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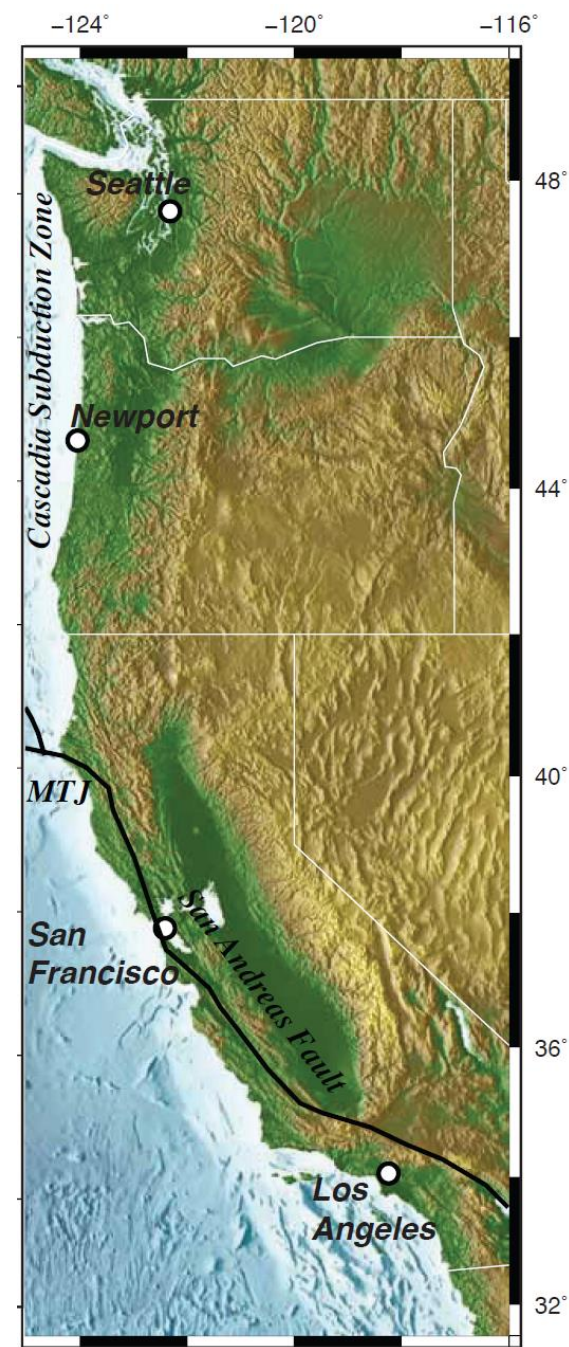
## Bottom-up approaches for adapting to climate change impacts: Perspectives from the U.S. West Coast

