US Army Corps of Engineers®

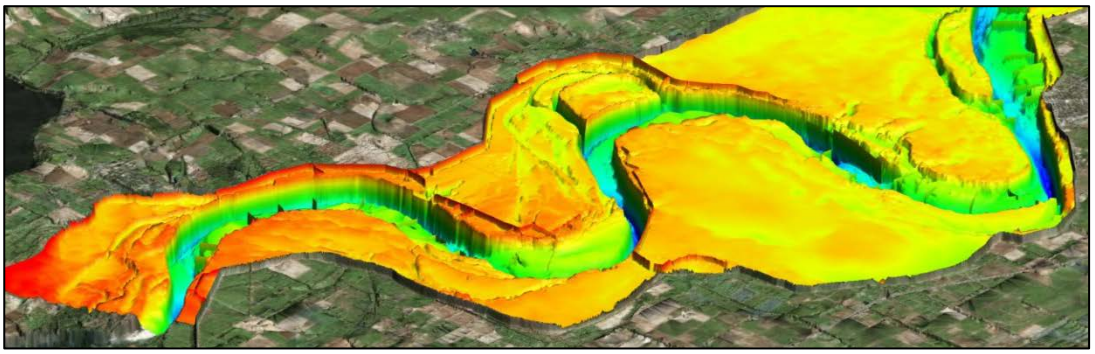
Merriwether – Cherokee Potamology Study

Mississippi River Geomorphology and Potamology Report No. 9

During the historic flood of 2011, the Mississippi River reached record-breaking water levels between Cairo, IL, and Memphis, TN. Downstream from Tiptonville, TN, Sheep Ridge Road Spur Levee (private) was overtopped and crevassed when the Mississippi River reached a stage of 48.35 feet (ft) on the Tiptonville gage. The length of spur levee crevassed was 3,000 ft, and the length of bankline eroded was 2,700 ft. As a result, the Mississippi River began to form a new cutoff from river mile 869 to 860. Erosion extended approximately 4,000 ft along Island 13, degrading the landscape to elevations 80 feet below natural ground. The crevasse divided the Sheep Ridge Road Spur Levee, leaving an approximate 3,000 ft section to the east of the crevasse (eastern spur levee) and an approximate 2.2-mile section to the west of the crevasse of Sheep Ridge Road Spur Levee (the western spur levee). The eastern spur levee is connected to the mainline Tiptonville–Obion River Levee.

A concern was that without modification of the western spur levee and Island 13 overbank, the Mississippi River would continue to form a 9-mile cutoff. If a cutoff were to form, potential adverse impacts included the following: changes in long-term reach dynamics, navigation outdraft conditions, increased dredging operations, hydrodynamic condition changes in close proximity to a Mississippi River Levee mainline levee (Tiptonville-Obion River Levee), endangerment of existing channel improvement features ($60M), endangerment of completed crevasse repairs ($27M), and endangerment of planned crevasse repairs.

The Merriwether-Cherokee Potamology Study report documents the following analyses: infrastructure, Low Water Reference Plane, thalweg and tertiary layer, volumetric, specific gage, duration, multi-dimensional modeling, one-dimensional modeling, and a navigation assessment.



Multi-dimensional model domain surface

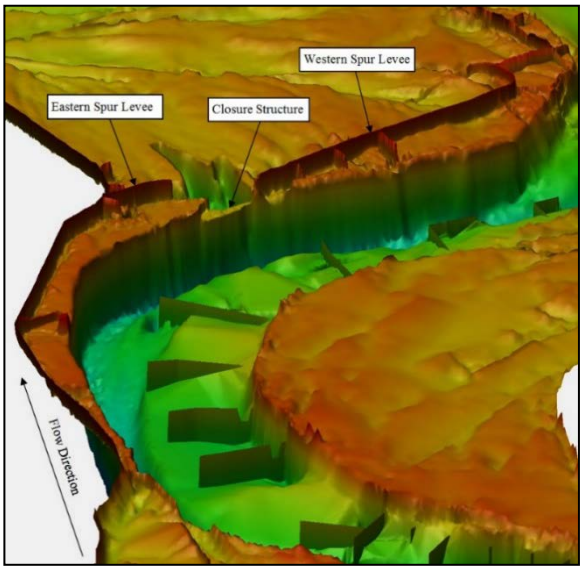
MRG&P
Mississippi River Geomorphology & Potamology Program

Report prepared for the Mississippi River Commission

MRG&P

Mississippi River Geomorphology & Potamology Program

Island 13 overbank crevasse post 2011 flood.



Multi-dimensional model island 13 overbank features.

For More Information

To access the full version of *Merriwether-Cherokee Potamology Study* report, click the following link: https://erdc-library.erdc.dren.mil/xmlui/handle/11681/22562

Additional MRG&P reports, historic reports, and MRG&P information can be accessed from the MRG&P Publications and Technology Transfer website: http://www.mvd.usace.army.mil/Missions/MississippiRiverScienceTechnology/MSRiverGeomorphologyPotamology/PublicationsTechTransfer.aspx.

Points of Contact

Brian M. Hall, P.E.
Author
USACE MVM
Brian.M.Hall@usace.army.mil

Freddie Pinkard
MRG&P Sr. Program Manager
USACE MVK
Freddie.Pinkard@usace.army.mil

Ty V. Wamsley, Ph.D.
MRG&P Technical Director
USACE MVD
Ty.V.Wamsley@usace.army.mil

Summary of Significant Findings

- The study results indicated that there is a moderate risk for cutoff formation. Dense vegetation on the entire Island 13 overbank was recommended to mitigate the long-term risk of cutoff formation. Short-term risk mitigation measures are required until mature vegetation across entire overbank is established.
- The analysis indicated a severe risk for local scour at the closure structure. Local scour countermeasures were evaluated and recommended for implementation.
- The navigation analysis indicated a potential for an outdraft condition at the study crevasse.
- The analysis indicated scour potential at the toe of the Tiptonville–Obion River Levee. It is recommended that further investigation be conducted on the scour potential to determine if MRL protection measures are required.

US Army Corps of Engineers®

Report prepared for the Mississippi River Commission