Hurricane barriers floated to keep sea out of NYC

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Map shows proposed barriers to protect New York City from storm surges

(AP) -- When experts sketch out nightmare hurricane scenarios, a New York strike tends to be high on the list.

Besides shaking skyscrapers, a major hurricane could send the Atlantic Ocean surging into the nation's largest city, flooding Wall Street, subways and densely packed neighborhoods.

As a new hurricane season starts Monday, some scientists and engineers are floating an ambitious solution: Barriers to choke off the surging sea and protect flood-prone areas.

The plan involves deploying giant barriers and gates that would move into place - in some cases rising out of the water - for storms. One proposal calls for a 5-mile-long barrier between New Jersey and Queens.

No one has formally proposed the structures, which would require extensive government reviews and billions of dollars.

But a first-ever conference on the subject this spring drew 100 researchers and engineers, who provided various conceptual designs. City emergency management officials say they're interested in hearing more if details develop.

Some scientists have questioned whether the barriers would be environmentally sound and socially equitable. But proponents say the structures could offer the best chance of preventing catastrophe in a city with hundreds of miles of shoreline, nearly 8.3 million residents and a vast web of crucial underground infrastructure.

New Yorkers are "living under the volcano, and people haven't thought about it," says Douglas Hill, an engineer who began discussing the idea several years ago with Stony Brook University oceanography professor Malcolm J. Bowman.

Warnings that New Orleans faced disaster from a major hurricane proved devastatingly true, they note, when Katrina struck in August 2005. The storm breached levees, flooded most of the city and killed more than 1,500 people in New Orleans and elsewhere.

The next year, former National Hurricane Center director Max Mayfield told a congressional committee that "it is not a question of if a major hurricane will strike the New York area, but when."

The city has been hit before, including by a September 1821 hurricane

that raised tides by 13 feet in an hour and flooded all of Manhattan south of Canal Street - an area that now includes the nation's financial capital.

Depending on its track, a Category 3 storm - with sustained winds of 111 to 130 mph, akin to an infamous 1938 hurricane that swept through nearby Long Island - could produce a storm surge as high as 25 feet in some parts of the city. Officials estimate as many as 600,000 people's homes could be flooded, and 3 million would have to evacuate because of flooding and other perils; economic loss estimates top $100 billion.

Forecasters expect a fairly average hurricane season this year. But the year's first tropical depression, a potential precursor to a tropical storm or hurricane, formed Thursday, before the season even officially began. It wasn't expected to threaten land.

Hurricanes aren't the only flood threat. Nor'easters also have caused storm-surge problems in the city, and scientists have projected that the waters around the city could rise by 2 feet or more in the coming decades because of global warming, making coastal flooding more frequent.

The idea of barricading against storm-tossed seas is centuries old, with examples standing in places from London to Providence, R.I.

In New York, a set of barriers a mile long or less at three critical points could protect 50 square miles of the city and New Jersey, according to Hill. The locations: the Narrows, the gateway to New York Harbor near the Verrazano-Narrows Bridge; the northern end of the East River, where it meets Long Island Sound; and the southern end of the Arthur Kill, a waterway between Staten Island and New Jersey.

Barriers there would shield Manhattan and parts of the four outer boroughs but still leave large, low-lying areas exposed, especially in

Brooklyn and Queens.

Some would gain protection under an alternative idea for a single, 5-mile-long barrier between Sandy Hook, N.J., and the Rockaway Peninsula in Queens - an idea devised by London-based infrastructure consulting firm Halcrow Group Ltd.

Halcrow described the estimated $5.9 billion project at a March conference at New York University's Polytechnic Institute; three other firms aired conceptual designs for pieces of the estimated $9.1 billion three-barrier network.

All would have gates, navigation locks or other mechanisms to let water and boat traffic flow under normal conditions - but block a 25-foot storm surge when needed. Some would have substantial walls or berms visible all the time, but one concept, from New York-based Parsons Brinckerhoff, is a wall that would lie flat and virtually invisible on the bed of the East River, pivoting up when needed. The wall would jut out of the water at an angle to block storm surges.

Deputy emergency management commissioner Kelly McKinney said the barriers were as yet too theoretical for the city to analyze but "an intriguing idea."

"If (experts) came back with more concrete details and costs and things like that, we'd be interested" in exploring it further, he said. Meanwhile, the city is taking smaller steps to prepare for potential flooding, such as moving critical pumps to higher spots in wastewater treatment plants.

While engineers say the barriers are technically feasible, questions remain about their environmental and political viability.

Structures that constrict the flow of water could alter fish migration,

shellfishing beds and the salinity in the harbor, said Robert "Larry" Swanson, a Stony Brook University oceanographer.

Bigger problems could lie outside the barriers. No one has suggested yet how to pay for them, but a sizable public investment could be hard to sell to a city that would be only partly protected - let alone to a federal government that might then face similar requests from other vulnerable communities.

At least one scientist questions whether the barriers would be the best choice even for those inside.

Given the unknowns of climate change, any system designed now could prove inadequate in the future, said Klaus H. Jacob, a Columbia University climate-risk researcher. Some scientists say London's Thames Barrier, finished 26 years ago, may not be able to keep up with rising tides.

If New Yorkers relied on a barrier system, they might be forced to raise it indefinitely - or, worse, unable to do so, Jacob fears.

New Yorkers could instead prepare to "live with the water, rather than fight it," he said, by taking such steps as making tunnel entrances sealable and moving buildings' electrical and other vital equipment from basements to higher floors.

Hill and Bowman are skeptical that such measures can do enough. But for now, their goal is a full-fledged study of the barriers and possible alternatives - work they say can't afford to wait.

"We're going to have to do something," Bowman said. "Or else you retreat, and that's inconceivable. How are you going to retreat from New York City?"