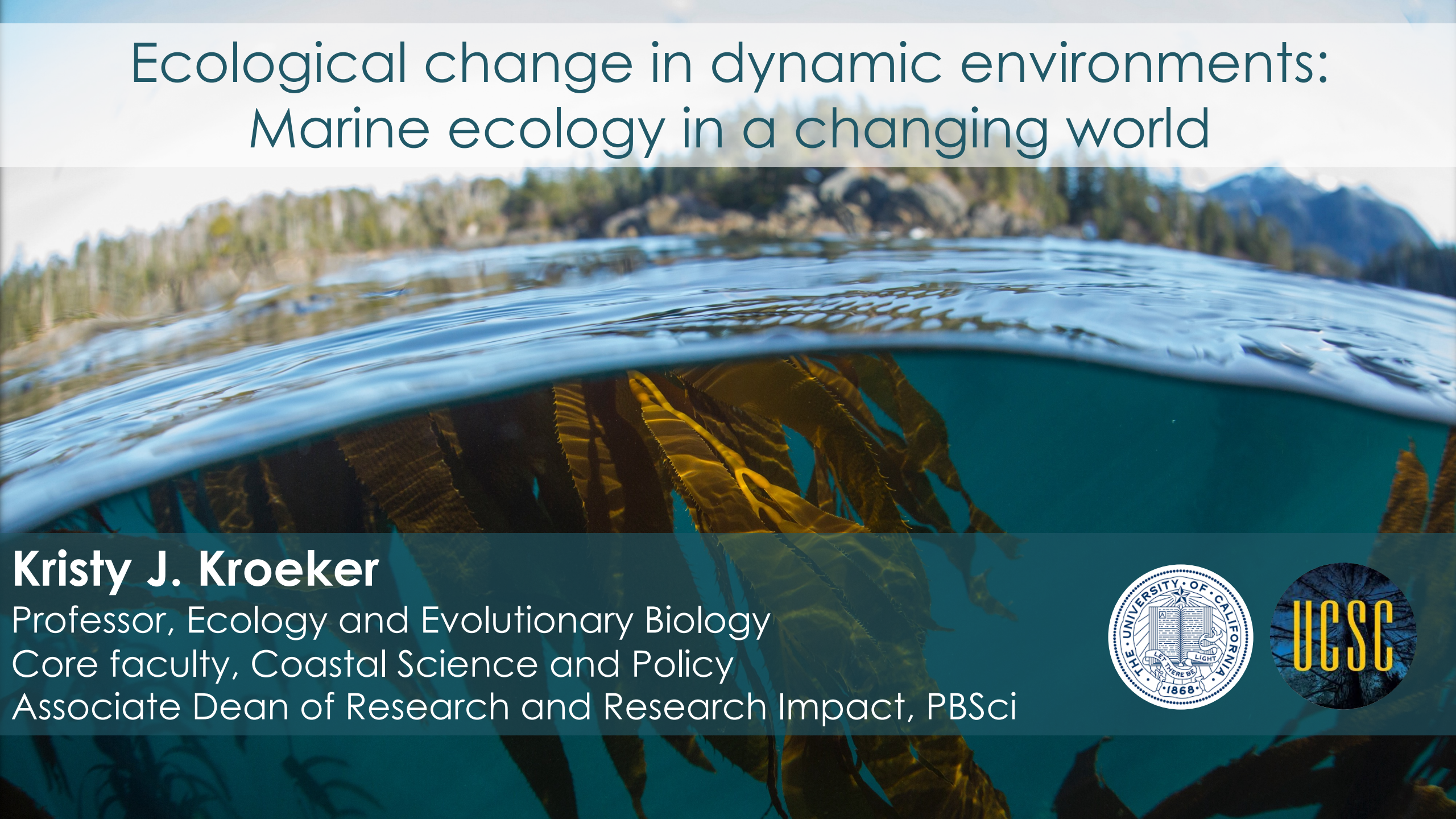
Ecological change in dynamic environments: Marine ecology in a changing world



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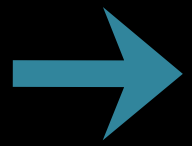
Michael Langhans Photography

Photos: Patrick Webster


Renegade

What are the mechanisms underlying ecosystem dynamics in nature?



How can we support ecosystem function in systems undergoing directional change?

