# AdaptLA:
# Helping Coastal Communities Plan for Climate Impacts

Alyssa Newton Mann, USC Sea Grant
Dr. Juliette Finzi Hart, USGS

August 3, 2016 | Venice LCP Public Meeting

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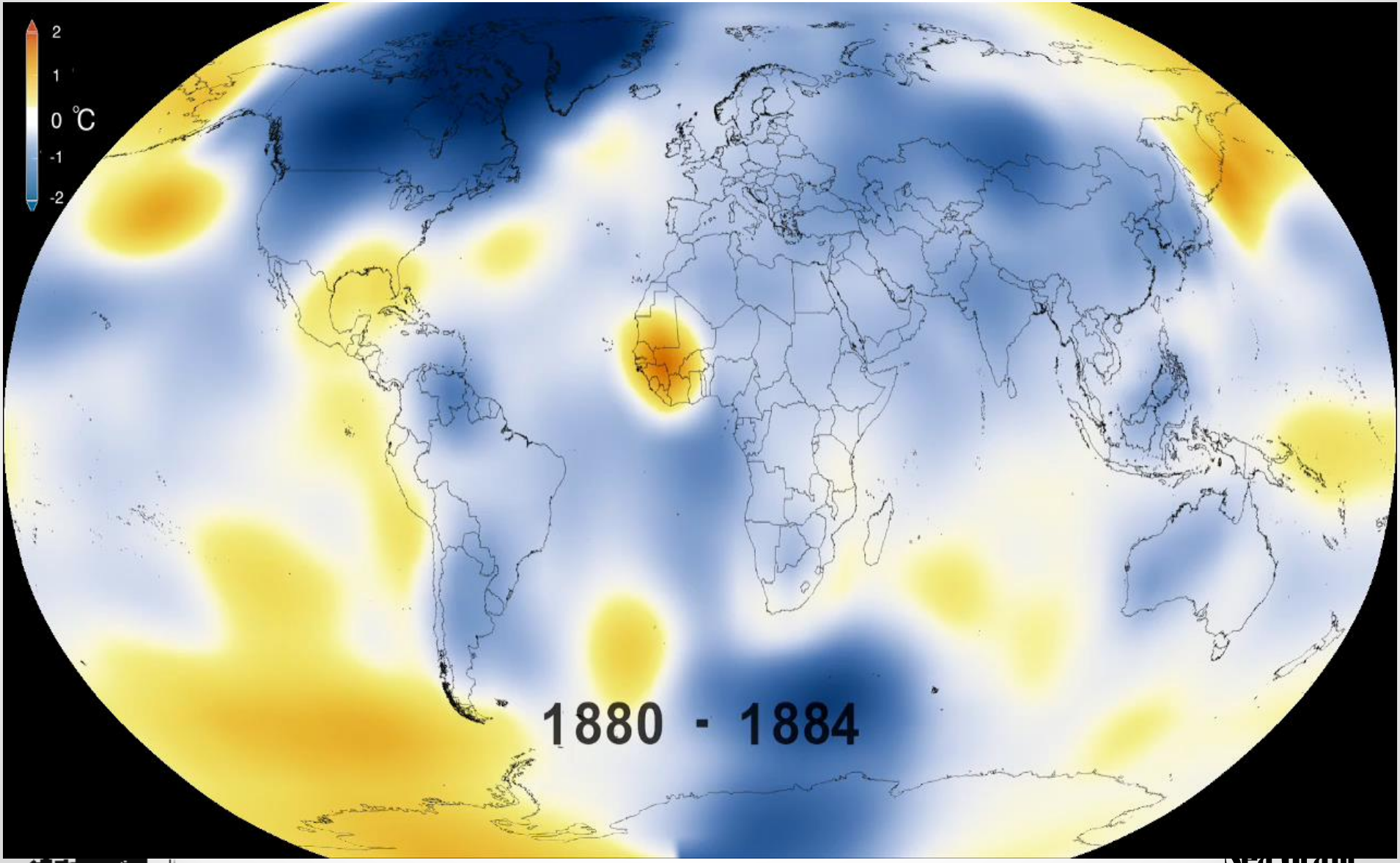
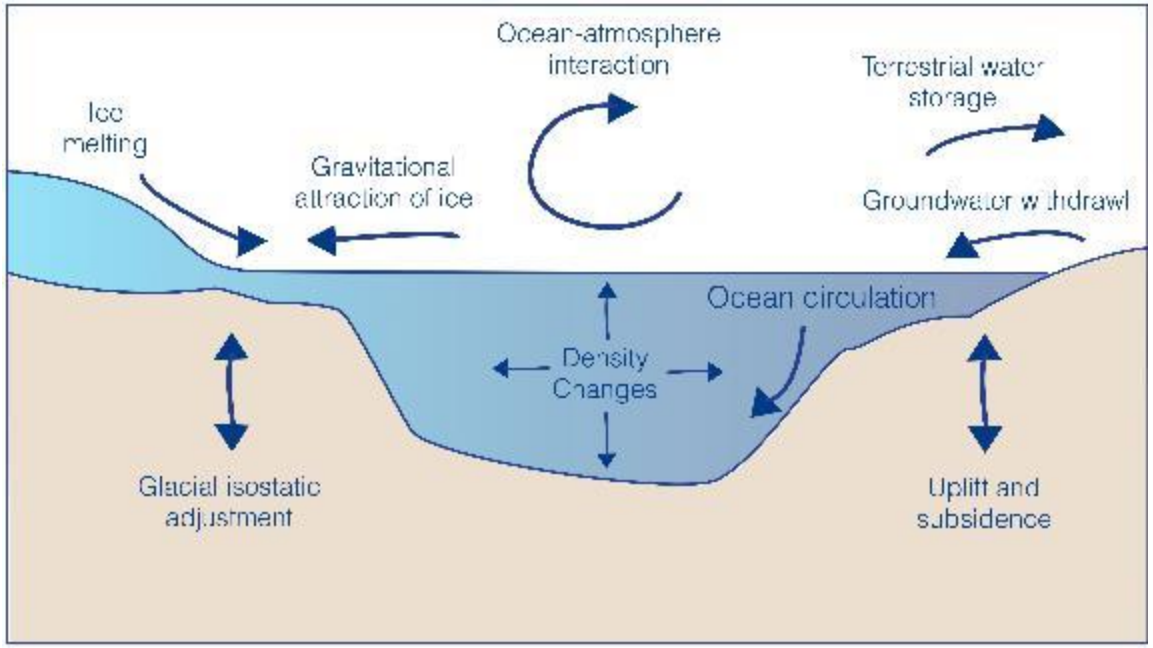
# The earth is warming…



