El Niño Flood Hazard Risks and Impacts



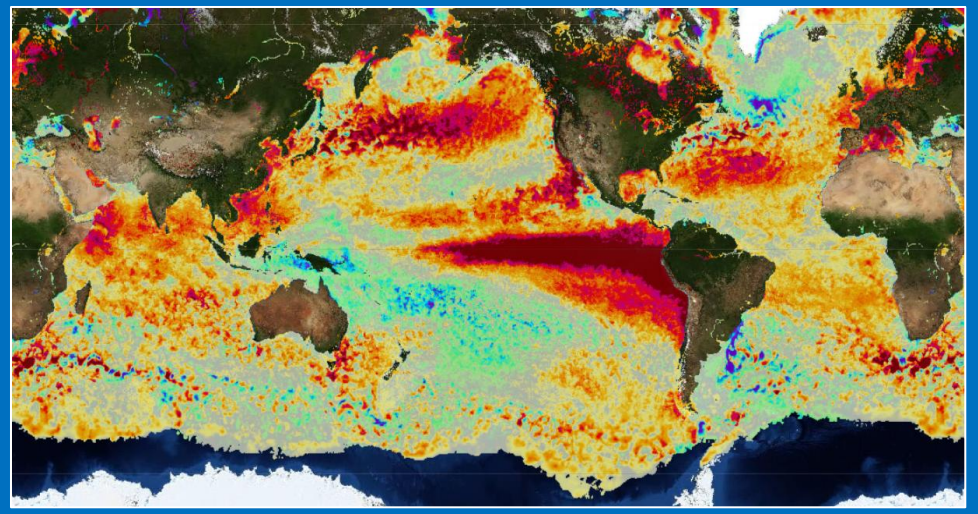
Marin County, October 2026 (Cal OES)

Patrick Barnard
University of California, Santa Cruz

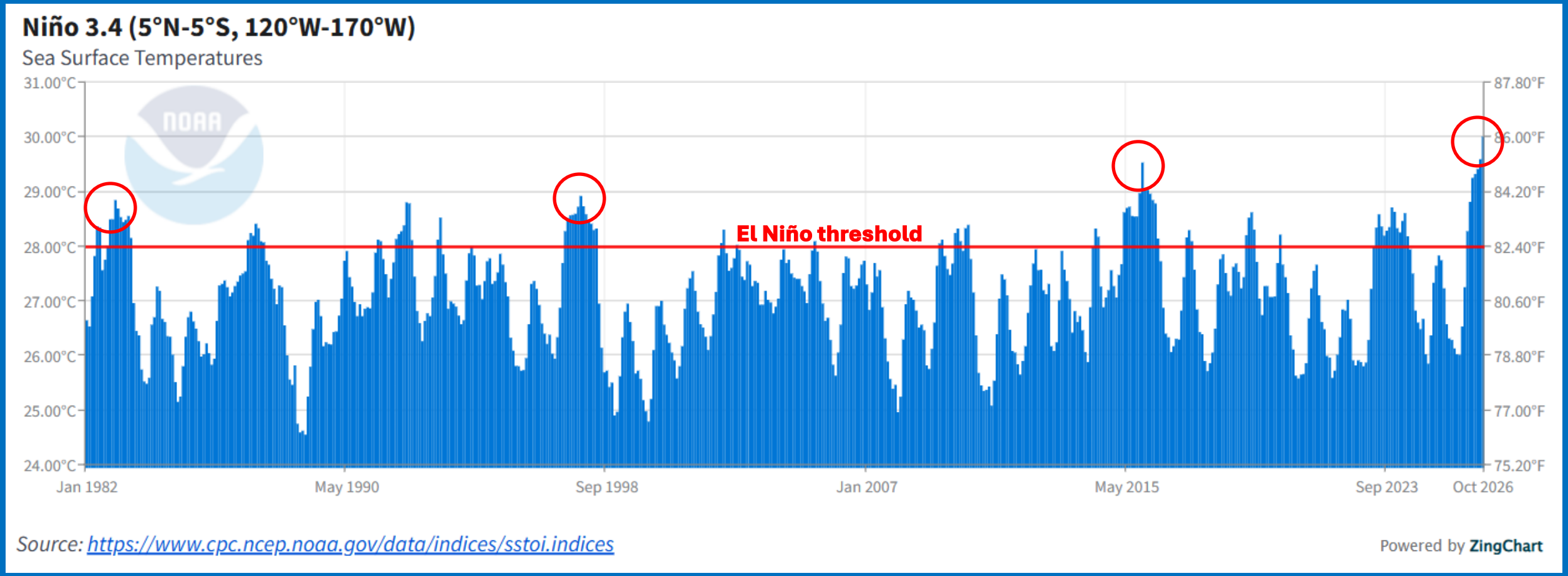
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Climate Variability Across the Pacific

