

Restoration of Mississippi River Delta

A. Overview Mississippi watershed, river and delta

- a. 41% of the continental US drains into the Mississippi
- b. Over the years communities along the river built levees for flood control. Now levees control most of the river. Without flooding, the wooded bottomlands are lost, and the river continues to deposit silt into the Gulf of Mexico, extending a spit of land where the river empties.
- c. Above Baton Rouge, the US Corps of Engineers built control structures to keep the river from breaking the banks and forming a new channel. They now allow 30% of the river's water to divert at this point, and the rest flows on down the Mississippi.
- d. New Orleans and Lake Pontchartrain are also surrounded by levees to protect them from flooding. Pumps from the lake can drain this area at the rate of 1 inch per hour in the case of heavy rainfall.
- e. Catastrophic events typically cause the river to change directions on occasion. Hasn't happened recently due to human intervention.

B. Restoration

- a. Hypoxia - $DO < 2$ mg/L in an area of 1.6 to 2 million ha in the Gulf of Mexico
 - i. 80% of nitrogen input from 3 million km² in the river basin. From farms (N fertilizer, non-point source pollution - field runoff) and cities (NO_x compounds from car emission).
 - ii. Treatment - increasing river bottom forest wetlands by allowing controlled release of water and silt through levees.
 1. Denitrification takes place in the wetland, converting nitrate (NO₃) to nitrous oxide (N₂O) to nitrogen gas (N₂). Gases escape, lowering N in wetland system. N₂O is a harmful greenhouse gas, N₂ makes up most of the air and is not harmful
- b. Delta
 - i. 36,000 km² of marsh, swamp, shallow lakes
 - ii. losses - about 10,000 ha/yr, land subsidence, levees, sediment diversion, climate change
 - iii. 1990 Coastal Wetland Planning, Protection, Restoration Act
 1. to build new deltas - diverting the river
 2. to build new barrier islands
 3. cost of \$50 million /yr - for a total of \$14 billion
 4. lost value if not completed - \$37 billion