

OAP

NOAA OCEAN ACIDIFICATION PROGRAM



U.S. Coordination on Ocean Acidification Science

Strategic Plan for Federal Research and Monitoring of Ocean Acidification

Vision

“A nation, globally engaged and guided by science, sustaining healthy marine and coastal ecosystems, communities, and economies through informed response to ocean acidification”

“...provide for an **assessment** of the impacts ...on marine ecosystems and the **development of adaption and mitigation strategies** to conserve marine organisms and marine ecosystems.”

March 2014



Coastal and estuarine acidification, to the extent that the cause of the acidification can be traced back to anthropogenic atmospheric inputs to the ocean, are assumed to be covered

NOAA Ocean Acidification Program

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 **NOAA**
SCIENCE. SERVICE. STEWARDSHIP.



Mission:

Better prepare society to respond to ocean acidification by fostering interdisciplinary research, monitoring, forecasting, and community outreach engaged through both national and international partnerships



REAL Partnership is KEY

Leverage \$7.5M

OAP \$10M

In-kind = \$500K+

In-kind = \$500K+ per laboratory + AOML

\$500k
Integrated Ocean Observing System

\$500K+

In-kind = \$100K+

\$3 M +
CPO

\$50K+

\$350K +

\$1 M

\$10 M
OCEAN ACIDIFICATION PROGRAM

\$1 M
CORAL REEF CONSERVATION PROGRAM

NOAA OCEAN ACIDIFICATION PROGRAM

HYDROGRAPHIC CRUISES

DOCUMENTING CARBON DISTRIBUTIONS IN THE OCEAN INTERIOR



VOLUNTEER OBSERVING SHIPS

DOCUMENTING CARBON DISTRIBUTIONS IN THE SURFACE OCEAN



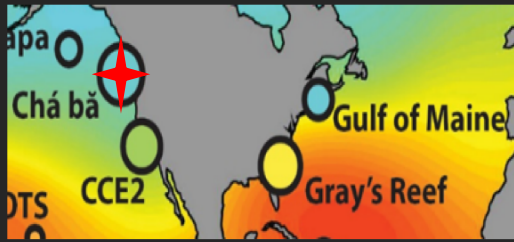
BUOYS AND OTHER AUTONOMOUS SYSTEMS

DOCUMENTING TEMPORAL CHANGES IN OCEAN CARBON



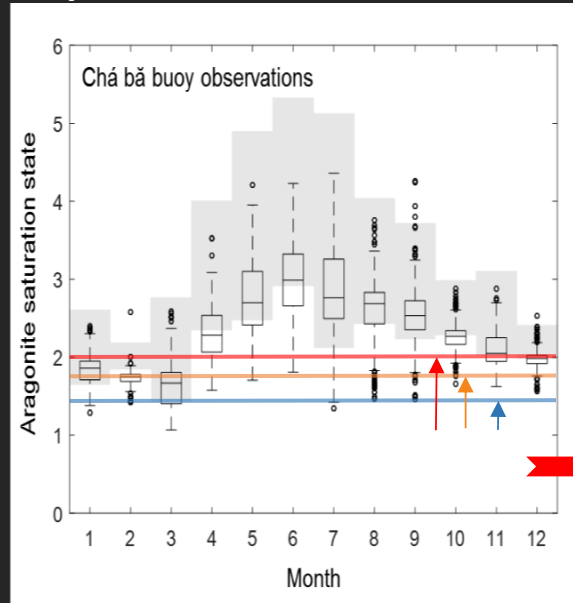
Courtesy of NOAA

Shellfish exposure: seasonal variability + ocean acidification

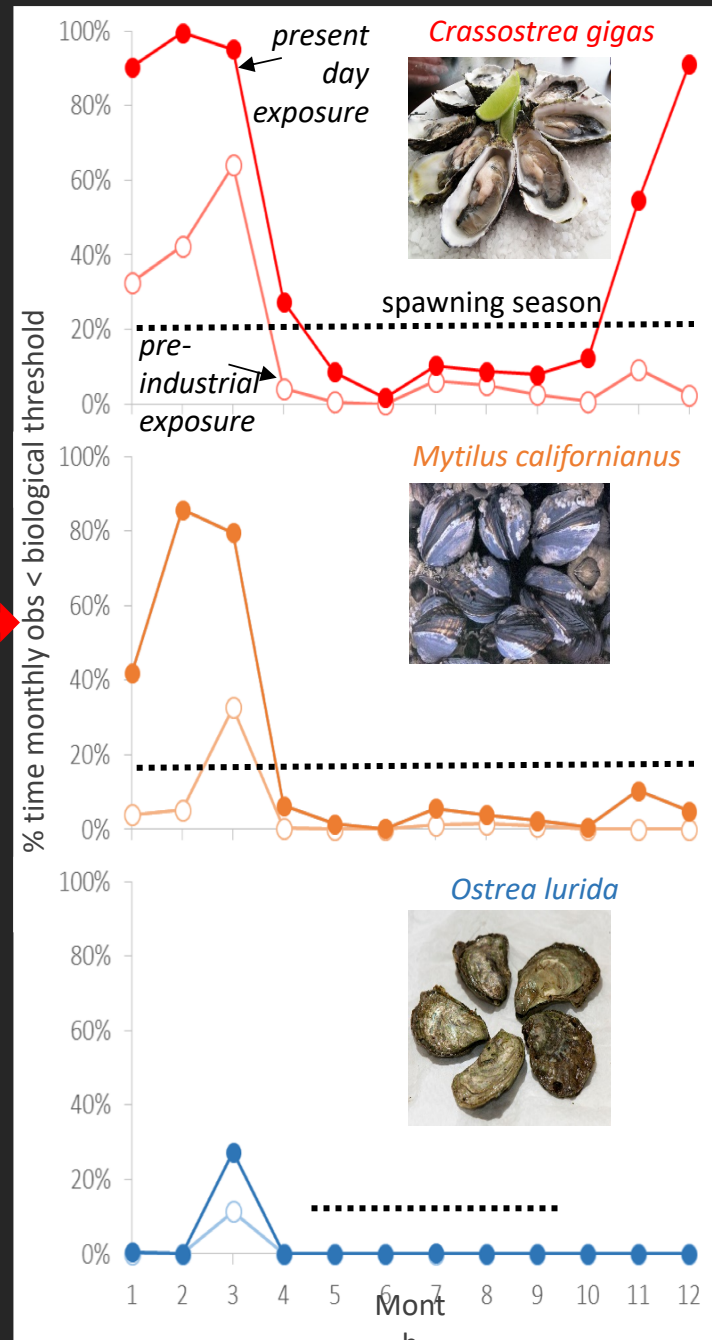


Present day seasonal conditions in the California Current Ecosystem (example here) and Gulf of Maine exceed thresholds known to impact shellfish larvae

Unfavorable conditions existed prior to OA, however these conditions now occur more often

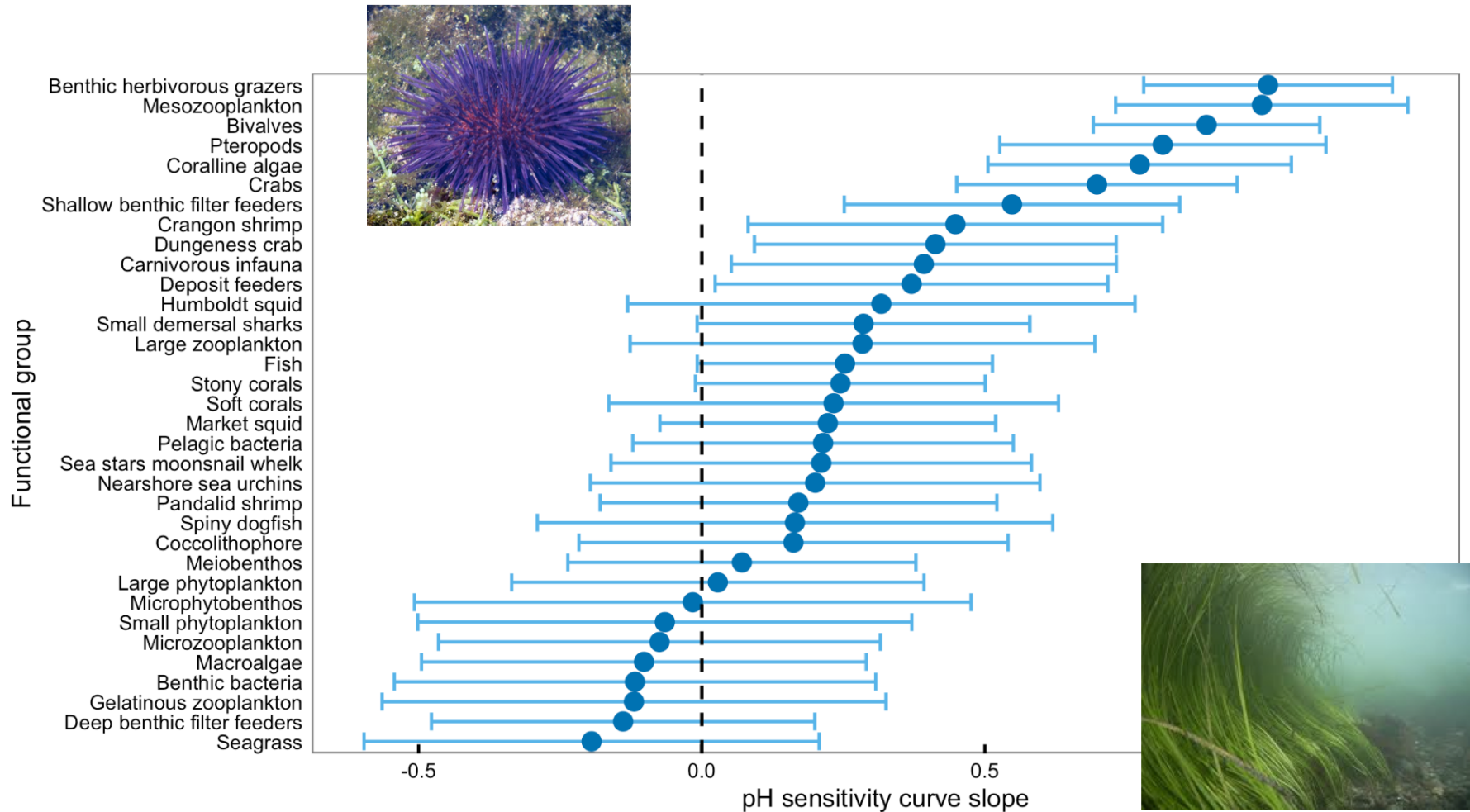


Threshold	Larvae	Region	Spawning season	Reference
$\Omega_{arag} < 2.0$	Pacific oyster	northern CCE	year round (hatchery)	Barton et al. 2012
$\Omega_{arag} < 1.8$	California mussel	throughout CCE	year round	Gaylord et al., 2011
$\Omega_{arag} < 1.4$	Olympia oyster	northern CCE	late spring through summer	Hettinger et al. 2013



Relative pH Sensitivity

Meta-analysis of ~400 OA Papers Relevant to California Current



Know Thyself

- Temple of Apollo at Delphi ~8th Century BCE

