

Troubled islands: Hurricanes, oil spill and sea level rise

October 29 2010

The islands flanking the outlet of the Mississippi River are not only facing losses due to sea level rise and local subsidence, according to one study, but new unknown impacts from oil recovery operations, say researchers working on another project. Both will be presenting their work on Nov. 1 and 2 at the meeting of the Geological Society of American in Denver. Some islands could disappear entirely in coming decades, exposing huge swaths of marshland to the waves of the open sea.

On one side of the [Mississippi River](#) outlet, to the east of the river outlet, is the Chandeleur Islands-Biloxi Marsh system which is on its last legs, say researchers studying the recent geological history of the area via peat layers beneath in the marshes. On the other side, to the west, is Grand Isle which is the focus of a study that helps document what conditions BP needs to restore oil-damaged beaches to return to some kind of normal state – at a time when the island itself is undergoing massive and rapid changes due to hurricanes and repeated beach nourishment efforts.

Islands' Last Gasp

The Chandeleur [Islands](#), are remote, tenuous strips of sand that have served as surf breaks for the steadily sinking Biloxi Marsh. The marshes used to be farmland and are still fishing grounds, though no one lives in the area today, say researchers who now say these islands' are on track for oblivion.

"Hurricanes have done a number on them," said Mary Ellison of the University of New Orleans. Ellison and her colleagues have been putting the present storm batterings and bleak future of the islands and marsh into perspective by studying the past via sediments beneath the marsh. Ellison is scheduled to present their work on Nov. 2.

The sediments show that a thousand years ago the disappearing marshes were part of the delta with the Mississippi river debouching in an eastern direction, loading the area with sediments. Then the river abandoned the east channel and drained further west. Waves from the Gulf took over and started chipping away at the delta, eventually winnowing out the finer grained silts and leaving the larger-grained sand. That piled up along long strips to create the Chandeleur Islands.

Today, the thousand-year trend is being accelerated by the lack of any sand from the Mississippi River to feed the islands. The islands are now cannibalizing themselves in order to maintain their shorelines. Unfortunately, unlike what was once supplied by the river, the supply of cannibalized sediment is finite. The result is that the islands are on course to become little more than shoals in 50 years or so, Ellison explains.

"These islands are beyond the point of recovery," said Ellison. If the past is any measure of the future, the loss of the islands will allow more waves to attack the marsh directly, which will lead to more winnowing of fines and coarse material, and perhaps the creation of another long strip of islands closer to the mainland, she said.

"It's kind of at warp speed" compared to such changes at other barrier island systems along other coasts, said Ellison. And that's exactly why the Chandeleur Islands are so important to study for the sake of barrier islands everywhere.

Beaches in 3D

Far to the west, on the other side of the current Mississippi River outlet, a section of Grand Isle State Park has been divided into 59 cross sections 50 meters apart along a 3 kilometer stretch of beach in order to study how the beach is changing over time. Researchers from Tulane University and the University of Massachusetts at Dartmouth have been monitoring the beaches evolution since Feb. 2008, which has included the effects of two hurricanes, two beach nourishment projects and BP oil clean-up operations.

"There have been two beach nourishments since Gustav and Ike," said Tyler Brown of Tulane University. Brown will be presenting a poster on the ongoing project on Monday, Nov. 1, at the annual meeting of the Geological Society of America in Denver.

"The BP cleaning process is to scrape the top layer of sand off the beach and clean it," Brown said. With the oil spill coming on top of the most recent beach nourishment project completed in March 2010, that has resulted in some interesting changes and maybe even a net gain of sand for the beaches in some areas, he said.

"I was actually very surprised by the result of our data sets," Brown said. He hopes to have additional data from October measurements to present at the meeting that may help tease out the effect of oil spill clean up operations on the Grand Isle beach sand budget.

More information:

gsa.confex.com/gsa/2010AM/finalsearch.cgi?/abstract_181274.htm

gsa.confex.com/gsa/2010AM/finalsearch.cgi?/abstract_177355.htm

Citation: Troubled islands: Hurricanes, oil spill and sea level rise (2010, October 29) retrieved 26 April 2024 from <https://phys.org/news/2010-10-islands-hurricanes-oil-sea.html>

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