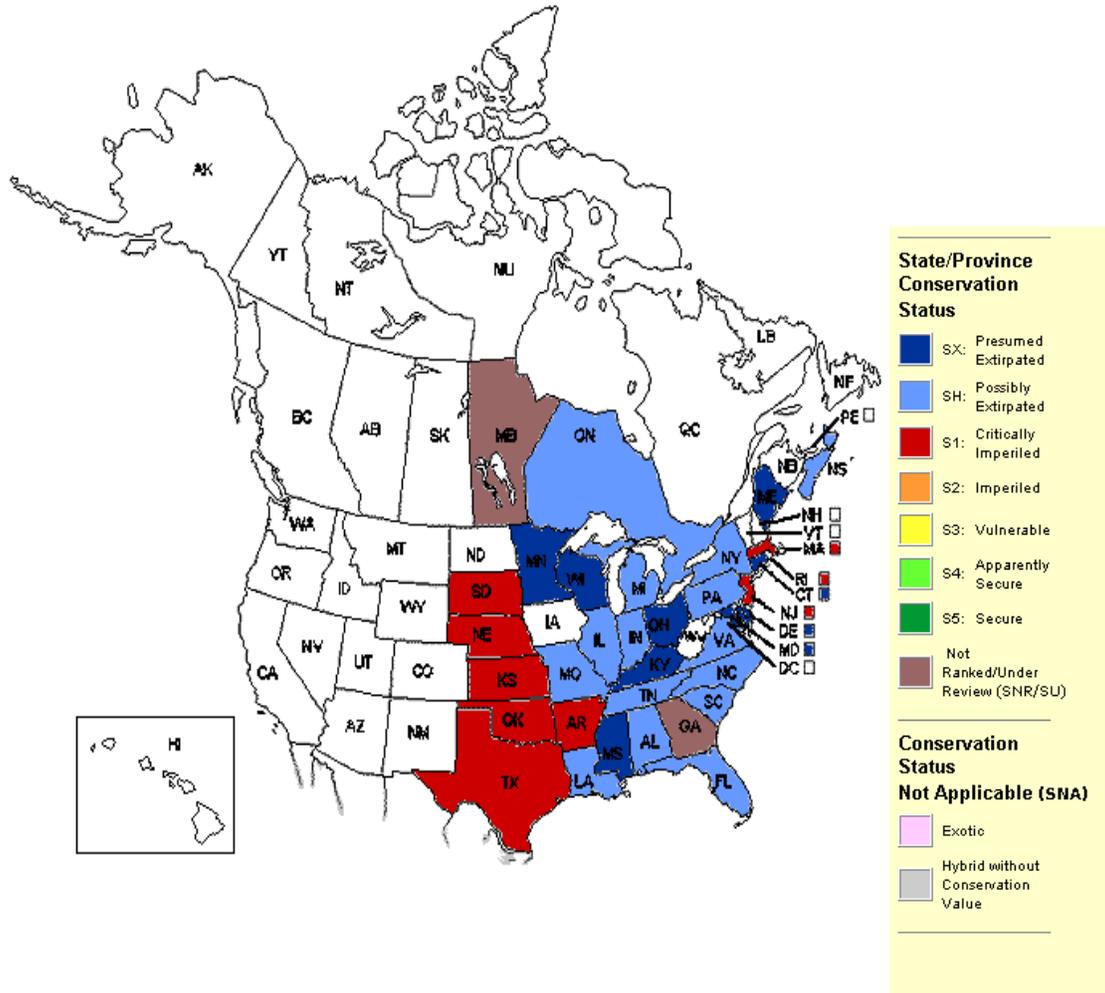


Figure 1: Conservation status of American burying beetle in North America (NatureServe 2011).