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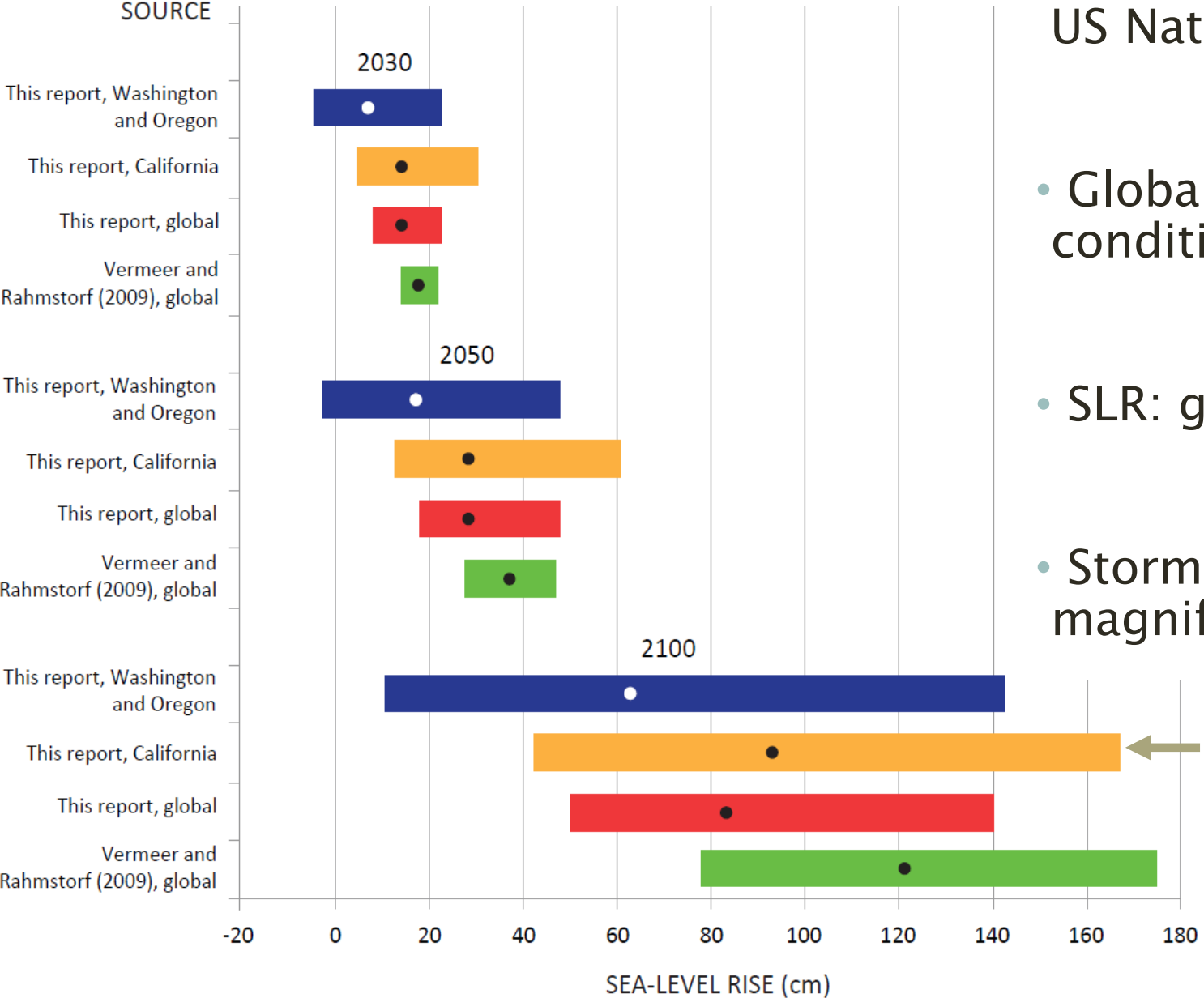
# Overview

- Regional context & expected impacts
- Community responses
  - Sea-level rise → King Tides Project
  - Ocean acidification → Shellfish industry
- Informing further adaptation approaches

Image: NRC, 2012



# Impact: Sea-Level Rise + Storms



## US National Research Council (2012):

- Global & local factors: physical ocean conditions & tectonics
- SLR: greater uncertainty at local scale
- Storms: increased high wave events & magnification due to SLR

← 167cm by 2100



# King Tides Project

“Snap the Shore, See the Future”

