

As rising oceans threaten NYC, study documents another risk: The city is sinking

May 29 2023, by Bobby Caina Calvan



A man checks his footing as he wades through the Morris Canal Outlet in Jersey City, N.J., as the sun sets on the lower Manhattan skyline of New York City, May 31, 2022. If rising oceans aren't worry enough, add this to the risks New York City faces: The metropolis is sinking under the weight of its skyscrapers, apartment buildings, asphalt and humanity itself — and will eventually become flooded by the Hudson River and Atlantic Ocean. Credit: AP Photo/J. David Ake, File

If rising oceans aren't worry enough, add this to the risks New York City faces: The metropolis is slowly sinking under the weight of its skyscrapers, homes, asphalt and humanity itself.

New research estimates the [city](#)'s landmass is sinking at an average rate of 1 to 2 millimeters per year, something referred to as "subsidence."

That [natural process](#) happens everywhere as ground is compressed, but the study published this month in the journal *Earth's Future* sought to estimate how the massive weight of the city itself is hurrying things along.

More than 1 million buildings are spread across the city's five boroughs. The research team calculated that all those structures add up to about 1.7 trillion tons (1.5 trillion metric tons) of concrete, metal and glass—about the mass of 4,700 Empire State buildings—pressing down on the Earth.

The rate of compression varies throughout the city. Midtown Manhattan's skyscrapers are largely built on rock, which compresses very little, while some parts of Brooklyn, Queens and downtown Manhattan are on looser soil and sinking faster, the study revealed.

While the process is slow, lead researcher Tom Parsons of the U.S. Geological Survey said parts of the city will eventually be under water.



Waves wash over the seawall near high tide at Battery Park in New York, Oct. 29, 2012, as Hurricane Sandy approaches the East Coast. If rising oceans aren't worry enough, add this to the risks New York City faces: The metropolis is sinking under the weight of its skyscrapers, apartment buildings, asphalt and humanity itself — and will eventually become flooded by the Hudson River and Atlantic Ocean. Credit: AP Photo/Craig Ruttle, File

"It's inevitable. The ground is going down, and the water's coming up. At some point, those two levels will meet," said Parsons, whose job is to forecast hazardous events from earthquakes and tsunamis to incremental shifts of the ground below us.

But no need to invest in life preservers just yet, Parsons assured.

The study merely notes buildings themselves are contributing, albeit incrementally, to the shifting landscape, he said. Parsons and his team of researchers reached their conclusions using satellite imaging, data modeling and a lot of mathematical assumptions.

It will take hundreds of years—precisely when is unclear—before New York becomes America's version of Venice, which is famously sinking into the Adriatic Sea.

But parts of the city are more at risk.

"There's a lot of weight there, a lot of people there," Parsons said, referring specifically to Manhattan. "The average elevation in the southern part of the island is only 1 or 2 meters (3.2 or 6.5 feet) above [sea level](#)—it is very close to the waterline, and so it is a deep concern."



People walk on the Brooklyn Bridge at sunset, Nov. 18, 2022, in New York. metropolis is slowly sinking under the weight of its skyscrapers, homes, asphalt and humanity itself. Credit: AP Photo/Julia Nikhinson, File

Because the ocean is rising at a similar rate as the land is sinking, the Earth's changing climate could accelerate the timeline for parts of the city to disappear under water.

"It doesn't mean that we should stop [building](#) buildings. It doesn't mean that the buildings are themselves the sole cause of this. There are a lot of factors," Parsons said. "The purpose was to point this out in advance before it becomes a bigger problem."

Already, New York City is at risk of flooding because of massive storms that can cause the ocean to swell inland or inundate neighborhoods with torrential rain.

The resulting flooding could have destructive and deadly consequences, as demonstrated by Superstorm Sandy a decade ago and the still-potent remnants of Hurricane Ida two years ago.

"From a scientific perspective, this is an important study," said Andrew Kruczkiewicz, a senior researcher at Columbia University's Climate School, who was not involved in the research.



A man stands near the East River and Brooklyn Bridge with the New York skyline in the background on a Saturday, Oct. 1, 2022. If rising oceans aren't worry enough, add this to the risks New York City faces: The island metropolis is slowly sinking under the weight of its skyscrapers, homes, asphalt and humanity itself. Credit: AP Photo/Julia Nihinson, File



The Golden Gate Bridge and San Francisco skyline from the Marin Headlands above Sausalito, Calif. are shown in the photo, Oct. 28, 2015. New York City isn't the only place sinking. San Francisco is, too — putting considerable pressure on the ground and on active earthquake faults. Credit: AP Photo/Eric Risberg, File



The central business district skyline is seen during the dusk in Jakarta, Indonesia, April 29, 2019. Indonesia's decades-long discussion about building a new capital has inched forward after President Joko Widodo approved a long-term plan for the government to abandon overcrowded, sinking and polluted Jakarta. Credit: AP Photo/Dita Alangkara, File

Its findings could help inform [policy makers](#) as they draft ongoing plans to combat, or at least forestall, the rising tides.

"We can't sit around and wait for a critical threshold of sea level rise to occur," he said, "because waiting could mean we would be missing out on taking anticipatory action and preparedness measures."

New Yorkers such as Tracy Miles can be incredulous at first.

"I think it's a made-up story," Miles said. He thought again while looking at sailboats bobbing in the water edging downtown Manhattan. "We do have an excessive amount of skyscrapers, apartment buildings, corporate offices and retail spaces."

New York City isn't the only place sinking. San Francisco also is putting considerable pressure on the ground and the region's active earthquake faults. In Indonesia, the government is preparing for a possible retreat from Jakarta, which is sinking into the Java Sea, for a new capital being constructed on the higher ground of an entirely different island.

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