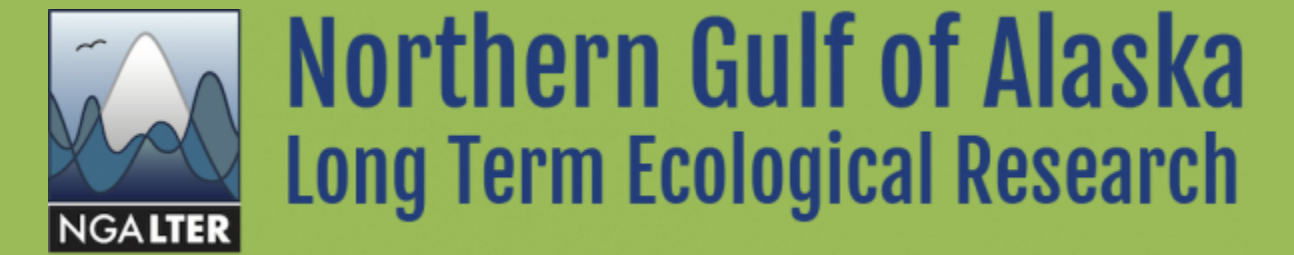


Diversity in light: growth optima may occur within not between phytoplankton types in the Northern Gulf of Alaska

Gulf of Alaska

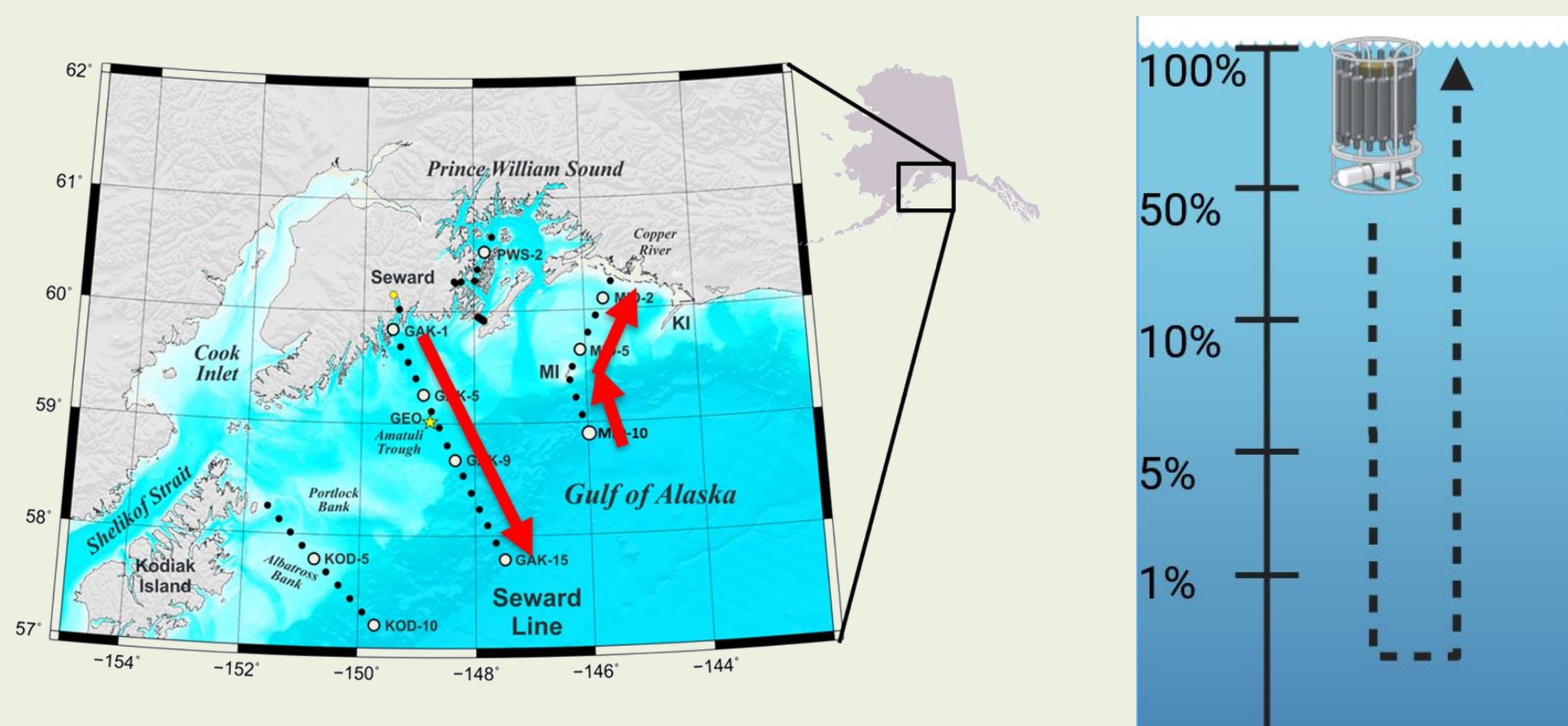
Asher Marvy, Dr. Suzanne Strom, Kathryn Williams
Shannon Point Marine Center, Western Washington University