# Sea Level Rise




- Thermal expansion
- Melting of Glaciers & Ice Sheets
- Terrestrial Water Storage
- Tectonic Activity

Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future
http://www.nap.edu/catalog.php?record_id=13389

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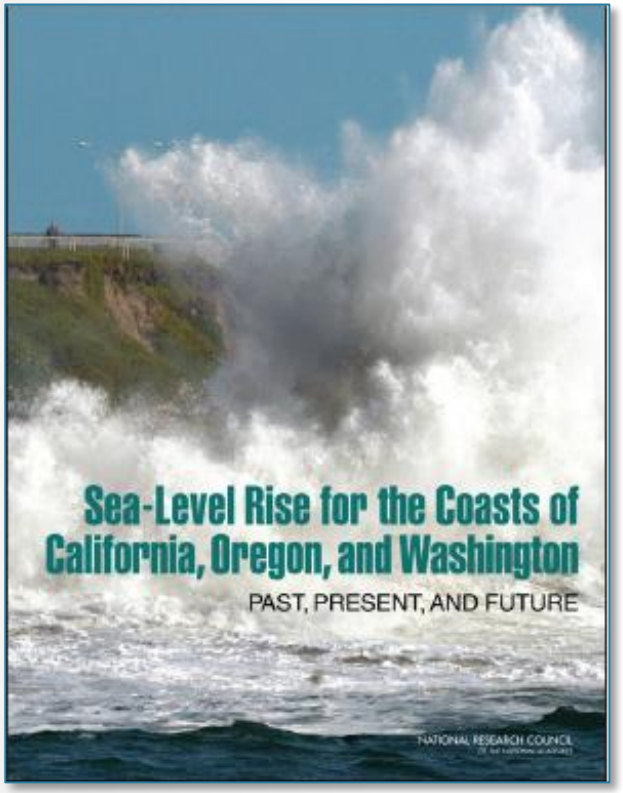
# Sea Level Rise (SLR) Projections for U.S. West Coast