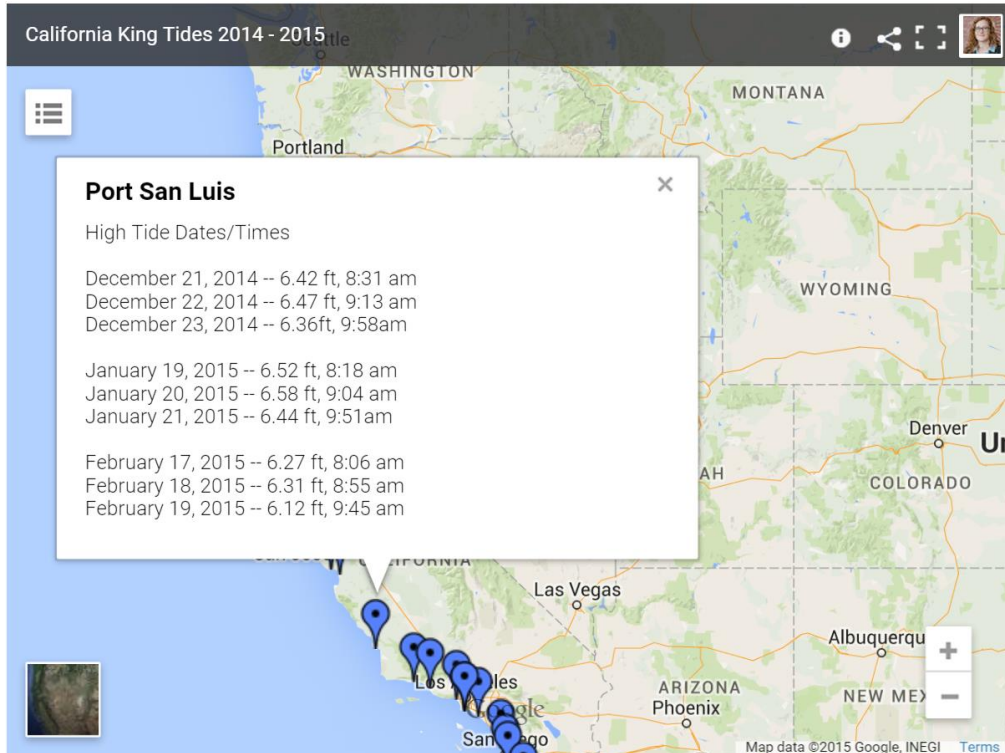
- Help people understand what is at risk
- Provide data to improve models and local decision-making
- California: 1,788 photos from 335 photographers collected since February 2011



