



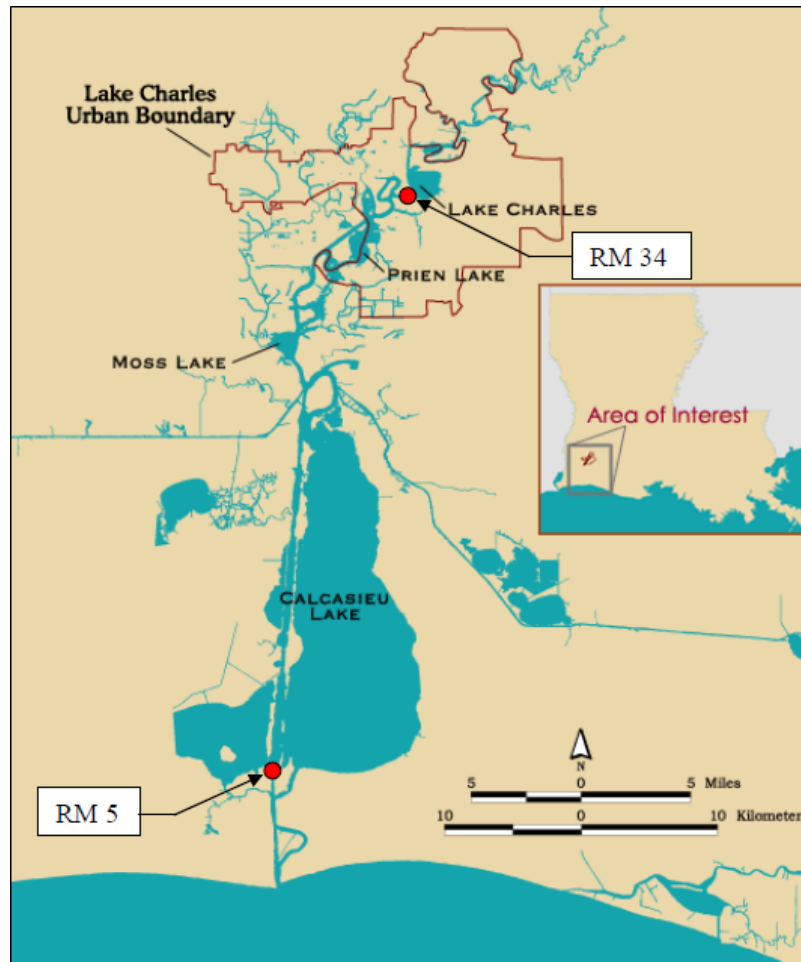
US Army Corps
of Engineers®
Engineer Research and
Development Center

National Regional Sediment Management Program New Orleans District (MVN):



Investigation of Sources of Sediment Associated with Deposition in the Calcasieu Ship Channel (CSC)

Description (This project entails the geochemical fingerprinting of probable sediment sources and shoal material samples from the Calcasieu Ship Channel to estimate the relative contribution of each source to the channel’s sediment load. Through prior studies and numerical modeling performed in FY18, these sources likely include: (1) eroded wetlands within the Calcasieu basin; (2) offshore littoral sediment; (3) eroded channel banklines; and (4) upriver inflow from the Calcasieu River drainage basin. The physicochemical characteristics that can be used to distinguish sediments rarely exist independently of each other. Therefore, a limited number of sediment and shoal material samples will be subject to a broad suite of geochemical assays to identify the most robust and cost-effective tracers. Subsequent sampling campaigns would then target shoals throughout the ship channel for geochemical fingerprinting based on these tracers.



