Underwater: Data Centers Nationwide Must Prepare for Flooding

Justine Brown | August 28, 2014

According to a study by the Proceedings of the National Academy of Sciences (PNAS), the future looks wet. The study, Multimillennial Sea-level Commitment of Global Warming, found that the mean sea level has risen steadily over the last century and will continue to rise unless the current global mean temperature trend is reversed. What this means, according to PNAS, is that more than 1,000 cities will be all or partially under water within the next century.

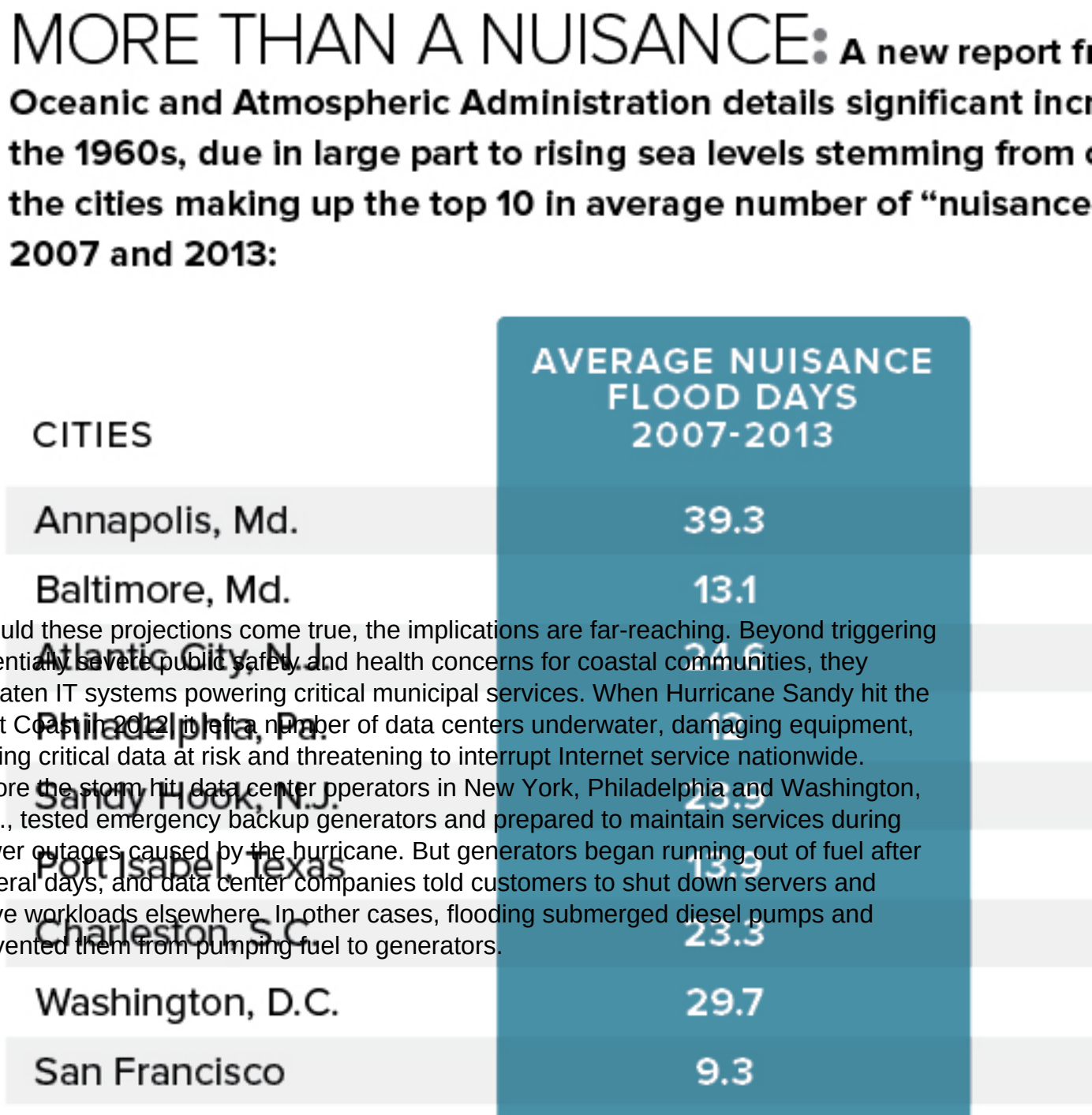
Benjamin Strauss, vice president for climate impacts and director of the Program on Sea Level Rise at Climate Central, recently produced his own study based on the PNAS data. Strauss said the greenhouse gases we've already pumped into the atmosphere have " locked-in" an eventual sea-level rise of more than four feet — enough to submerge more than half of the current population in 316 coastal cities in the United States, or more than 4 million people.

By 2020 (using a 50 percent threshold for defining an impacted city) Strauss predicts that Florida and Louisiana could be significantly affected by sea-level rise. Florida could have 150 threatened towns with a total population of 2.7 million, while Louisiana would

add another 1.2 million people and 114 towns to the list. Hundreds of thousands more would be affected across California, New Jersey, North Carolina and other states, predicts Strauss.

