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### Rising Seas are Coming for the Dead

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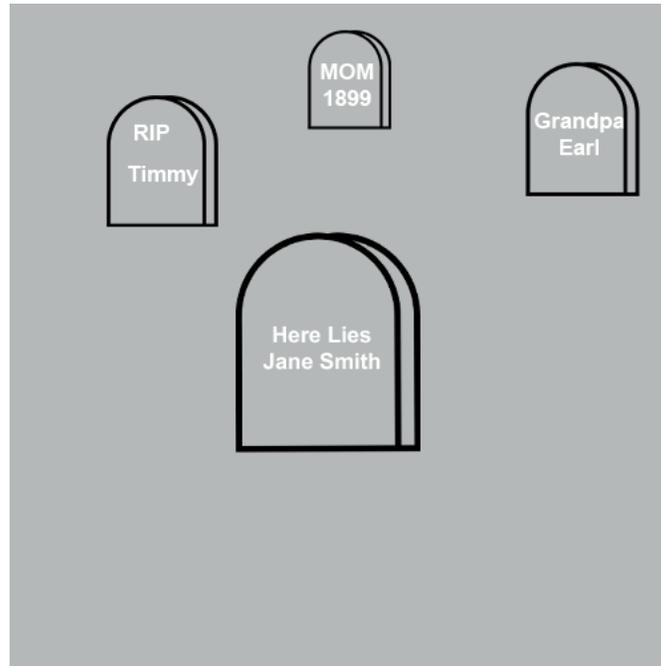
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# Rising Seas are Coming for the Dead

Climate-driven flooding and storm surges are endangering coastal cemeteries.

By Kristen Ancillotti



*Sea-level rise is causing increased flooding in coastal cemeteries.  
Animation by Kristen Ancillotti.*

In September 2019, Tropical Storm Imelda made landfall in southeastern Texas and caused devastating flooding, with 31 inches of rain falling in 12 hours in some places. Cars were stuck on the road, 5,100 homes were destroyed in one county alone, and five people died.

But it was not only the living who were affected. In Mary Williams Cemetery in Orange County, caskets floated in murky water next to partially submerged headstones. One coffin was found over half a mile from the cemetery, according to a report by 12News, a station in Beaumont.

Similar reports have emerged recently in North Carolina, South Carolina and other states. When a massive, slow-moving storm hit Denham Springs, Louisiana, in 2016, over a dozen caskets popped out of the ground. Four floated over the cemetery fence and were found in the street.

“High-tide flooding” is occurring three to nine times more frequently on U.S. coastlines than it did 50 years ago, and these storm surges are pushing further inland than before, according to an article published in December by the National Oceanic and Atmospheric Administration (NOAA). Projections from NOAA indicate that the global mean sea level is likely to rise at least 12 inches by 2100, and in a worst case scenario in which greenhouse gas emissions are at their highest, as high as 8.2 feet. About 40 percent of Americans live on the coasts, and they are already anticipating damage to infrastructure, installing permeable pavement when possible, raising the elevation of roads and homes, and relocating wastewater-treatment plants.

But a growing problem that few people are talking about is the destruction of low-lying cemeteries. As sea levels continue to rise, more and more cemeteries will wash away, sink, or crumble into the ocean. Coastal cemeteries in New York, New Jersey, Virginia, Florida, and California are likely to be affected in the near future, based on a 2012 study in *Environmental Research Letters*. The study used data from the United States Geological Survey to figure out what communities and assets could be most at risk.

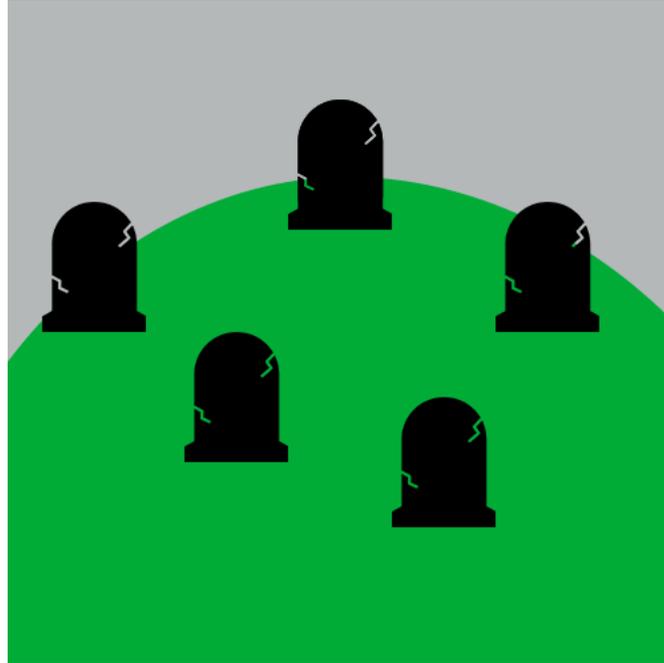
There are an estimated 145,000 cemeteries in the U.S., based on data compiled by data visualization expert Joshua Stevens, who created a map using information from the Bureau of Labor and Statistics, the US Census Bureau, and OpenStreetMap. Most cemeteries are concentrated in the eastern half of the country with clusters along both coastlines, putting them in a position of vulnerability.