| Time Period | North of Cape Mendocino | South of Cape Mendocino |
|---|---|---|
| 2000 – 2030 | -2 – 9 in. | 2 – 12 in. |
| 2000 – 2050 | -1 – 19 in. | 5 - 24 in. |
| 2000 – 2100 | 4 – 56 in. | 17 – 66 in. |

http://www.nap.edu/catalog.php?record_id=13389

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# Beyond SLR…storms & tides

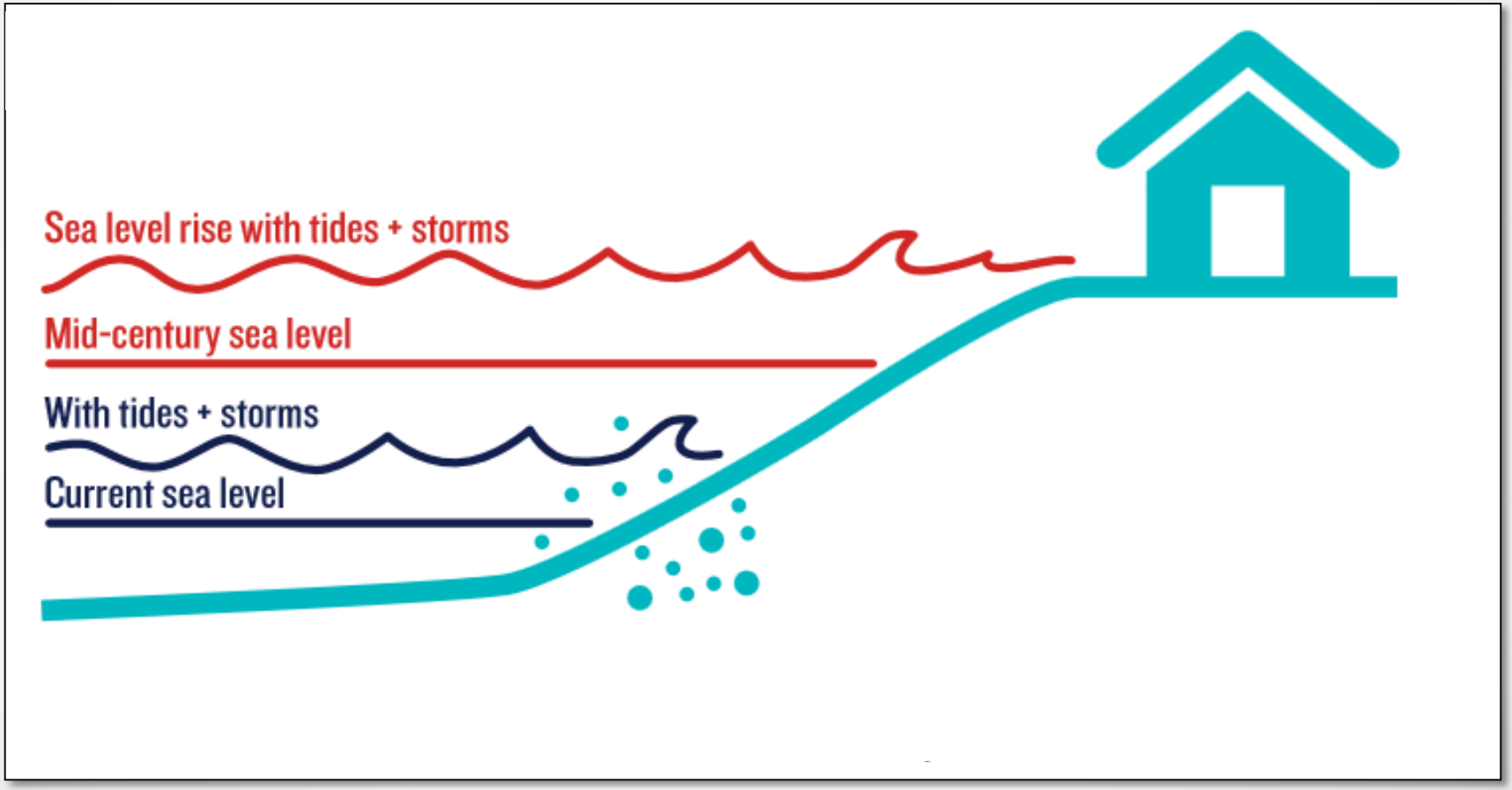


Image adapted from illustration by Dr. Bill O'Reilly (UCSD)

