



US Army Corps
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Engineer Research and
Development Center

National Regional Sediment Management Program Memphis District (MVM):



Title: Geomorphic Assessment of the St. Francis River, Phase II

Description

MVM will conduct a geomorphic analysis on a portion of the St. Francis River to help understand sediment sources and the river response through the system that contributes to the continual blockages below Arkansas Highway 90. Data collected and analysis performed through this effort will inform future management decisions for the St. Francis River and its watershed.



Debris and sediment blockage Below Hwy. 90

Issue/Challenge To Address

A portion of the St. Francis River below Arkansas Highway 90 continually fills with sediment and requires significant maintenance by the Memphis District to maintain drainage through this reach and reduce standing water and seepage potential on the levees upstream of this reach. Typically, a 5.5 mile reach of the channel requires a cleanout every 5 years or less with a cost of \$2-5M. However, spoil areas are now full and local sponsors have encouraged the district to continue to haul material out of the floodway. This has become a significant money sink to the district. Other areas of the St. Francis basin experience significant bank erosion or channel incision. A geomorphic analysis of the St. Francis River is needed to understand the channel response and sediment sources to the below Highway 90 reach to help develop a long term solution. An assessment of the river from Fisk MO (RM 199.45) to the confluence with Varney River (RM 132.2) for a total 67.25 total river miles is proposed. This area extends just downstream of the below Highway 90 reach to just upstream of Wilhelmina cutoff. The lower 36.7 miles of this reach is within the leveed floodway. An extensive inventory and site visit will help identify aggradational and depositional reaches, reaches with unstable streambanks and locations of active incision. This will allow the district to gain an understanding of the sediment dynamics within the watershed. Field reconnaissance of major tributaries will also occur. Three main tributaries (Mingo Ditch, Dudley Ditch, and Ditch 12) in this reach are thought to be major sources of sediment due to known channel incision. In addition, 30 years' worth of sediment data collected by the USGS will be analyzed. Historic data and construction records will be compiled to develop a timeline of past major river engineering construction and hydrologic events.



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Successes Lessons Learned

A previous phase of this study was performed in FY20. We learned that the river system as shown significant aggradation with very little degradation. This raises the question of where the sediment in the river is originating. Lessons learned will be compiled at the end of the study.

Projected Benefits Cost Savings Value Added

This project will allow for a comprehensive assessment of a portion of the basin that will ultimately lead to a basin wide sediment management plan that targets the region as a whole. This initiative will allow for the synthesis of previous studies to give a broader view of the instabilities within the river system as well as provide valuable data for future sedimentation studies in the St. Francis Basin and for prioritizing future maintenance projects.

Expected Products

- Data for future sedimentation studies and model development
- Presentation to MVM leadership and stakeholders
- Identification of key sediment sources
- Field investigations to support results of specific gage analysis
- Timeline of major hydrologic events, channel cleanouts, etc.
- Final report

Stakeholders/Users

Stakeholders include:

- St. Francis Drainage District of Clay and Greene Counties, AR
- Eight Mile Drainage District of Greene County, AR
- Drainage District No. 48, Dunklin County, MO
- Varney River Drainage District
- Levee District No. 7 of Dunklin Co. MO
- Mingo Drainage District
- Drainage District No. 12 of Stoddard Co., MO
- Drainage District No. 12 of Dunklin Co., MO
- Drainage District No. 5

Leveraging Opportunities

This effort will leverage currently available sediment data (30 years of record), existing literature, and survey data throughout the basin to develop an exhibit that identifies areas of aggradation and degradation as well as historical trends. This initiative will allow for the synthesis of previous studies to give a broader view of the instabilities within the river system. These results will allow MVM to identify areas for future study and sediment management projects.

Points of Contact

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Participating Partners

ERDC