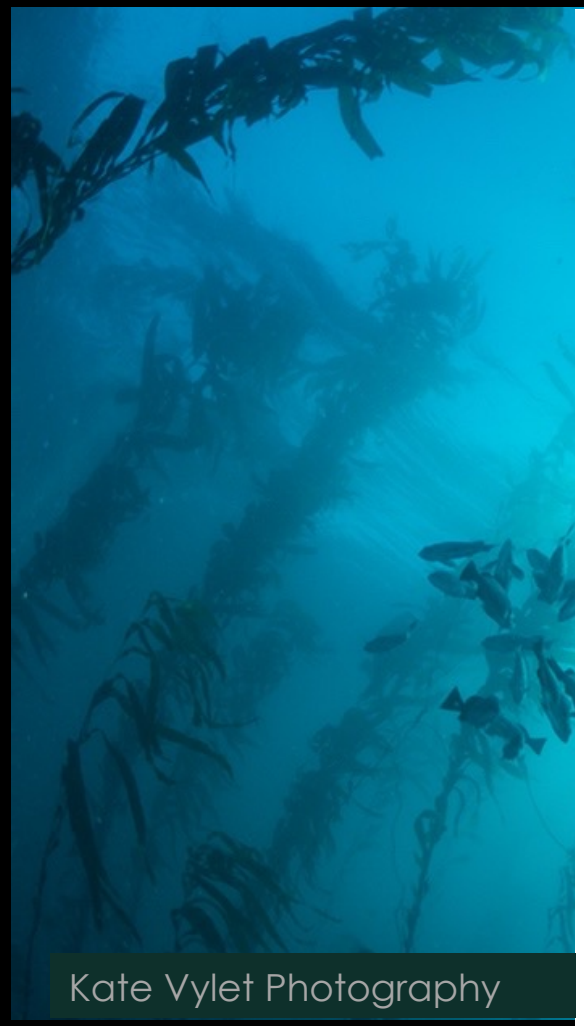
Challenge: environmental change is complex

