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Phytoplankton Community Dynamics in the Northern California Current System

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Phytoplankton community dynamics in the Northern California Current

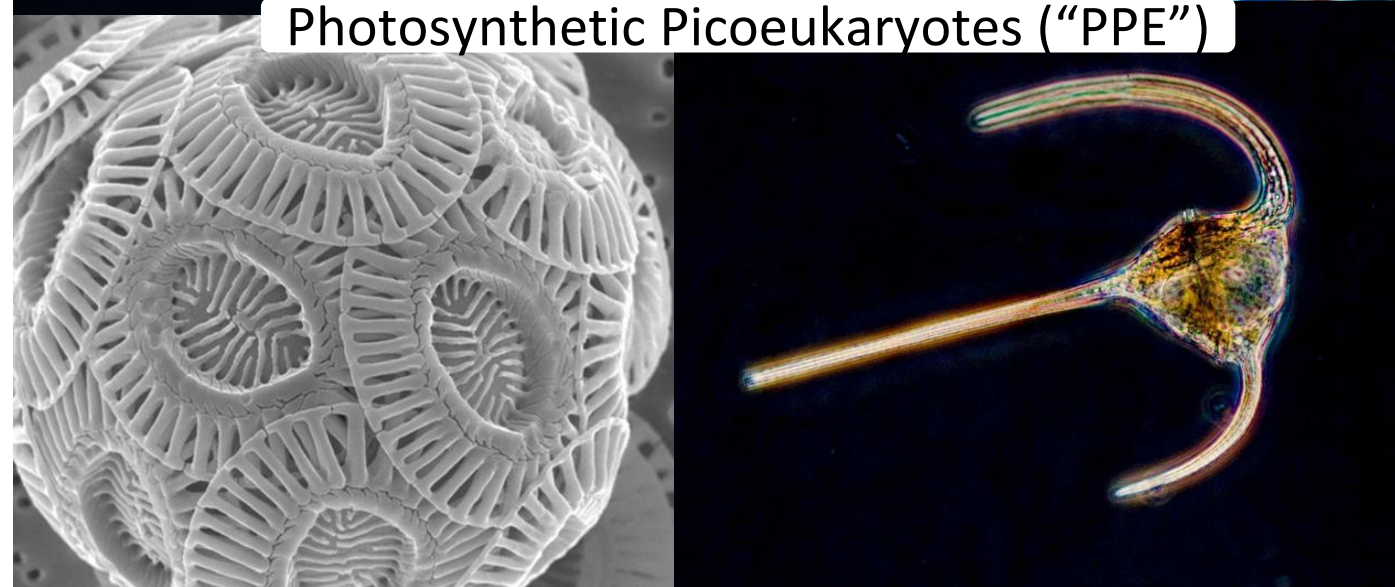
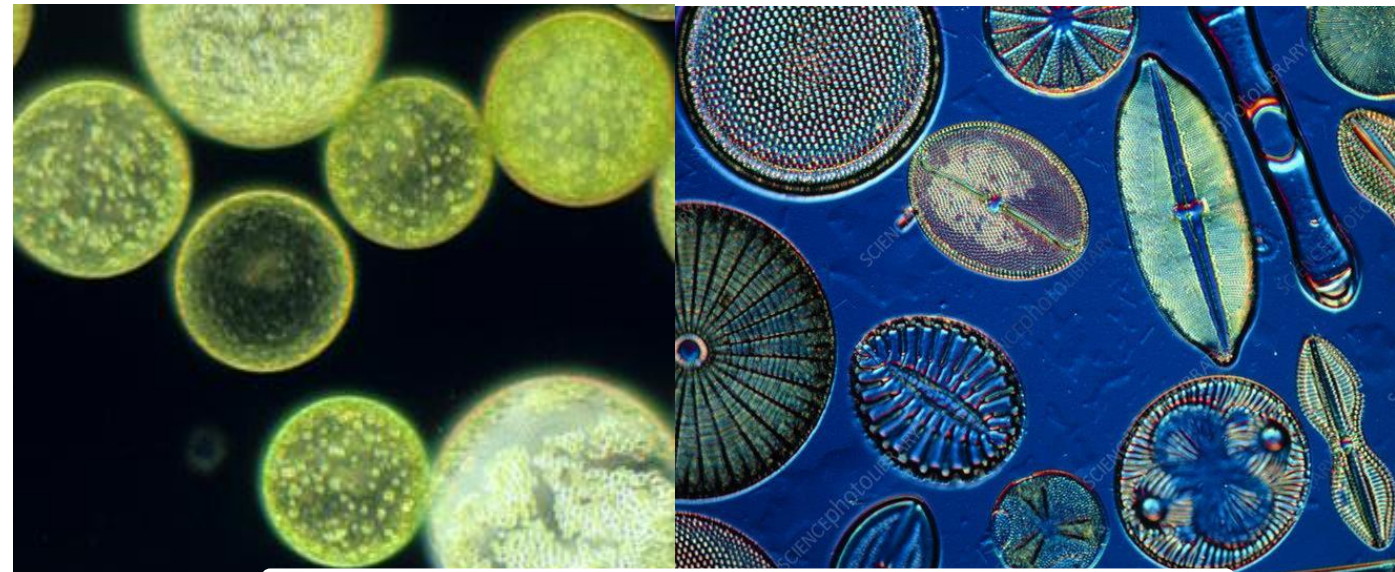
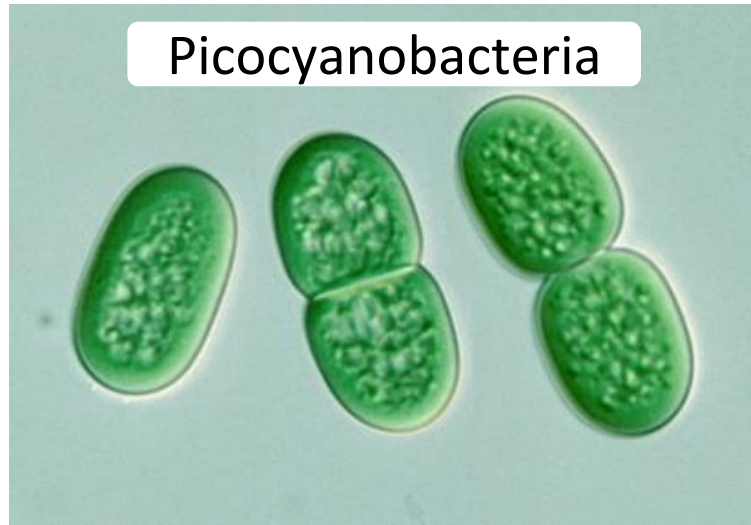
Kristin Forgrave

