

# IMPACT REPORT

2024



## Center for American Burying Beetle Conservation



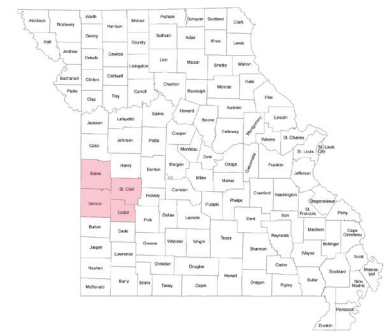
## Background

The critically endangered American burying beetle (*Nicrophorus americanus*) was once found in 35 eastern and central states, as well as the southern borders of at least two eastern Canadian provinces. By the time this carrion feeder (meaning that it eats dead animals) was placed on the United States federal endangered species list in 1989, the only known remaining population was in Rhode Island. Since its federal listing, field surveys have discovered populations in six other states. Four of these states—Arkansas, Kansas, Nebraska and Oklahoma—share portions of their borders with Missouri. However, until the Saint Louis Zoo’s recent reintroductions, no American burying beetle had been found in Missouri since the mid-1970s. Since 2005, the staff at the Saint Louis Zoo’s Bayer Insectarium has successfully bred burying beetles from the relatively small original captive population drawn from the wild in Arkansas. As of 2023, the Zoo’s colony has produced over 14,000 beetles. Many have been used to start colonies in other zoos. At the request of the United States Fish and Wildlife Service (USFWS), the Saint Louis Zoo provided both beetles and personnel for reintroductions to South Central Ohio from 2005 to 2011. Between 2012 and 2018, staff from the Saint Louis Zoo transported and reintroduced burying beetles to Missouri at the Wah’ Kon-Tah Prairie. In 2019, the reintroduction effort was strategically moved 12 miles to the north of Wah’ Kon-Tah to Taberville Prairie, also managed by the Missouri Department of Conservation (MDC). This shift allows us to monitor for any lasting impact of our seven-year effort at Wah’ Kon-Tah while also embarking on a new strategy to establish a “metapopulation” of American burying beetles in the area.

## Achievements In Missouri

The reintroduction project to Missouri had, up until 2018, noted a steady increase in numbers of beetles found in nearly every stage of their active period (roughly May through September). This set the stage for our plan to expand the scale and scope of our reintroductions by shifting the project to other sites within the four-county Nonessential Experimental Population (NEP) boundaries of Cedar, St. Clair, Bates and Vernon counties (see Figure 1).

- » The first achievement to point out is at Taberville Prairie, overwintering and unmarked beetles have been found every year since reintroductions began (not including 2020 when no surveys were conducted). This persistence indicates the ability of beetles to locate and utilize carrion resources that occur naturally in the area.



- » The second achievement is the persistence of beetles found at reintroduction sites until 2018. This is especially significant in regards to overwintering beetles that have been found at Wah’ Kon-Tah Prairie three years after the last reintroduction there. This persistence indicates the ability of beetles to locate and utilize carrion resources that occur naturally in the area, although we have not seen beetles in 2022 or 2023.
- » The third achievement is that the Center work has been able to continue, in spite of obstacles presented with the Covid-19 global pandemic. In 2023, we were able to reintroduce 297 beetles, the most since 2019, due to assistance from many of our partners that were unable to help over the previous three years.



## Budget Allocations By Target Organizations

Fiscal Years 2022 -2023

The 2022 season was the first time since the Covid-19 pandemic that field activities reached more historical levels. Reintroduction numbers were tracking closer to pre-pandemic levels, and field surveys resumed with the same pre-pandemic numbers. However, survey methodology shifted in an attempt to capture any migration between survey sites. So, all five sites were surveyed in a planned rotation that equalized activity between them.

In 2023, because of the change in surveying the previous year and the fact that zero American burying beetles were found at Wah' Kon-Tah, a decision was made by State partners to focus intensity of surveys at the Wah' Kon-Tah site. These surveys occurred there at least twice a month throughout the season and resulted in zero beetles found there. Overwintering and wild-produced beetles were still being found in significant numbers at Taberville.



Saint Louis Zoo field technicians conducting pitfall trap surveys.

In early 2024, after consultation with State partners, it was determined that this adjustment in survey intensity at the Wah' Kon-Tah site has satisfied the zero (null) result for two consecutive years. It was decided to still survey this site, but turn the focus to monitoring the Taberville site, in order to get more comprehensive data regarding the status of the reintroduced population there.

