Environmental Dynamics and Plankton Interactions in the Northern California Current

Kylie Cherneskie[1],

Dong Liang[1], Katie Lankowicz[2], Hongsheng Bi[1], Brian Wells[3,4], and Richard Brodeur[45]

1 University of Maryland Center for Environmental Science, Solomon's Island, Maryland, USA.
2 Gulf of Maine Research Institute, Portland, Maine, USA
3 NOAA Fisheries, Southwest Fisheries Science Center, Fisheries Ecology Division Santa Cruz, California, USA
4 NOAA Fisheries, Northwest Fisheries Science Center, Newport, Oregon, USA.
5 College of Earth, Ocean, and Atmospheric Sciences, Oregon State University, Newport, Oregon, USA

Key Background

- Northern California Current
- Upwelling system
  - Redistribution of nutrients
  - Supports phytoplankton blooms

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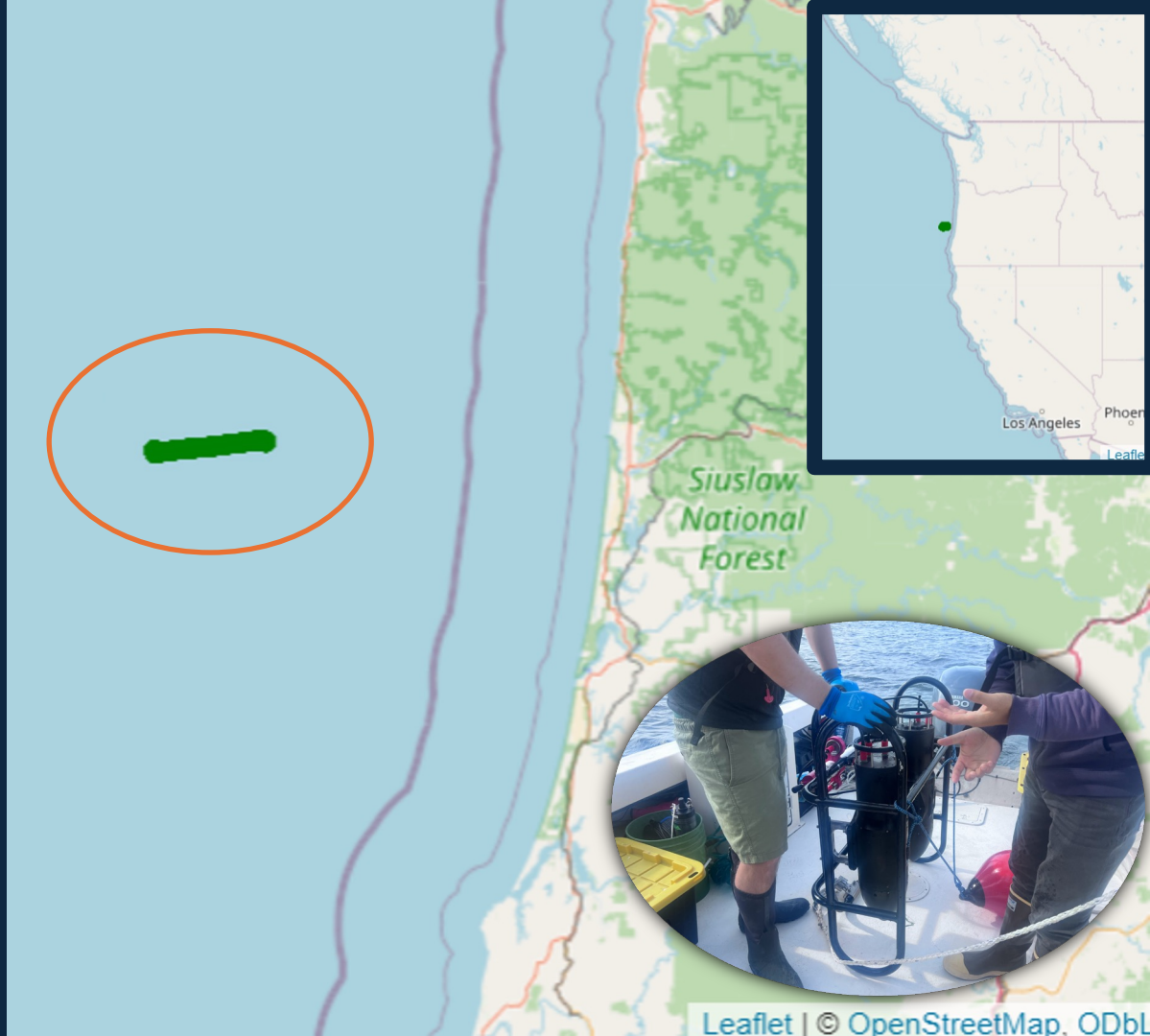
Aims of the Study

