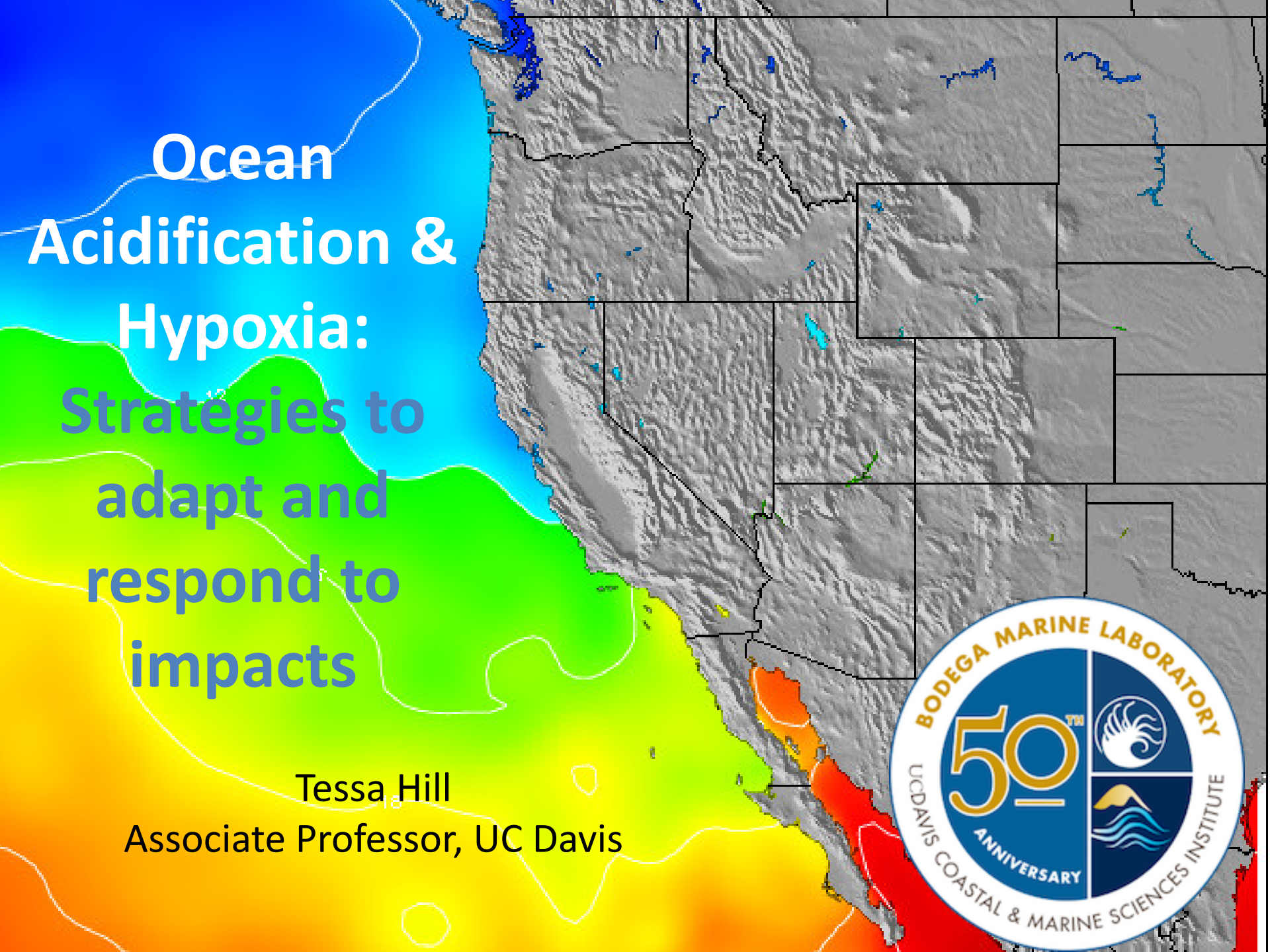