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# Beyond SLR…storms & tides

Hurricane Marie
September 2014

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# Beyond SLR…storms & tides

"Today's storm is tomorrow's high tide…"

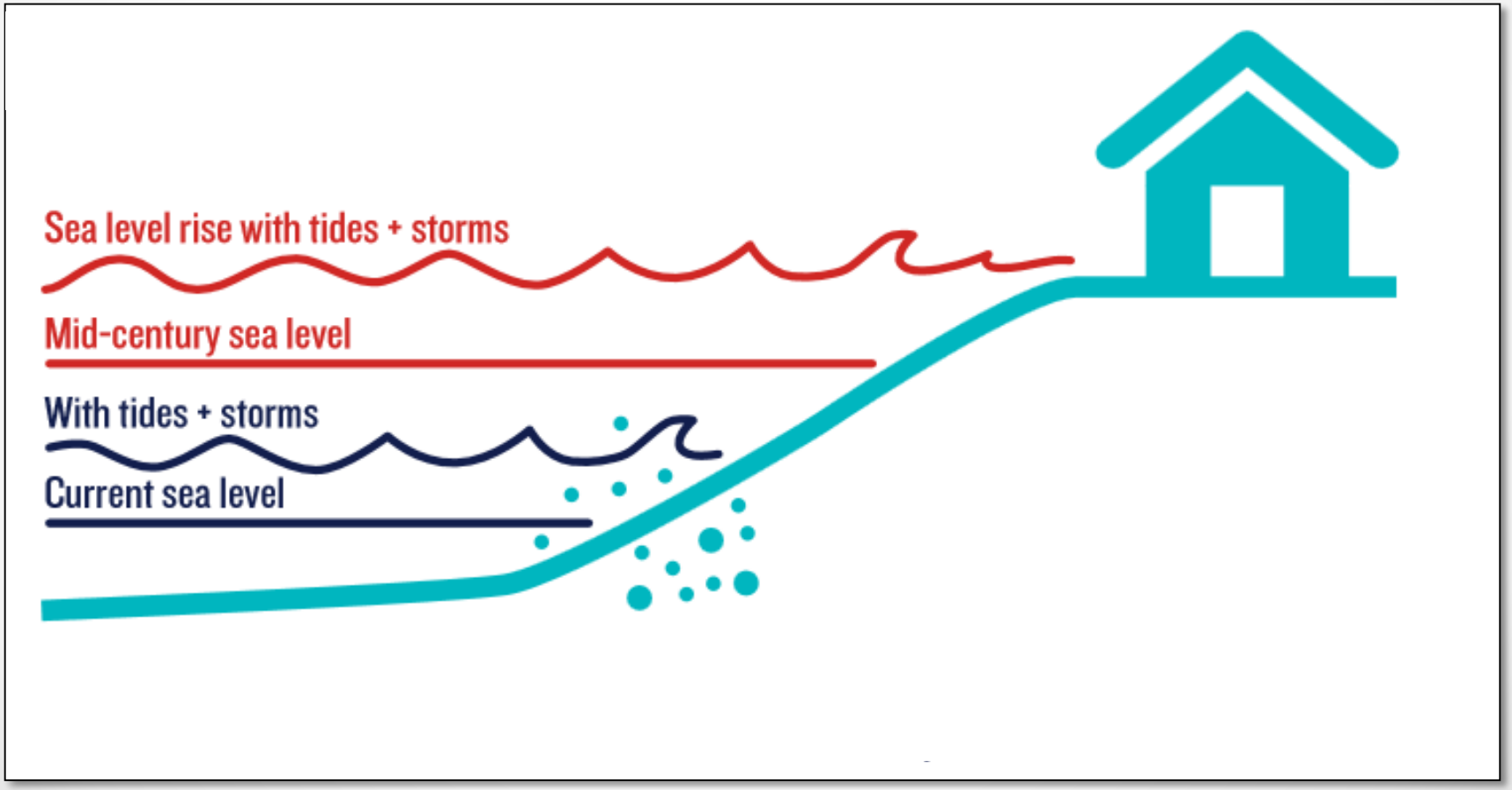


Image adapted from illustration by Dr. Bill O'Reilly (USGS)

