

The Bohemia Spillway in southeast Louisiana: The 2008 Flood Event

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The Bohemia Spillway area is defined here as the 12 mile reach on the east bank of the Mississippi River approximately 45 miles downriver of New Orleans extending below the terminus of the Mississippi River (MR&T) levees to Bayou Lamoque (**Figure 1**). The Bohemia Spillway area has a complex legal and historical legacy since approximately 33,000 acres were authorized to be expropriated in 1924 by the Louisiana state legislature (United States Court of Appeals, the Fifth Circuit, 2002). Although the legislature moved to return the property in 1984, it was not until 2006 that heirs to the prior landowners won back their property through more than a decade of litigation.



Figure 1: Bohemia Spillway area is east of the Mississippi River downstream of the terminus of the Mississippi River levee (source basemap: SONRIS CIR 2005).

From approximately 1924 to 1984, the Bohemia Spillway was under management by state agencies, such as various levee boards and predecessor agencies to the Department of Wildlife and Fisheries and the Department of Natural Resources. Landscape management goals are unknown, but may have been for fisheries management or management of river flood stage. USGS quad maps and the Louisiana Coastal Zone Map (2002) identify the area as the Bohemia State Wildlife Management Area or Point a la Hache Relief Outlet. Little is known and or well documented about the Bohemia Spillway region, but it may prove be an analogue for riverine processes and instructive to coastal restoration.

Informal investigation of the Bohemia Spillway area by the Lake Pontchartrain Basin Foundation, National Audubon Society and Pontchartrain Institute for Environmental Sciences began in 2007 and 2008, and is ongoing. Below are some preliminary observations.

- A natural levee is present throughout the Bohemia spillway region and is the dominant landform. It has been impaired, including at least; historical deforestation, dredging of canals, an elevated road made of limestone rubble, several borrow pits, river channel bank stabilization, and land clearing for roads, pipelines and power lines.
- The forested natural levee crest near the river is probably four to six feet above sea level and slopes eastward toward the marsh and Breton sound. On average, the width from the river to the sound is three miles.
- The forest has indigenous species, such as live oak, black willow, and baldcypress, but also invasive species such as tallow. The marsh transitions over a few miles from intermediate to brackish. In places within the marsh, dense stands of Roseau cane are present. Most of the trees appear relatively immature except for some live oak located on a spoil bank adjacent to the natural ridge. Marsh habitat appears healthy with relatively firm soils (non-quantified observations).
- At least three generations of engineered river discharge structures are present and include an uncontrolled spillway weir with a concrete embankment, a controlled diversion with three box culverts, and several uncontrolled pipe culverts. All of these structures have a history of function and subsequent damage. Most are now abandoned and may be non-functional. Locals report that annually the road (and natural levee) can have minor overtopping by river discharge for short durations. Although outside of the Bohemia spillway, two additional historical diversions are located nearby at Bayou Lamoque and may have influenced the Bohemia Spillway area habitats when they were operational. A new generation of diversion within the Bohemia Spillway area has been authorized by CWPPRA.
- Land loss maps or land change maps by the USACE and by the USGS illustrate that, except for the direct wetland loss from canal excavation and slight shoreline erosion near the sound, land loss of the wetlands within the Bohemia Spillway region are low, being approximately 20% loss from 1932 to 1990 (**Figure 2**). “Interior” patterns of marsh loss commonly seen elsewhere in the Louisiana coast are not present.

In 2008, the Mississippi River was at flood stage from March 13 to July 20 and during this time several visits to the Bohemia Spillway area and an over flight reconnaissance were conducted. Some landscape (elevation) and hydrologic (velocity) data were collected. During the 2008 flood event, 1.7 miles of the riverbank were observed to have four active flowing breaches with

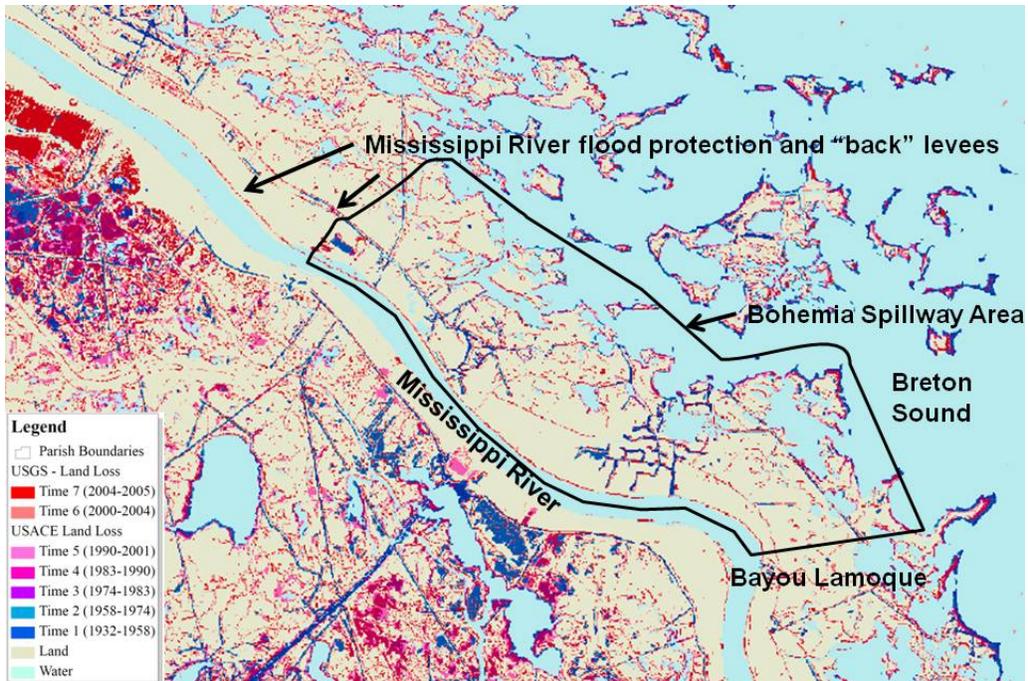


Figure 2: Composite wetland loss (change) map from USGS and USACE data sources (LPBF and CRCL, 2008).



Figure 3: Mississippi River discharge through a breach eroded through the road and into the natural levee within the Bohemia Spillway area during high water on May 24, 2008.

incision through the road and into the natural levee (**Figure 3**). In addition, the natural levee and road were overtopped for 0.6 miles with a depth of 0.1 to 1.5 feet (**Figure 4**).



Figure 4: Mississippi River flow overtopping the road on the natural levee within the Bohemia Spillway area during high water on May 5, 2008

Although overtopping observed in 2008 was influenced by the road and other human alterations, the 2008 event and future flood events at Bohemia Spillway may represent the best modern analogue to the natural riverine process of overbank discharge on the lower Mississippi River. In addition, the history of success and failure of successive diversion structures within the Bohemia Spillway may provide valuable lessons for designing future structures. The curiously low historical land loss is anomalous and begs the question: ‘why?’

References Cited

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United States Court of Appeals, the Fifth Circuit, 2002 no. 01-30728, Anthony L. Vogt, versus Board of Commissioners of the Orleans Levee District, and James Huey.