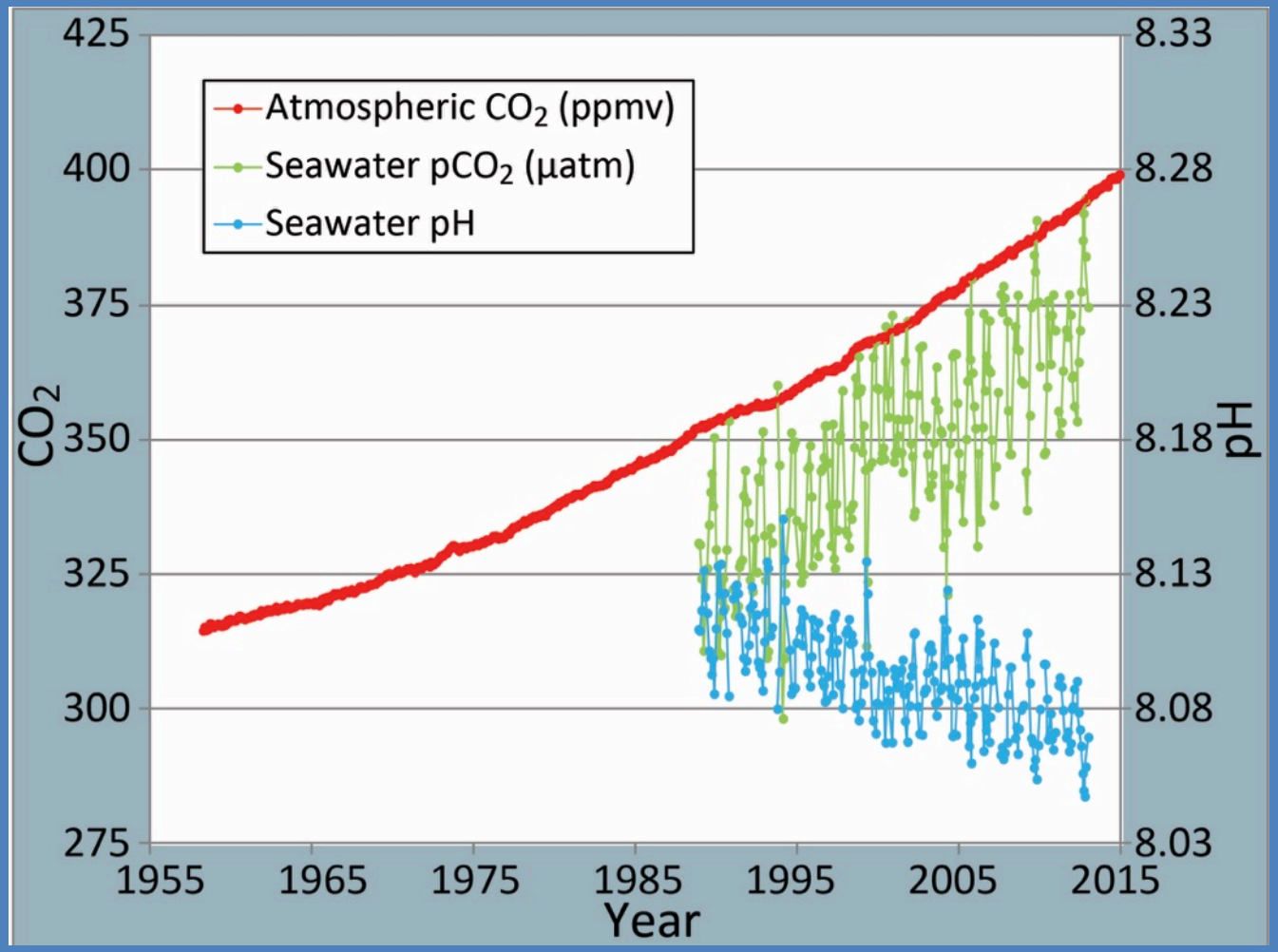