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# Expected Impacts from SLR and Storms

- Accelerated beach erosion rates
- Greater incidence of cliff failures
- Landwards translation of coastal flooding & inundation
- Dangerous navigation conditions
- Beach/shore safety compromised
- Saltwater intrusion into coastal aquifers

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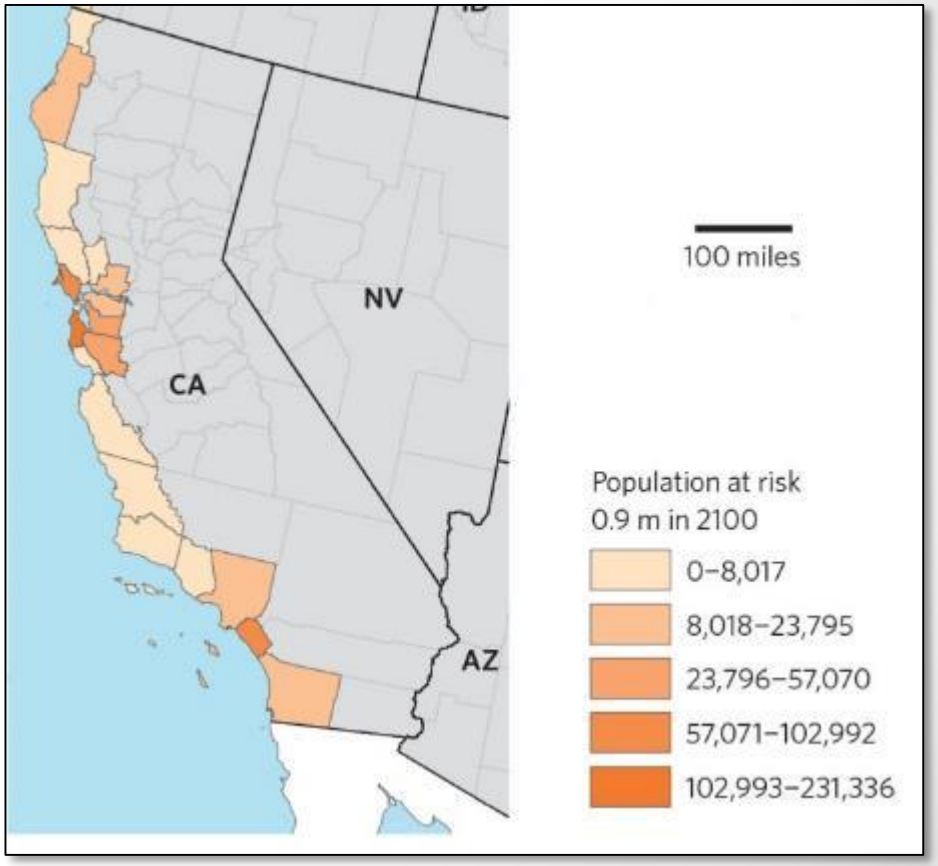
# CA Population at Risk from SLR

- Nature Climate Change (Hauer et al., 2016) – SLR w/population growth
- Across the U.S., average population at risk from SLR at 2100 is ~3 times greater when population growth is considered
- For CA, the population at risk is 5 times greater!
  - Today: 94,217 (current) vs. 472,248 (future growth)
  - By 2100 w/1.8 m of SLR = 216,174 vs. 1,046,057
- Does not consider storm surge, waves, or vertical land motion




