Vulnerable coasts

Scripps research provides the data to manage these most vulnerable zones when coastal erosion, pollution and rising seawater hit close to home.

Some 308 million people live in the U.S. today, and about one out of eight people live in California, largely along the coastline. Perhaps even more surprising is that across the U.S., more than half the population lives within 50 miles of the coast.

Coastal zones are critical to our lives. They nourish us with food, temper our weather, transport our goods, provide places to play and awe us with their beauty. But they are also vulnerable to the effects of human activity, particularly from the disproportionately large number of people that live there.

We study and interpret signs of the continuing effects of human impact: eroding cliffs, overbuilding at the water’s edge, sand erosion, pollution, even dead sea life washing ashore. But what more needs to happen?

Building on Scripps leadership

The Center for Coasts and Communities at Scripps has been established to leverage Scripps’ expertise in measuring, understanding and predicting coastal processes, sea-level rise and storms that are critical to preserving the natural systems that

Forecasting climate change

The Center for Coasts and Communities at Scripps applies resources from government, industry and the community to real-time oil and water sampling, and studies on how contaminated runoff is driven by wind and coastal currents, shoreline flooding, beach erosion and cliff movement. Longer range, the center expects to forecast the potential effects of climate change on our beaches.
sustain the health of our coastlines. As a center, this resource can more effectively attract, deploy and manage resources from government, industry, and our community supporters, and as a result, can have a greater impact in areas such as the following:

- **Oil and water sampling in real time.** When oil exploded from the sea floor into the Gulf of Mexico in April 2010, Scripps researchers immediately went to the region to gather data using a pioneering autonomous underwater glider called Spray. From the surface to as deep as 1,000 meters, Spray gliders traveled on preprogrammed routes, measuring temperature, salinity, currents, dissolved oxygen, the presence of phytoplankton and zooplankton and other indicators of coastal health. Spray gliders have surveyed more than 56,000 miles of California’s coastal waters—that’s more than twice the circumference of the Earth. The data is posted in real time on websites so scientists around the world can analyze it and integrate it into predictive studies of the coastal ocean.

- **What’s flowing into our ocean?** Wherever rivers run into the sea, contaminated runoff from rainfall does, too. Pollution that flows into the ocean and along the coast to nearby beaches is an all-too-frequent threat to public health, the marine environment and the local economy. A group of Scripps scientists has developed an online tracking tool to show the trajectory of one frequent runoff source, the Tijuana River, as it flows into the ocean near Imperial Beach. This tool uses sophisticated technologies and observations such as autonomous underwater vehicle mapping, near-real-time surface current mapping, ocean stratification and full water-column profiling. It is being developed for use on other pollution outfalls, including oil spills and agricultural drainage. It is even being used in sea rescues.

- **Tracking the surf zone.** The oceans are in constant motion, and Scripps coastal oceanographers have recently conducted a series of studies to better understand how pollution travels along the coast. Field experiments at California’s Imperial, La Jolla and Huntington beaches have deployed teams of scientists, technicians and engineers to probe the intricate dynamics of the surf zone, including where waves break and release their energy. Studies have included surf zone “drifter” instruments to track currents and the release of nontoxic bright pink fluorescent dye into the water to mimic pollution and study the intricacies of water movement. If a disaster were to occur at the San Onofre Nuclear Power Plant, such technology could provide critical data about the movement of radioactive water.

- **Daily ebb and flow.** Since 1976, lifeguards, coastal engineers, city managers, boaters, fishermen, harbor masters, divers, surfers, the U.S. Navy and the National Weather Service have all relied on Scripps’ Coastal Data Information Program, which updates wave information hourly. Scripps’ 35 years of tracked data is also being analyzed to provide insight on shoreline flooding, beach erosion and cliff movement, as well as forecast the potential effects of climate change on our beaches.

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**Select giving opportunities**

- **Endowed Chair in Coastal Studies**
  - $3.5 million

- **Endowed Directorship Fund**
  - $500,000

- **Endowed Career Development Award for Young Scientists**
  - $500,000

- **Named Endowed Student Fellowship**
  - $250,000

- **Career Development Award for Young Scientists**
  - $100,000
  - ($20,000/year for five years)

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**Can you help stem the tide?**

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