- Utilize high-resolution in situ imagery data
- Perform a spatial cluster analysis
- Examine and quantify fine-scale planktonic distribution
- Analyze distribution in relation to environmental gradients

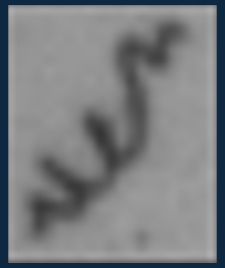
Data Collection and the Planktonscope

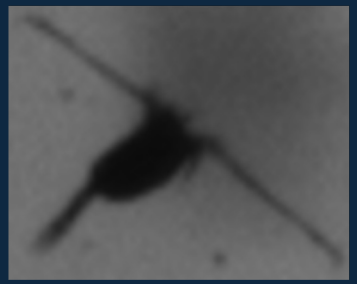
- Coordinate data from handheld Garmin GPS
- Conductivity, Temperature, Depth (CTD) data
- Plankton count data from the Planktonscope imaging system



Plankton Groups of Interest

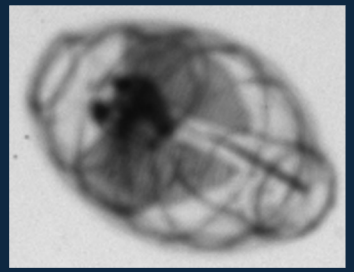
Bacillariophyceae
(Diatoms)





Copepoda

Thaliacea
(Salps)



Appendicularia
(Larvacean)

Overview of Methods/Results

Temperature Salinity profile

Poisson point pattern analysis with covariates to model plankton counts

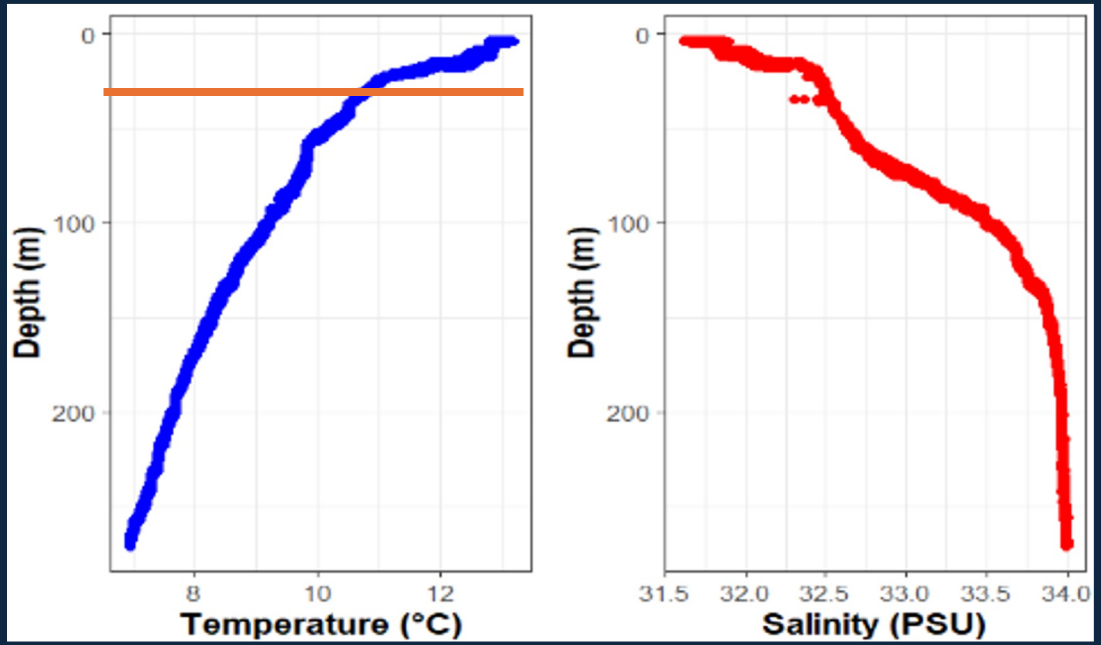
Distance to next encounter and patch statistic calculations