- El Niño-Southern Oscillation (ENSO) is the dominant mode of climate variability across the Pacific Ocean basin
- El Niño in linked to higher coastal water levels, waves, flooding, and erosion on the West Coast
- The three most powerful El Niños since 1871 occurred in 1982-83, 1997-98, and 2015-2016
  - Consistency across those “Super” El Niño events, including sea level ~6-12 inches higher than normal
- Studies suggest a significant increase in the frequency of powerful El Niño events

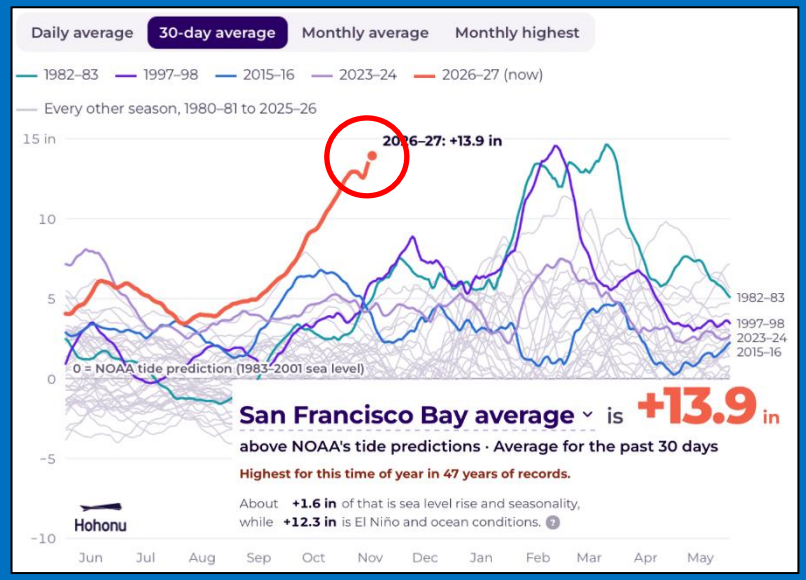


Current Conditions – sea surface temperatures at record highs!



Current Conditions

- Sea level 12-18 inches above normal (similar to mid-century projections of mean sea level rise)
- California set century-high coastal water level records in late October
- Coastal flooding during high tides across the state