Ocean Acidification & Hypoxia:
Strategies to adapt and respond to impacts
Tessa Hill
Associate Professor, UC Davis
BODEGA MARINE LABORATORY
50TH ANNIVERSARY
UCDAVIS COASTAL & MARINE SCIENCES INSTITUTE

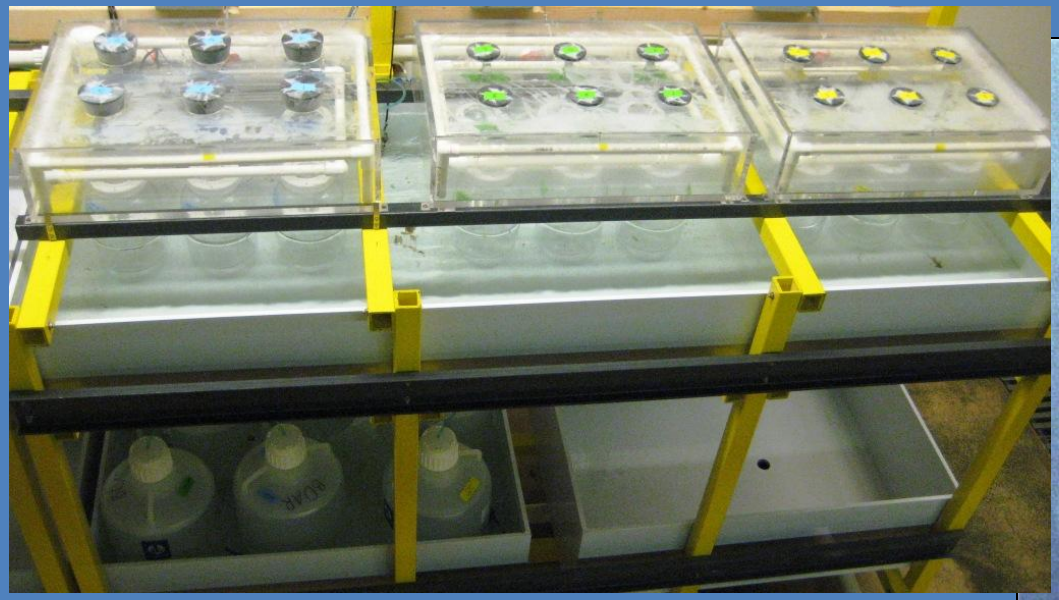
Ocean chemistry is changing at an alarming rate

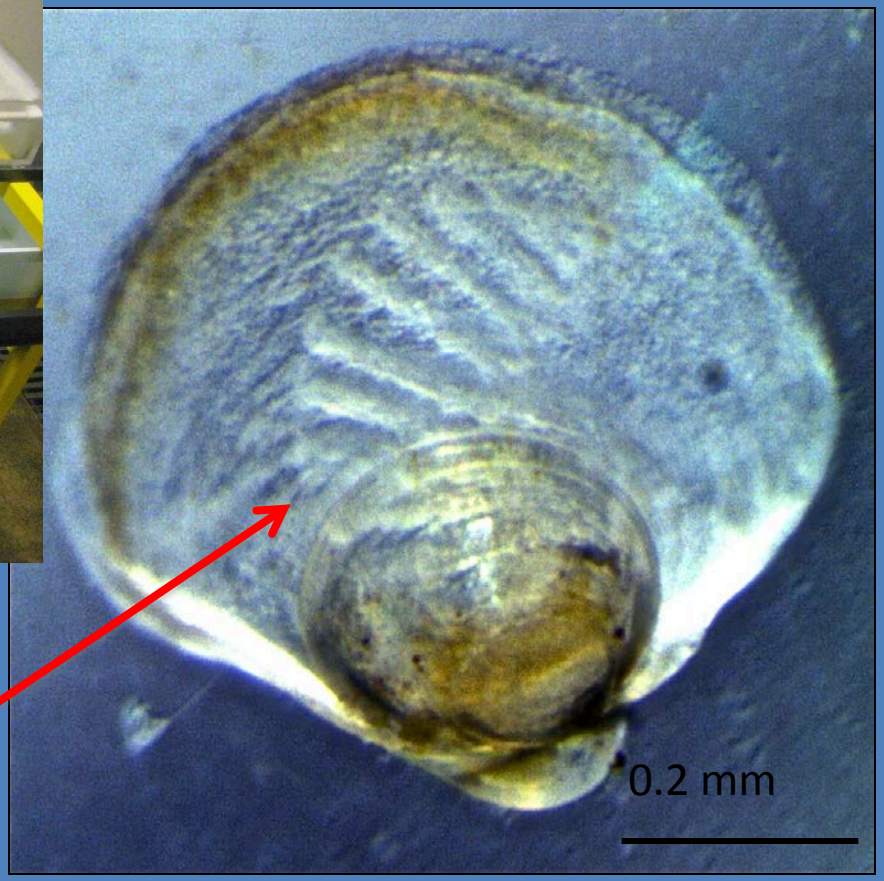


Credit: Modified after R. Feely, Bulletin of the Meteorological Society, July 2008

Bodega Ocean Acidification Research:

Predicting Future Impacts





- Larvae from high-CO_2 treatments: 14% decrease in shell growth

- Juveniles from high-CO_2 : 36% decrease in shell growth *regardless of if in ambient or high-CO_2 conditions as juveniles*