Location of the CSC (source: Fischenich, 2004)

**Issue/Challenge
To Address**

The Calcasieu Ship Channel (CSC) is a deep-draft Federal Channel located in Southwest Louisiana. It is the channelized lowermost segment of the Calcasieu River, connecting



US Army Corps
of Engineers.
Engineer Research and
Development Center

National Regional Sediment Management Program New Orleans District (MVN):



Investigation of Sources of Sediment Associated with Deposition in the Calcasieu Ship Channel (CSC)

Lake Charles to the Gulf of Mexico. Between river miles 5 and 34, approximately 5 million cubic yards per year (mcy/yr) of sediment is dredged to maintain the channel. In 2003, MVN sponsored a study of the project to determine the extent to which erosion of the banklines and of Confined Disposal Facilities (CDF's) adjacent to the channel contribute to the shoaling. The study was conducted by personal in the Environmental Laboratory at the Engineer Research and Development Center (ERDC). The study found that approximately 0.7 mcy/yr of sediment was contributed by erosion to the sediment and available for deposition in the channel. Further, the study found that the sediment load from the Calcasieu River was approximately 0.25 mcy/yr of sediment. (Fischenich, 2004). Hence, the combined contributions of the identified sources of sediment to channel deposition are a maximum of 0.95 mcy/yr, which represents only about 20% of the total volume dredged annually. Building off of prior research conducted by the ERDC, a Fiscal Year 2018 (FY18) RSM project (Brown, in preparation) investigated the potential transport pathways for various sources of shoal material with simulations on an existing AdH/SEDLIB model. Based on findings of this investigation, roughly 40% of channel shoaling originates from eroded wetlands and banklines within the Calcasieu Basin; 20% originates from offshore littoral sediments carried in on the tide, and 5% originates from Calcasieu River inflow. Therefore, in order to understand and potentially mitigate for channel sediment deposition, it is necessary to identify and quantify the source or sources of the remaining 35% of sediment that is deposited in the CSC.

Successes Lessons Learned

Lessons learned will be compiled during the duration of this study.

Expected Products

- Identification of potential sources of sediment to the CSC
- Quantification of the range of the potential relative magnitudes of these sources
- Final report and presentation

Stakeholders/Users

Stakeholders include the Lake Charles Harbor and Terminal District, and the Calcasieu Water Safety Committee.

Projected Benefits Value Added

Depending on the conclusions of this study, there is a potential for significant value added, in terms of a reduction in dredging costs. If the investigation reveals that a significant portion of the sediment that is deposited in the CSC is derived from sources for which there is potential mitigation, then the dredging costs could be reduced significantly. In addition, the lessons learned from this effort may be applicable to other Federal navigation channels – potentially resulting in even greater cost savings and navigation efficiencies.

Leveraging Opportunities

This study will leverage several existing and ongoing studies. The identification of source material was informed by CSC sediment modeling and gradation studies performed by Brown (in preparation), Channell et al. (2004), and Fischenich (2004). In turn, the results of this study would help confirm and refine CSC source material estimates developed by Brown (in preparation). Additionally, the methods proposed in this work would be informed by work performed on Calumet River sediment sources (Perkey et al., 2017).

Points of Contact

Darren Flick, CEMVN-ED-E
Plan Formulator
504-862-1020
Darren.S.Flick@usace.army.mil



US Army Corps
of Engineers®
Engineer Research and
Development Center

National Regional Sediment Management Program New Orleans District (MVN):



Investigation of Sources of Sediment Associated with Deposition in the Calcasieu Ship Channel (CSC)

Participating Partners

There are no participating partners

References

Brown, Gary (in preparation). Investigation of Sources of Sediment Associated with Deposition in the Calcasieu Ship Channel. FY18 RSM project report prepared for US Army Engineer District, New Orleans.

Channell, Mike, Susan Bailey, and Landris Lee (2004) “Calcasieu River and Pass Dredged Material Sediment Study” DRAFT report prepared for US Army Engineer District, New Orleans.

Fischenich, Craig, J. (2004) “Calcasieu River and Ship Channel, Erosion and Sediment Impact Assessment (Phase 1)” DRAFT report prepared for US Army Engineer District, New Orleans.

Perkey, D.W.; Chappell, M.A.; Seiter, J.M.; Wadman, H.M. 2017. Identification of sediment sources to Calumet River through geochemical fingerprinting. ERDC TR-17-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.