Image: Claire Fackler, Isla Vista, CA

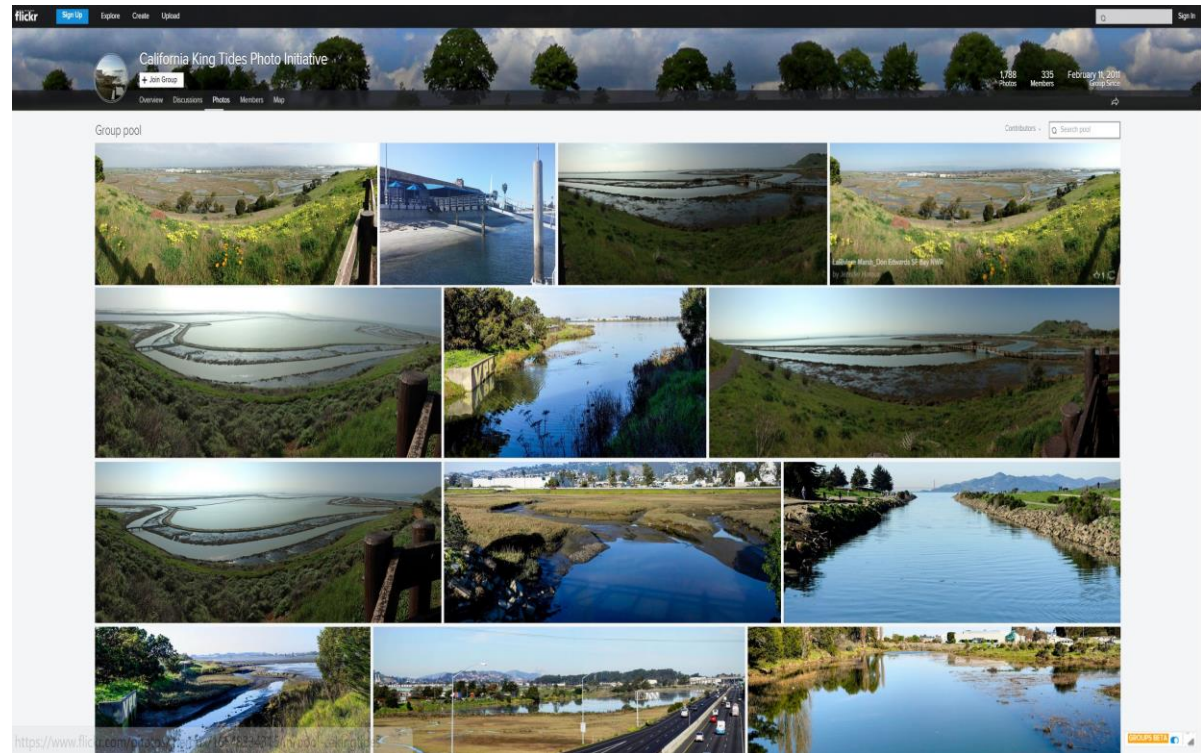
# How it works

## 1) Take pictures



- Identify King Tide times
- Follow photo protocol

## 2) Share



- Upload to Flickr Group
- Tag on Facebook or Twitter #kingtides

# Adaptation: Society

- Open technology
- Raises citizens' vulnerability awareness



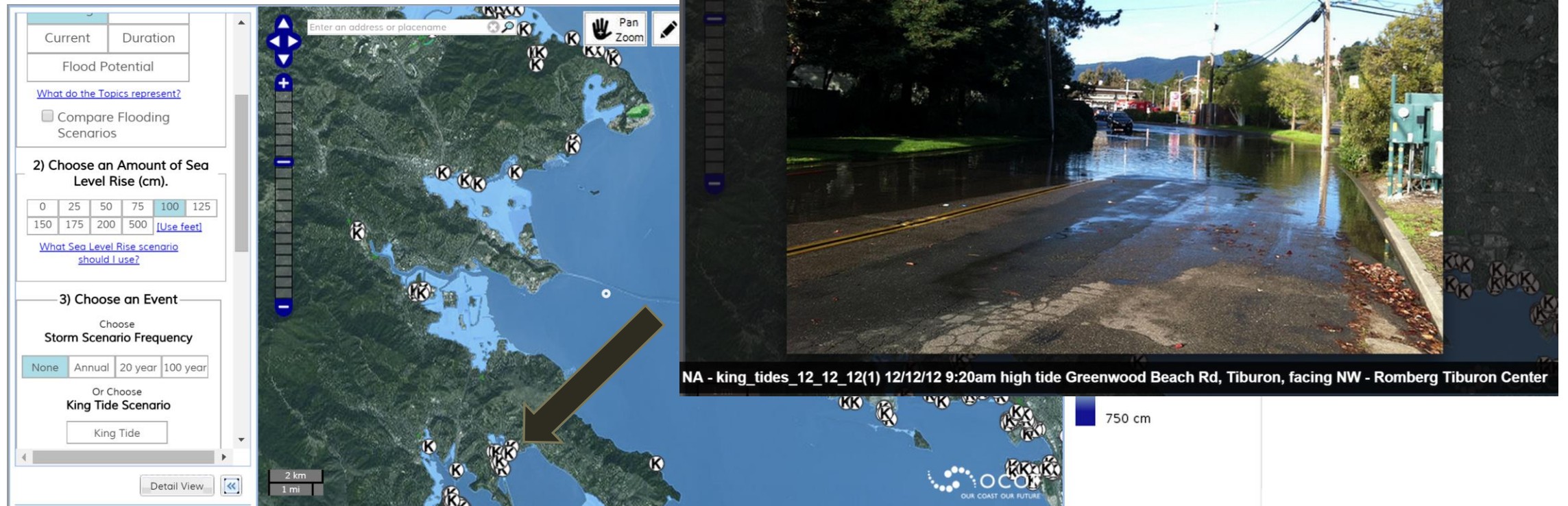
Image: LA Waterkeeper, Malibu, CA



Image: Amy Robertson, SF Chronicle

# Adaptation: Science

- Validate predictions
- Decision support tools



# Policy Response

- Vulnerability assessments
- Political attention
- Hazard avoidance policy



John Laird, California's Secretary for Natural Resources



# Impact: Ocean Acidification

NOAA (2014):

