

**CURRENT AND HISTORICAL SEDIMENT LOADS IN THE LOWER
MISSISSIPPI RIVER**

Third Interim Technical Report

by

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14. ABSTRACT Questions concerning past, present and future temporal trends in the sediment load of the Lower Mississippi River are relevant to the redistribution of available Mississippi River sediment as part of efforts to reduce loss and restore coastal lands in Louisiana. The aim of this project is to compile a comprehensive data base on measured loads in the Lower Mississippi River and supply the evidence base necessary to inform debate on the way that sediment loads have changed through time. Results from this research will then inform plans to divert water and sediment out of the river to support coastal wetland enhancement and rehabilitation in the delta.					
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Administrative Actions

During the third phase, normal administration of the project continued with contractual matters dealt with by administrative staff at the University of Nottingham, Halcrow and Cottonwood Research. There were no changes to staffing or other non-routine administrative actions.

Technical Work performed in this Reporting Period

Aim

The aim of the research is to compile a comprehensive data base on measured sediment loads in the Lower Mississippi River and supply the evidence base necessary to inform debate on the way that sediment loads supplied to the coastal area of the Gulf Coast have changed through time. Results from this research will also inform plans to divert water and sediment out of the river to support coastal wetland enhancement and rehabilitation.

Scope of Work

The contract sets out the SoW for the project in four phases. During this reporting period, work continued in Phase 1, as set out in the contract:

Phase I. Data Assembly and Reduction

1. Assemble as complete a data base of historical sediment transport data as possible, building on the data set compiled by Thorne et al. (2001) through data tracing, accessing, assimilation and entry into the master data base extending (if possible) from the time of Humphreys and Abbott (1861) to the present day.
2. Contact other parties who hold or have reported sediment transport data and attempt to acquire this for inclusion in data base – subject to stringent quality control and validation.
3. Add recent data from routine gaging on the Mississippi River to bring the data base as up to date as possible.
4. Compute best estimates of sediment loads at gage stations along the river, with appropriate uncertainty analyses and representations to represent multi-error sources.
5. Collect any existing sediment load data gathered at major diversions that presently exist along the Mississippi River (for example: Old River).

Tasks 1, 2 and 3 were essentially completed during this reporting period, although efforts to trace data will continue at a low level throughout the project. Further progress was made by the team with Task 4.

During the last reporting period, concerns arose over the accuracy of loads routinely computed by the USACE at Vicksburg District stations. Close examination of the raw data at the stations in the Vicksburg District has revealed a number of data quality

concerns that potentially limit the value of the data record. Investigations have continued into September to understand the laboratory analysis, data recording and data management procedures undertaken by the Vicksburg District to identify the source, pattern and magnitude of errors within the record. Once this work has been completed, we will develop a data quality flagging procedure to ensure that we are aware of data uncertainties in our analysis. This approach will allow the Vicksburg District data to be used in our historical analysis of changes in sediment loads. However, as a result of the data quality concerns, there is currently a high risk that the Vicksburg District data record will not allow robust uncertainty analysis to be undertaken, as originally envisaged.

To mitigate against this risk, raw data has been requested by the Halcrow team and traced by Dr Biedenbarn for the Tarbet Landing sampling site in the New Orleans District. Close liaison is currently ongoing between Halcrow, Cottonwood Research, and the New Orleans District to understand the format of the raw data for Tarbet Landing so that this data set can be used as an alternative to estimate uncertainty in the sediment loads calculated from raw data.

Under Task 5, Cottonwood Research have continued to collate existing data from diversions, but to date their investigations have found no measured data for many diversion locations. USGS sources have confirmed that no long term collection of sediment concentration is being performed at existing diversions. Data is available on the Mississippi River and for several of the existing marsh channels, and this is now being assembled, however.

Work has also continued in Phase 2 as specified in the contract:

Phase II. Historical Trend Analysis

6. Establish historical trends in annual sediment loads during the 20th century and reconcile these against published accounts.
7. Determine current sediment transport rates and historical trends at sediment gaging stations along the river and, where possible, reconcile these against published accounts.
8. Use any data available from existing diversion sites to quantify sediment discharges out of the Mississippi River and quantify sediment performance and balance at existing diversions.
9. Perform the statistical analyses necessary to estimate error bands and evaluate the confidence that may be placed in time trends and diversion performance, given uncertainties in the historical data.

