

# Bays on US Gulf Coast vulnerable to flooding

October 2 2008

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The most comprehensive geological review ever undertaken of the upper U.S. Gulf Coast suggests that a combination of rising seas and dammed rivers could flood large swaths of wetlands this century in one or more bays from Alabama to Texas.

"In terms of sea-level increases and river sediments flowing into the bays, we're rapidly approaching a time when bays will face conditions they last saw in the Holocene, from about 9,600 until 7,000 years ago," said lead researcher John Anderson, the W. Maurice Ewing Professor in Oceanography and professor of Earth science at Rice University. "That period was marked by dramatic and rapid flooding events in each of these bays -- events that saw some bays increase their size by as much as one-third over a period of 100 or 200 years."

Anderson is presenting the findings at next week's annual meeting of the Geological Society of America (GSA) at Houston's George R. Brown Convention Center. Anderson said the magnitude of flooding seen in bays during the Holocene -- the geological epoch that began 10,000 years ago -- would be noticeable and apparent, even on a year-to-year timescale.

"If you lived at the head of Galveston Bay, near Anahuac (Texas), you could see the bayhead move northward by as much as the length of a football field each year," Anderson said.

Anderson and colleagues, including Antonio Rodriguez of the University of North Carolina at Chappell Hill, compiled their research in a new

146-page monograph published by the GSA, "Response of Upper Gulf Coast Estuaries to Holocene Climate Change and Sea-Level Rise."

Their findings stemmed from an analysis of 30 years of data from hundreds of bayfloor sediment samples, radiocarbon tests and seismic surveys from Galveston, Matagorda and Corpus Christi bays in Texas, Mobile Bay in Alabama, Calcasieu Bay in Louisiana and Sabine Lake on the Texas-Louisiana border.

"There is no question that sea levels are rising in this region at a rate today that approaches what we saw in the Holocene," Anderson said.

He said the Holocene was also marked by alternating wet and dry periods upstream, particularly in central and western Texas. There was significantly less sediment flowing into the bays during the dry periods, and the researchers found that the most dramatic flooding events occurred when less sediment was flowing into the bays at the same time that sea levels were rising faster than four millimeters per year.

Anderson said that's a particularly troubling finding because several recent studies have confirmed that the rate of sea-level rise along the Gulf Coast has doubled in the past century to a current rate of about three millimeters per year. At the same time, the installation of dams upstream has slashed the amount of sediment flowing into every southern U.S. bay.

"Our research paints a pretty clear picture of what happened in these bays the last time they encountered the circumstances that we expect to see during the coming century," Anderson said. "Our hope is that policymakers will take note of the potential danger and take steps to help alleviate it."

For example, Anderson said it doesn't make environmental sense to keep

a navigation channel open between the lower Trinity River and upper Galveston Bay because the channel diverts the sediment that is flowing into the bay, preventing it from replenishing the upper bay wetlands near Anahuac.

"Now that we're aware of the dangers, there are clearly things we can do to try and avoid them," he said.

Source: Rice University

Citation: Bays on US Gulf Coast vulnerable to flooding (2008, October 2) retrieved 5 May 2024 from <https://phys.org/news/2008-10-bays-gulf-coast-vulnerable.html>

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