“Acidification” refers to a pH shift towards the acidic end of the pH scale

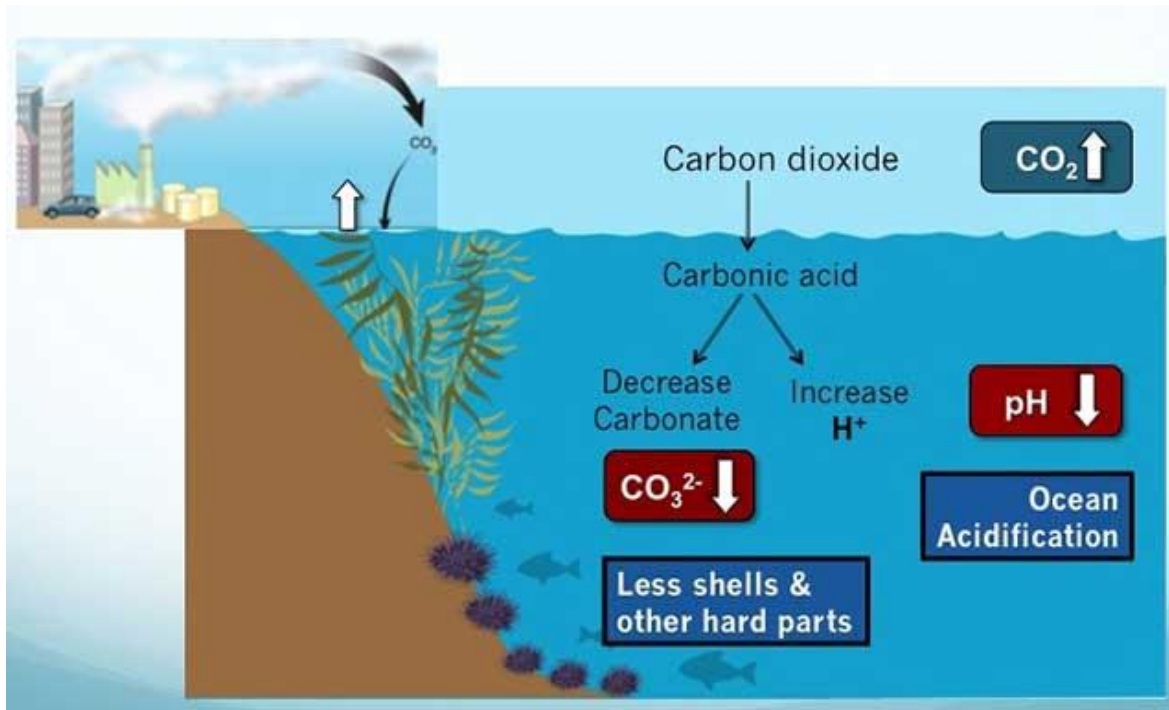


Image: Monterey Bay National Marine Sanctuary