Work has also continued in Phase 4 as specified in the contract, although progress to date has been limited by issues with uncertainty in the data.

Phase IV. Implications for Sediment Diversions

15. Assemble estimates of the sediment quantities and calibers available for diversions planned to promote marsh and wetland restoration.
16. Develop best estimates of needed sediment loads, with appropriate error bars to represent uncertainty.
17. Identify seasonal windows for diverting sediment out of the river for marsh and wetland restoration purposes.

Specifically, work has considered and built on the outcomes of meetings with USACE personnel and with habitat planning groups associated with local agencies have been

undertaken. The planning-level model for computation of the sediment quantities needed for construction of wetland/marsh complex per area desired obtained during the last reporting period is being evaluated. The literature review begun in August has been completed. This establishes which wetland/marsh complexes have been lost through time. It is now planned to use the estimated range of wetland/marsh land lost together with the planning level model to compute the volume of sediment of various grain sizes required to replace the lost features.

The dredging records provided by USACE, New Orleans District during the last reporting period are being analyzed. This data refers to the Mississippi and Atchafalaya Rivers and includes dredging quantities and locations for the past several years. Gradations of the dredge material are available, but this data has not yet been supplied to the team. Use of dredge material has become viewed as a viable source of material for marsh building. Dredge material is presently available, and only the added cost to deliver the material to the marsh-building site would be required.

Statistical Analyses

Statistical analyses identified and agreed upon during the last reporting period are now in place and ready for application to the database. However, application of these techniques is dependent on resolution of issues concerning data uncertainty.

Planning the 'Buy-in' Meeting

A major feature of the next reporting period is the 'Buy-in' meeting to be held with experts and stakeholders. The purpose of this meeting is to inform key individuals in all the relevant organizations that have supplied data to the team concerning what we have done with the data and to share with them preliminary and indicative findings before these are finalized. 'Buy-in' to the procedures and outcomes by the 'owners' of the data is vital to the successful dissemination and uptake of the results of this project. Hence, this meeting is a crucial reporting milestone.

The meeting date has been set during this reporting period for October 29 and 30, 2007. The venue may be Vicksburg or Tunica Mississippi. The meeting is being organized and facilitated by Mr Knuuti, with the UK and US team members assisting through suggesting key individuals who should be invited. A provisional attendance list has been prepared and is given in Table 1.

Table 1. Preliminary attendance list for the 'Buy-in' Meeting

Project Team:
Colin Thorne
Oliver Harnar
Chester Watson
David Biedenbarn

USGS:
- Brod Davis (only part of Monday, then driving to Tunica)

- Richard Coupe (Pearl)
- Mike Runner (Pearl, MS)
- (no reply from Charlie Demas, yet)

MVD:

- Eddie Brooks is a doubtful "maybe"
- Frankie Griggs
- Clarence Thomas
- James Guttshaw
- Steve Ellis
- (Donnie Cool - not sure)

MVN:

- Cherie Price
- Leslie Lombard
- Angel Mislán

MVK:

- Basil Arthur
- Joey Windham
- Michael Sorrels
- Ron Copeland

MVM:

- no replies yet

A project progress meeting was held at University of Nottingham on Tuesday September 25. This meeting will be attended in person by Mr Knuuti of ERDC together with Oliver Harmar, Nick Clifford and Colin Thorne. At this meeting it was resolved that a follow-up meeting will be held to resolve any issues that remain outstanding after the 'Buy-in' meeting during the week commencing December 3. This meeting will be lead by Nick Clifford and Richard Measures.

Plan for next Reporting Period

The final project reporting period is of nearly 6 months duration. During this period it is planned to complete the remaining Tasks in Phase 2, while revisiting issues from Phase 1. Phases 3 and 4 will be fully addressed in the final reporting period, leading to preparation of the draft final report for submission to the European Research Office.

Project variations

There were no project variations during this reporting period.