Coastal Storm Modeling System for Southern California (CoSMoS) – Fact Sheet and FAQs

What is CoSMoS?
CoSMoS stands for “Coastal Storm Modeling System.” It is a region-specific numerical modeling system that will project coastal flooding and erosion driven by climate change, not only from sea level rise (SLR) but from future storms as well.

- Takes into account various SLR scenarios and coastal storm factors (e.g., tides, storm surge/wind/atmospheric pressure, waves), plus shoreline change and river (fluvial) inputs.
- Produces hazard projections for the Southern California coastal region (Point Conception to the U.S.-Mexico border, including the Channel Islands, harbors, and coastal embayments) by downscaling global climate models and adding regional storm factors.
- Includes scenarios that feature the full spectrum of SLR (up to 5m) and coastal storms (daily to 100-year) to meet every possible management planning horizon and degree of risk tolerance.

Who should use CoSMoS, and why?
CoSMoS is meant to be used by local governments and communities to support coastal hazard and SLR vulnerability assessments, which in turn underpin planning and decision-making needs. Potential applications include:

- Vulnerability Assessments and Adaptation Plans
- Local Coastal Program (LCP) Updates
- Hazard Mitigation Plans.

Best available science
The US Geological Survey (USGS, Dr. Patrick Barnard) has been developing CoSMoS with a team of international experts for over five years. This effort will update the model for Southern California. Coastal Commission staff will also provide input to the development team.

User-support, trainings, and availability
USC Sea Grant will lead outreach, communication, and training to ensure the model meets user needs and effectively supports policy and planning decisions.

- Workshops and webinars to learn user needs and provide information about adaptation planning and climate science will occur in 2014.
- Model results will be available by mid-2015, followed by a user interface, and refined modeling of shoreline change and river inputs (estimated delivery mid-2016).

What will it cost?
The total cost of this effort is over $1M. The State Coastal Conservancy has coordinated model development and been its primary sponsor, with additional funds from the CA Department of Fish and Wildlife and the Tijuana River National Estuarine Research Reserve, and generous in-kind match from USGS and USC Sea Grant. Therefore, model results and training will be available free of charge.

Where can I get more information?
http://walrus.wr.usgs.gov/coastal_processes/cosmos/
- State Coastal Conservancy, Moira McEnespy (mmcenespy@scc.ca.gov, 510-286-4165)
- USGS, Dr. Patrick Barnard (pbarnard@usgs.gov, 831-460-7556)
- USC Sea Grant, Phyllis Grifman (grifman@usc.edu, 213-740-1963), Alyssa Newton Mann (agnewton@usc.edu, 213-740-8602)
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It seems there are different versions of CoSMoS…what are the differences, and what do I need to know about the southern California version?

USGS piloted CoSMoS development for the City of Los Angeles using "hindcast" data (CoSMoS 1.0). Subsequent versions for north-central California and San Francisco Bay (CoSMoS 2.0 and 2.1, Our Coast Our Future) estimated future conditions, producing a total of 40 scenarios that should cover any plausible combination of sea level rise (i.e., 0-2 m in 25 cm increments, 5 m) and storms (i.e., average, 1 yr, 20 yr and 100 yr) for the 21st century, and support virtually any planning horizon.

CoSMoS “3.0” for southern California also incorporates long-term coastal change, fluvial inputs, and dynamically-downscaled winds. USGS will determine long-term coastal change for sandy beaches and cliffs using an “ensemble” projection of shoreline change, meaning it will incorporate its own approaches with those from Terra Costa Group and ESA-PWA—this will establish a robust and consistent approach for the entire southern California region using the best available science.

How does CoSMoS relate to other southern California models and studies?

The good news is that vulnerability assessment efforts are getting underway now, many of which include their own modeling components. Jurisdictions are working to integrate efforts to the greatest extent possible. For example, in several cases such as in the Los Angeles and Santa Barbara regions, CoSMoS/USGS will supply the physical forcing data that will drive other shoreline change or hazard models.

Other coastal flooding and coastal change projections will likely NOT be the same as those projections done as part of the USGS-led CoSMoS 3.0 effort. Some of the models used and the physical forcing will be the same as mentioned, but ultimately the combination of methods and, therefore, the results, will be different. Basically, some of the work that will be necessary for the ensemble shoreline change approach (plus more detail and other non-CoSMoS components) is being conducted sooner rather than later for portions of the bight; the bottom line is that the coastal management community will have access to multiple, high-quality data products on which to base their planning decisions.

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