



PUPCYCLE* FACT SHEET

* *Phytoplankton response to the UPwelling conveyor belt CYCLE*

Principal Investigator: Adrian Marchetti, Ph.D.; UNC – Chapel Hill, NC

Additional Scientists: 10 additional researchers from the United States and Canada: 5 from UNC-CH (North Carolina), 3 from Humboldt State (California), and 2 from the University of British Columbia

R/V Oceanus Crew: 12 Crew (male and female); including cooks, engineers, mates, and officers

Teacher at Sea: Miriam Sutton, M.A.; *Science by the Sea*®

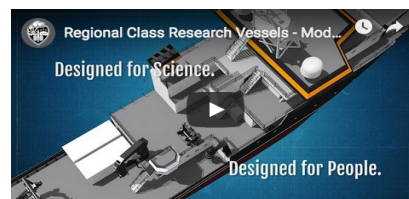


Figure 1 An Introductory Video to Research Vessels (2:30minutes)
[HTTPS://YOUTU.BE/cP3-G2Q9Dy0](https://youtu.be/cP3-G2Q9Dy0)

PUPCYCLE Study Sites:



- ★ Embark on the R/V Oceanus May 24, 2019 from the Hatfield Marine Science Center in Newport, Oregon.
- ★ Collect phytoplankton along wide continental shelf region along northern California coast.
- ★ Collect phytoplankton along narrow continental shelf region along northern California coast.
- ★ Return to Newport, Oregon on June 7, 2019 for disembarkation of the R/V Oceanus.

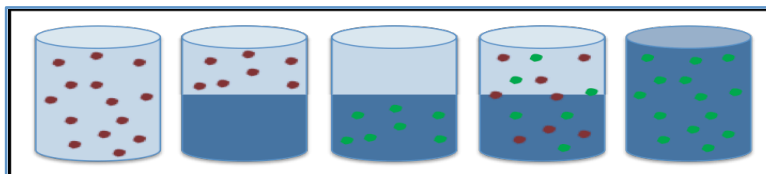
Figure 2 Study Sites will be in a region referred to as the California Upwelling Zone (CUZ), known for increases in phytoplankton blooms and ocean productivity.

Primary Goal: Determine the molecular mechanisms in how specific groups of phytoplankton physiologically respond to environmental conditions UCBC – (Upwelling Conveyor Belt Cycle) and how phytoplankton will be affected by changing ocean conditions.

Hypothesis: Diatoms are uniquely adapted to thrive under UCBC conditions compared to other phytoplankton functional groups (e.g., Dinoflagellates, Haptophytes, Chlorophytes).

Experimental Design: Five (5) Incubation Experiments are designed to investigate these concepts:

- ★ Compare phytoplankton responses to different UCBC stages;
- ★ Compare Surface vs. Subsurface phytoplankton seed populations for their contribution to phytoplankton blooms during an Upwelling Event;
- ★ Changes in phytoplankton compositions through UCBC stages; and
- ★ Effects of Iron Limitation & Ocean Acidification on phytoplankton responses to UCBC conditions.



(Left-Right): Surface phytoplankton (red dots) and surface water (light blue); Half surface water with surface phytoplankton and half subsurface water (filtered); Half surface water (filtered) and Half subsurface water (dark blue) containing subsurface phytoplankton (green dots); Half surface water and half deep water with Surface and Subsurface phytoplankton; and Subsurface water with deep phytoplankton. Experiments will be completed in triplicate for a total of 15 incubations. [NSF Award #1751805 – Adrian Marchetti, University of North Carolina – Chapel Hill]

Miriam Sutton, M.A., NBCT