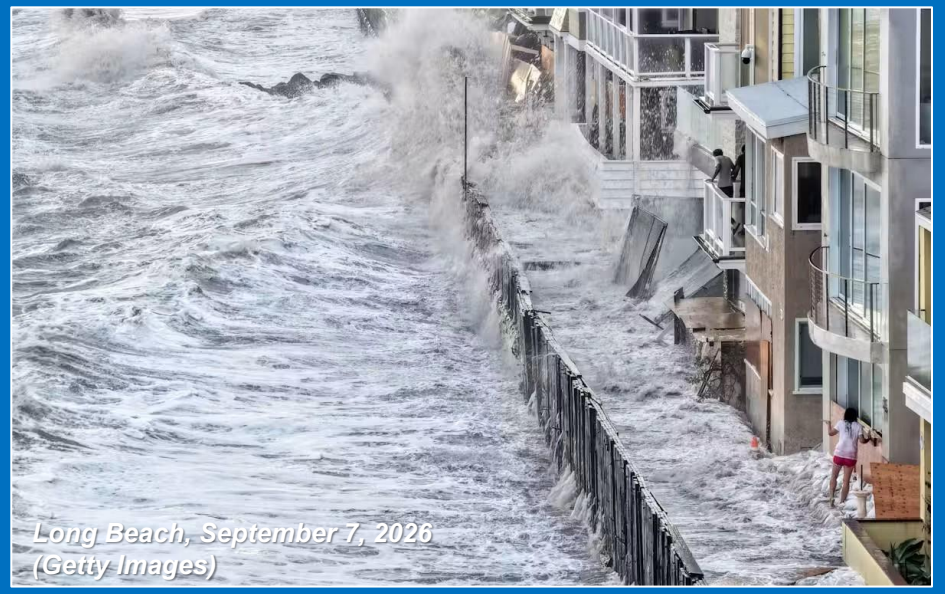




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El Niño 2026-27 Impacts

- 25 named storms in Eastern Pacific
- ~$10 billion in damages to Hawaii across from three Hurricanes
- Storm generated swells causing extensive beach loss and flooding in California
- ~$100's of millions in damages to SoCal and Bay Area communities so far
- California declared State of Emergency
- Ecosystem disruption due to elevated ocean temperatures



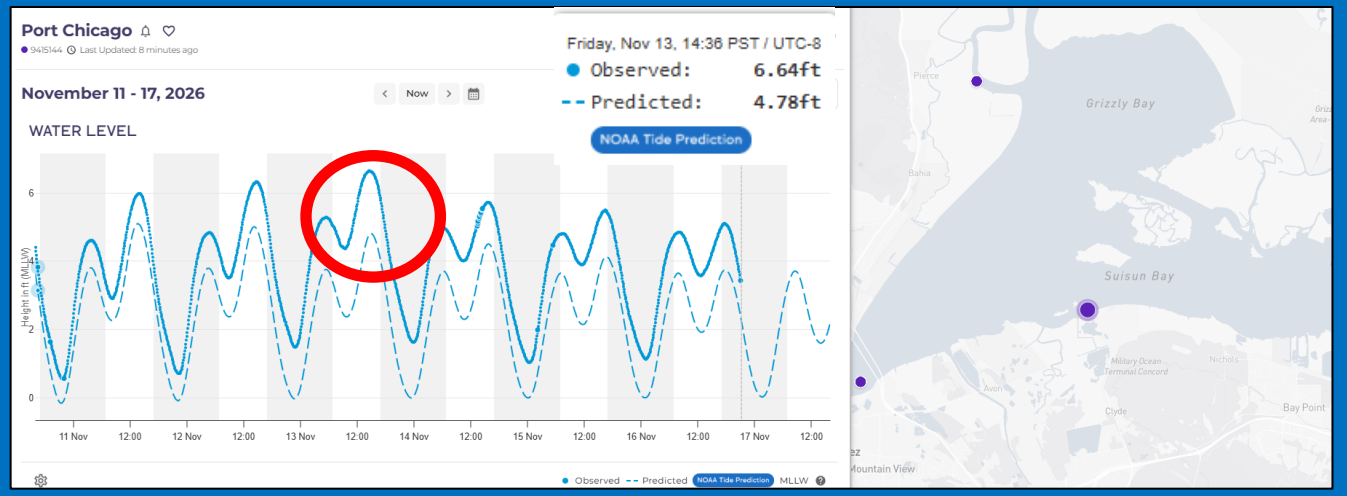
Long Beach, September 7, 2026 (Getty Images)



Mill Valley, October 29, 2026 (Getty Images)

El Nino 2026-27 Projections

- >90% chance of a very strong event (as in 1982-83, 1997-98, and 2015-16)
- Sea level ~18+ inches above normal
- Highest tides in 18 years to peak this winter, ~4 inches higher than late October
- Flood risk 4-6 times greater, placing 190,000 people and $70 billion of property at risk
- Delta flooding at heightened risk, especially if heavy rainfall/outflows coincide with extreme high tides




Rio Vista, May 22, 2023 (Getty Images)

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Flood Risk – Suisun Bay



https://ourcoastourfuture.org/

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Impact Report
2022–2026

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CoSMoS Adapts: Assessing Coastal Adaptation Strategies in California