Juvenile Olympia oyster

Hettinger et al., 2012

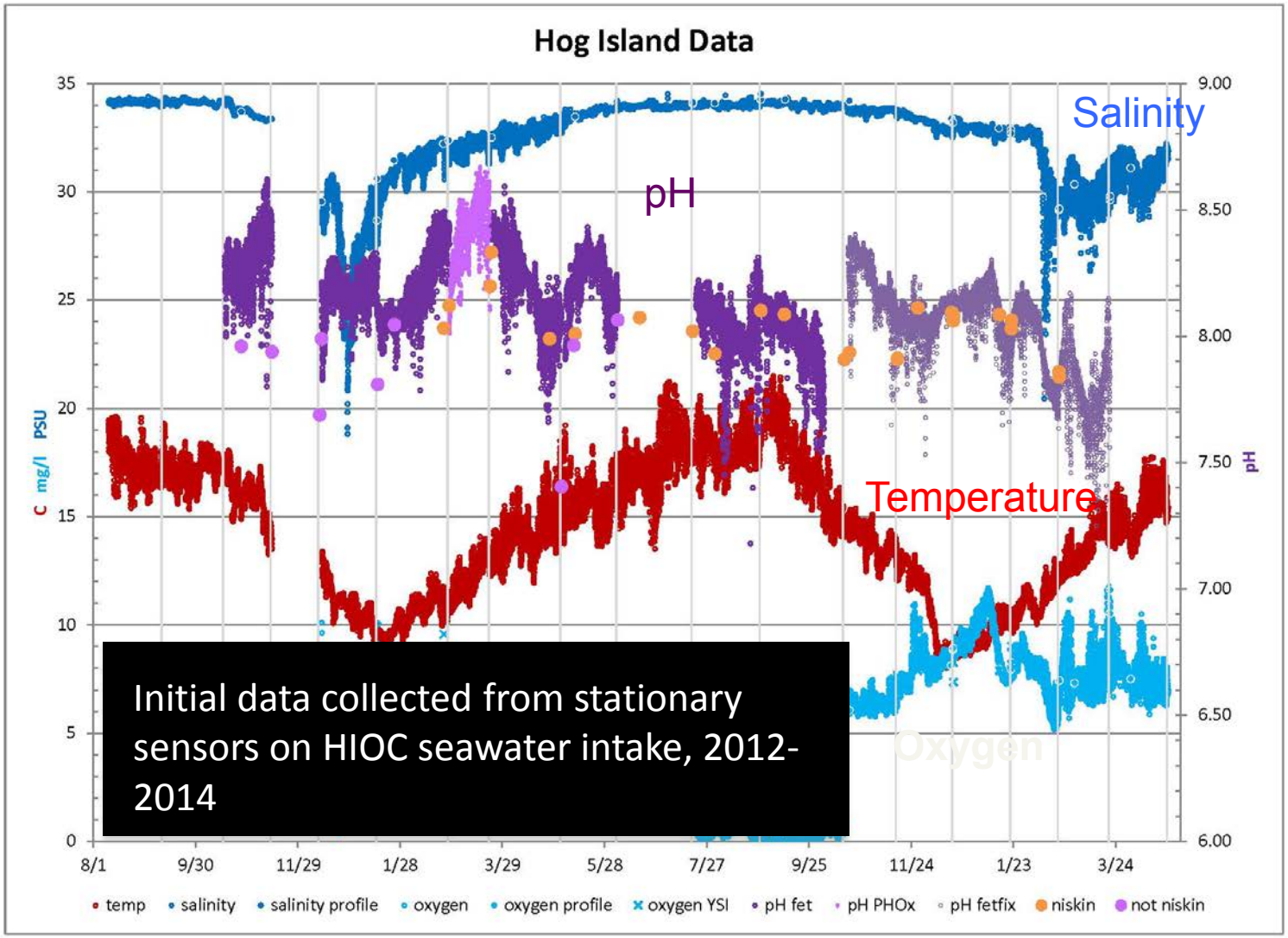
Partnership with Hog Island Oyster Co.

