

# New wave of planning for coastal zones

November 24 2010

---



Sam Iacobellis from the Scripps Institution of Oceanography presented a sampling of research pertaining to rising sea levels to the Greenovation audience.

Among the traits they share in common -- proximity to the coast, popularity among tourists, renowned, painterly light -- Venice, Italy, and San Diego also share one all-too-disturbing similarity: They are both in considerable danger if climate change leads to a predicted rise in sea levels.

At the most recent installment of an ongoing series of Greenovation Forums at the University of California, San Diego, a panel of experts warned of the potential threats to both cities and discussed ongoing methods for mitigating and adapting to risks posed by climate change and rising [ocean levels](#).

Titled "Rising Seas: Adaptation Strategies for Coastal Bays and

Lagoons," the forum was held last week at the UC San Diego division of the California Institute for Telecommunications and Information Technology (Calit2) and featured speakers Christina Nasci, a research associate with both the Scripps Institution of Oceanography (SIO) at UCSD and a marine biologist with the Environment and Territory Division at the Venice-based Thetis S.P.A.; Sam Iacobellis, a research specialist and senior lecturer at SIO; and Michelle White, manager of the Green Port Program for the Port of San Diego.

Nasci's presentation to a standing-room-only audience painted a disconcerting yet hopeful portrait of an ancient city under siege by its surrounding waters. She said that over time, changes in sea levels, land subsidence, erosion and wave motion have caused more frequent and intense floodwaters in Venice, resulting in near-daily flooding in the lowest-lying zones of the city during the autumn and winter months.

Nasci also noted that the erosion of salt marshes around Venice and its environs has led to widespread loss of intertidal habitat, and the beaches of the littoral have been drastically reduced in width or have even disappeared, leaving the coastal areas increasingly at the mercy of storms emerging from the Adriatic Sea.

Venice's first management intervention, according to Nasci, was put in place in the 15th century with the diversion of the main river from the lagoon. Since then, the pace of adaptive measures has been stepped up, most recently with the creation of a major intervention plan by the Venice Water Authority that called for the restoration of wetlands using dredged sediments, as well as the construction of a Mose system of mobile flood barriers that can be activated for tides higher than 110 cm (and up to 2 meters). Nasci said that since the plan was established in 1992, 11 square kilometers of wetlands have been restored, and work on the Mose barriers (a system of submerged gates installed in the seabed along ocean inlets) will be complete in 2014.

"The integration of mobile barriers with other measures makes this system very flexible," she added. "The barriers represent an adaptive solution effective for flood protection, salt marshes, tidal flats, tidal flushing and the control of polluted waters."

Venice's current adaptation strategy was devised, in part, under the guidance of the Venice Sustainability Advisory Panel's Final Report, drafted by Principal Investigators Paul Linden and Charles Kennel of UCSD's Sustainability Solutions Institute, which sponsors the Greenovation forums.

Many of the report's recommendations are based on research conducted by the Scripps Institution of Oceanography (SIO), with additional contributions from a variety of [marine biologists](#) and research scientists from around the world.

Sam Iacobellis of SIO presented a sampling of that research to the Greenovation audience, beginning with the famed Keeling Curve developed by SIO researcher Charles Keeling. The curve shows a continuous rise in atmospheric greenhouse gases since 1958, and scientists have used it (among other relevant data such as astronomical tides, oceanic circulation, atmospheric pressure and weather) to develop various predictions about the potential rise in worldwide sea levels. One "worst-case" scenario suggests a 1 meter global sea level rise by 2100. That might not sound like much, but with cities like Venice, which are at sea level, it could portend disaster.

High-water events in the world's coastal areas are also predicted to become more frequent and longer-lasting, which would contribute significantly to coastal erosion, beach loss, wetland loss, street flooding and potential residential damage. That translates, in local terms, to flooding in areas of Del Mar, Mission Beach and several areas along San Diego Harbor, including the Lindbergh Field airport.

"Climate models only provide loose guidance on the amount of sea level rise," Iacobellis explained, "but it's very likely that rates will increase."

That's where San Diego's own mitigation and adaptation strategy comes in. Forum panelist Michelle White oversees the development and implementation of the Port of San Diego's environmental sustainability initiatives. The Port manages the coastal land around San Diego Bay, including property within the cities of San Diego, National City, Chula Vista, Imperial Beach and Coronado.

The Port is currently developing a Climate Mitigation and Adaptation Plan.

According to White, the plan "provides a tool for identifying strategies to achieve greenhouse gas reductions and mitigating impacts of greenhouse gases" and rising sea levels on both human and natural habitats, such as San Diego's coastal eelgrass beds, which provide breeding and foraging grounds for fish and turtles.

White said that one challenge facing Port management is that it's trying to reconcile sea level rise scenarios that take place 90 years from now with an internal planning horizon that typically only spans two or three decades.

Another challenge is the tendency for local governments to work independently (or not at all) on climate mitigation planning. In what White calls "the first regional adaptation plan in the nation," the Port — along with its five member cities and Lindbergh Field — have joined forces to collaborate on a San Diego Bay Regional Adaptation Strategy, which should be complete by August 2011.

"These issues expand jurisdictional borders," she noted. "They expand international borders, and we all need to work together to solve them."

What we're doing is creating a new way of doing business."

Paul Linden, the founding director of SSI and a professor emeritus of Environmental Science and Engineering at UCSD, said he recognized the need for "a new way of doing business" among climate scientists as well.

"We do global estimates but typically can't give the public information about what's happening in their own backyard," he said. "That's much harder to do, and yet that's the information people need to know" — especially people living in threatened coastal regions.

But no matter how precise and targeted scientists' climate change predictions become, there is one variable that will likely always keep them guessing: The human element.

"Unfortunately, the story we're talking about today has no endpoint," remarked David Woodruff, director of SSI and a professor in the Division of Biological Sciences at UCSD. "We can't even predict what the endpoint will be unless humans change their ways."

Provided by University of California - San Diego

Citation: New wave of planning for coastal zones (2010, November 24) retrieved 27 April 2024 from <https://phys.org/news/2010-11-coastal-zones.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.