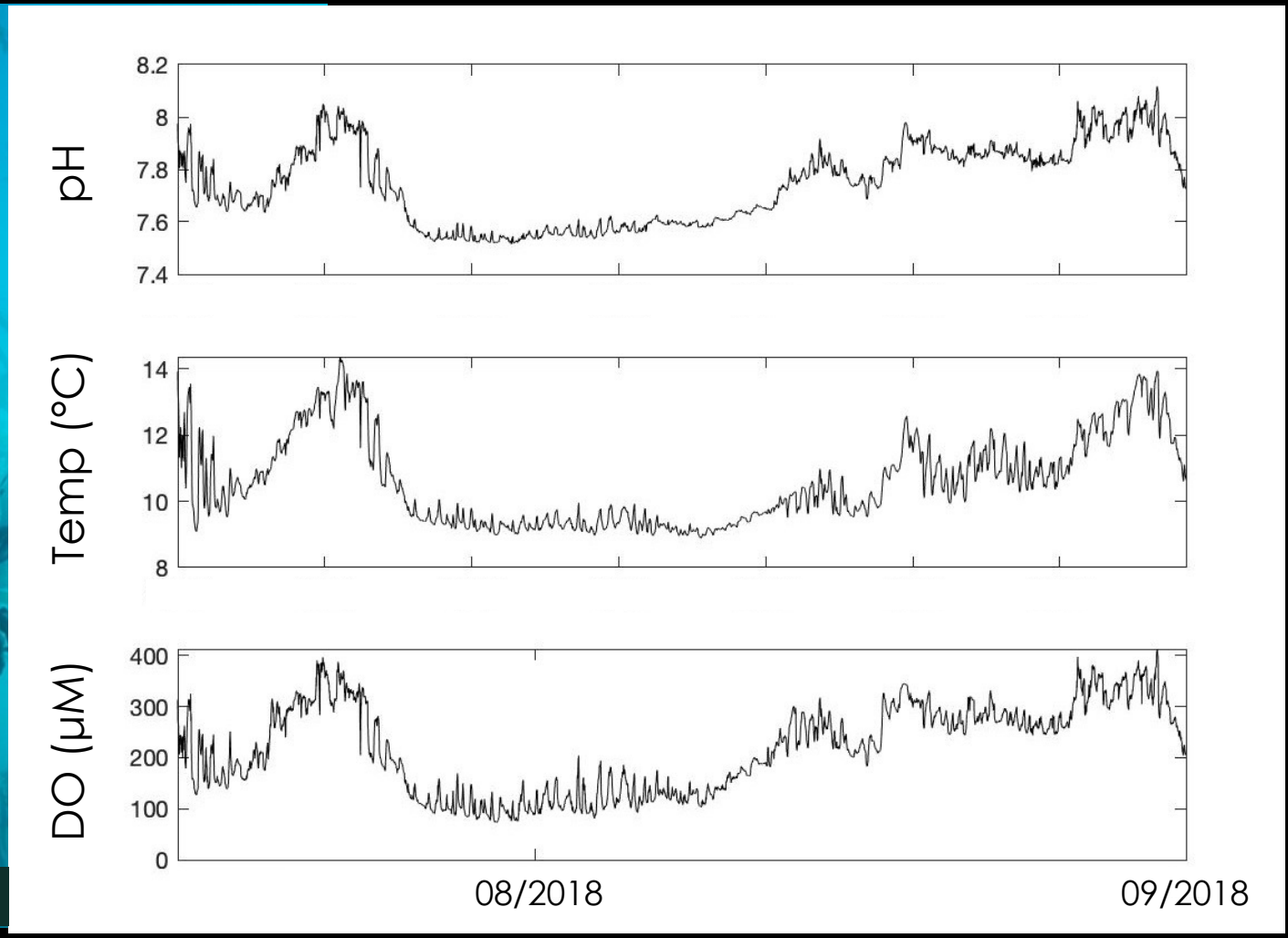
CO_2

>90% heat

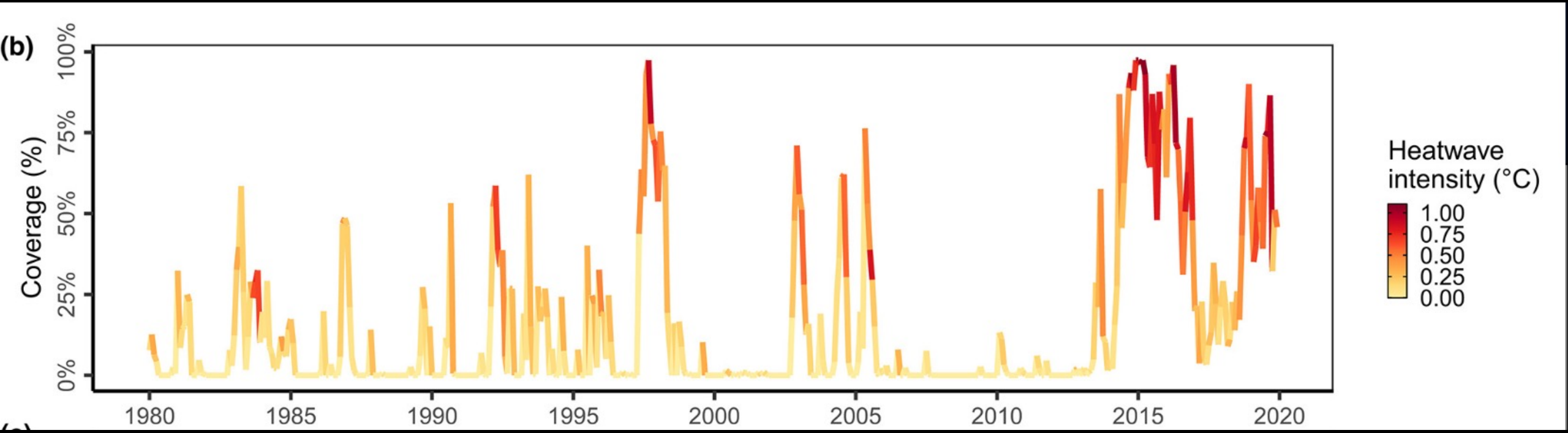
>25% CO_2