M.S. Student

Thompson Lab

May 8, 2024

Phytoplankton: The base of the food web

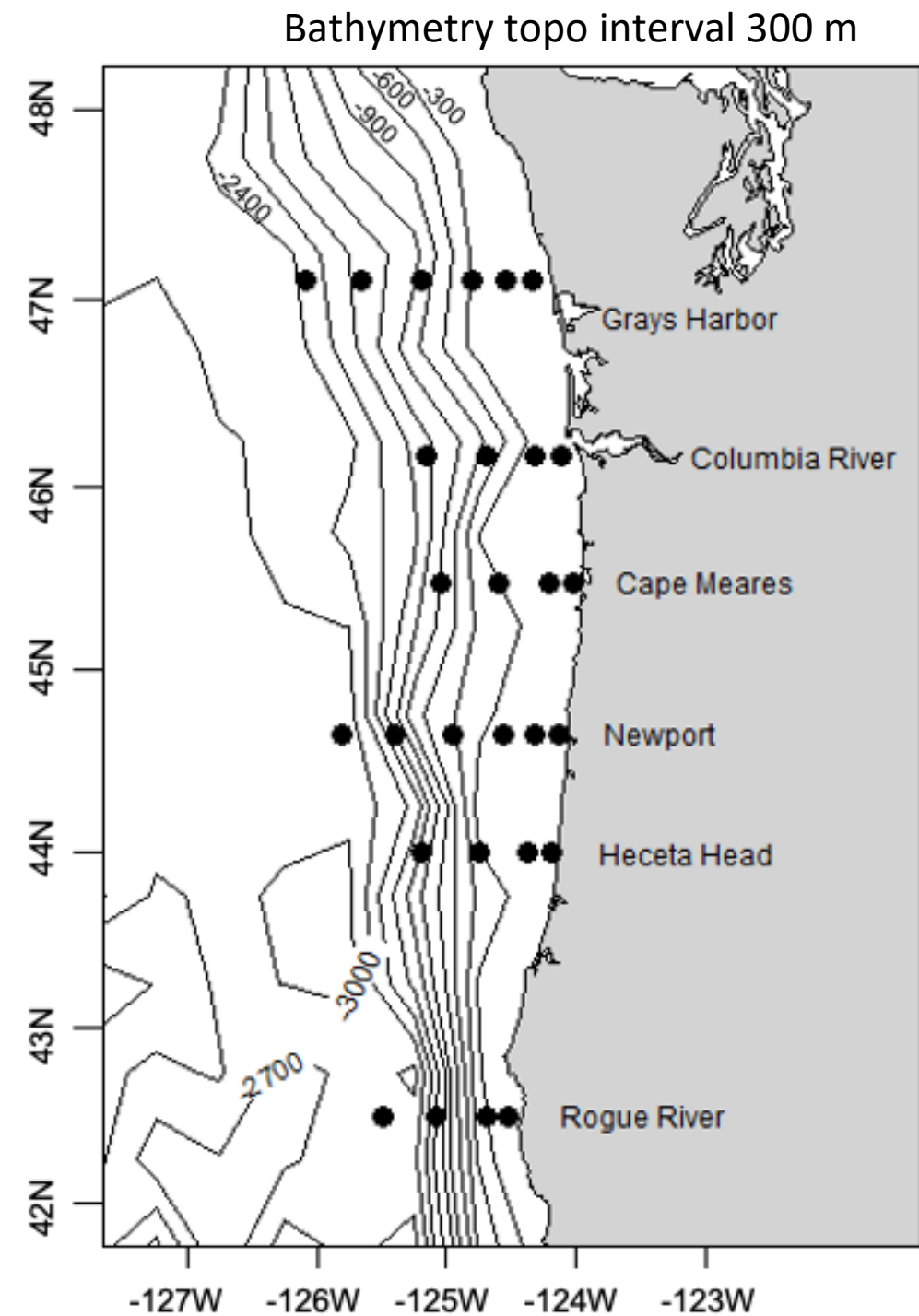
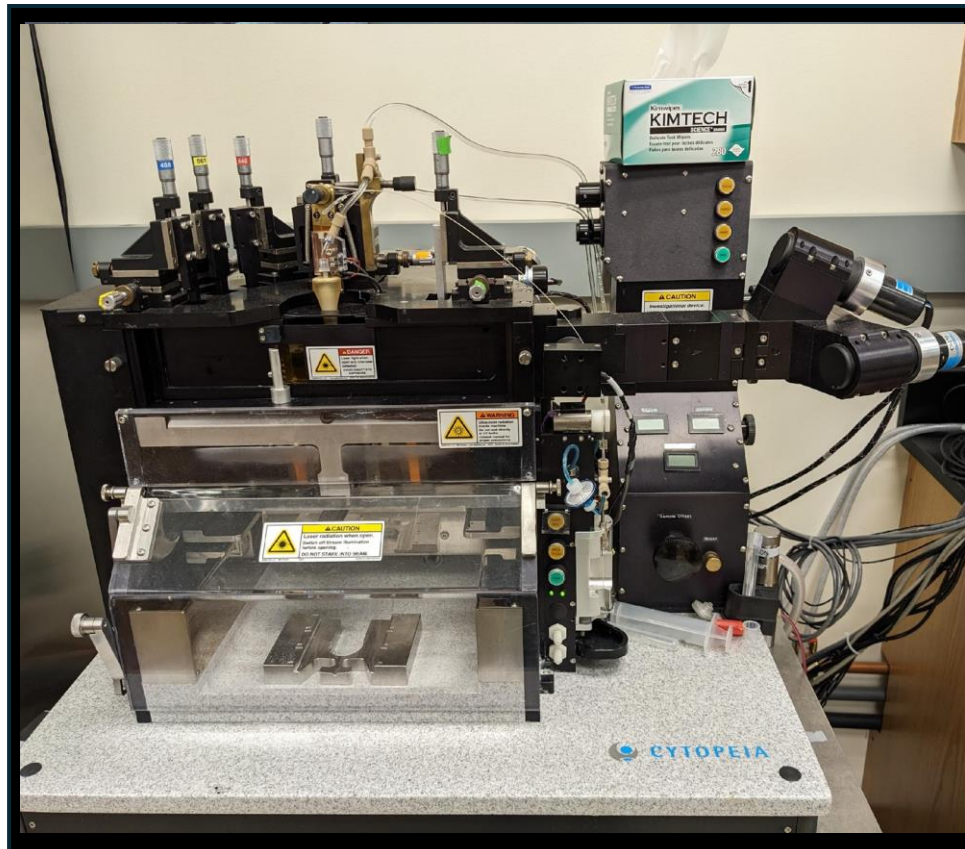