Hauer et al., Nature Climate Change, 2016

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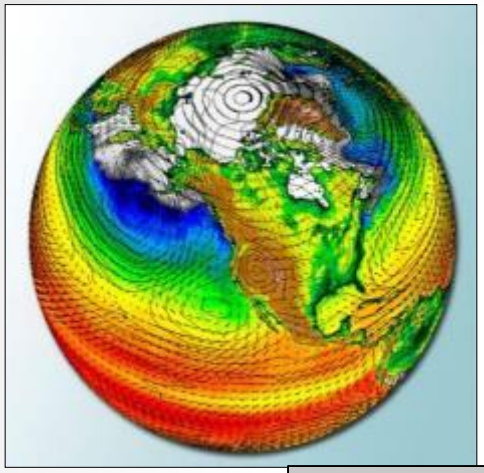
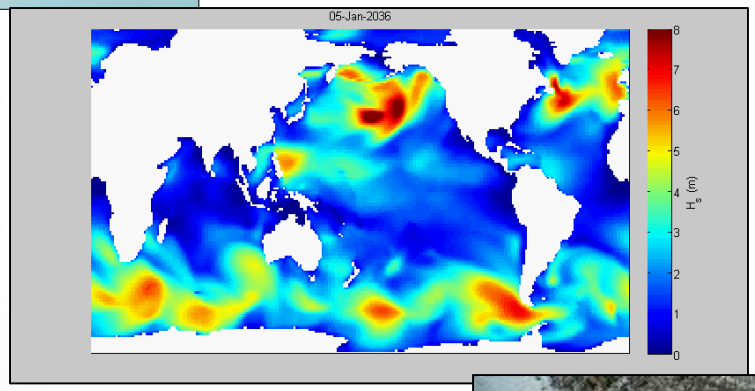
# USGS Coastal Storm Modeling System



1. Global forcing using the latest climate models




2. Drives global and regional wind/wave models

3. Scaled down to local hazards projections

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# USC Sea Grant – The Urban Ocean Program

## USC Sea Grant Provides

- Fund Research
- Community Outreach & Education
- Technical Assistance to Local/Regional Government

## 10 Million by the Sea…

- Climate Change Science & Planning
- Coastal Ecosystem Science
- Coastal Management
- Maritime Affairs

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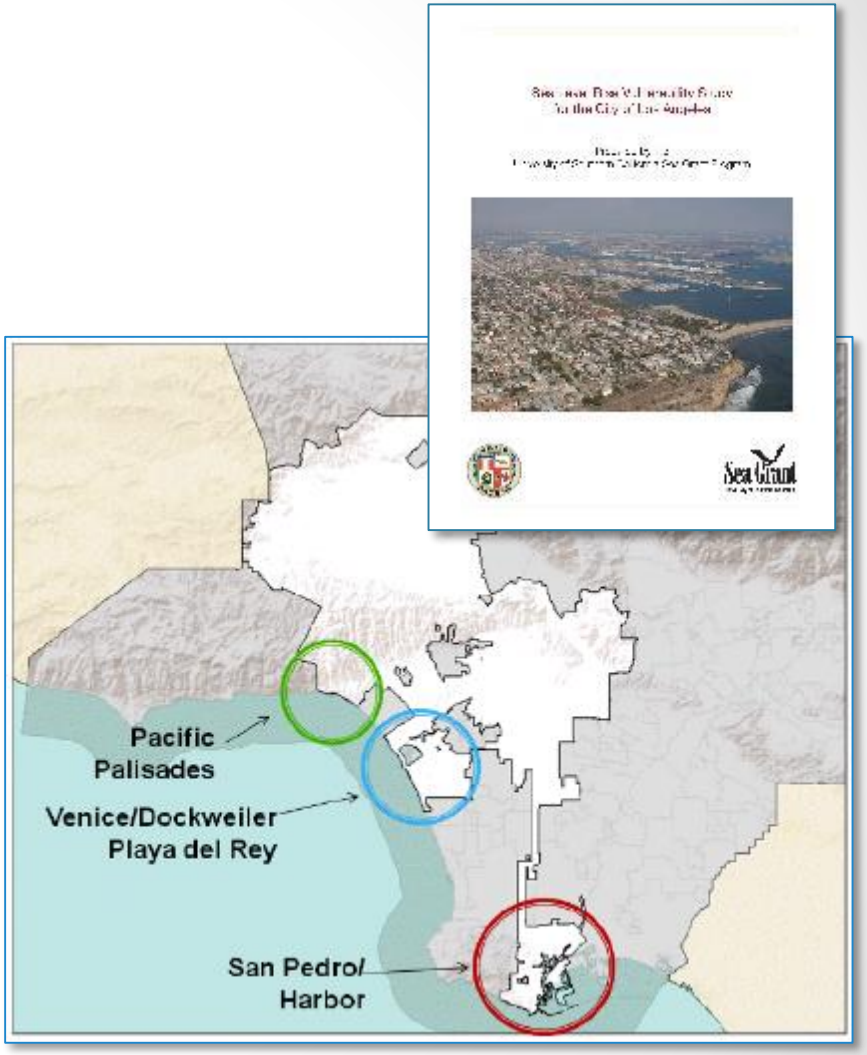
# AdaptLA: City of L.A. SLR Vulnerability Study