## Center Impact

### Key Results Of Strategy 1 – Reintroduce Captive American Burying Beetles

2022 and 2023 marked the eleventh and twelfth years of reintroductions in Missouri and the the fourth and fifth years to the Taberville Prairie site. There were 120 American burying beetles reintroduced at this location in 2022 and 297 beetles were reintroduced over two reintroduction events in 2023. For comparison, a total of 182 beetles were reintroduced in 2021. This was accomplished by producing these beetles with the Zoo's colony in a timely manner and by arranging assistance to dig soil plugs and place the beetles underground with adequate carrion resources and protection.

It is important to point out that the consistent success of these rearing and reintroduction methodologies were proven by consistent survey results over eight years. Reintroduced beetles, naturally produced beetles and overwintering beetles were all found in significant numbers following these seven reintroduction events at Wah' Kon-Tah. The similar results at the Taberville site, since reintroductions began there, continue to confirm this. This proves that the reintroduction methodology is sound and can thus be removed from speculation regarding declining survey numbers for this species. This allows us to focus on exploring other factors that may be causing the decline in beetles caught after human assistance ceased.



## Key Results Of Strategy 2 – Survey Released Beetles

Overwintering surveys at both Wah’Kon-Tah and Taberville prairies began in mid-May which included the two field researchers that were hired for the season. Overall, 2023’s survey efforts resulted in 1,593 trap nights logged. The term “trap night” is defined as one trap per night; therefore, 10 traps set up for three nights equals 30 trap nights. From those traps: 29,190 Silphid beetles were collected and documented. This number includes the 208 American burying beetles (a type of Silphid) that were collected in these. 127 of the collected American burying beetles (including those collected before the reintroductions) were un-notched (since we notch every beetle that we capture with a medical cautery tool, an un-notched beetle means that it is a naturally produced beetle that we have not captured yet), and the rest were notched recaptures. Timing of the captures indicates that two overwintering beetles were captured as well in 2023.

While zero American burying beetles were captured at Wah’Kon-Tah this year, both overwintering and unmarked beetles were found at Taberville which suggests that this population is persisting at the second reintroduction location.



## Key Results Of Strategy 3 – Establish A Viable Reintroduced Colony

Whereas establishing a viable reintroduced colony is the ultimate goal of this project, this strategy is ongoing. Strategies 1 and 2 point toward positive progress toward this goal, but it cannot be fully realized for another 10 to 20 years. The progression of reintroductions to Taberville beginning in 2019 are a step toward this goal. And consistent population monitoring at both Wah’Kon-Tah and Taberville prairies as well as mark/recapture events will guide activities related to this goal.

American burying beetles were found at Wah’Kon-Tah in 2019, 2020 and 2021 after cessation of supplementation of beetles and carrion resources. No beetles were found in 2022 and 2023. Whereas some decrease was expected, it will take several years to be able to discern a trend. A myriad of factors can influence capture numbers, such as weather conditions during a particular week of surveys. Additionally, drastic natural trends in trapping numbers have been documented in surveys of other naturally occurring American burying beetle populations from year to year. These tend to average out over several years, however. More surveys and more time is needed to determine how self-sustaining the Wah’ Kon-Tah population actually is.

## Key Results Of Strategy 4 – Relocation of Reintroduction to Taberville

Moving the reintroduction to a new site required working with our MDC partners to acquire the proper approvals needed for this work to take place at another location. The new reintroduction site was scouted and has been used since 2019. Overwintering and un-notched beetles have been found every year in increasing numbers after starting reintroductions at Taberville. This suggests persistence of the species at this site which is encouraging.

The plan with State partners is to cease reintroductions to Taberville after the 2024 or 2025 season. Then survey the site for species persistence without the human assistance of providing carrion and fresh beetles. Subsequent survey results will determine the number of seasons that surveys continue at this site.