Research questions

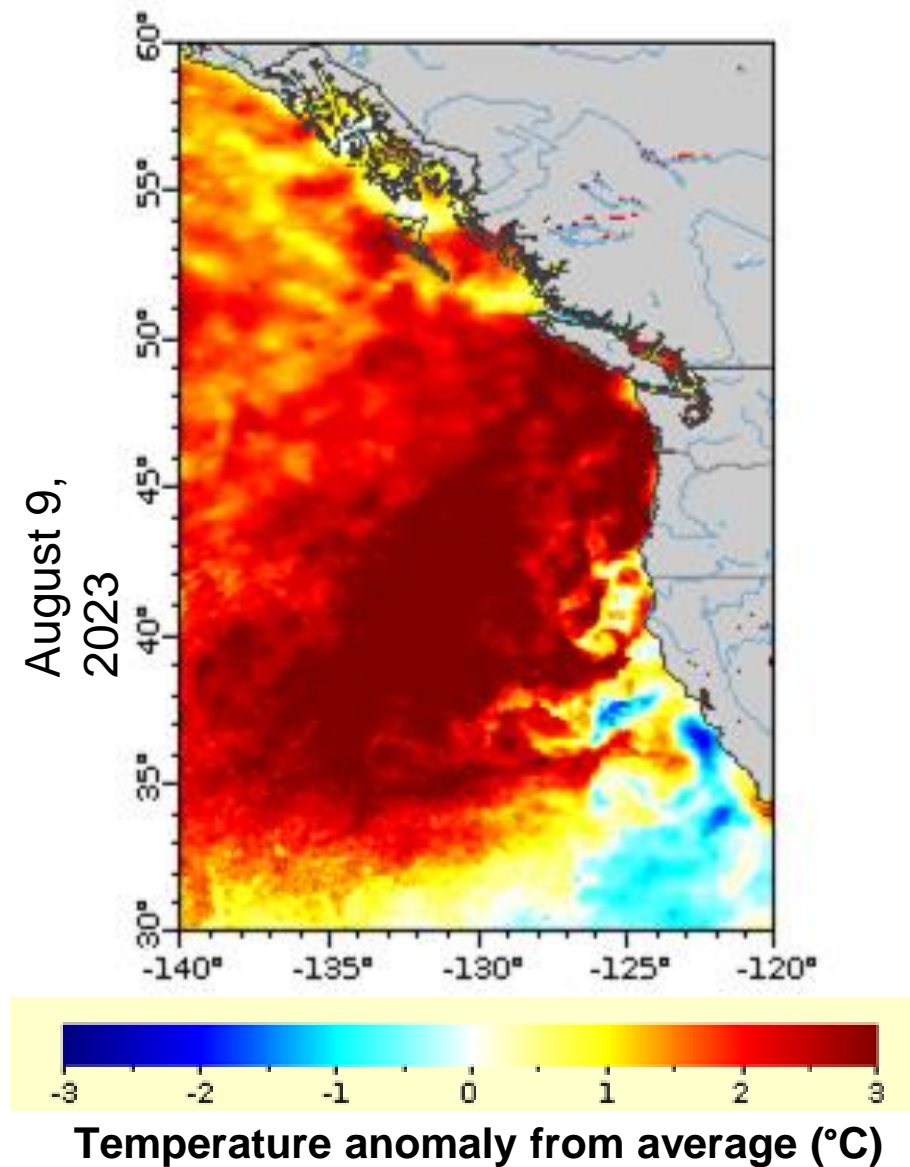
- How do picophytoplankton communities in the Northern California Current vary over gradients?
 - Variations of size and abundance
 - Spatially and over time
