

Climate change already showing effects at Kennedy Space Center

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The effects of climate change are already showing up in places from Miami to Alaska, scientists say, but two University of Florida geologists are focusing their attention on one especially noteworthy and vulnerable piece of waterfront real estate: Kennedy Space Center.

What's more, they say, the problem could affect operations at the [space center](#) within the next decade.

"We were a little blind to it, like pre-Katrina New Orleans," said one of the researchers, assistant professor Peter Adams of the UF Geological Sciences department. "Now that we've seen it, we're sensitive to it."

Adams and associate professor of geology John Jaeger, who have been studying Cape Canaveral's dunes and beach since 2009, say the impacts became most apparent after Hurricane Sandy.

"Sandy got a lot of press up north, but it really did a tremendous amount of damage at Cape Canaveral," Jaeger said. "Areas that had previously been relatively stable for decades ... suddenly they were gone."

Adams said a combination of [climate change](#)-related sea-level rise and increased wave energy is almost certainly to blame.

"Certainly it's occurring now," he said. "Is it affecting NASA infrastructure? The answer is yes."

Among the already apparent evidence:

- Dunes that historically protected Kennedy Space Center from high seas even during the worst storms were leveled during Tropical Storm Fay in 2008, Hurricane Irene in 2011 and Hurricane Sandy in 2012.
- A stretch of beachfront railroad track built by NASA in the early 1960s that runs parallel to the shoreline has been topped by waves repeatedly during recent storms. Though idle now – one vulnerable section has even been removed to make room for protective manmade dunes the track serves as a useful yardstick for the Atlantic Ocean's growing incursions. One 2010 NASA report predicts it will be permanently breached by 2016.
- After Sandy, one washed-out section of shoreline was so close to a launch pad at adjacent Cape Canaveral Air Force Station that a fence surrounding the pad was left teetering and near collapse.

Nancy Bray, director of center operations for Kennedy Space Center, said NASA is taking the situation seriously and has plans for dealing with it. A similar plan has been prepared for NASA's Wallops Island Flight Facility in Virginia, though Wallops has not yet seen the effects that have shown up at Kennedy.

"We do consider sea level rise and climate change to be urgent," she said.

The research came about after NASA partnered with the U.S. Geological Survey and UF to figure out why chronic erosion was happening along a roughly 6-mile stretch of beach between launch pads 39A and 39B – the ones used for Space Shuttle and Apollo missions. The problem had been occurring for years but seemed to be growing worse, beginning with the spate of hurricanes that struck Florida in 2004.

Jaeger said he, Adams and doctoral students Shaun Kline and Rich Mackenzie determined the cause was a gap in a near-shore sandbar that funnels the sea toward that section of beach. Faced with the question of what was causing the increased vulnerability in that part of the shoreline, they soon came to the conclusion that the culprits were sea-level rise and wave climate change.

As for what could be at risk next, the first item on the list is a two-lane road the runs parallel to and slightly inland from the railroad track. Buried beneath it are electrical power lines and pipelines used to transport liquefied gasses.

In the short term, NASA has built new dunes to replace the natural ones that were lost on the threatened section of shoreline. Visitors on tour buses can look out over one of the new dunes from an elevated mound on the beach.

"Without that secondary dune line, we could have saltwater intrusion at the launch pad," Bray said.

Looking further into the future, the agency is taking an approach it calls "managed retreat." That means if sea-level rise becomes insurmountable, Bray said, it may eventually have to move roads, utilities and perhaps even launch pads – a costly and complex possibility.

"When you put immovable infrastructure right next to a dynamic environment," Jaeger said, "something has to give."

Provided by University of Florida

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