

Dam It! New York's Barrier Prophet Speaks

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Photo: Alexander Mintz

Malcolm Bowman.

Malcolm Bowman had a message for the City of New York: Prepare, because the flood is coming.

It was the morning of Tuesday, May 8, and the respected oceanographer was sitting in the Mayor's Office of Operations, lecturing four officials on the potential plagues of global warming. He had sought out the meeting because he'd heard that the Bloomberg administration was eager to take on some of the challenges of climate change—and he had stumbled onto an enormous challenge: how to save the city from the future ravages of flooding.

It was a puzzle that he had been working on for several years, and as he scrolled through his PowerPoint presentation, he spared his audience none of the gruesome predictions—the rising sea levels, the super-powerful storms, and the flooding that would submerge some of the city in chill Atlantic brine.

And then he offered a solution.

New York, he said, should build storm barriers—a trio of them that would wall off the city's vulnerable parts like some giant floating chastity belt. These walls, when activated, would loom as high as 35 to 40 feet above the water and stretch as much as a mile in width. They would cost between \$1 and \$2 billion apiece and rival the construction of the Verrazano-Narrows Bridge in scope and complexity. But they would also keep the ocean at bay when a hurricane or northeaster decided to pound the city. Mr. Bowman called this creating a "circle of protection" around New York.

"This was a warning that the city is going to be flooded to an extent never seen before, and that we'd better start planning; we'd better start thinking about how we're going to protect the city," Mr. Bowman said of his talks with the Mayor's office, which included representatives from the Office of Long-Term Planning and Sustainability and the Departments of Environmental Protection, Buildings and City Planning. "The point was that we should be thinking ahead."

Mr. Bowman, a fatherly, cheerful 64-year-old native of New Zealand, is at first glance an unlikely Cassandra.

A professor of physical oceanography at Stony Brook University, and the leader of the university's Storm Surge Research Group, he has made it his mission over the last few years to "raise consciousness" about the feasibility—and, more importantly, the necessity—of storm-surge gates in New York City. And while he has few illusions about living to see the day when the concrete is poured and the barriers built, he does at least hope to see the era when the government starts doing "serious" storm-barrier studies.

His two-hour presentation to the city officials seemed, at the time, like a good step.

"They had tough questions," Mr. Bowman recalled, "as they should have, because we're proposing something that would be one of the largest engineering projects ever in the United States.

"But they were friendly," he said. "Definitely, they were interested."

The Bloomberg administration, for its part, seems to have come away with a more measured assessment of the meeting. While Rohit Aggarwala, the director of the city's Office of Long-Term Planning and Sustainability, suggested that he was open to further discussions with Mr. Bowman, he said that it was premature for the city to look at the specific idea of barriers in any formal way.

"The fact is that the overall challenges of climate change will require us to think broadly about solutions that we've never necessarily had to consider," Mr. Aggarwala said. "It certainly is the kind of thing that we will take seriously as we go forward. I think what is important from our point of view is that we have to consider a range of options."

Mr. Bowman first stumbled on the idea for storm-surge barriers in 1994, at a conference he and his colleague hosted to begin planning for the city's globally warmed future. At the time—and for some 20 years preceding—he had been fixated on a rather different kind of gate project: a system of tidal gates that would help flush pollution from the waterways surrounding New York City as well as coastal New Jersey. But, as he and Dr. Hill realized during the conference, the gates could also serve another purpose. With a few engineering tweaks—or perhaps a lot—they could be turned into a system for protecting the city from the flooding that was bound to intensify with global warming.

In the catalog of horrifying climate-change hypotheses, flooding is one of the scenarios that scientists fear most. As the earth warms, the theory goes, the waters of the ocean will expand, which will then cause them to rise around New York by as much as four inches in 2030, 10 inches by 2050, and nearly two feet by 2080 (according to fairly conservative estimates from Columbia University's Center for Climate Systems Research). None of this is inherently devastating, at least for the foreseeable future, but when coupled with a northeaster or hurricane—which some models predict will become fiercer and more frequent—it poses a serious flooding risk.

"In the future, if the sea levels go up another two and a half feet, a more modest storm could cause much more damage—it could do just as much damage as a very serious one today," Mr. Bowman explained. "And then, if the weather changes—if there are more hurricanes, if they're more fierce—then we're in hot water."

Mr. Bowman laughed. "I'm not trying to be an alarmist," he continued, "but I think these are predictions that we all, as a society, have to take very seriously and start planning for. We should start thinking about it."

Several years ago, Mr. Bowman and his colleagues began developing models to determine what the killer storms of the future might look like. They based these models on storms that had already struck New York in the past—most notably Hurricane Floyd, which slammed into the city in September 1999—except the scientists then cranked them up to ultra-violent levels. They made them into super-storms whose sea level was higher, winds stronger and devastation greater. It was based on the pattern of devastation that they eventually determined where the storm-surge barriers should go: across the Narrows (perhaps beneath the Verrazano-Narrows Bridge), across the upper reaches of the East River (right near the Throgs Neck Bridge) and across the Arthur Kill (at Perth Amboy).

Recently, Mr. Bowman has also begun talking about placing a fourth barrier across Rockaway Inlet to help protect southern Queens and Brooklyn.

If all of this seems ambitious—or quite simply quixotic—Mr. Bowman insisted that the idea for his barriers is rooted in serious hydrologic feasibility studies, and in several models already in operation in Europe.

From England to Russia to the Netherlands to Italy, the Europeans have been building barriers to protect their people from the brackish depredations of storm surges for the last several decades. They have built rotating blades across the Thames River, installed inflatable gates across the entrance to the Venice lagoon, and devised a whole system of dykes and locks throughout Holland. So why, he asked, can't New York City do the same?

This question didn't initially inspire much interest from the outside world. "There was never any sense of scoffing, or that we didn't know what we were talking about," Mr. Bowman said of his and his colleagues' early conversations with officials and policymakers. "But it was, 'Hey, you're a bunch of academics, and this is theoretical.'"

But within the last year or so, Mr. Bowman has become convinced that the ground has begun to shift, and that people outside his small academic circle have begun listening to him with something beyond polite curiosity. Mr. Bowman traced this change to a trinity of recent events that have shaken both civilians and politicians out of their environmental complacency—or at least brought words like "carbon-neutral" into the vernacular: Hurricane Katrina, Al Gore's *An Inconvenient Truth* and, most recently, two rather terrifying reports from the Intergovernmental Panel on Climate Change.

Together, he argued, they "seared" their way into the "national consciousness" and convinced people that climate change is serious business. At the very least, they help explain the flurry of phone calls he's begun receiving from reporters, *National Geographic* and the Metropolitan Transportation Authority, which has invited him to conduct three seminars (including one on his barrier proposals) for them.

Still, even within the world of academia, there has been skepticism about whether a giant barrier project can ever work. Klaus Jacob, a senior research scientist at Columbia University's Lamont-Doherty Earth Observatory, has been a vocal opponent of the gates for several years—not because he disagrees with Mr. Bowman's dire predictions, but because he thinks the storm-surge barriers don't go far enough to protect New York in the centuries to come (when, say, the Greenland ice cap has melted and the seas have swelled to devastating heights).

"I don't think, in the long run, when you look to several hundred years, it's a sustainable solution," he told *The Observer*.

Still, Mr. Bowman is confident that time, in one sense, is on his side. "There's been an awakening," he said. "It's just sort of like: Climate change is real, it's now, it's happening, and it's going to get worse—and we better start doing something about it."

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