Background

- Phytoplankton are unicellular primary producers in marine ecosystems
- Environmental conditions, including light, are highly variable in the Northern Gulf of Alaska (NGA)
- Previous work has demonstrated seasonal and cell size-related differences in phytoplankton light: growth relationships
- I explored the effect of light on the <20um phyto community through two questions, one investigating diversity within a plankton class (cryptophytes), and one investigating diversity between phytoplankton classes (pico, nano, syn)

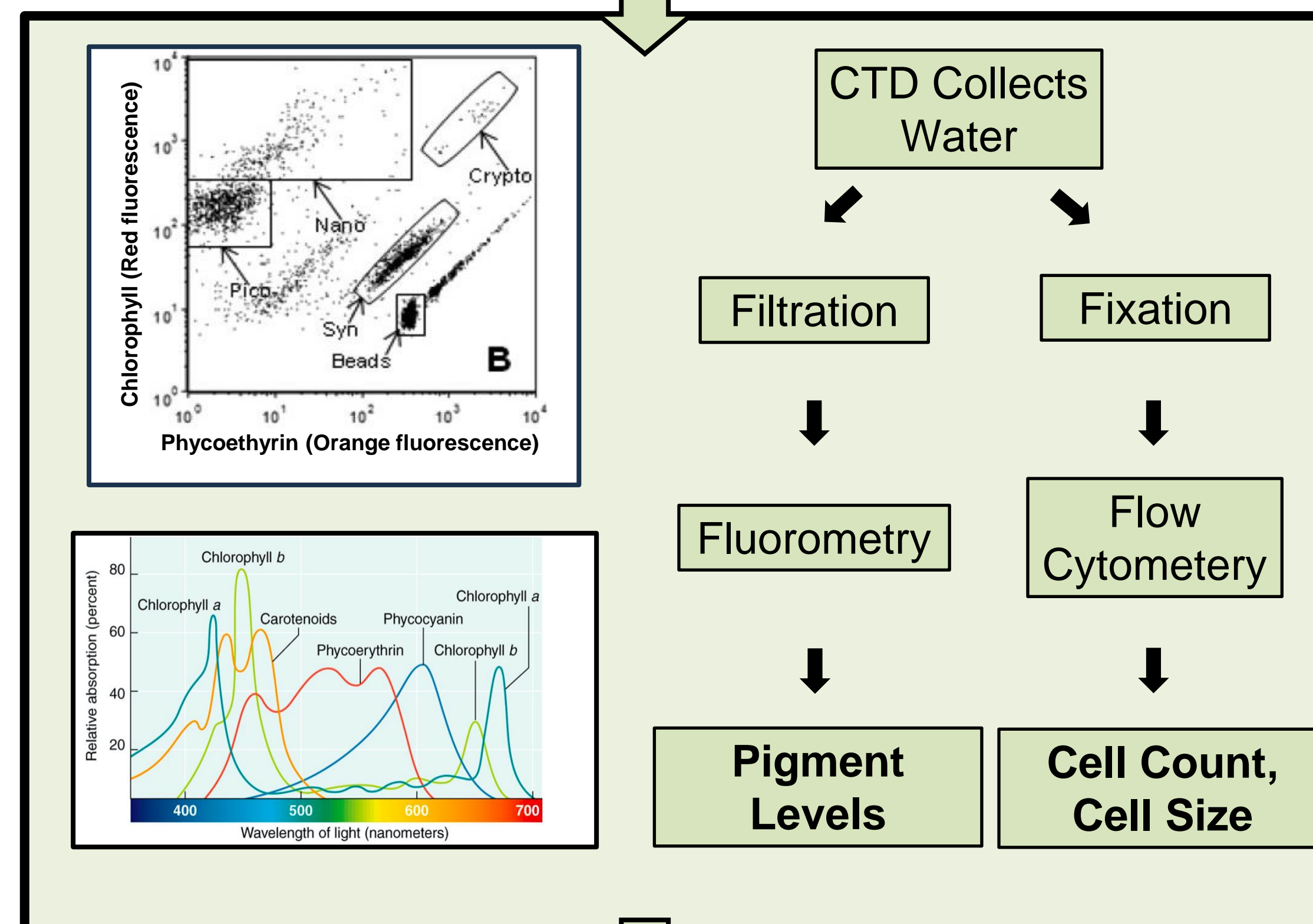
Methods



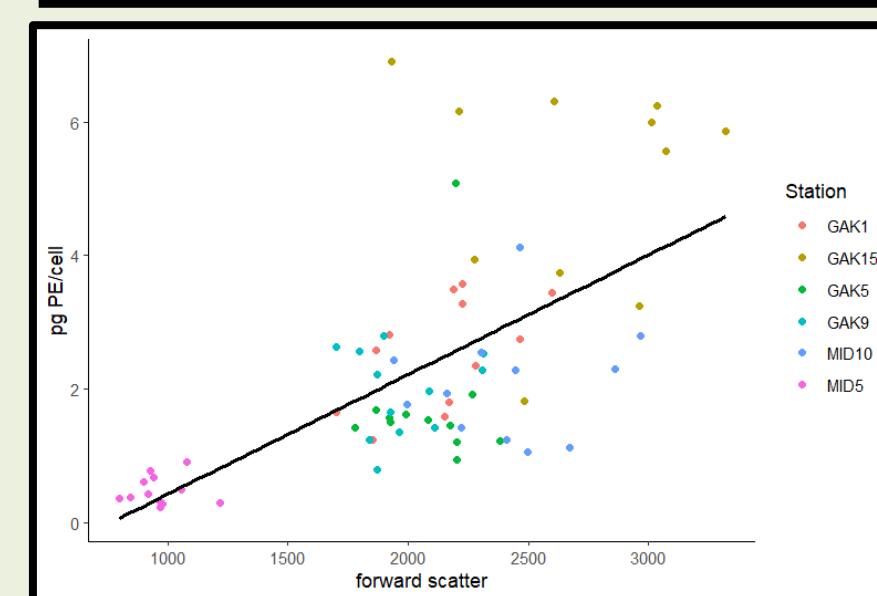
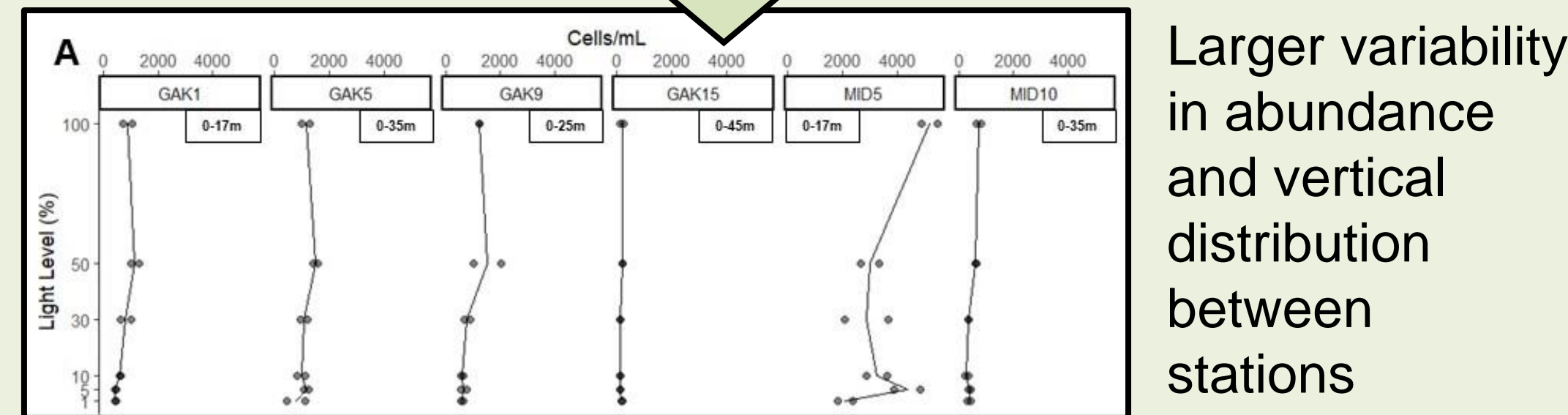
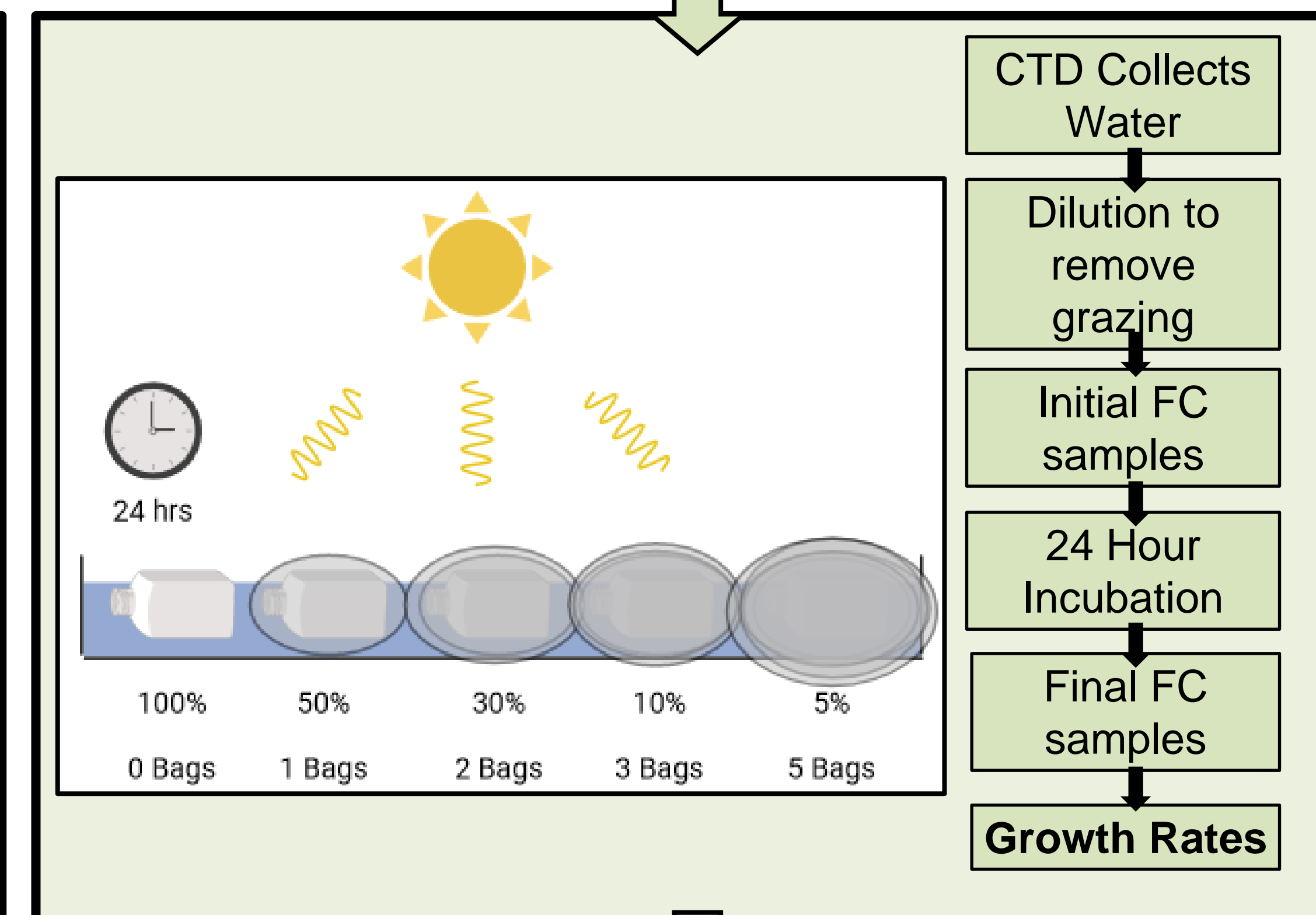
Significance