Marine organisms experience unique combos of drivers



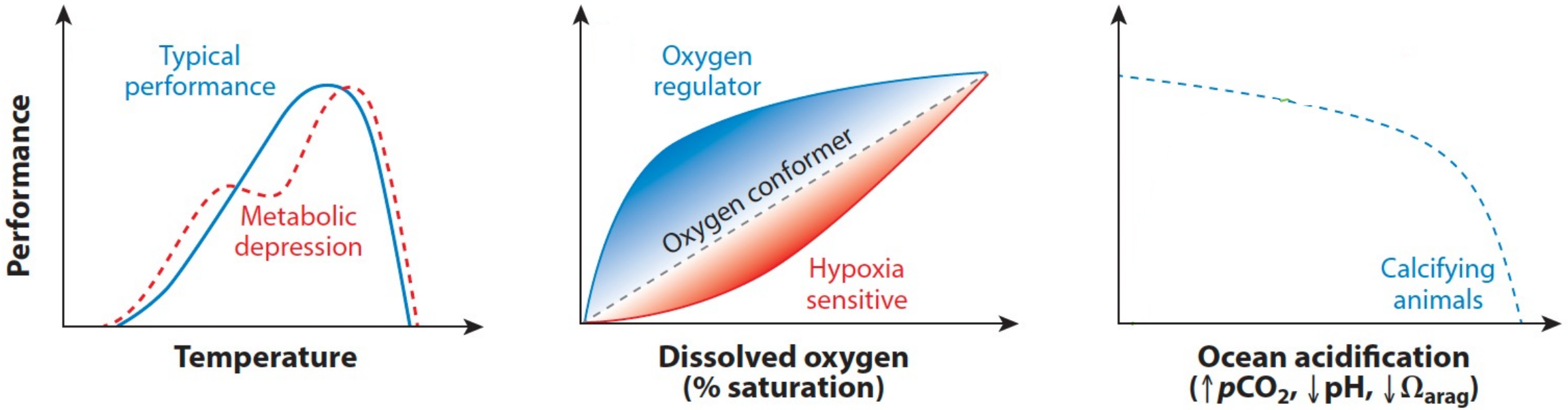


Environmental conditions are dynamic in time!