- Correlation between abundance/size patterns and environmental factors

Methods

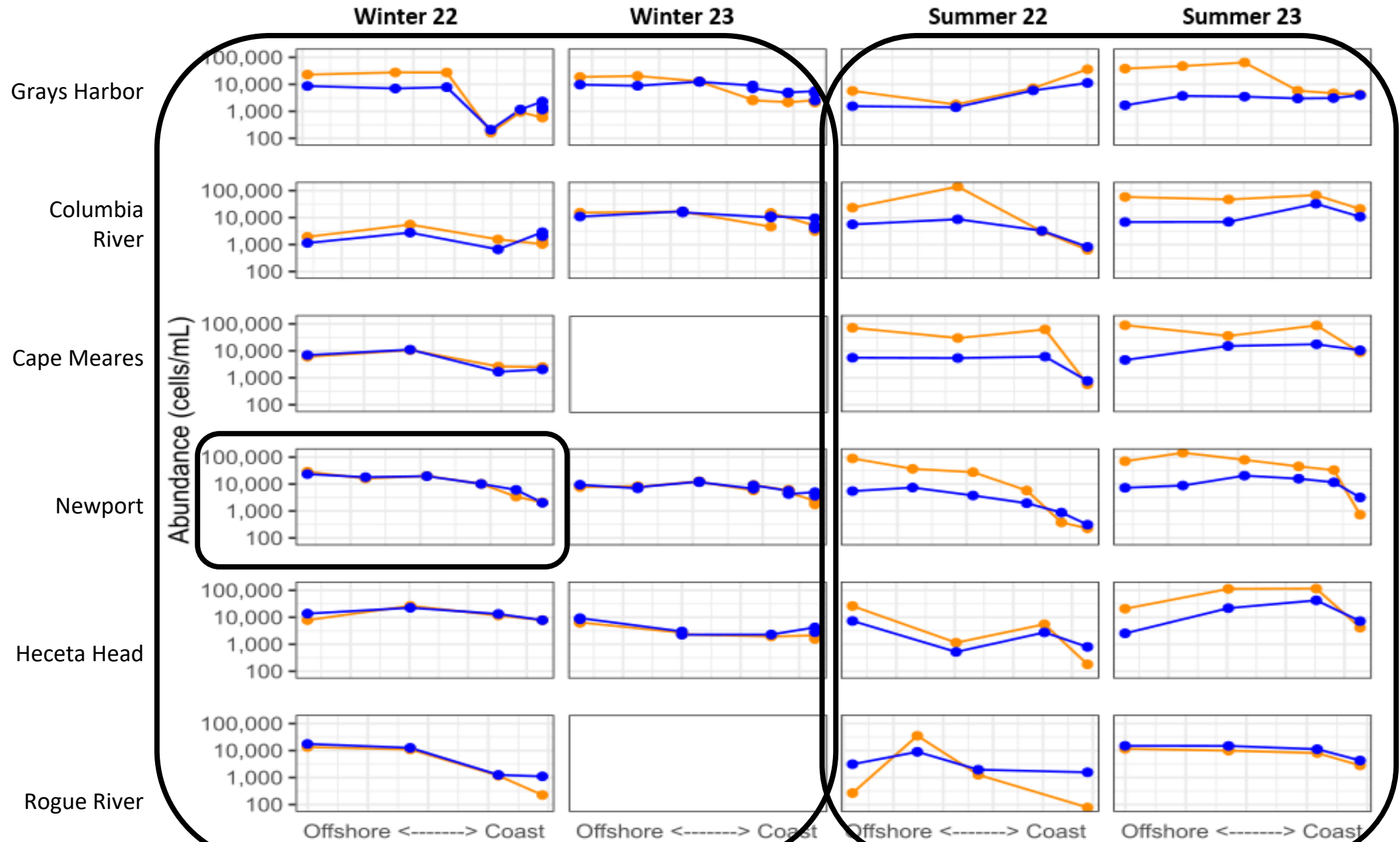
- Four research cruises: 2 summer, 2 winter
- 367 samples collected for flow cytometry