Pacific NW vulnerable to acidification due to freshwater inputs and upwelling

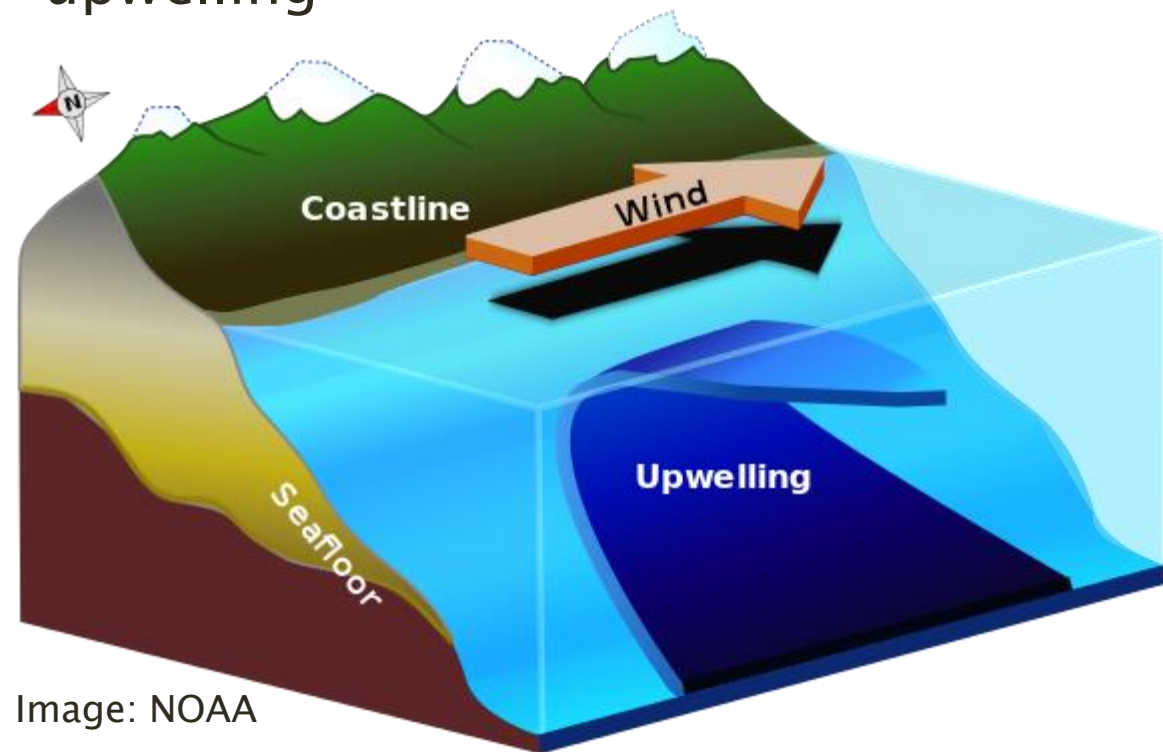
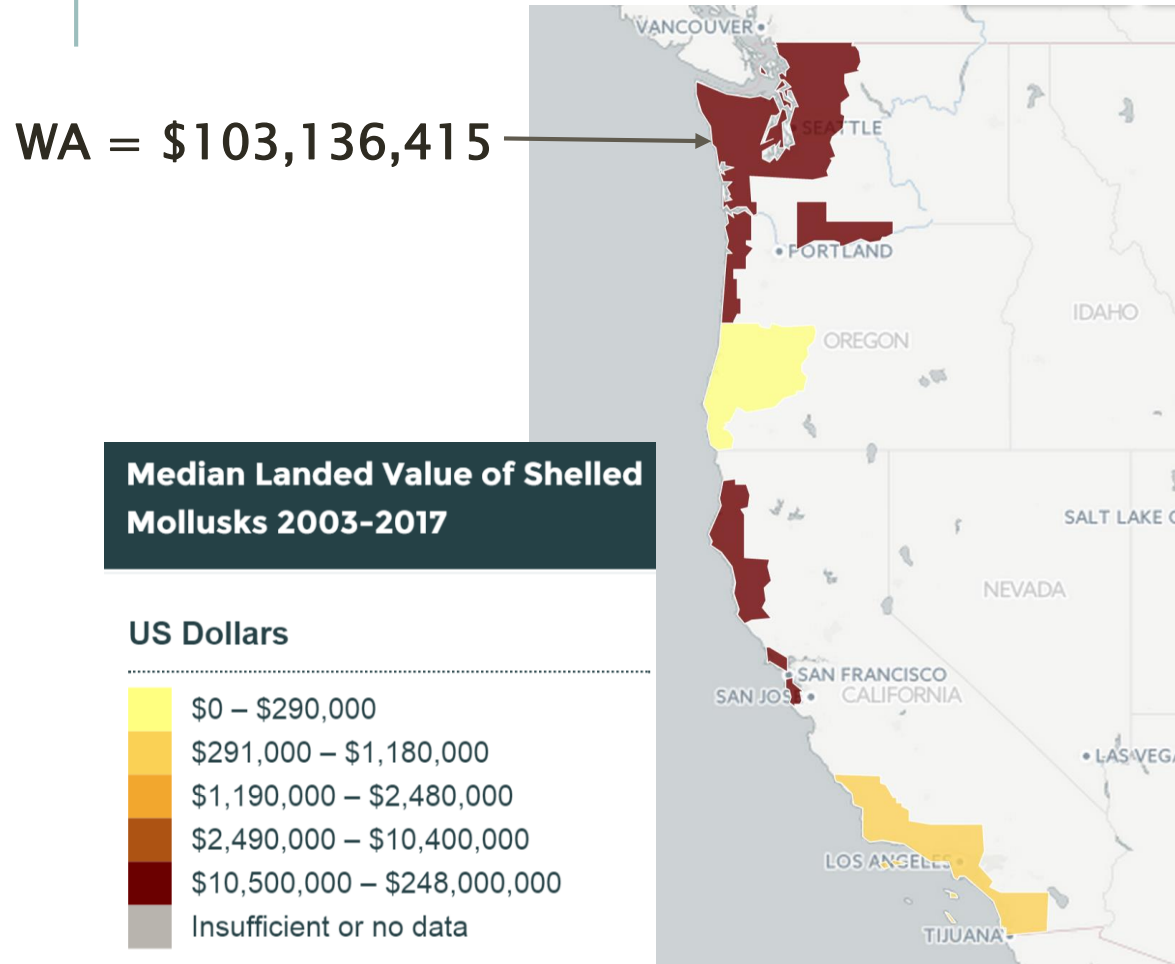