Repeated disasters are depleting the finances of small cemeteries, putting families of loved ones through further trauma, and destroying the shared history of communities. Cemetery managers are taking notice. At its annual meeting in April 2020, the International Cemetery, Cremation & Funeral Association will discuss how to plan for and recover from disasters.

“The ‘100-year-storm’ now happens three to five times a year,” said Poul Lemasters, general counsel for the trade association. “That is a problem I see for cemeteries across the U.S., be it from flooding, tornadoes, or hurricanes.”

Rising sea levels can affect cemeteries in a number of ways. In places like North Carolina’s barrier islands, which barely rise above sea level, erosion has caused two cemeteries on Shackleford Banks to fall into the sea. Orrin Pilkey, a retired professor of geology at Duke University said the one remaining cemetery at Shackleford Banks was getting closer and closer to disappearing. “Twon’t be long,” he said.

Less exposed cemeteries may not utterly disappear, but they can transform dry land to marsh. Bones can wash out of the soggy ground, or entire caskets can become unearthed.



*As cemeteries are inundated with water in some areas, they may be taken over by marshland, and bones creep to the surface.  
Animation by Kristen Ancillotti.*

The 2016 flooding of Denham Springs, Louisiana, is notable because the cemetery is further inland, about 40 miles from Lake Pontchartrain, which is connected to the Gulf of Mexico. Sustained rain combined with storm surges soaking the ground created conditions that led to catastrophic flooding. Residents first noticed the caskets when they went to muck out their homes the day after the flood. Calls started coming in to Gerard Landry, the mayor of Denham Springs.

“We would get the call and then we’d have to send somebody out to retrieve the casket,” said Landry. “That’s not something I ever thought I would have to do.”

Landry called the Louisiana Funeral Directors Association president for guidance on how to recover the caskets that had floated off the grounds. Landry at first planned to move the stray caskets down the street to the funeral home, but that was flooded as well. City officials settled on taking them back to the cemetery and putting them on tarps, then covering them so they would not suffer further damage.

Their bigger challenge was figuring out where the coffins belonged, as they had over a dozen to put back in the proper place, and a flooded landscape of soggy ground and knocked over headstones to navigate. Landry said they had to cut the top off the caskets and examine the bodies, looking for unique identifying marks. If someone had distinctive jewelry that had been documented in their file, they were able to identify them that way. In the end, there was only one casket whose remains could not be identified.

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**When caskets floated out of the Denham Springs Memorial Cemetery, they had to cut the top off the caskets and use identifying marks on the bodies or distinctive jewelry to return the deceased to the right grave.**

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It can be hard to put numbers on how many cemeteries are already affected nationwide, because there is no formal reporting system or federal agency overseeing cemeteries. Cemeteries can be publicly or privately owned, but they are run at the local level, with state boards ensuring they follow regulations. Even without a centralized place for reporting, word is starting to get around in the death care community that cemeteries are struggling.

“Any time you see all these floods, hurricanes, tornadoes, or anything that hits like that, chances are there’s a cemetery that’s been affected,” said Lemasters. “A lot of times the cemeteries are left alone to solve the problems. You don’t hear about it, they just take care of it.”

Insurance may handle some of the costs, but depending on where the cemetery is located, flooding may not be covered. People operate under the erroneous assumption that cemeteries have endless money to handle these types of things, through funding from cemetery endowment care trust funds, according to Lemasters. These funds are a way to ensure that there will always be income available for maintenance and upkeep of the cemetery, even after all plots are sold. However, the cemetery is only allowed to use the interest the trust generates, so if multiple disasters occur, there won’t be enough money to cover the costs.

Cemetery destruction is more than a financial nightmare for cemetery owners. It can be a personal trauma for relatives of the people buried in those plots. Local news reports in affected areas often show a stricken family member, heartbroken to find that their loved one’s grave has been disturbed, and unsure of how to proceed if the cemetery is unable to fix it.

In Denham Springs, the priority was to rebury stray caskets, but there were other issues, like headstones that had fallen over and needed to be reset. One man went to Landry with concern over his grandfather’s grave. The ground around it was so soggy that the cemetery had to pay to have someone suck out all the water. For Landry, it was worth it to put the man’s mind at ease about his grandfather’s resting place.

While cemetery owners must think of the pressing needs of families of the people buried in their cemeteries, there are also historic and cultural impacts when a cemetery is destroyed or damaged.

“They’re not really thought of as something that immediately needs to be preserved,” said William Lovekamp, professor of sociology at Eastern Illinois University, and an expert in cemeteries and disaster planning. “Cemeteries are such an important part of communities, of community identity, and of family history and heritage.”