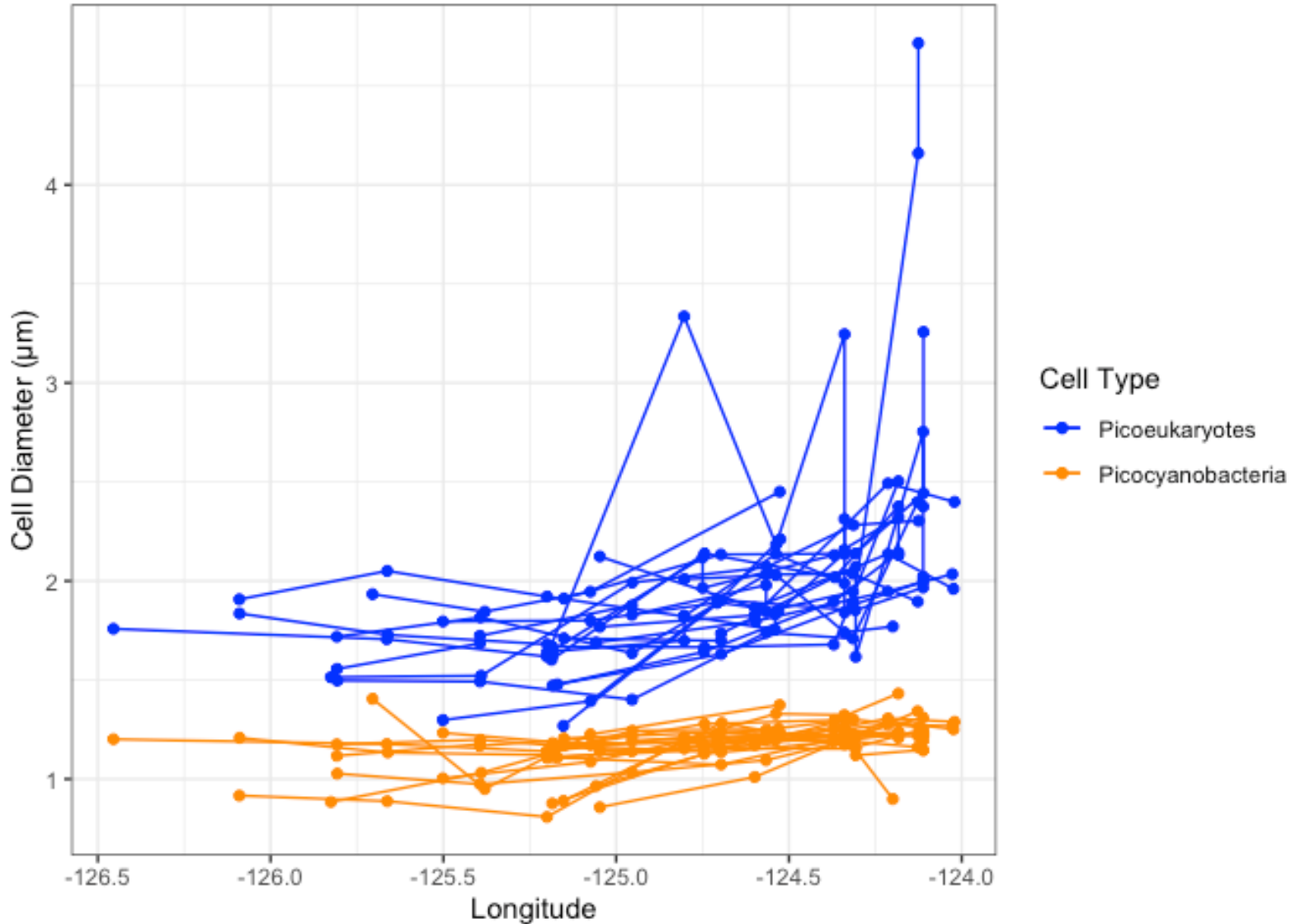
Marine heat wave



- Summer 2023
- 3°C warmer than average