Free et al. 2023 Fish and Fisheries

Response to single environmental drivers

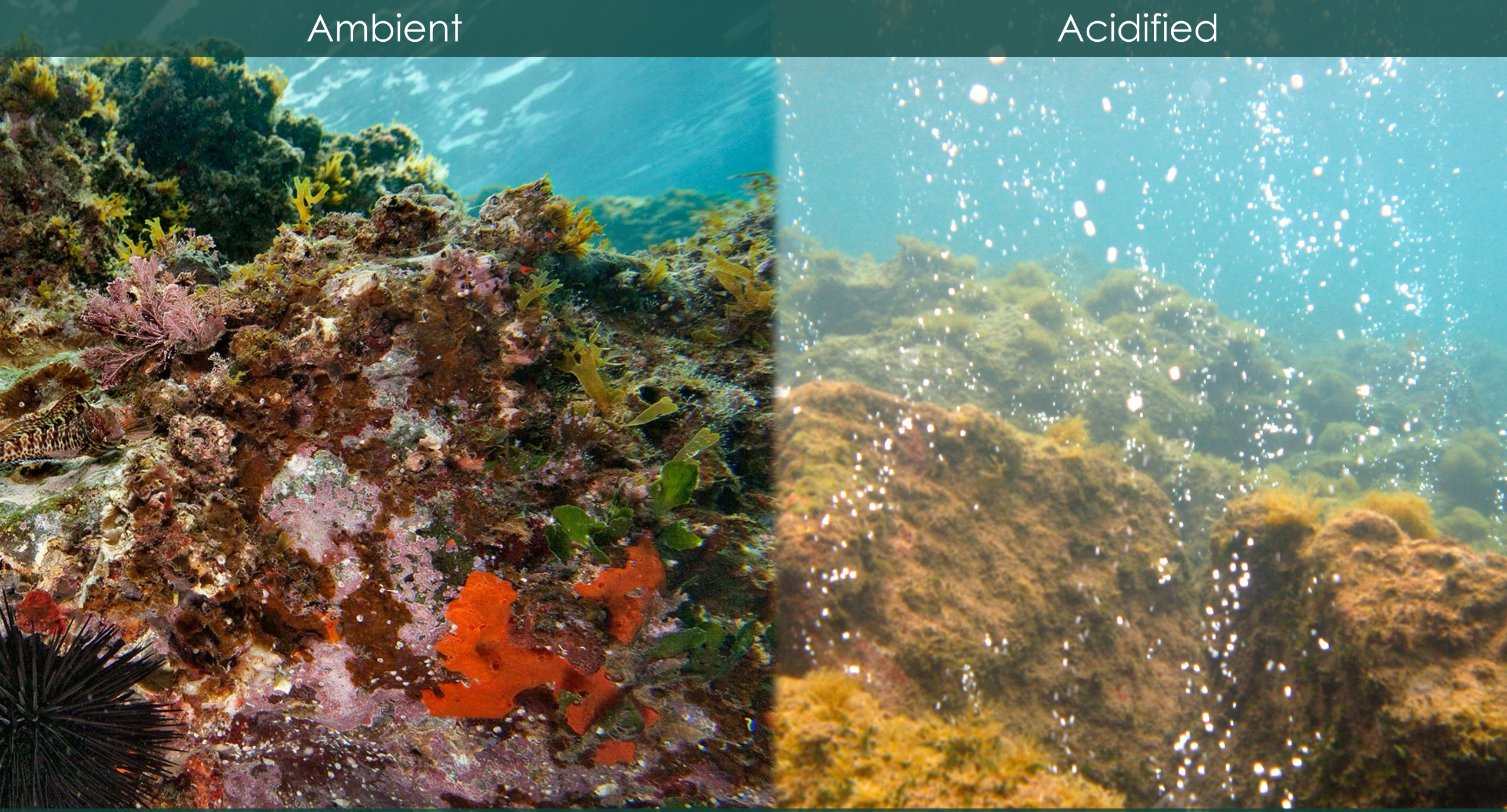


?

Opportunity: Interdisciplinary programs that pair oceanographic