

Coasts in peril plan ahead for rising seas

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A tugboat moves a boat across the Manhattan harbor in 2009 in New York City. Scientists warn that by the end of this century, the sea level along North America's west coast will rise by about a meter due to global warming and melting arctic glaciers.

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That presents a scenario that few people in the world's coastal and [island communities](#) want to think about -- the end of their water's edge way of life, their homes flooded, their farming fields drenched and rendered useless.

But one coastal port in British Columbia has begun to plan for this grim future with the help of scientists who created computer images that show exactly what their town will look like when it is inundated with water.

"In our work we try to visualize four different worlds," said David Flanders, a landscape architect and research scientist at the University of British Columbia.

Those include building larger sea walls and dykes to hold the water back, crafting [barrier islands](#) to absorb some of the tides and reinforce the shores, moving entire towns inland, or building everything higher by raising homes on stilts and elevating roads.

Flanders said his team has been working with a municipality called Delta, home to one of metro Vancouver's largest industrial ports and a thriving population of 100,000 people, where tensions have mounted over the prospect of the coming sea change.

By creating digital images of what the future might look like -- some images are at www.aaas.ubc.ca/media-resources/photos -- Flanders said residents have been better able to decide how to move forward.

"It has helped community members decide what kind of world they want to live in in the future," Flanders told the American Association of the Advancement of Science meeting in Vancouver.

In his experience working with Delta since 2006, Flanders said he has found that the first impulse of locals and officials is to want to erect higher walls to protect areas with lots of homes.

But eventually, they agree that "some kind of mix is going to be ideal," he said.

The costs of recrafting modern life along the water's edge are certain to be enormous, with hundreds of millions of people affected by sea-level rise in communities worldwide.

"Depending on what we are trying to protect, protection strategy can be really expensive," said Denise Reed, a professor at the University of New Orleans.

She told reporters that after Hurricane Katrina devastated much of Louisiana's coast in 2005, rebuilding the levees around New Orleans cost more than \$14 billion.

Faced with that sort of price tag, many people go into a state of denial, questioning if the sea will really ever get so high.

But while the creeping increases may seem tiny -- scientists estimate the worldwide rise annually is about 3.3 millimeters per year, subject to regional variations -- the evidence is already here, experts said.

"It is a small amount... however that rate is higher than at any point in the last 5,000 years. We are in uncharted territory," said researcher professor John Clague of Simon Fraser University.

Clague said he and colleagues use the latest satellite technology combined with global tidal records to assess the changes over decades, and they have determined that the phenomenon is "definitely real."

Sea-level rise is also dangerous because it can make high tide, storm surge, floods and erosion much worse, said Margaret Davidson, director of the Coastal Services Center of the US National Oceanic and Atmospheric Administration (NOAA).

"The reality is we are already experiencing these things because of the dramatic change in the greater severity of extreme events," she said.

"This trend is very clear. You don't actually have to be a scientist to see that."

And even though many parts of the world face the same problems, Davidson said the solutions are entirely local.

"Everything about how we do or don't manage these challenges is actually a local action, a local strategy."

Asked how long people have to prepare for sea-level rise, Flanders replied, "Communities everywhere are wondering the exact same thing."

"There is no free option. 'Do-nothing' isn't an option."

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