Red River Lock 1 Shoaling
Ben Emery

ERDC Dredging Operations Technical Support Program (DOTS)

U.S. ARMY CORPS OF ENGINEERS BUILDING STRONG®

Response Summary:

MVK requested CHL to assist in finding solutions for mitigating the extreme shoaling in the uncontrolled portion of the Red River below Lock and Dam #1. Over the last five years the approach to LD1 has required significant dredging, with the dredging generally needed to complete operations at the site multiple time through the year. Surveys showed a consistent shoaling pattern at the site, with large amounts of sedimentation after high water events. These shoals occur at the same location in any event. To reduce this dredging burden, the configuration of the structure/channel would need to be changed, or the material would need to be consistently moved via a Sediment Collection System or an Agitation System to keep the material in suspension so it will not settle.

Period of Performance:

9/24 – 11/24

Benefits of the Response to the USACE Dredging/Navigation Program:

Since 2012, 38% of the dredging funds for the Red River within MVK AOR have been spent below Lock and Dam 1. In 2012, $5.4M of the $7.7M budget on the Red River was spent below Lock and Dam 1. Reducing the dredging burden in this area will allow MVK to focus on the entire system and ensure a navigable channel through Lock and Dam 5. This will also help MVK better schedule dredging operations on this waterway, as currently the Dredge is having to traverse the waterway multiple times to keep Lock and Dam 1 open. Due to this, a lot of money is spent in moving/transit costs, rather than physical dredging.

Deliverable:

While researching past efforts at Red River Lock and Dam 1, CHL found “Technical Report HL-88-15, Red River Waterway Sedimentation Study Downstream from Lock and Dam #1”, which came to the conclusion that due to the long wall, that was previously installed beside the old floating guide wall, there would be significant deposition of material in the Lock Approach. As this sedimentation pattern was created by the structure, the structure would ether need to be altered or the sediment would have to be dealt with via dredge or other system.

CHL briefly looked at agitation systems to keep the sediment in suspension and potentially counteract the vector forces creating deposition in this area but could find no proven technology for this to work. Another alternative is to install a bedload sediment collection system in this area that would continuously remove the sediment as it deposits. After speaking with a representative from “Streamside Systems, Inc.” it was determined that this area would likely need a series of 30 ft collectors. In most cases, these systems run perpendicular to a tributary channel and reduce sediment from entering the main channel. If used in this application, the collection systems would have to run parallel to the main channel. A ballpark cost for a collection system was provided to MVK, along with a past case study on the use of these type systems. A quote was also provided to MVK for CHL to run a numerical model to ensure that this type application, or others, would work.

While reviewing the past ERDC Technical Report, MVK also came across another ERDC study provided by ITL in 2002, entitled “Risk Analysis of Design-Improvement Alternatives to the Lindy Claiborne Boggs Lock and Dam.” In conjunction with this study, MVK also uncovered plans for an improved Lock and Dam Design. At this time MVK is looking for approval to move forward on the structural changes to Lock and Dam 1. If additional modeling is needed, MVK may reach back out to CHL.

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