observations with organismal and population level studies relevant to dynamic, multivariate environments.

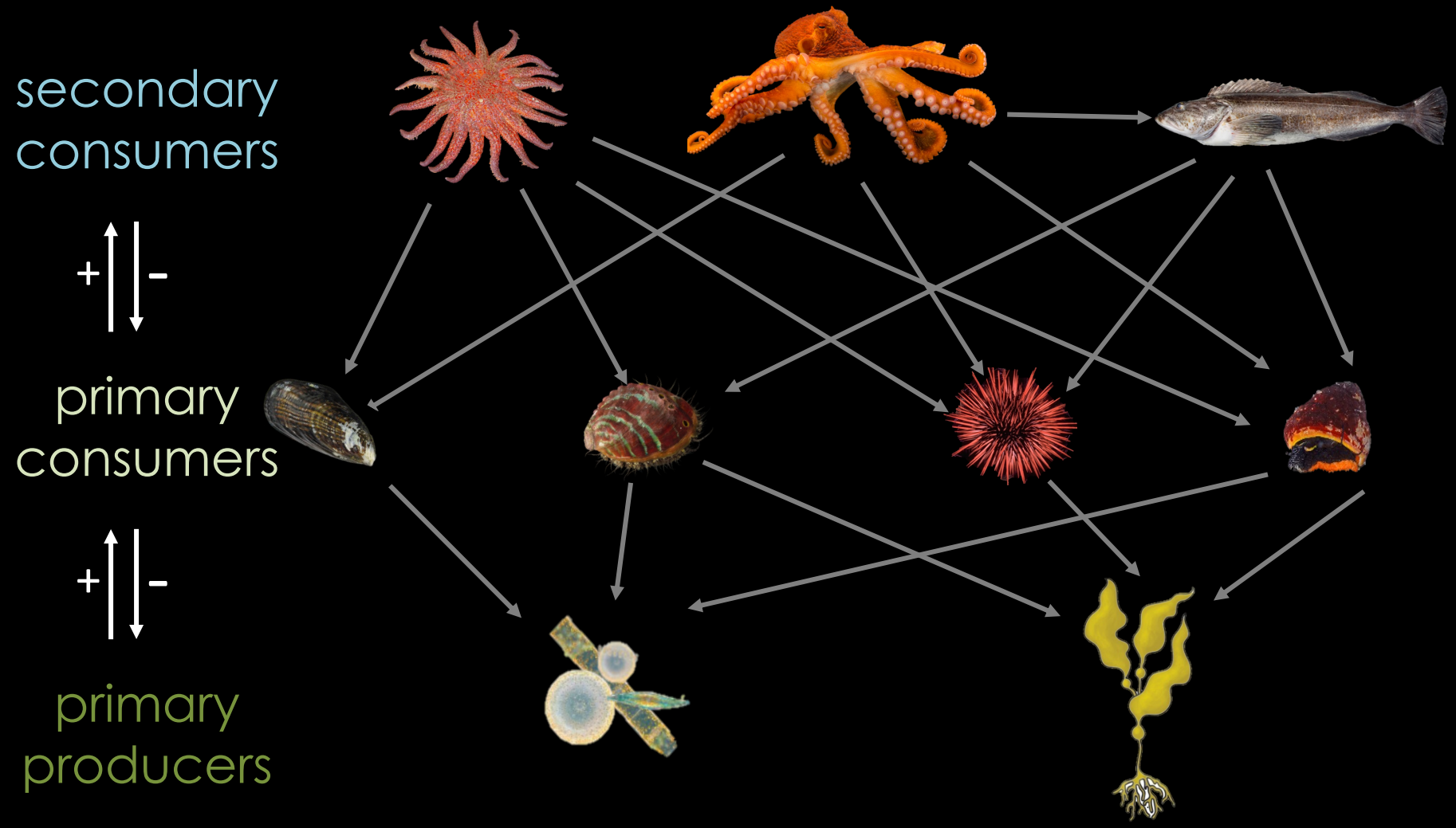
Challenge: scaling from individuals to ecosystems

