

ESC America's Top 10

General Information	Please Use this Column to Provide the Requested Information
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Report Questions	
Do you have photos that can be used in the report?	Yes
Will you want printed reports?	Yes
If your species is selected, will you use the opportunity to organize around the species and/or publicize its plight?	Yes
The Species & Its Status Questions	
Common name, genus & species	American Burying Beetle (<i>Nicrophorus americanus</i>)
Conservation Status	Endangered (USFWS), Critically Endangered IUCN Redlist A1c ver 2.3
Current population size	Fragmented populations within seven U.S. states. No precise estimates exist.
Has the species been delisted? If yes, when? Was the recovery on time? (Skip questions 17+18.)	No
If no, does the species have a recovery plan?	Yes
If it does have a recovery plan, what is the projected downlisting and/or delisting date?	Criteria for delisting in the USFWS Recovery Plan are: "a) When three populations have been established or discovered in each of the four geographical areas, b) each population contains 500+ adults, c) each population is self-sustaining for 5 consecutive years, and, ideally, each primary population contains several satellite populations."
Background Questions (for the report profile)	
Geographic range	Former range is 35 U.S. states and the southern portion of three Canadian Provinces. Current range is isolated populations in Arkansas, Oklahoma, Kansas, Nebraska, South Dakota, Rhode Island, Texas (however there is doubt that the Texas population still exists). The last record in Missouri of a natively found American Burying Beetle is 1972.
Habitat	Not necessarily a habitat specific species. They are found in forests, grasslands, riparian and marine habitats.
Primary diet (if applicable)	Carrion from various sources. Size (between 100-200 grams) seems to be the most important factor in food source selection. Adults will also opportunistically eat caterpillars and beetle larvae.
Public Engagement Questions (Please explain why the species is interesting, why it matters, why decision-makers + the public should care.)	

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Interesting facts about the species	This insect species exhibits cooperative parental care. This is something very rare with insects. Both parents remain with their larvae through most of their developmental stages and assist by feeding them regurgitated carcass. The parent beetles will even call larvae to them for feeding by making squeaking noises (stridulation) with their elytra (hardened forewings) and their abdomens. Parents will also provide starter holes for beetles to travel away from brood chamber for pupation.
Additional background information to complete the species profile in the report.	The beetle parents will prepare a carcass and using oral and anal secretions with antiseptic properties, prepare a chamber. The preservative secretions slow decay and keep the resource fresh for over two weeks. This species was placed on the Endangered Species list in 1989 when only one population -Block Island, Rhode Island - was known. Since then, subsequent surveys have discovered populations in six other states. This species has shown rapid recent decline. In many states, this species was naturally found until the 1960s-1970s. Whereas the cause(s) of decline are not specifically known, the American Burying Beetle may serve as an indicator species throughout its former range. Reintroduction efforts in various locations will allow researchers to test the various theories behind this species decline.
What are the most important messages that should be communicated about this success story?	An immediate threat is the Keystone XL Pipeline. This pipeline not only cuts through five of the seven U.S. States with existing isolated populations, it will directly impact areas where beetles are currently found in several of the States. The direct impacts of the pipeline are debated, but even current mitigation by bait away programs have been shown to be detrimental to this species. (http://rip.trb.org/browse/dproject.asp?n=28301)
Outline and describe the existing threats that might impede its recovery, e.g., new threats to its habitat, etc. Include any potential political threats, e.g., a Congressional delisting before its time. Cite any substantiating scientific studies.	

Criteria-Specific Questions

Detail the ecological and scientific importance of the species. Note if it is a keystone species. Describe its role in the biodiversity of its environment. Cite any substantiating scientific studies.

Provide information on any additional benefits the species provides, such as economic, medicinal, or ecosystem services.

Judge's score for importance of species.

This is unknown. They are a recycler species that removes carrion from the ecosystem. It is speculated that their presence reduces fly populations, mesopredator/scavenger populations.

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What recovery actions have been taken for the species?