- Comprehensive planning process
  - City-led
  - Best available science (CoSMoS 1.0)
  - Participatory and stakeholder process
- Potentially vulnerable infrastructure
  - 2 wastewater treatment plants, 2 energy generation plants, POLA, PCH, 780,000 feet of pipes, 10,500 water services
- Released in 2014. Results available on our website:

  dornsife.usc.edu/uscseagrant/la-slr/

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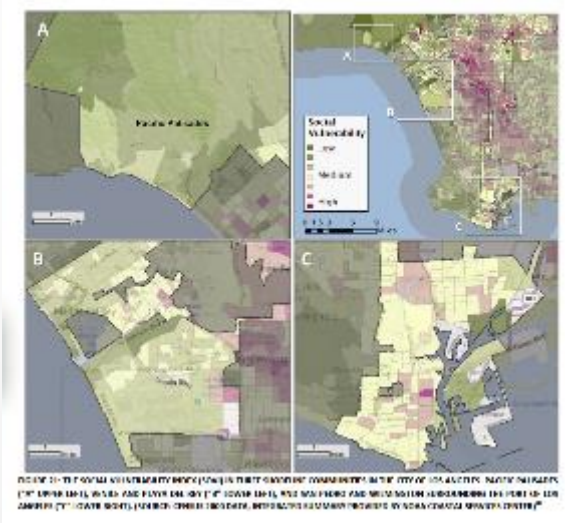
# 4 Component Vulnerability Study






Social Vulnerability
(Drs. Moser & Ekstrom)

Economic Vulnerability
(Drs. Wei & Chatterjee)

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# Physical Vulnerability Findings

Led by ICLEI

- Water systems (wastewater, stormwater, potable) water are vulnerable
- Building stock and roads in Venice area – highly vulnerable
- Boardwalk, Pier, Lifeguard HQ, Venice Beach Recreation Center – highly vulnerable
- While parks and open space could experience flooding, can be restored
- Energy facilities – low vulnerability