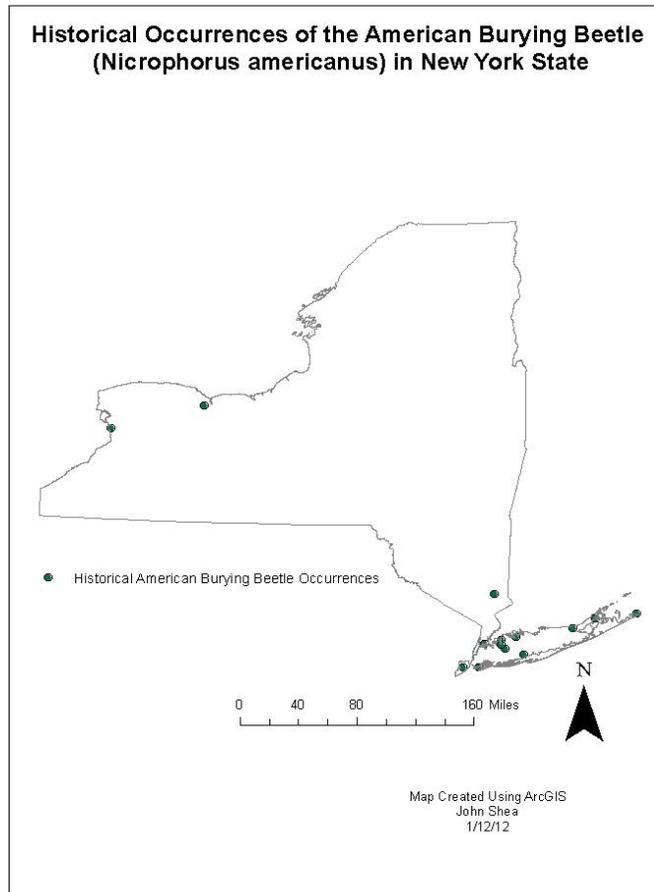


Figure 2: Historical occurrences of American burying beetle in New York (NYNHP 2013).

III. New York Rarity, if known:

Historic (select one)	<u># of Animals</u>	<u># of Locations</u>	<u>% of State</u>
prior to 1970	_____	14	_____
prior to 1980	_____	_____	_____
prior to 1990	_____	_____	_____

Details of historic occurrence:

Western NY records: Rochester, Durand-Eastman Park (no date), Buffalo, Erie County (no date); southern NY record: Somers, Westchester County (1923); NYC/Long Island area records: Brooklyn,

Kings County (1905), Staten Island, Richmond County (no date), Bronx, Bronx County (no date), North Hempstead-Roslyn, Nassau County (1930), North Hempstead-Westbury, Nassau County (1956), Oyster Bay-Sea Cliff, Nassau County (no date), Huntington-Cold Spring Harbor, Suffolk County (1921), Babylon, Suffolk County (1893), Brookhaven, Riverhead, Southampton, Southold, Suffolk County (1934), Southold (1920), Cutchogue (1921), Orient (1937), Montauk Point State Park, East Hampton, Suffolk County (no date).

Current	<u># of Animals</u>	<u># of Occurrences</u>	<u>% of State</u>
	<u> </u>	<u> 0 </u>	<u> 0% </u>

Details of current occurrence:

There are no current occurrences and this species is considered to be extirpated from New York.

New York’s Contribution to Species North American Range:

% of NA Range in New York	Classification of New York Range
<u> </u> 100 (endemic)	<u> </u> Core
<u> </u> 76-99	<u> </u> Peripheral
<u> </u> 51-75	<u> X </u> Disjunct
<u> </u> 26-50	Distance to nearest population:
<u> X </u> 1-25	<u> </u>

In a study of American burying beetle at Fort Chaffee in Arkansas, Holloway and Schnell (1997) concluded that this species frequents sites where small vertebrates, particularly mammals, are relatively abundant, irrespective of the predominant vegetation at the site.

V. New York Species Demographics and Life History

Breeder in New York (extirpated)

Summer Resident

Winter Resident

Anadromous

Non-breeder in New York

Summer Resident

Winter Resident

Catadromous

Migratory only

Unknown

Species Demographics and Life History Discussion:

American burying beetles are active from late April through September. Adults are nocturnal and active when temperatures exceed 15°C (60°F). Most reproductive activity and carcass burial occur in June and July. Reproduction depends on the availability of carrion. Bird and mammal carcasses weighing between 100 and 200 grams (i.e. pheasant chicks) are used as a food source during the breeding season. Carcass weight is critical to successful reproduction; there is a positive correlation between carcass weight and number of larvae produced.

Males find carcasses at night, soon after it is dark. They then emit pheromones (sex attractants) to attract females. Carcasses are buried on the spot or rolled into a ball, carried elsewhere (up to 1 m), then buried, usually before dawn. Carcasses weigh up to 200 times a beetle's own weight. The beetles move a carcass by lying on their backs and balancing the carcass above them, then walking their legs to move the load forward as if on a conveyor belt.

