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At the request of the Missouri Sedimentation Action Coalition (MSAC), the Missouri River Institute (MRI) at the University of South Dakota has conducted a research project to look at sedimentation processes and impacts in the Missouri River near Springfield, SD. The main goal of the project was to review previous reports and data, and conduct new field surveys to provide a visualization of historical and future sediment accumulation in the Lewis and Clark Lake Delta. Specific questions that were addressed included:

- How has the delta evolved since Gavins Point Dam was built?*
- How far will the delta migrate in the future and what will it look like?*
- Where does the sediment in the delta come from?*

The primary objectives of the project were:

- 1. Compile information from previous science and engineering reports*
- 2. Re-interpret existing charts and create new charts from spreadsheets of raw data*
- 3. Conduct new field surveys of the delta*

Observation and conclusions from this project are:

Delta hydrology and geomorphology

- Closure of Gavins Point Dam in 1955 reduced the river's ability to carry sediment downstream.
- Half of the sediment accumulating in the delta comes from the Niobrara River.
- The delta migrated downstream at an average rate of 400 feet per year from 1978 to 2012.
- Flows in the river system can greatly impact delta movement. High flows in 1997 and 2011 each pushed the delta forward about 4,800 feet.
- The reservoir has lost 30% of its storage capacity.
- The reservoir is predicted to fill by 2175.

- Sediment management can extend the life of Lewis and Clark Lake and the benefits provided by the dam and reservoir.
- Ground water levels are expected to increase an average of 7 feet in the delta area in the next 50 years, impacting infrastructure and property.

Delta ecology

- Vegetation cover varies from Phragmites (common reed grass) to cattail marsh to bare sand. Phragmites is the dominant vegetation.
- Phragmites spreads aggressively, can quickly colonize bare sand patches, and crowds out native wetland plants, preventing diversity in the wetlands.
- Several patches of cottonwood and willow trees were observed. These trees cannot tolerate chronically saturated soils and were only present on sandbars built high above the water table.
- A recent animal survey of the delta found a diversity of species similar to what would be expected in other parts of the river, with 79 species of birds, 5 species of frogs/toads, 4 species of turtles, and 1 species of mussel (Kerby and Swanson, 2012).

During our review of previous literature, we determined that several good recommendations for sediment reduction exist. They are:

- Regional sediment management along the lower Niobrara River (WEST Consultants, 2010)
- Move existing and new sediment to below Gavins Point Dam (Coker et al., 2009)
- Lewis and Clark Watershed Project -- Best management practices to reduce sediment, nutrients, and other nonpoint source contaminants. (Randall RC&D, 2009)

The documents contained in this PDF portfolio are the products that the MRI research team produced. These products provide a visualization of historical and future sediment accumulation in the Lewis and Clark Lake Delta.

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