- Little observed variability in growth-light relationships between phyto groups but high variability in growth rates between stations
- Differences in light niche occupancy may be occurring within phytoplankton groups due either to acclimation or different strains rather than between these groups

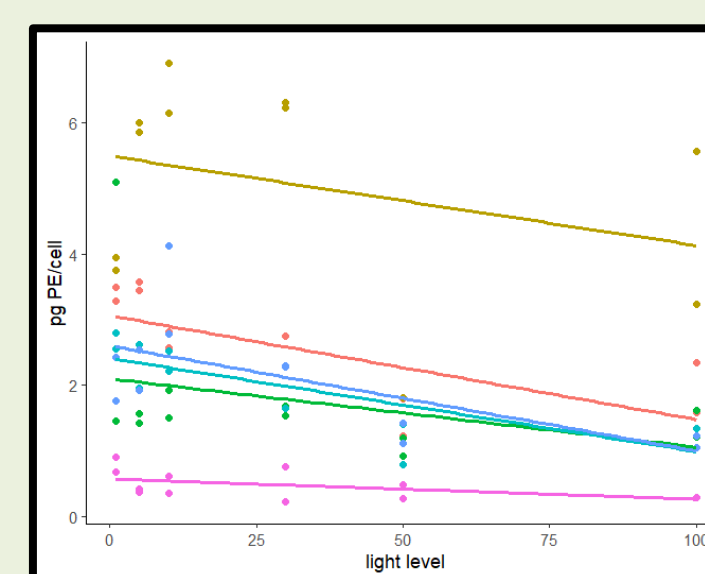
What is the vertical distribution and pigment content of *Cryptophyte* phytoplankton?