Michael Langhans Photography

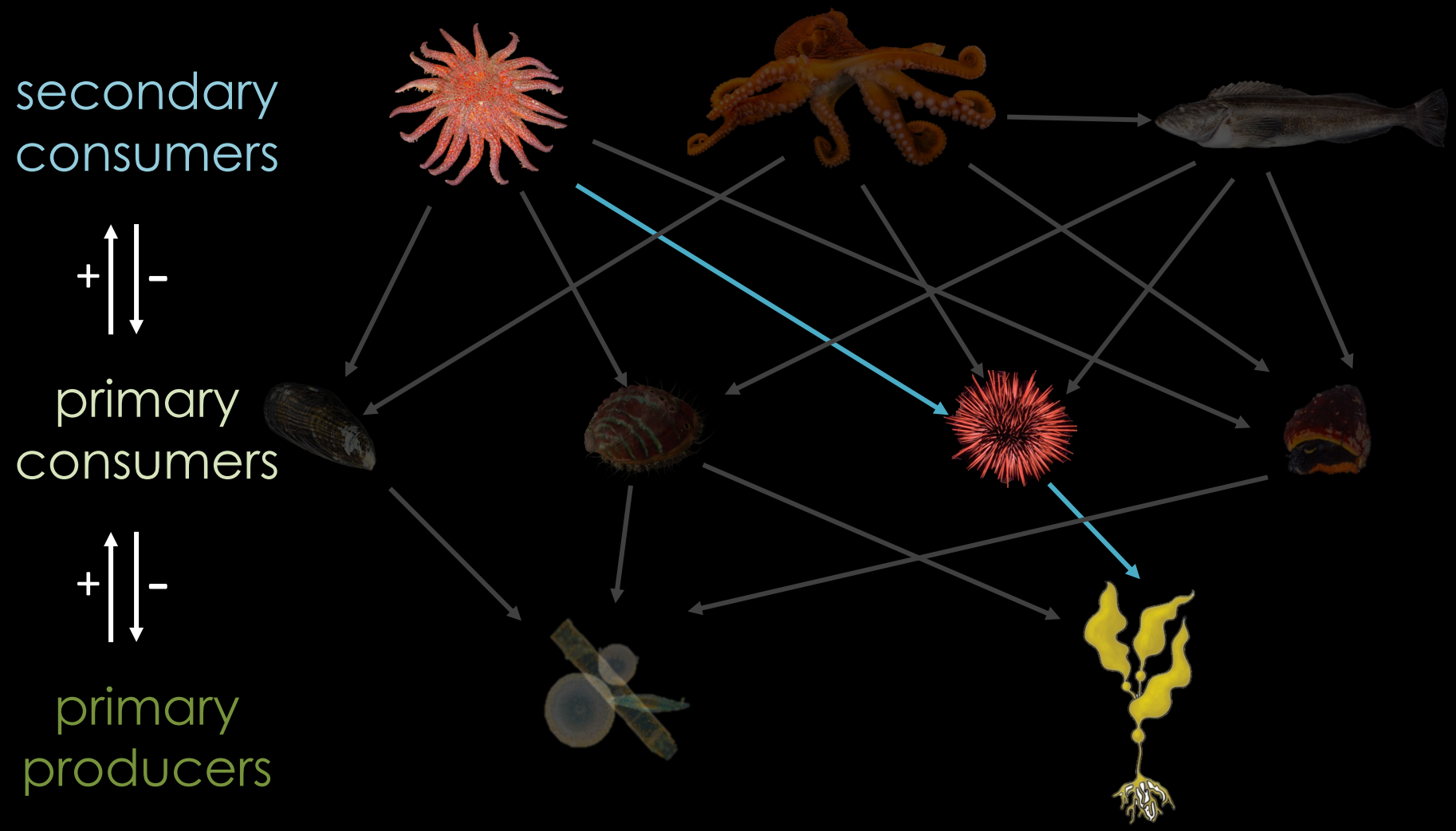


Kroeker *et al*. 2011 *PNAS*, Kroeker *et al*. 2013 *Nature Climate Change*, Kroeker *et al*. 2013 *PNAS*

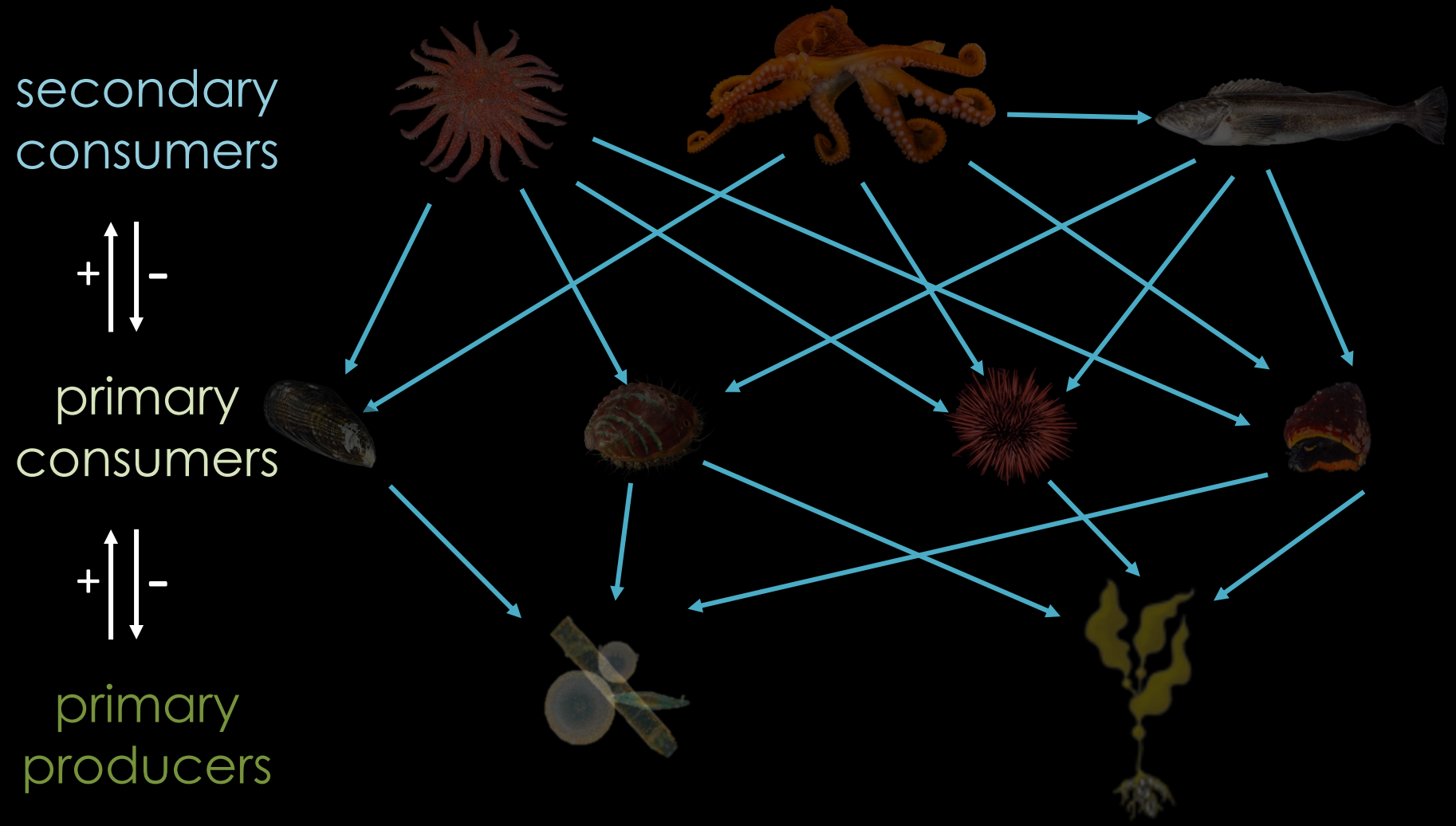
Opportunity: studying assemblages and interactions