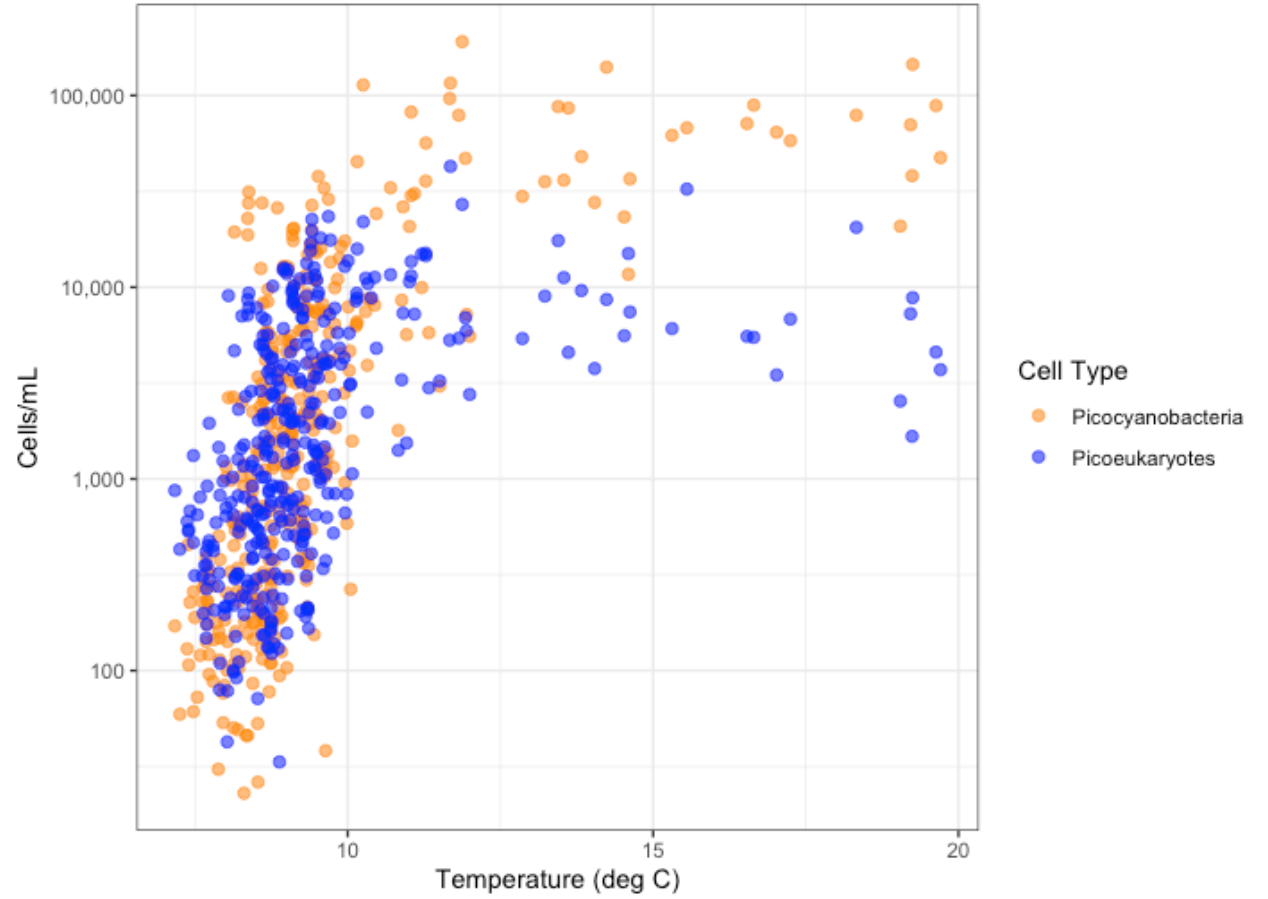
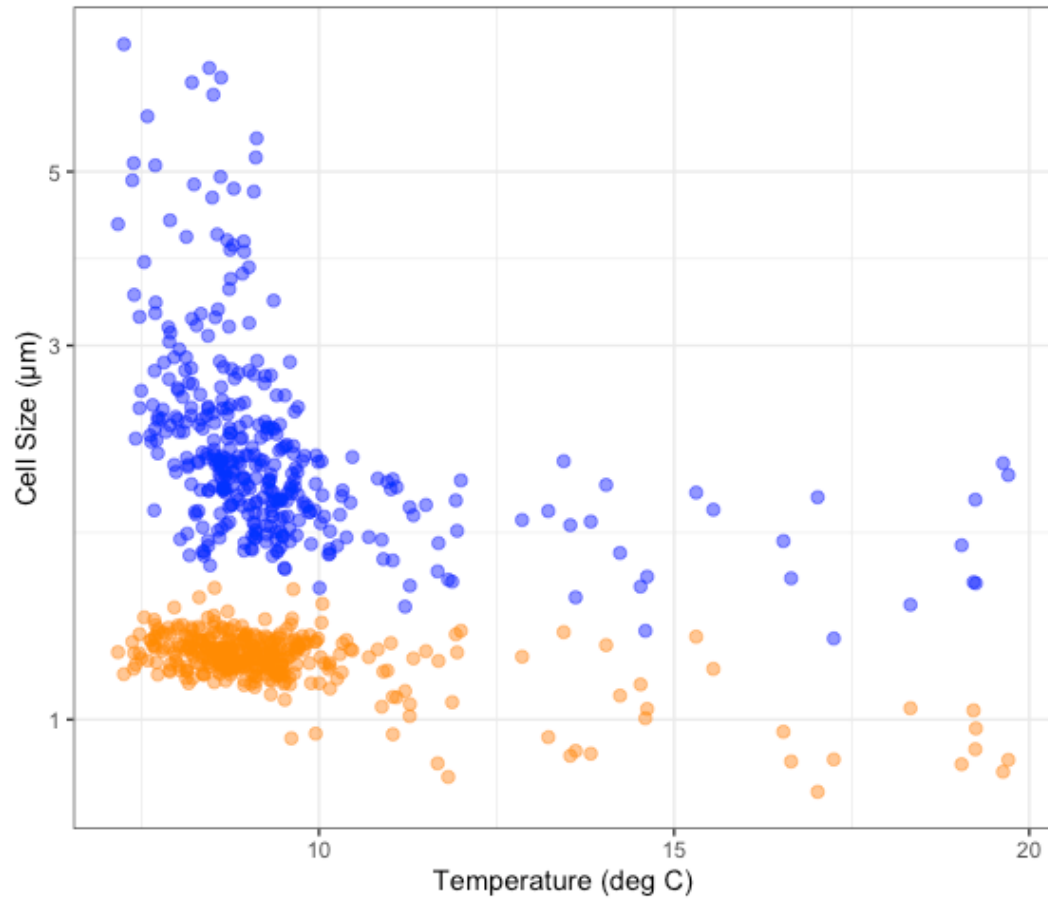