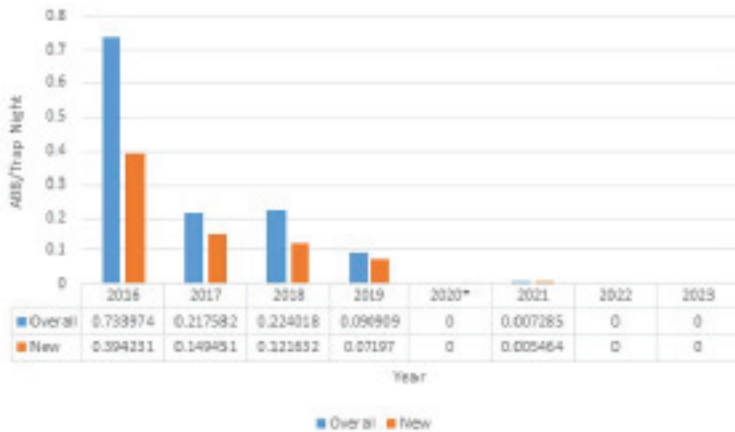
## Notable Recognition

- » Article in the Belleville News-Democrat titled: “The Saint Louis Zoo is working to reintroduce this ‘necessary’ endangered species,” on June 8, 2023. <https://www.bnd.com/news/state/missouri/article276159071.html>
- » Article in the Missouri Conservationist titled: “American Burying Beetle,” on August 1, 2022. <https://mdc.mo.gov/magazines/missouri-conservationist/2022-08/american-burying-beetle>
- » Article in the Joplin Globe titled: “Reintroduction of burying beetles continues in Southwest Missouri,” on July 4, 2021. [https://www.joplinglobe.com/news/local\\_news/reintroduction-of-burying-beetles-continues-in-southwest-missouri/article\\_8a9ae92e-d4f1-11eb-9509-17137eb15d6e.html](https://www.joplinglobe.com/news/local_news/reintroduction-of-burying-beetles-continues-in-southwest-missouri/article_8a9ae92e-d4f1-11eb-9509-17137eb15d6e.html).



## Lessons Learned

Because of the expansion of sites being monitored by Zoo staff, a new metric was needed to compare results between the various years at specific sites. We have broken down data into efficiency per trap night for previous years for comparison to this year’s efforts. Therefore, instead of looking at beetle captures within a specific time frame, this metric gives insight into the specific metric of a trap night. See Figure 2.



**Figure 2:** Overall and new *N. americanus* found per trap night at Wah’Kon-Tah Prairie. No surveys conducted in 2020.

It is important to note that since 2020, both MDC and USFWS are in a period of internal restructuring. This may limit both partners in their ability to help with funding and personnel with this program.

This demonstrates the critical importance that the constancy of the Center for American Burying Beetle Conservation has in this project.

## Plan For The Future

We expect to continue reintroductions at Taberville Prairie sites for at least one more year. Surveys at Linscomb Prairie and Schell-Osage Prairie will inform us of beetle movement in the four-county NEP area.

Consistent monitoring over at least the next three years at the Wah’Kon-Tah Prairie will inform us of the effectiveness of our reintroduction efforts to date and any progress toward our ultimate goal of establishing a self-sustaining population of American burying beetles in the area.

The finding of zero American burying beetles for the past two seasons at the Wah’Kon-Tah site has allowed us to look further into the future. It has been discussed that if the Taberville site shows the same trend to zero beetles, we would turn our efforts into investigating why the reintroductions did not work at these sites.



There is potential through stable isotope evaluation and other emerging technologies to get the bottom what resources are being utilized by the beetles on the natural landscape. We have begun discussions, in early 2024 with university and USFWS partners to begin to explore these options, beginning in 2024.

Additionally, looking forward, both Bob Merz and Kayla Garcia are continuing to act as co-directors to better coordinate Center activities. Personnel changes within Invertebrate Unit staff necessitate future field training for all new keepers as well as expanding the potential for other animal units to assist in field work efforts to better balance workload on the Invertebrate Unit. A recent, internal 360-style evaluation coordinating with the Zoo's Conservation Audience Research and Evaluation department (C.A.R.E.), has provided considerable

direction regarding internal relations and telling our stories. Actions identified through this process will be implemented in the next two years.

We also plan to continue our partnership with the Saint Louis Zoo teen volunteer group, Zoo ALIVE. We plan on continuing our mentorship with these teens, both at the Zoo and in the field, with the intent of fostering deep and meaningful experiences that shape these volunteers' perceptions regarding the environment and our place in it.

This long-term endeavor is also part of a comprehensive evaluation by the Zoo's C.A.R.E. team looking at lasting impact of that program and experiences like the ones they have had with the Center for American Burying Beetle Conservation.