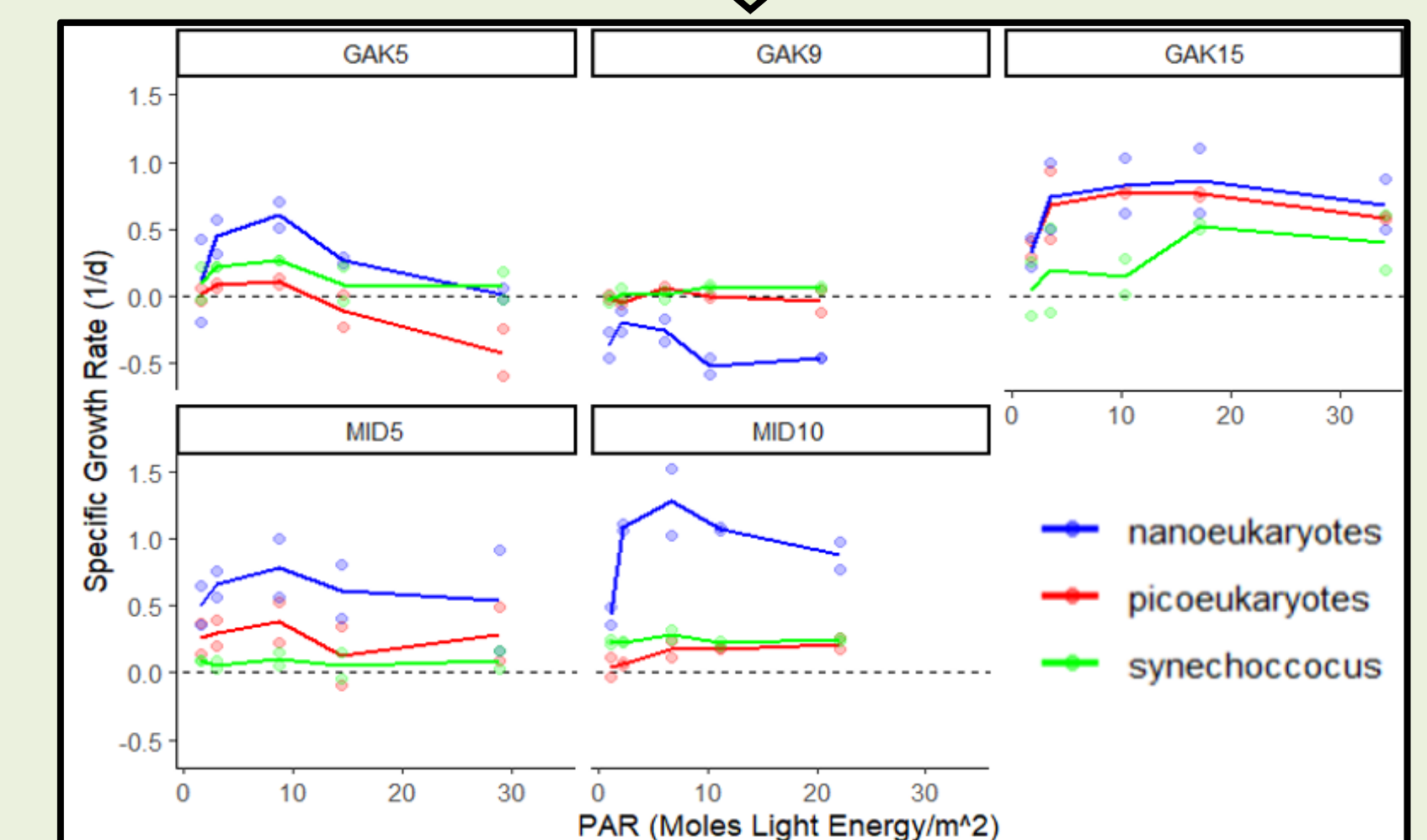
What is the effect of irradiance on the growth rates for different types of phytoplankton?



Larger and more pigmented cryptophyte cells at lower light levels – evidence for photoacclimation within phytoplankton type



Large variability in size and pigmentation between stations, distinct communities forming with different environmental profiles



- Cells reached their growth rate optima at ~30% of surface irradiance
- Light: growth optima did not differ significantly across cell types
- variation among the phyto groups, but that variation isn't consistent across the stations
- Evidence for photoinhibition at highest light levels

Future Directions

- Future work exploring light niche diversity in the NGA should focus on species and strain level differences (plasticity vs. diversity) rather than size category or cyano – eukaryote differentiation

Acknowledgments

Dr Suzanne Strom, Katey Williams, Kelley Bright, crew of the R/V Kilo Moana, Dr. Brian Bingham, WWU REU funded by NSF Grant #OCE-01947838, and the NGA LTER program fund by NSF grant 1656070