EVANS-HAMILTON, INC.

TRACER STUDY TO INVESTIGATE ISSUES RELATED TO DREDGING OF FLUID MUD ATCHAFALAYA BAR CHANNEL, LA

The U.S. Army Corps of Engineers (Corps), New Orleans District, is responsible for the maintenance dredging of the Atchafalaya Bar Channel. The rapid accumulation of high water content, fine grained sediments in the channel has been a persistent problem at the site and the Corps has undertaken numerous studies to gain a better understanding of the source and movement of these sediments. The Corps identified the following three specific questions to be addressed by a tracer study:

a) Is sediment placed by the dredge at the west and east side dredged material disposal sites transported back into the channel over short time periods as suspended solids?

b) Is the dredger resuspending large quantities of fluid mud that are redistributed throughout the mixing zone over several tidal cycles?

c) How effective is the dustpan dredge at removing sediments from the channel?

Tracer Being Injected into the Dredge Discharge

SCOPE AND APPROACH

EHI and its subcontractor, Environmental Tracer Systems (ETS), developed a two-week tracer study to address these questions. The study included the use of three silt tracers of different colors placed at specified locations and the monitoring of the movement of these tracers using sediment traps, water samples, and sediment samples.

Sediment Trap

The first tracer was placed directly into the dredge discharge over an 8-hour period, the second tracer was placed in sediments in the channel just prior to dredging, and the third tracer was placed to the east of the channel to act as a control.

RESULTS

The tracer results clearly showed the following:

- A portion of the dredged sediments are rapidly transported back into the channel as suspended sediment.
- Deposited material is likely to be eroded/entrained & transported back into the channel even in low energy tidal conditions.
- The dredging system used did not resuspend significant volumes of sediment in the channel during the dredging operation.
- The dredging system was effective at removing sediments from a given portion of the channel in close proximity to the dredge head.

Tracer definitively showed that the channel is an extremely effective sediment trap and that even though long-term sediment transport may be to the west, if sediment encounters the channel as it moves back and forth with the tidal currents, it will likely be captured by the channel and remain there.

Project sponsors reported that the tracer study proved very valuable in gaining better comprehension of sediment transport at the site.