About two days after burying the carcass, the female lays her eggs in an escape tunnel leading off an adjacent brood chamber. One parent, usually the female, stays with the eggs. Larvae hatch in approximately four days and are cared for and fed by the adult. This level of parental care is unusual

for a non-social insect. Development of larvae is complete in 6-12 days, at which time the brood disperses to pupate in the soil nearby. They emerge as adults 48-60 days later in July and August, and then disperse with their parents. The young, now adults, reproduce the following June or July. They overwinter, probably singly, in the soil. The parents die after reproduction or during the subsequent winter.

While this basic life history has been known for years, since the federal listing of the species, additional research has been published on a number of aspects of burying beetle life history and ecology (USFWS 2008).

Among the important new contributions are:

- Ants compete with burying beetles for carcasses and interference by imported fire ants in Florida led to the inability of *Nicrophorus carolinus* to successfully bury carrion (Scott et al. 1987).
- In addition to seeking carrion during the breeding season, American burying beetles also seek carrion in the fall and one study suggests this provides an overwinter survival benefit (Schnell et al. 2007). There is significant overwintering mortality which may range from 25% to 70%, depending on year, location, and availability of carrion in the fall (USFWS 2008). Bedick et al. (2004) found a bimodal distribution in captures related to age class, with August and September captures corresponding with the emergence of teneral adults.
- American burying beetles are, by necessity, strong flyers as they must travel large distances overnight to seek carrion. On average, recaptured marked beetles at Fort Chafee, Arkansas in 2006 moved 1.29 km (0.8 miles) per day, while in a Nebraska study one marked beetle was recaptured 6.1 km from its original capture location (Bedick et al. 1999, Schnell et al. 2006).
- Multiple, consecutive-year monitoring data at several sites in Oklahoma indicate that American burying beetle captures typically fluctuate on an annual basis (USFWS 2008).
- American burying beetles have a life span of about 12 months (USFWS 2008).
- Few American burying beetles were found in disturbed and fragmented habitats around a studied Nebraska population, consistent with the idea that disturbance and fragmentation are a factor in the species decline (Bedick et al. 2004).

VI. Threats:

The cause of the American burying beetle's decline is not well understood. Habitat loss, fragmentation, and degradation likely played a role, affecting not only the beetle's habitat but

enabling other scavengers to exploit forest edges. Changes in land use resulted in higher populations of scavengers including raccoons, foxes, and crows, which led to competition for food resources. The decline and disappearance of the passenger pigeon—which was an ideal carrion size for American burying beetle—occurred just prior to the burying beetle's decline. Other species of an ideal size for burying beetle that became rare across its range include black-footed ferret, northern bobwhite, and greater prairie chicken. In New York, the American woodcock and ring-necked pheasant would also have provided an appropriately-sized source of carrion.

Recent studies have reinforced the hypothesis that reduction in carrion availability due to land use changes and increased competition was the overriding cause of the species decline. It has been noted that the distribution of remaining populations also points to disease as a possible contributing factor, but as yet there is no further supporting evidence for this. Nevertheless, disease (though none are specifically identified) and the effects of climate change have not been ruled out as concerns (USFWS 2008).

Newly identified threats of invasive animals (red-imported fire ant) and invasive plants (red cedar) have been noted as growing problems in the portion of the range where all but one of the natural populations occur (USFWS 2008).

Because they are largely nocturnal, the American burying beetle is easily disrupted by increasing light pollution from urban and suburban development. Burying beetles are susceptible to pesticides.

Are there regulatory mechanisms that protect the species or its habitat in New York?

No Unknown

Yes

The American burying beetle is listed as an endangered species in New York and is protected by Environmental Conservation Law (ECL) section 11-0535 and the New York Code of Rules and Regulations (6 NYCRR Part 182). A permit is required for any proposed project that may result in a take of a species listed as Threatened or Endangered, including, but not limited to, actions that may kill or harm individual animals or result in the adverse modification, degradation or destruction of habitat occupied by the listed species. It is also protected by its status as a federally-listed endangered species.

Knowledge of management/conservation actions that are needed for recovery/conservation, or to eliminate, minimize, or compensate for the identified threats:

The USFWS Recovery Plan and 5-Year Review for American burying beetle list recovery objectives and needs for this federally listed species. Central to downlisting from endangered to threatened status is the re-establishment of a representative distribution of the species in all four geographic areas of its former range. Although the Midwest geographic recovery area has met the conditions for reclassification, efforts to locate extant populations in the Southeast, Great Lakes, and Northeast

recovery areas have been unsuccessful and it is not yet known whether reintroduced populations can be successfully established (USFWS 2008).

