

APPENDIX II

Freshwater Mussel Monitoring in the Lower Osage River

2023 Progress Memo

**Lower Osage River Protection and Enhancement Program
Project 15-1**



United States Department of the Interior

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To: Ameren Missouri

From: U.S. Fish and Wildlife Service

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Subject: Project 15-1, Freshwater Mussel Monitoring in the Lower Osage River, 2023 Progress Memo

This memo briefly describes the 2023 results of annual mussel monitoring conducted by the U.S. Fish and Wildlife Service in the lower Osage River (LOR) for project 15-1 of the Lower Osage River Protection and Enhancement Program. The goals, methods, and detailed schedule of Project 15-1 are described in Simmons *et al.* 2021. Since 2014, we have been sampling mussels at 18 sites in the LOR below Bagnell Dam on a rotational schedule. The schedule allows each site to be sampled at least once every five years. This year marks the fourth year of the second round of sampling of these 18 sites. Round two of monitoring is scheduled to be complete in 2025. At that time, we will prepare a detailed technical report that will include all monitoring data. Monitoring data from the first round of sampling (completed in 2020) is summarized in Roberts *et al.* 2021.

In 2023, mussels were monitored at sites 37.6, 43.4, 95.4, and 108.7 in the LOR (sites are labeled by river kilometer). The results are briefly summarized below.

Species richness, density, and relative abundance

Sampling at Site 37.6 was conducted on September 12 and 13, 2023. Quantitative samples (mussels collected within 50 randomly placed 0.25 m² quadrats) yielded 120 individuals, representing 15 species with an overall average mussel density of 9.6 mussels/m². The 3 most abundant species were Pimpleback (*Cyclonaias pustulosa*), Deertoe (*Truncilla truncata*) and Threehorn Wartyback (*Obliquaria reflexa*). Searching the timed search units (TSU) increased the number of living species detected at the site from 15 (in the quantitative samples) to 19. One Species of Conservation Concern (SOCC) Black Sandshell (*Ligumia recta*), was collected live in one TSU, but it was not found in quantitative samples.

Sampling at Site 43.4 was conducted on June 28, September 14, and September 27, 2023. Quantitative samples yielded 151 individuals, representing 14 species with an average mussel density of 11.8 mussels/m². The most abundant species were Deertoe, Pimpleback, and Fawnsfoot (*Truncilla donaciformis*). TSUs increased the number of living species detected at the site from 14 (in the quantitative samples) to 19. Two

SOCC were collected live, Pink Mucket (*Lampsilis abrupta*) and Black Sandshell. The live Pink Mucket were found in one TSU, but none were collected during quantitative sampling. One Black Sandshell was collected during quantitative sampling and was present in 4% of the TSUs.

Sampling at Site 95.4 was conducted on September 8, 19 and 20, 2023. Quantitative samples yielded 203 individuals, representing 15 species with an overall average mussel density of 16.2 mussels/m². The most abundant species were Washboard (*Megaloniaias nervosa*), Deertoe, and Pimpleback. TSUs increased the number of living species detected at the site from 15 (in the quantitative samples) to 19. One SOCC, Black Sandshell, was collected live during quantitative sampling and it also occurred in one TSU. Additionally, a weathered-dead shell of Spectaclecase (*Cumberlandia monodonta*), was collected during TSU searches.

Sampling at Site 108.7 was conducted on September 7 and 26, 2023. Quantitative samples yielded 101 individuals, representing 9 species with an overall average mussel density of 8.1 mussels/m². The most abundant species were Pimpleback, Deertoe, and Threeridge (*Amblema plicata*). TSUs increased the number of living species detected at the site from 9 (in the quantitative samples) to 20. Two SOCC, Black Sandshell and Hickorynut (*Obovaria olivaria*), were collected in one TSU while none were collected during quantitative sampling.

In all, 575 native mussels were collected during quantitative sampling representing 20 species. TSUs increased the number of species totaling 24 species. Of those, three were SOCC.

Mussel recruitment

The percentage of “younger” animals or sub-adults (≤ 5 years old) of the total number of mussels collected at sites 37.6, 43.4, 95.4, and 108.7 in 2023 were 10%, 22%, 17%, and 12%, respectively. Nine of the 20 species collected were represented by sub-adults, but Deertoe and Fawnsfoot accounted for most of the sub-adult individuals collected, possibly indicating that there was a notable recruitment event for these two species at these locations.

Zebra Mussel

Little evidence of Zebra Mussel was found in the LOR during the 2023 mussel monitoring. Of the 575 native mussels collected during quantitative sampling, 1 living Zebra Mussel was found attached to native shells. One live Zebra Mussel was attached to a Pimpleback, 0.5% of the native mussels collected, at Site 95.4.

References

Roberts, A.D., J.T. Hundley, and B.R. Simmons. 2021. Long-Term Monitoring of Freshwater Mussels in the Lower Osage River – A Summary of the First Five Years of Sampling. Five Year Summary Report for Project 08-6 of the Lower

Osage Protection and Enhancement Program, 30pp + App., Appendix III *in* U.S. Fish and Wildlife Service. 2021. Lower Osage River Protection and Enhancement Program, 2020 Annual Report submitted to Ameren Missouri (for actions completed in 2020) 5pp + App. U.S. Fish and Wildlife Service, Columbia, Missouri. https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20210412-5595&optimized=false

Simmons, B.R., A.D. Roberts, and J.T. Hundley. 2021. Protocol for Long-Term Monitoring of Freshwater Mussel Populations in the Lower Osage River. Product of Project 08-6 of the Lower Osage Protection and Enhancement Program, 24 pp., Appendix V *in* U.S. Fish and Wildlife Service. 2021. Lower Osage River Protection and Enhancement Program, 2020 Annual Report submitted to Ameren Missouri for actions completed in 2020. 5 pp. + App. U.S. Fish and Wildlife Service, Ecological Services, Missouri Field Office