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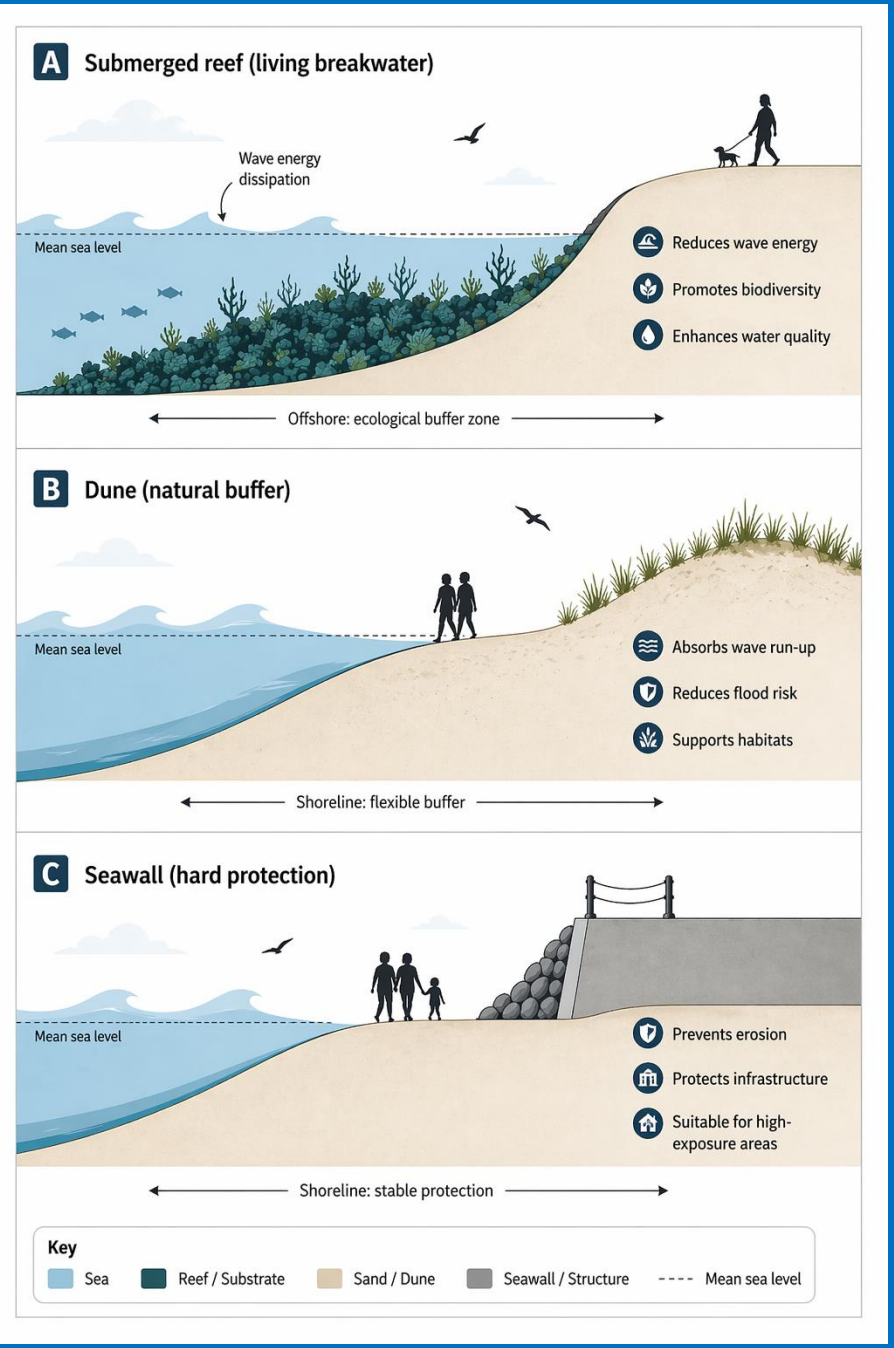
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CALIFORNIA'S FIFTH CLIMATE CHANGE ASSESSMENT

CoSMoS Adapts

- Advance the characterization of coastal risks over time, including tipping points.
- Quantitative evaluation of adaptation strategies, cost:benefit analysis, and their spatial distributions.
- Develop a pilot framework for statewide scalability





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