There is little mention of New York State in either the Recovery Plan or the 5-Year Review. Habitat fragmentation and competition for carrion are thought to be two major factors in the species decline, and thus barriers to re-establishment. Both factors would be problematic throughout New York. Two areas that minimally warrant survey work for this species in New York include Gardiners Island and Plum Island. Both of these are large islands are located offshore, but close to, the easternmost points of the south shore and north shore of Long Island, respectively. A recent review of information for Plum Island completed by the New York Natural Heritage Program suggests that the natural communities, undeveloped nature, and low abundance of mid-level predators and scavengers would make Plum Island a possibility for either existence of an undiscovered, extant burying beetle population or a site for a re-introduction attempt, and the same could likely be said of Gardiners Island (Schlesinger et al. 2012). Unfortunately, to date, access issues have made survey of these islands next to impossible.

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for the American burying beetle.

Habitat research:

- ___ Identify sites that may warrant surveys for American burying beetle based on likely availability of appropriate size carcasses, and relatively undisturbed habitat of grasslands or woodlands (probably mainly oak or oak/pine).

Other management plan:

- ___ Incorporate findings into USFWS Recovery Plan and planning efforts.

Statewide baseline survey:

- ___ In addition to Gardiner's Island, sites to be surveyed (if any) could be expected to occur within the vicinity of known, recorded New York locations for the species, but need not be restricted to those areas as the species' overall range suggests it could possibly have occurred throughout the state. Surveys are called for in the USFWS Recovery Plan.

VII. References

Bedick, J.C., B. C. Ratcliffe, and L. G. Higley. 1999. Distribution, ecology, and population dynamics of the American burying beetle [*Nicrophorus americanus* Olivier (Coleoptera: Silphidae)] in south-central Nebraska, USA. *Journal of Insect Conservation* 3:171-181.

Bedick, J.C., B. C. Ratcliffe, and L. G. Higley. 2004. A new sampling protocol for the Endangered American burying beetle, *Nicrophorus americanus* Olivier (Coleoptera: Silphidae). *The Coleopterist Bull.* 58(1):57-70.

Center for Biological Diversity

http://www.biologicaldiversity.org/campaigns/esa_works/profile_pages/AmericanBuryingBeetle.html

Holloway, A.K. and G. D. Schnell. 1997. Relationship between numbers of the endangered American burying beetle, *Nicrophorus americanus* Olivier (Coleoptera: Silphidae) and available food resources. *Biological Conservation* 81:145-152.

NatureServe. 2011. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: January 17, 2011).

New York State Department of Environmental Conservation. 2005. New York State Comprehensive Wildlife Conservation Strategy. Albany, NY: New York State Department of Environmental Conservation.

New York Natural Heritage Program. 2012. Element Occurrence Database. Albany, N.Y.

Schlesinger, M.D., A.L. Feldmann, and S.M. Young. 2012. Biodiversity and ecological potential of Plum Island, New York. New York Natural Heritage Program, Albany, New York.

Schnell, G.D., A. H. Hiott, and V. Smyth. 2006. Distribution, ecology, and population dynamics of the American burying beetle, Arkansas. Final re. to Chaffee Maneuver Training Center. 29 pp.
Schnell, G.D., A. H. Hiott, J. C. Creighton, V. L. Smyth, and A. Komendat. 2007. Factors affecting overwinter survival of the American burying beetle, *Nicrophorus americanus* (Coleoptera: Silphidae). *Journal of Insect Conservation*. In press.

Scott, M.P., J.F.A. Traniello, and I. A. Fetherston. 1987. Competition for prey between ants and burying beetles (*Nicrophorus* spp.): differences between northern and southern temperature sites. *Psyche* 94:325-332.

Sikes, D.S. 2002. A review of hypotheses of decline of the endangered American burying beetle (Silphidae: *Nicrophorus americanus* Olivier). *Journal of Insect Conservation* 6: 103-113.

USFWS. 1991. American Burying Beetle (*Nicrophorus americanus*) Recovery Plan. Newton Corner, MA. 80pp.

USFWS. 2008. American Burying Beetle (*Nicrophorus americanus*). 5 Year Review: Summary and Evaluation. New England Field Office, Concord, NH. 46 pp.

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