Photo: Phyllis Grifman

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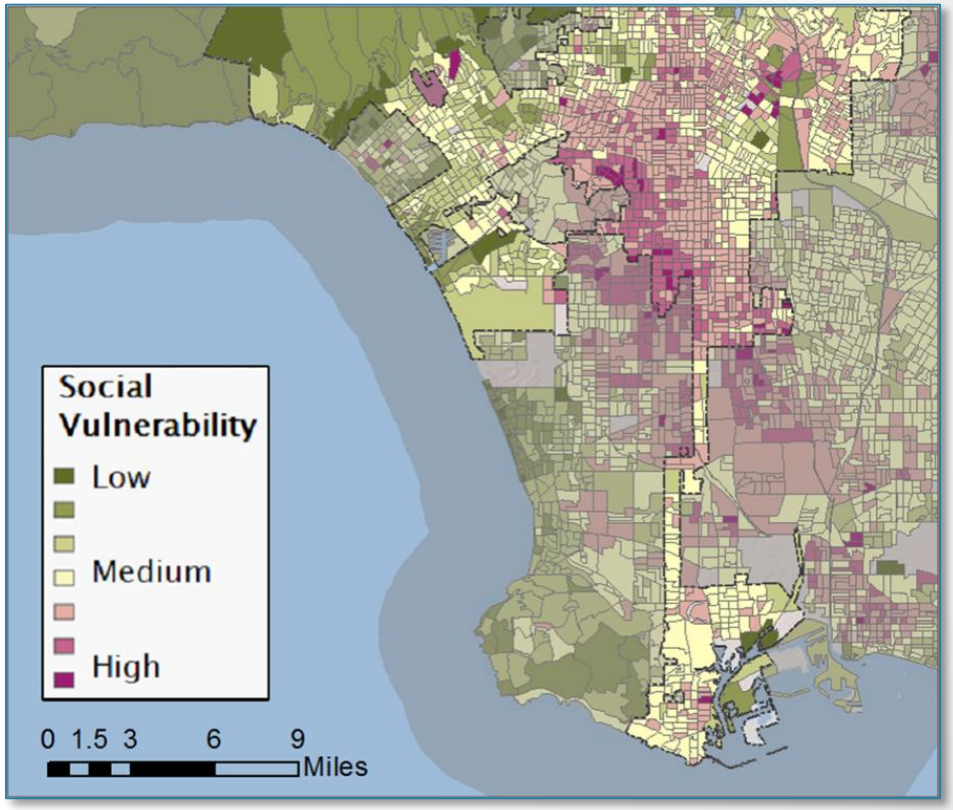
# Social Vulnerability Findings

- Dr. Susanne Moser & Dr. Julia Ekstrom
- Venice, low-lying San Pedro, Wilmington highest vulnerability
  - Lower per capita income & education
  - Linguistic isolation
  - Larger proportion of renters

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# Economic Vulnerability Findings

- Dr. Dan Wei & Dr. Sam Chatterjee, USC
  - Tripling of economic losses with 1.4 m SLR
  - Primary building loss is residential
  - Minimal business interruption losses
  - Conservative estimate


- Updated Study - Dr. Jeroen Aerts, Lars de Ruig & colleagues

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# Guidance for Moving Forward

- Document all vulnerable populations
  - Locations for first responders
  - Alternative forms of education/outreach
- Build regional community of practice
- Beaches are LA's best defense
  - Invest in beach width/cliff retreat monitoring
  - Maintain beaches
  - Big need for shoreline change information

# Regional AdaptLA


- Grant led by City of Santa Monica, on behalf of 11 coastal jurisdictions and L.A. County
- Outreach by USC Sea Grant
- Project partners: LARC, Heal the Bay, Santa Monica National Estuary Program

# Regional AdaptLA: Science

- U.S. Geological Survey
  - Coastal Storms Modeling System (CoSMoS 3.0)
- TerraCosta Consulting Group
  - Short-term & long-term beach position change
- ESA
  - Backshore characterization
  - Shoreline change
  - Infrastructure Exposure Analysis

# Regional AdaptLA: Outreach

- Stakeholder Engagement/Capacity-Building
  - Initial Process Workshops
  - Webinar Series
  - Technical Outreach Workshops

Coastal Conservancy

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# You are not alone…

- City of Santa Monica
  - Local Coastal Program Development
- City of Hermosa Beach
  - Local Coastal Program Development and General Plan Update
- Los Angeles Regional Collaborative for Climate Action and Sustainability (LARC)
  - *A Greater LA*: Framework for Climate Action
- City of Imperial Beach and many other coastal communities throughout CA

# Stakeholder Engagement

| | |
|---|---|
| Political Leaders | NGOs |
| City Councils | Academia |
| Sustainability Depts | Educators |
| Wastewater Treatment | State Agencies |
| Emergency Managers | Federal Agencies |
| Private Industry | MPOs, JPAs, COGs |
| Consultants | Museums, Aquariums |
| Public Utilities | Community Organizations |
| Public Works | Professional Associations |
| Harbor Depts | Regional Organizations |
| Planning Depts | Neighborhood Councils |
| Park Managers | Social Justice Organizations |

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# CoSMoS links & thank you!

- Initial 100 yr storm results available now for LA to SD https://www.sciencebase.gov/catalog/item/5633fea2e4b048076347f1cf
- Los Angeles-focused results: http://dornsife.usc.edu/uscseagrant/sccip/
- Webinars: http://dornsife.usc.edu/uscseagrant/adaptLA

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