Deployed sensors starting in Fall 2012

- Temperature
- Salinity
- pH
- Dissolved oxygen
- CO_2 (added 2014)

Measurements document daily, seasonal, and annual variability

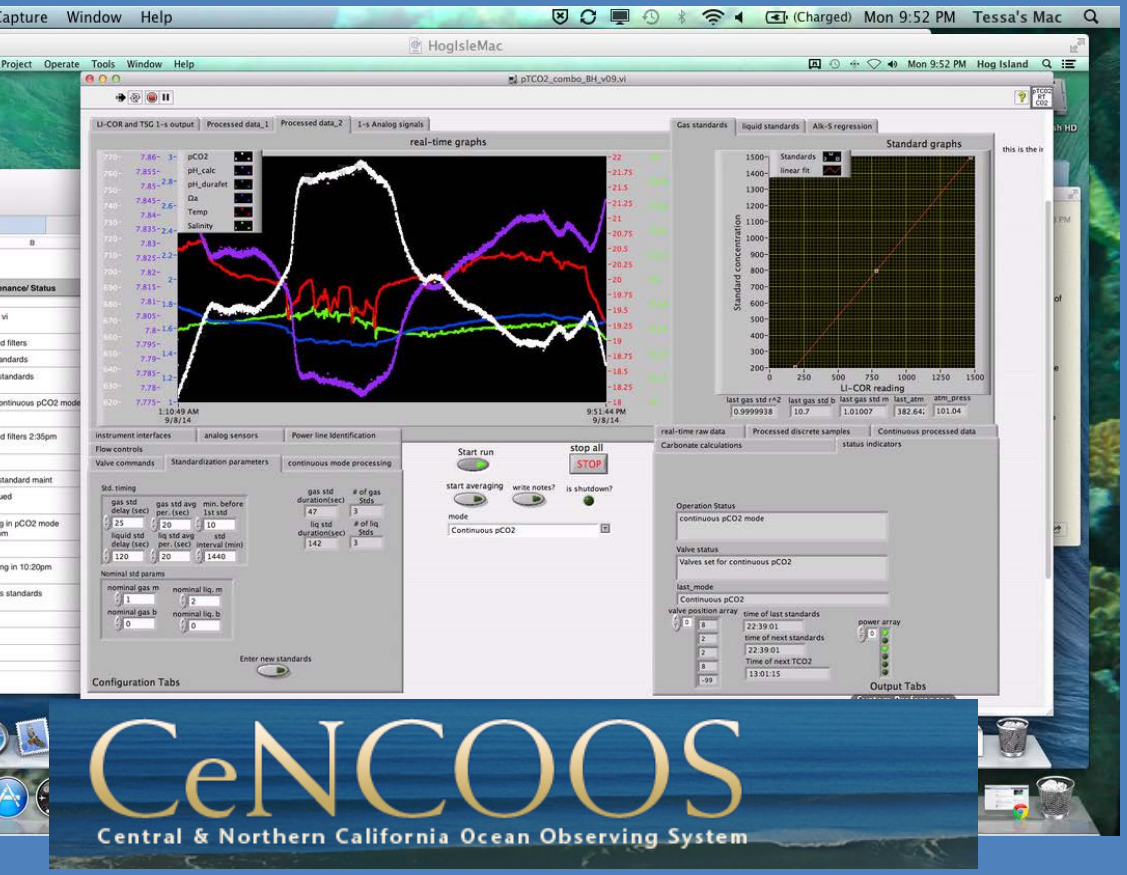
Partnership with Hog Island Oyster Co.