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**“Cemeteries are such an important part of communities, of community identity, and of family history and heritage.” – William Lovekamp, professor of sociology at Eastern Illinois University.**

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It has only been in the last five years that people in the cemetery business have begun talking about disasters repeatedly striking, said Lemasters. Cemetery owners are still in the stage of realizing it's a problem and trying to figure out strategies to lessen the impact.

It is essential that cemeteries be mapped and documented before a disaster strikes, according to Lovekamp. It's the same survey process that is used to assess property boundaries, combined with recording burial information for each plot.

Typically, active cemeteries that operate as for-profit businesses will use high-tech data gathering tools like Geographic Information Systems, which includes data about headstones, footstones, and corner markers, as well as the roads and landscaping near it. This will usually show information in map form, and may be used in tandem with other digital records like photos or burial records.

Since some of the technology that is used is expensive, like Ground Penetrating Radar or Electromagnetic Induction for mapping unmarked graves, it may not be possible for all cemeteries to have access. There are instances where local preservation societies or associations in smaller or non-profit cemeteries may be able to get access to these tools, and if an area has heavy tourism, they can work with the tourism board to map historic cemeteries.

In spite of the cost, Lovekamp said that it is worth it to be able to recreate what the cemetery was like before the disaster--for history, the community, and individuals. In some instances, Lovekamp found that people checked their cemeteries before they would check their house for damage to make sure their loved ones graves were still intact.

“In a way, I guess it's like family pictures,” said Lovekamp. “Cemeteries tell the story of your family lineage. That's what I love so much about it. It's one of the ways that people try to recreate the sense of home and family.”

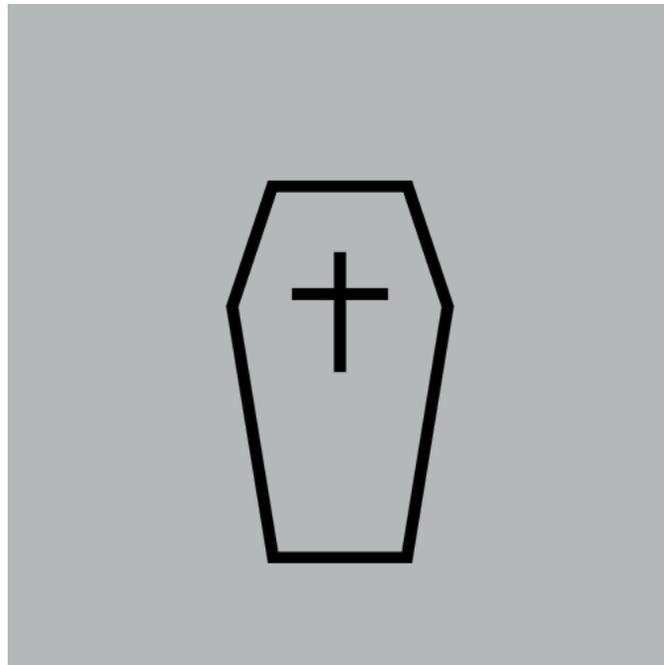
This may be why some people feel tied to cemetery locations that seem to be doomed, as in the case of the barrier islands of North Carolina that are teetering on the edge of disappearance. People residing near the outer banks resist the idea of moving away from the shoreline, or moving the cemeteries, because they do not want to be separated from their dead, according to Pilkey.

The average cost of moving one grave is in the thousands, so it would be a massive investment to move an entire cemetery, in areas that have probably already depleted their funds from dealing with previous flooding. When money is needed for new homes and infrastructure for the living, the steep price tag of cemetery relocation may not be seen as a priority.

There are also state laws governing how and under what circumstances bodies can be moved. There are procedures and notices required, and at this point, Lemasters said there is not a provision that allows for it due to emergency circumstances like floods.

Cemetery experts are focused on strategies that are less expensive than moving graves. In Denham Springs, officials recently changed an ordinance so that newly interred bodies must be buried six feet deep with four feet of dirt on top of the coffin, in the hopes that they will stay there the next time it floods. They have also adopted a method of identification for caskets so that bodies may be reunited with their coffins.

This method entails the use of coffin identification tubes, also referred to as “memory tubes”, which holds a scroll of paper with the person’s name, sex and date of birth. The glass tube is then screwed into the coffin, usually near the right foot.



*Caskets now come with coffin identification tubes to be used in the event of a disaster as a way to match the deceased with their graves. Animation by Kristen Ancillotti.*

“There are things that are being thought of now that weren’t being thought of 10 to 20 years ago,” said Lemasters.

Lemasters said at the upcoming cemetery trade association meeting, officials will discuss the impacts of repeated storms and will brainstorm ways of managing weather damage and financing strategies.

“With most cemeteries, the plan is, once you have a burial you’re done,” said Lemasters. “What these cemeteries are seeing is that with more and more 100-year-storms, they’re having to relook at what they do and how they do it. It is changing, you know. Time will tell.”