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MRG&P
Mississippi River Geomorphology & Potamology Program

A Review of the Lower Mississippi River Potamology Program

Mississippi River Geomorphology and Potamology Report No. 1

The Mississippi River and Tributaries (MR&T) Project is the comprehensive water resources project for flood damage reduction and navigation improvement on the Mississippi River. MR&T elements include levees, floodways, diversion structures, tributary basin improvements, as well as channel improvements such as meander cutoffs, bank stabilization, dikes, and dredging. Understanding how these elements, combined with natural factors such as floods and droughts, impact the historical, current, and future river morphology is a complex challenge for managing the Mississippi River for floods, navigation, environmental restoration, and coastal wetland loss.

Potamology History and Knowledge

Potamology comes from the Greek word *potamas* and is simply defined as the science of rivers. Some of the earliest Mississippi River studies were conducted in the early 1800s by the forerunners of the US Army Corps of Engineers (USACE).

Floods are major catalysts for Mississippi River programs. The devastating 1927 Mississippi River flood contributed to the creation of the 1928 MR&T Project that helped foster meander cutoff operations in the 1930s, which were the impetus for the first official USACE *Potamology Investigations* initiated in 1946. This program produced more than 70 reports that advanced the understanding of the complex relationship between nature and man-made changes that shape the river and how the river adjusts over time.

The 1973 flood was another benchmark as it produced river stages that were up to 5 feet higher than anticipated in some locations. These higher stages made it apparent that the stage-discharge relationships were several feet higher than those used to establish levee grades and other flood damage reduction projects, which showed a potential for significant reduction in flood capacity. USACE potamology studies (T-1 reports) addressed river behavior during the 1973 flood.

Follow-on potamology studies (P-1 reports) were issued 1981–1992, examining four major parameters: hydrology, sedimentation, channel geometry, and man-made modifications. This knowledge helped USACE develop more efficient and cost-effective flood damage reduction and navigation projects at the time.

The vast amounts of historical river data and unpublished studies conducted by various USACE organizations are of great value. These data, from the 1800s to modern times, include detailed hydrographic surveys, sediment sampling, velocity and current measurements, boring data, flow data, bed form data, geologic information, water surface slopes, and geomorphic assessments, covering a wide variety of river locations and dates. Such information is a valuable resource that gives a historical perspective of the river and contributes to understanding the river system. Unfortunately, some of this information has already been lost, and much of the data is not cataloged and only exists in hard copy in obscure locations in various USACE offices.

Report prepared for the Mississippi River Commission

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The epic 2011 Mississippi River flood fostered a new interest in river knowledge to more thoroughly understand how the USACE projects successfully passed this flood's record flows. This renewed interest led the USACE Mississippi Valley Division (MVD) to initiate the Mississippi River Geomorphology and Potamology (MRG&P) Program. This program will advance current knowledge and understanding of the complex processes that impact the Mississippi River (the river is still responding to the meander cutoffs made more than 75 years ago).

Future

The lessons learned and recommendations implemented from the USACE potamology studies of the 1940s–1980s worked to help pass the record high flows of the 2011 flood. Traditional Mississippi River projects are today augmented by focused environmental efforts: restoration, conservation, recreation, coastal land loss, water quality and supply (surface and aquifer), as well as other basin-wide and localized issues. Mississippi River projects face environmental components and challenges of balancing habitat development, fisheries enhancement, recreation, threatened and endangered species, invasive species, water quality, etc., that will be championed by a wide variety of new and traditional river stakeholders.

The report provides a short historical review of USACE Mississippi River potamology studies, includes an initial bibliography of USACE potamology reports, and makes recommendations of potential actions to expand USACE technical expertise in potamology and manage a potamology program that would have short- and long-term national implications.

Summary of Significant Findings

- Potamology influences *all* Mississippi River projects and programs—historical, current, and future.
- Flood-risk reduction projects, based on potamology input, have saved billions of dollars in potential damages.
- Mississippi River environmental and ecosystem restoration projects rely heavily on potamology data.
- USACE has conducted potamology studies since the early 1800s; a vast amount of data in many locations need to be utilized.
- Reinvestment in a USACE potamology program will grow expertise and knowledge that will have national implications.

For More Information

To access the full version of *A Review of the Lower Mississippi River Potamology Program* report, click the following link: http://acwc.sdp.sirsi.net/client/search/asset/1035268

Additional MRG&P reports, historic reports, and MRG&P information can be accessed from the technology transfer section link at the MVD Historic Studies website: http://www.mvd.usace.army.mil/Missions/MississippiRiverScienceTechnology/MSRiverGeomorphologyPotamology/FieldData/HistoricStudies.aspx.

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