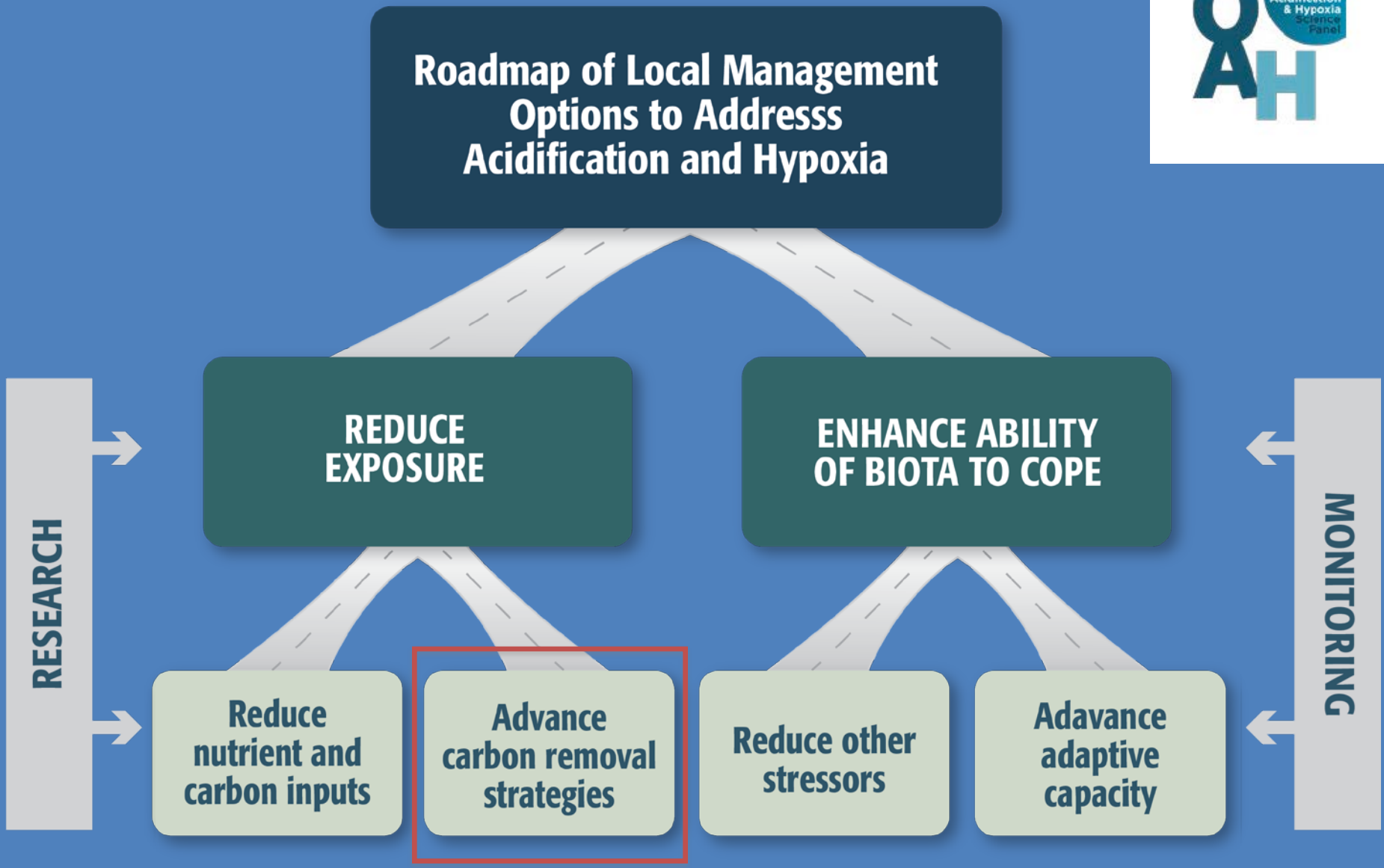
Initial data collected from stationary sensors on HIOC seawater intake, 2012-2014

Partnership with Hog Island Oyster Co.

- Sensors
- Maintenance tasks
- Data access
- Research ideas
- Communicating science



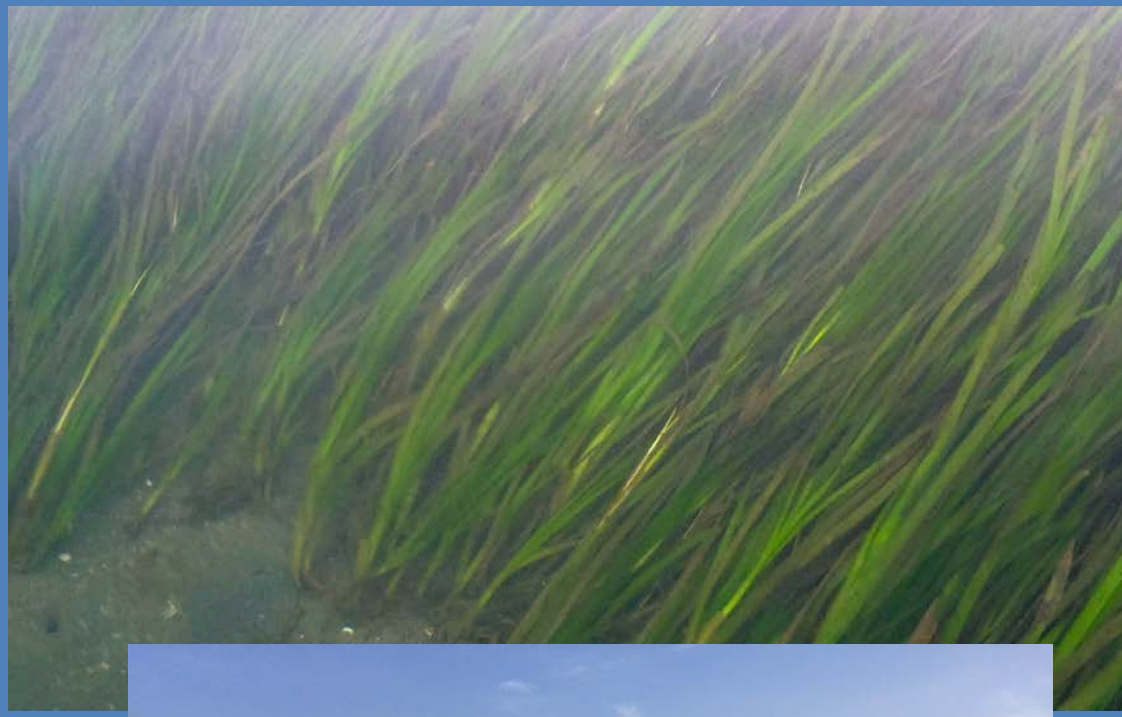
Data now ‘stream’ live to the web, and are publicly available.