Does cell size change between inshore and offshore?



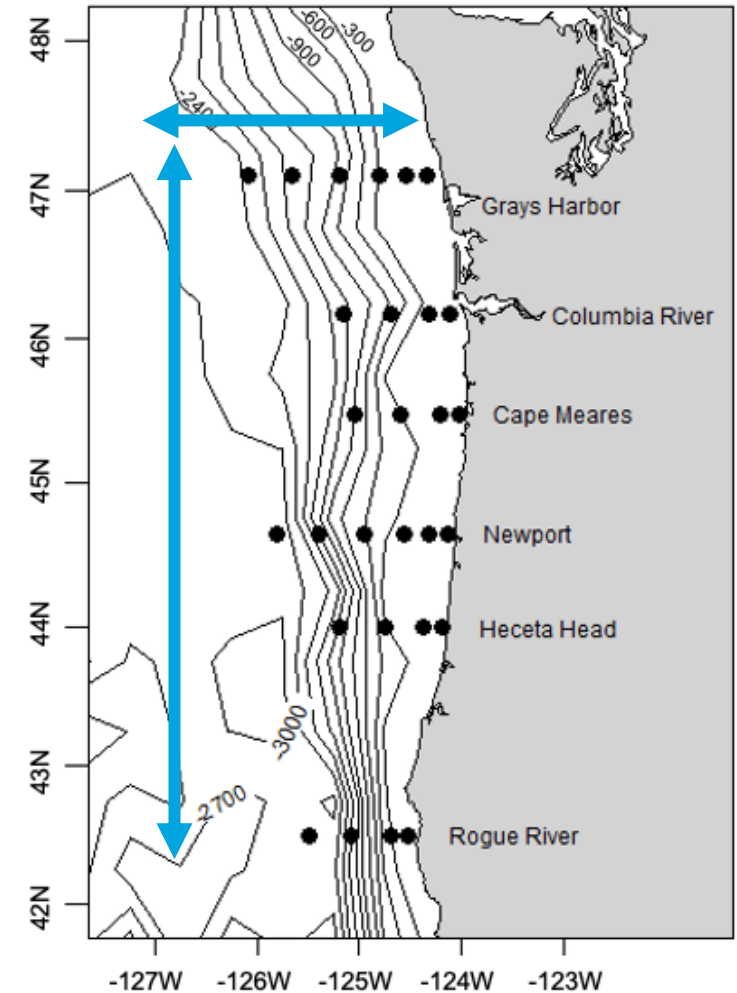
- Larger average cell size closer to shore
- More noticeable variation in PPE

Temperature correlations



Correlations with distance from shore and topography along coast

- Higher abundances offshore, lower on shelf
 - Consistent with NCC 20 years ago
- Community structure along coast
- Picocyanobacteria more sensitive to different conditions?