Opportunity: ecological leverage points

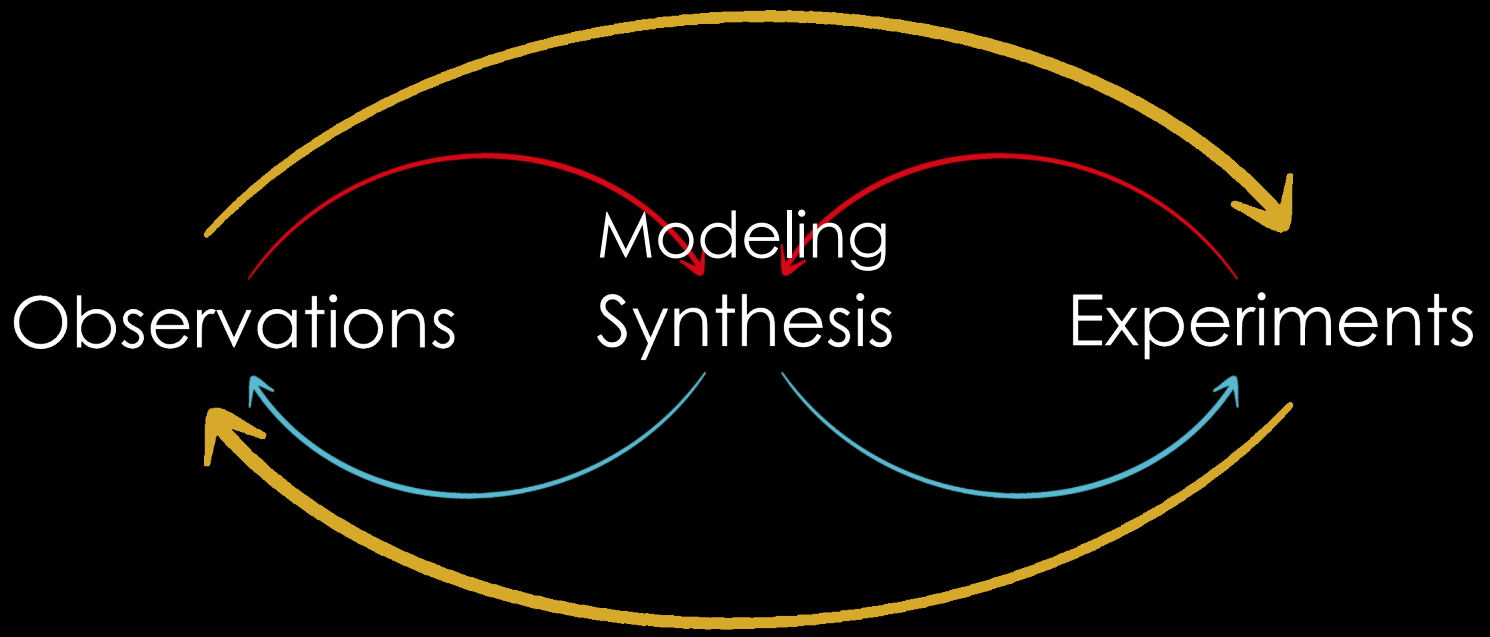


Opportunity: traits, functions, rates, flows



Opportunity: Programs that address the mechanisms, functional consequences, and cross-ecosystem comparisons of community and ecosystem change.


Observations
Experiments


Observations
Modeling
Synthesis
Experiments

Multi-stressor infrastructure
Cross-scale studies

Modeling
Synthesis

Observations

Experiments

Long-term monitoring (LTER, etc.)
RAPID

Thank you

NSF

the David & Lucile Packard FOUNDATION

The Nature Conservancy

Alfred P. Sloan FOUNDATION

Sea Grant California

OCEAN PROTECTION COUNCIL

THE UNIVERSITY OF CALIFORNIA

UCSC