

Changing Hydrology of a Large, Floodplain Lake in Response to Geomorphic Alterations at the Head of the Mississippi River Delta

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Abstract. Natural and anthropogenic changes in the geomorphology of the Mississippi, Red, and Atchafalaya rivers during the last 200 years have impacted the hydrology of these rivers, their tributaries, and lakes in their proximal floodplains in Louisiana. The hydrology of Catahoula Lake, which is a large, backswamp lake with large annual fluctuations in its water level near the confluence of these rivers, is driven by local rainfall but also by backwater effects. Historic gauge readings, elevation-controlled forest banding data developed from bearing tree notes recorded in the field notes of US Government surveyors in the early 1800s, and historic data about alterations such as removal of the great Atchafalaya River Raft debris jam indicate regionally consistent changes. Maximum annual high water stage has apparently not changed substantially over the last 200 years, but the duration of higher stages has decreased. For example, in 1929 the expected annual duration of lake level exceeding 5 m depth was 118 days, but by 1995 expected duration above that stage had dropped to 65 days. There are legal implications of changing lake stages because of land ownership boundaries that depend on high water marks. There are also ramifications for ecosystems in Catahoula Lake and the regional floodplain that are unknown but may be related to encroaching woody vegetation at the lake margins that is degrading important wildlife habitat.

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