The Saint Louis Zoo has been working on American Burying Beetle recovery since 2002. We have conducted field surveys in Missouri to find any remaining populations. Total numbers for field surveys are: 16,192 trap nights in 34 Missouri counties. The Zoo has maintained a colony of American Burying Beetles since 2004, producing nearly 7770 -to date- over the years. This population has been genetically managed according to an American Association of Zoos and Aquariums (AZA) Species Survival Program (SSP) with meticulous record keeping on every individual beetle. The North American Regional Studbook for American Burying Beetles is managed by the Saint Louis Zoo. Beetles raised at the Zoo have been used for reintroduction to Southeast Ohio for over seven years and most recently to Missouri in 2012 and 2013. The Missouri reintroduction includes follow up surveys of the reintroduction site and tracking population increases and potential migration of any offspring. The Zoo's colony has also been used for research into pheromone composition (Carrie Hall, Ph.D. and Daniel Howard, Ph.D.), changes to the acoustic qualities of stridulation resulting from elytral notching prior to reintroduction (Carrie Hall, Ph.D. and Daniel Howard, Ph.D.), to study the effects of elytra notching (prior to reintroduction) on brood fecundity (Carrie Hall, Ph.D.). Preserved specimens from this population are currently being used for development of genetic markers to compare existing wild populations to one another by Patty Parker, Ph.D. and Lisa Rois, Masters student. Also through the Zoo's attendance of roughly 3 million visitors each year, a weekly local television show, various other media interactions, classes, and interpretation the message about this species has reached countless people.

Why were those recovery actions successful?

Since all of the actions are currently ongoing, it would be premature to claim "success." However, the actions are showing progress. For instance the study on the impact of elytral notching on brood fecundity showed no significant impact on brood size, health or survival because of the prescribed method of marking reintroduced beetles via this method. In effect showing that this protocol of reintroducing the beetles did no harm. The reintroduction to Missouri and our subsequent surveys have shown not only offspring surviving in the area after reintroduction, but overwinter survivorship of offspring from reintroduced beetles. The genetic work has just begun is already showing success in amplifying DNA from just the legs of preserved specimens -something that had been attempted before, but never successfully carried out.

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If there are or have been multi-agency and/or public/private collaboration to protect the species, please describe.

Our Missouri reintroduction program has partnered with the United States Fish and Wildlife Service (USFWS), The Nature Conservancy (TNC), and the Missouri Department of Conservation (MDC), the Missouri Department of Transportation (MoDOT, for roadside surveying permissions), and the United States Army at Fort Chaffee Arkansas that provided founders for our colony. The Ohio reintroduction project collaborated with The Ohio Department of Natural Resources (ODNR), The United States Forest Service (USFS), The Ohio State University, and two zoos (The Wilds in Zanesville, Ohio and the Cincinnati Zoo). Our DNA work has partnered with the University of Texas at Austin and most recently, the University of Missouri- Saint Louis (UMSL).

Please detail the species' recovery. What increases have there been in the size of the population and in the number of populations?

Since its listing, 6 additional populations have been discovered as a result of surveys. With regard to reintroduction efforts: nationally, a reintroduced population to Nantucket Island, MA, had survived and increased without supplementation for several years. Locally, individuals from the Missouri reintroduction have been shown, through surveys, to have reproduced and the offspring have survived the Winter season. Since this project is only in its second year, further surveys will be able to gauge the success of this reintroduction.

If there is political support for the conservation of the species, please explain.

Nothing organized

Are there actions that need to be taken by government officials and/or NGOs to continue the recovery?

Yes. Government conservation organizations can encourage or conduct surveys for existing populations within the former range of this species. Very little surveying has been conducted and only a few States have recent surveys conducted specifically for carrion beetles like this. If adequate populations are found, the species could be reassigned and possibly de-listed. Likewise, zoos within the range of this beetle could conduct local surveys or serve as holding facilities for representative local populations. These colonies could be a reservoir for genetic variety within the species. Maintaining this diversity with a species could be key for saving a species in the case of a stochastic event critically damaging one of the smaller isolated populations.

Are there additional actions that individuals can take to continue the species' recovery?

Awareness could be the best contribution to recovery. Identifying additional populations throughout the species former range could lead to delisting. Citizen scientist that are aware of this could potentially identify new populations and confirm findings with photographs or digital images.

Judge's score for recovery.

Final Judge's Score

0