Image: NOAA

# Impacts: Shellfish Industry



Source: Ekstrom, J.A. et al, 2015

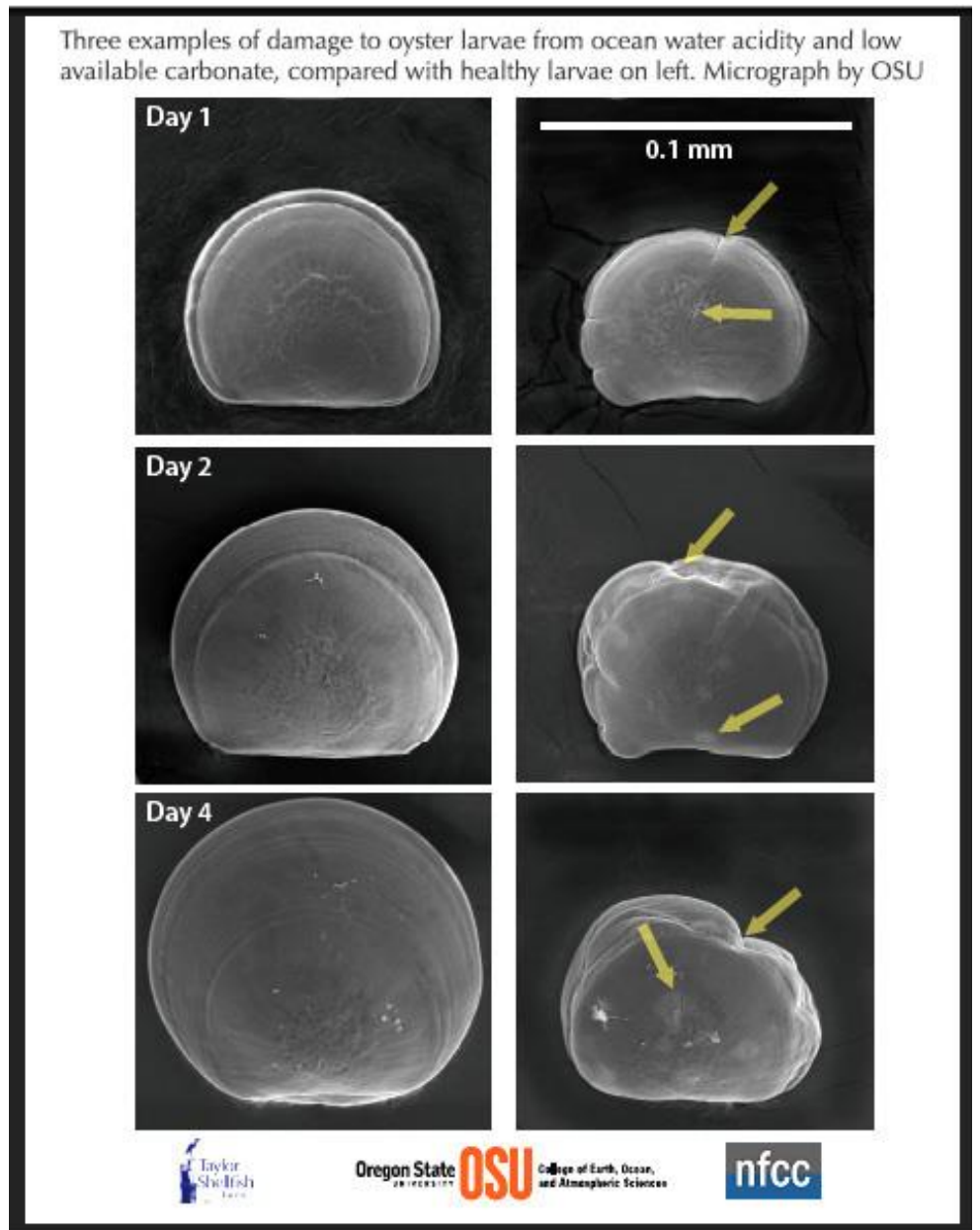


Image: Waldbusser, G. et al, 2013

# Adaptation: Industry

- Science–industry partnerships
- Operations adaptations
  - When is water quality best
  - Water treatment
  - Shifting geographic operations



Images: Steve Ringman, Seattle Times

# Policy Response



# Conclusions

- Crowdsourcing data through citizen science initiatives provides significant data to inform adaptation efforts.
- Private industry partnerships can advance scientific understanding of both impacts and adaptation responses.
- Engaging policy and decision makers can pinpoint information needs and scale-up understanding and measures to broader levels, increasing adaptation impact.

# References

National Research Council (NRC) Committee on Sea Level Rise in California, Oregon and Washington. 2012. Sea Level Rise for the Coasts of California, Oregon and Washington: Past, Present and Future. The National Academies Press, Washington, D.C.

King Tides Project. <http://kingtides.net/>

California King Tides Project. <http://california.kingtides.net/>

NOAA. Ocean Acidification in the Pacific Northwest. May 2014.

Waldbusser, George G., et al. "A developmental and energetic basis linking larval oyster shell formation to acidification sensitivity." *Geophysical Research Letters* 40.10 (2013): 2171–2176.

Ekstrom, Julia A., et al. "Vulnerability and adaptation of US shellfisheries to ocean acidification." *Nature Climate Change* 5.3 (2015): 207–214.

Ocean Acidification and Hypoxia: Today's Need for a Coast-wide Approach. California Ocean Science Trust, Oakland, California, USA. 2014

Thank you!  
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