Roadmap of Local Management Options to Addresss Acidification and Hypoxia
REDUCE EXPOSURE
ENHANCE ABILITY OF BIOTA TO COPE
RESEARCH
MONITORING
Reduce nutrient and carbon inputs
Advance carbon removal strategies
Reduce other stressors
Adavance adaptive capacity

Coastal carbon “sinks”

- Seagrass meadows and salt marshes provide an opportunity to store excess carbon (“Blue Carbon”)

- We are investigating the long and short term potential for seagrass beds to modify water chemistry and storing carbon – in Bodega Harbor and Tomales Bay



Sea Grant
California

CALIFORNIA'S INVESTMENT IN MONITORING CRITICAL TO DOCUMENT *AND RESPOND* TO CLIMATE CHANGE, OCEAN ACIDIFICATION AND HYPOXIA

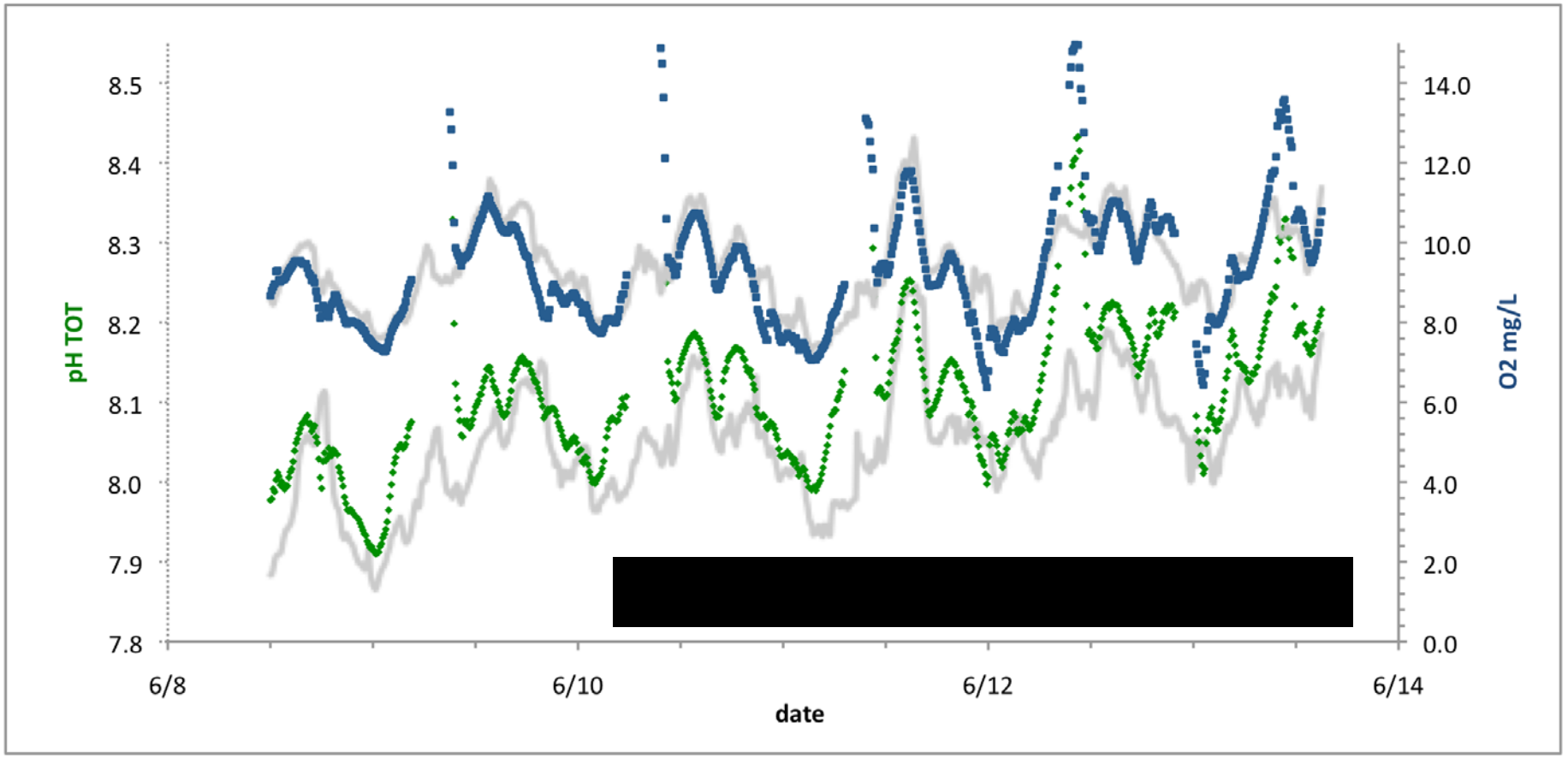
Acknowledgements

Co PI's: Brian Gaylord, Eric Sanford, Ann Russell, John Largier

Hog Island Oyster Company, Seth Miller, Annaliese Hettinger, Kristy Kroeker, Jessica Hosfelt, Dan Swezey, Kate Davis, Aaron Ninokawa, Jordan Young, Emily Rivest

Tom's Point, Tomales, June 2015

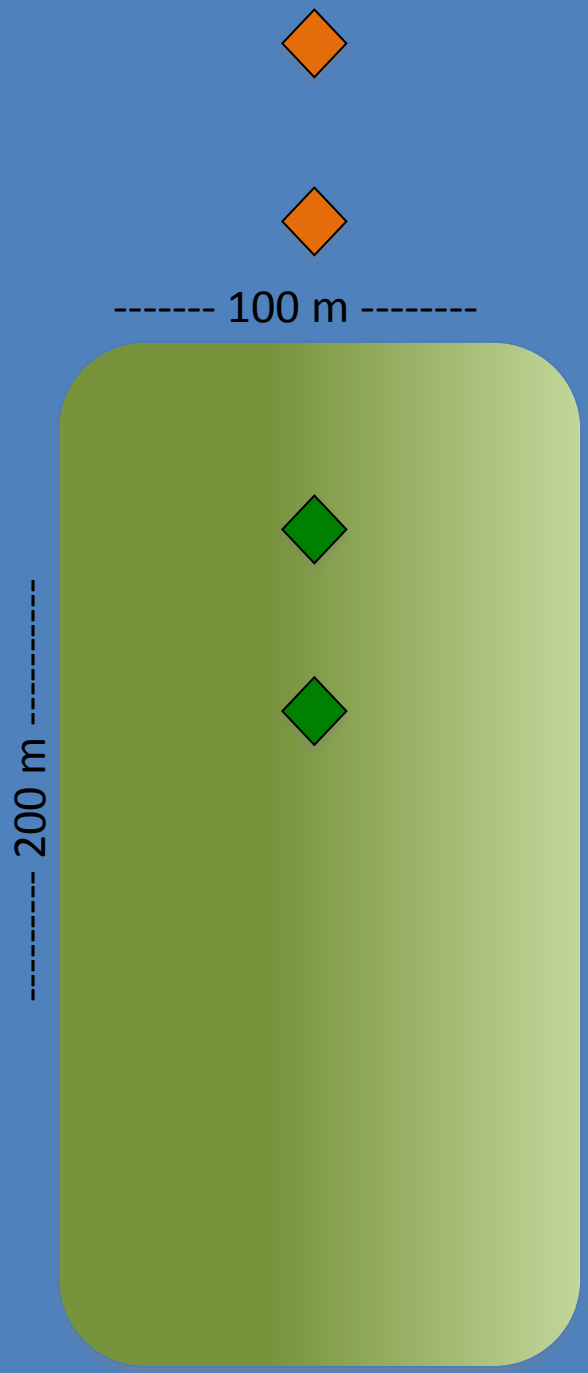
Color – inside seagrass bed **Grey** - outside



Seagrass beds may experience more 'extreme' conditions

Seagrass beds appear to 'trap' organic carbon – what is long term fate?

Experimental design



- SeaFet/SatFET or SeapHox type instruments (T, S, pH, O_2 + current flow)
- 3-6 week deployments
- Biomass & shoot density in transects at deployment
- Sediment cores