Impact of cell size along temporal and spatial gradients

- Size of cells impacts carbon export rates
- Different carbon export rates by season or location
- Can't separate temporal and spatial factors

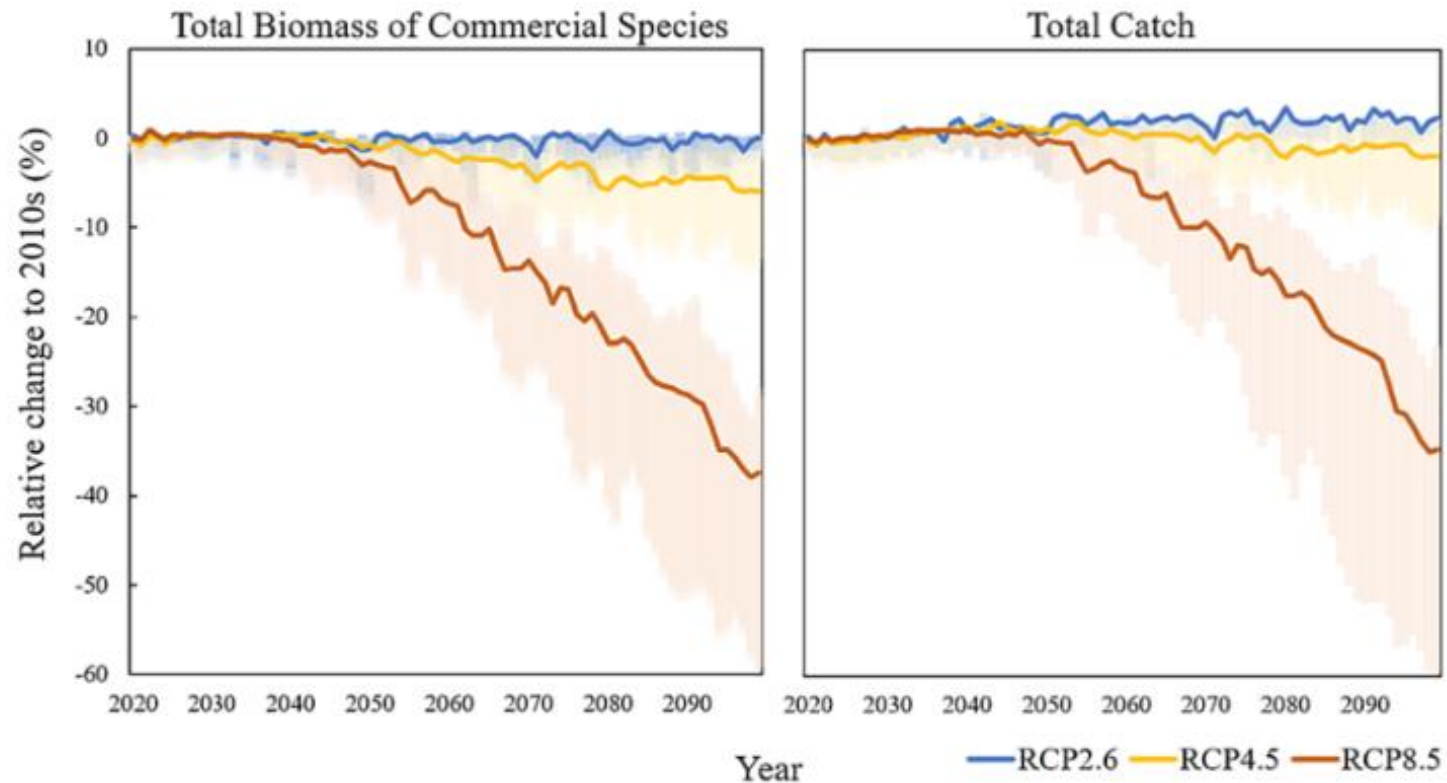
Le Quéré, et al. (2005), *Global Change Biology*, 11(11), 2016–2040.

Bopp, L., et al. (2005), *Geophysical Research Letters*, 32(19).

Chabert, P., et al. (2021), *Journal of Geophysical Research: Oceans*, 126(2), e2020JC016611.

High temperatures and small cells

- Less efficient energy transfers to higher trophic levels
- Impact on carbon and nutrient cycles



Conclusions

- Spatiotemporal patterns along gradients
- NCC is very dynamic
- Outlook for future ocean warming
- Important considerations in resource management

