

**SEDIMENT AND NUTRIENT TRAPPING ON THE MORGANZA SPILLWAY  
DURING THE 2011 MISSISSIPPI RIVER FLOOD.**

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The 2011 Mississippi River Flood resulted in the opening of the Morganza Spillway for the second time since its construction in 1954. The opening of the Spillway structure released 7.6 km<sup>3</sup> of water through agricultural and forested lands into the Morganza Floodway and the Atchafalaya River Basin (the Basin). This volume represented 5.5 % of the Mississippi River (MR) discharge and 14% of the total discharge through the Basin during the Spillway operation and 1.1 % of the MR and 3.3% of the Basin 2011 water year discharge. During the release there was a net sediment deposition of 0.77 Tg over the 500 km<sup>2</sup> Morganza Spillway and 0.26 Tg was eroded from behind the Spillway structure. The majority of deposition (63 %) occurred in the Forebay (upstream of the structure) and within 4 km downstream of the Spillway structure with minor deposition on the rest of the Floodway. There was a net deposition of 2,600 Mg of nitrogen (N) and 536 Mg of phosphorous (P), during the diversion and was equivalent to 0.17% N and 0.33% P of the 2011 annual MR load. Deposited sediment (84%) was composed of particles that were finer than 50 µm. Median deposited sediment grain size at the start of the Forebay was 13 µm and decreased to 2 µm 15 km downstream of the Spillway structure. Deposition on the Morganza Spillway was limited by a lack of hydraulic connectivity. There was one source of water whose sediment and nutrient content were rapidly deposited. The reconnection of floodplains via flood control spillways can be an effective means to reduce nutrient loading to eutrophied water bodies, like the Gulf of Mexico.