

# Engineering With Nature Project Fact Sheet



## Big River Confluence Hydraulic and Ecosystem Dynamics

### Background

A loss or change in critical habitats for fish and other animals has occurred in most navigable rivers in the U.S. due to the construction of navigation structures and levee systems. Many USACE Districts are evaluating strategies to recreate lost habitats or to enhance existing habitats to reestablish important ecological functions. In some cases, implementation of these measures can be difficult due to the short-term nature of case studies and research to help determine their success. This study focuses on the habitat usage and needs of riverine fishes and invertebrates, with special consideration for pallid sturgeon, which was listed as endangered under the Endangered Species act of 1973, and which has been impacted by river engineering of the Missouri and Mississippi River Basins. In this collaborative effort, new nature-based features and alterations of existing riverine engineering structures will be modeled, implemented, and monitored for success.

### Objectives

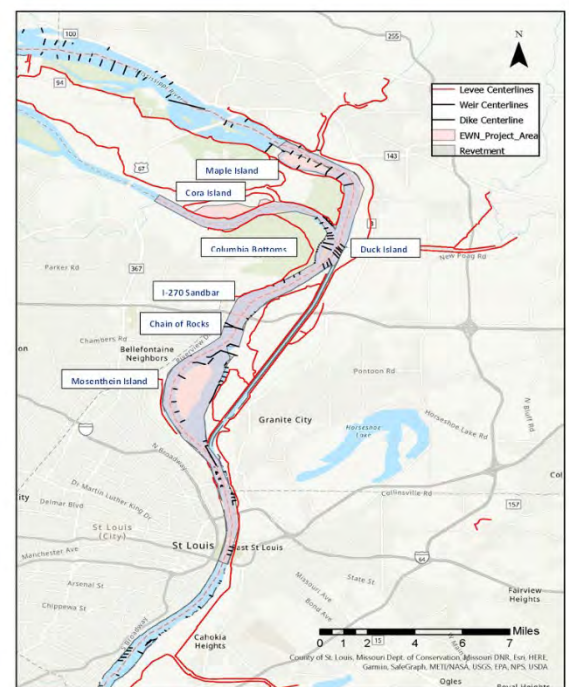
The two main goals of the project are to use navigation structures and nature-based features to leverage natural processes to improve the extent and diversity of aquatic habitats for riverine fishes and invertebrates and to improve the flow and retention of drifting organic material to include larval fishes. This project builds on the capacity of USACE to develop new strategies for habitat enhancement or restoration while sustaining the missions of flood control and navigation. This study advances the EWN practice by leveraging natural riverine processes to achieve navigation and environmental goals by modifying existing infrastructure and developing new innovative, nature-based infrastructure. Through advanced modeling, alternatives will be tested that minimize the amounts of hard structure necessary to meet engineering goals while reducing project costs. This work will strengthen the USACE portfolio by increasing our ability to test changes to navigation structures to include ecological benefits.

### Approach

Novel engineering and habitat creation, biological assessment and monitoring, and modeling will be combined to meet the above objectives. This project will be achieved by testing and evaluating 1) measures to improve the diversity and extent of habitats heavily utilized by pallid sturgeon, such as sand and gravel bars, 2) measures to improve hydrologic connectivity and retention of organic matter and drifting larvae around side channels, 3) measures to improve fish passage across structures, 4) impacts of a levee setback, and 5) improvements to existing modeling tools to better predict flow dynamics around engineering structures.

### Outcomes

This project protects people and the environment through the triple-win elements of engineering, environmental, and social benefits that can be gained through sustainable flood control and navigation management practices, including improved infrastructure that enhances and restores large river ecological habitats and processes, while maintaining safe and efficient navigation.



**Points of Contact:** Gaurav Savant (ERDC CHL) | Audrey Harrison (ERDC EL)

[Gaurav.Savant@usace.army.mil](mailto:Gaurav.Savant@usace.army.mil) | [Audrey.B.Harrison@usace.army.mil](mailto:Audrey.B.Harrison@usace.army.mil)

(601) – 634 – 3213 | (601) – 634 – 5294