But sea-level rise isn't the only concern. Strauss said higher sea levels raise the "launch pad" for coastal flooding. Long before the ocean tide is at a city's doorstep, he said, coastal floods become much more common.

"Sea-level rise has already doubled the chances of extreme flooding in locations around the U.S., and that will only accelerate in the coming decades," he said. "We look at these events as floods, but they are actually floods aggravated by sea-level rise. The way we experience sea-level rise is more floods reaching higher ground."


MORE THAN A NUISANCE: A new report fr

Oceanic and Atmospheric Administration details significant incr
the 1960s, due in large part to rising sea levels stemming from
the cities making up the top 10 in average number of "nuisance
2007 and 2013:

CITIES	AVERAGE NUISANCE FLOOD DAYS 2007-2013
Annapolis, Md.	39.3
Baltimore, Md.	13.1
Atlantic City, N.J.	24.6
Philadelphia, Pa.	12
Sandy Hook, N.J.	23.9
Port Isabel, Texas	13.9
Charleston, S.C.	23.3
Washington, D.C.	29.7
San Francisco	9.3

Should these projections come true, the implications are far-reaching. Beyond triggering potentially severe public safety and health concerns for coastal communities, they threaten IT systems powering critical municipal services. When Hurricane Sandy hit the East Coast in 2012, it left a number of data centers underwater, damaging equipment, putting critical data at risk and threatening to interrupt Internet service nationwide. Before the storm hit, data center operators in New York, Philadelphia and Washington, D.C., tested emergency backup generators and prepared to maintain services during power outages caused by the hurricane. But generators began running out of fuel after several days, and data center companies told customers to shut down servers and move workloads elsewhere. In other cases, flooding submerged diesel pumps and prevented them from pumping fuel to generators.

Ultimately, if a data center is in the wrong spot at the wrong time, even the most extensive preparations may not be enough to keep it online. But planning can help and may certainly be worth the effort. Strauss suggests that those working on contingency plans think broadly, as elements outside the data center itself ultimately can be the data center's downfall, as he found out during the course of his research.

"We analyzed the vulnerability of a broad array of infrastructure, but we couldn't examine everything," he said. "For example, we did not think it would be meaningful to analyze things like radio towers or cellphone towers because the equipment is at the top of a tower and therefore would not be affected by a flood."

But Strauss said that in talking to FCC officials, he learned that a lot of those towers have backup generators designed to keep them going in the event of a catastrophe. Many backup generators are located underground and therefore would be affected by a flood.

"If you are thinking about the vulnerability of a data center, you have to think not only about the location of the servers, but also about the location of everything else — the cooling equipment, backup generators, etc. If you want to make a facility floodproof, you have to make all its critical components floodproof as well."

Are You Prepared?

In light of sea rise predictions, *Government Technology* spoke with several local governments that could be affected by flooding to find out if they are preparing their IT operations to deal with climate change. Here is what we found.

Cambridge, Mass.: Cambridge is working on a comprehensive climate change vulnerability assessment it hopes to complete by the end of 2014. The assessment will examine the vulnerability of critical city services, including IT systems, and will use models to project scenarios as far out as 2070.

Fort Lauderdale, Fla.: Officials would not specify its exact location, but Fort Lauderdale's data center is located within city limits. At this point, the city has no plans to move or modify its data center to account for potential climate change-induced flooding.

Galveston County, Texas: Galveston's data center is located on the second floor of a building on the island, with backup in Lake City, which is inland and about 250 miles away. The county plans to move its entire data center to Lake City soon, primarily in response to hurricane threats, like those the data center sustained when Hurricane Ike hit the Texas Gulf Coast in 2008.

Long Beach, Calif.: The downtown building where the city's data center is may be replaced in the next several years, officials said. The city contracts with a major IT company for mainframe services and disaster recovery, with a backup system in Colorado. The building for the city's 911 operations, located near the Long Beach Airport, is an additional backup site.

Los Angeles: Los Angeles' data center is located downtown, with a disaster recovery site in Las Vegas. According to Steve Reneker, chief technology officer of Los Angeles,

relocating or building a new data center is cost-prohibitive, but the city has standardized its network, server and storage systems in a hot/cold aisle configuration, making sure all are earthquake-braced and have redundant power.

Newport News, Va.: Newport News' primary data center is on the fifth floor of a downtown building. Currently the city has no plans to make changes to the location of its data center, but it does plan to increase its security.

Sacramento County, Calif.: Sacramento County's data center is located on the sixth floor of a downtown building, where it's been for the past 16 years. CIO Rami Zakaria said flooding is always a risk in Sacramento County, and the county took that into consideration when it built its dedicated data center in 1997. The facility has all the necessary environmental safeguards (water pumps, generators, batteries) to operate in the event of a " reasonable flooding situation."

http://www.govtech.com/local/Underwater-Data-Centers-Nationwide-Must-Prepare-for-Flooding.html