Number of patches and total plankton counts

Results

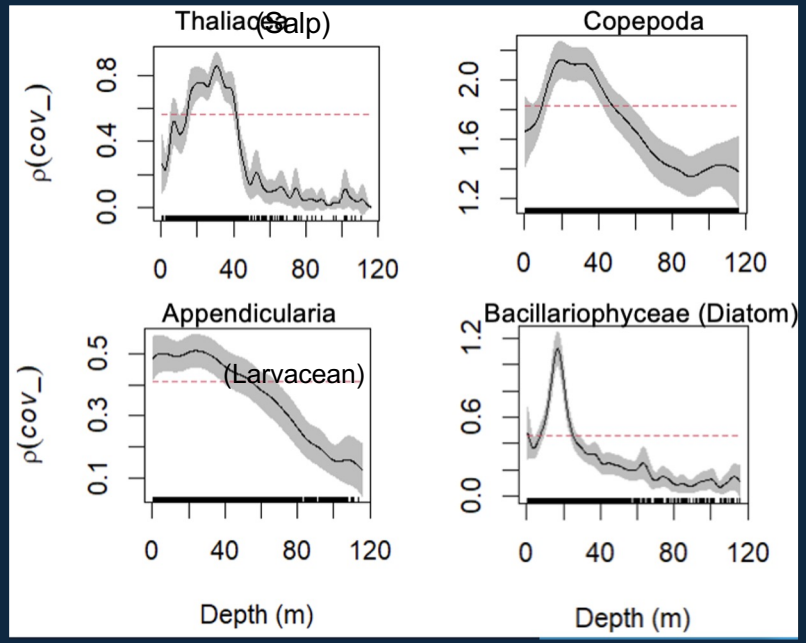
Temperature Salinity (TS) Profile of the Transect

- Typical temperature structure that shows the thermocline
- The surface waters have a lower salinity, while the deeper waters are more saline

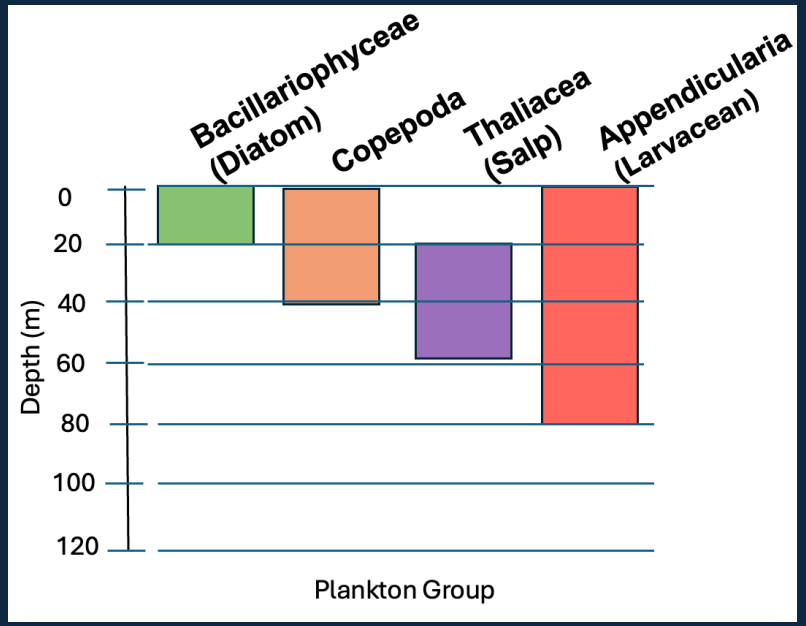


Poisson Point Pattern Analysis with Covariate

Resource Selection Function: Depth

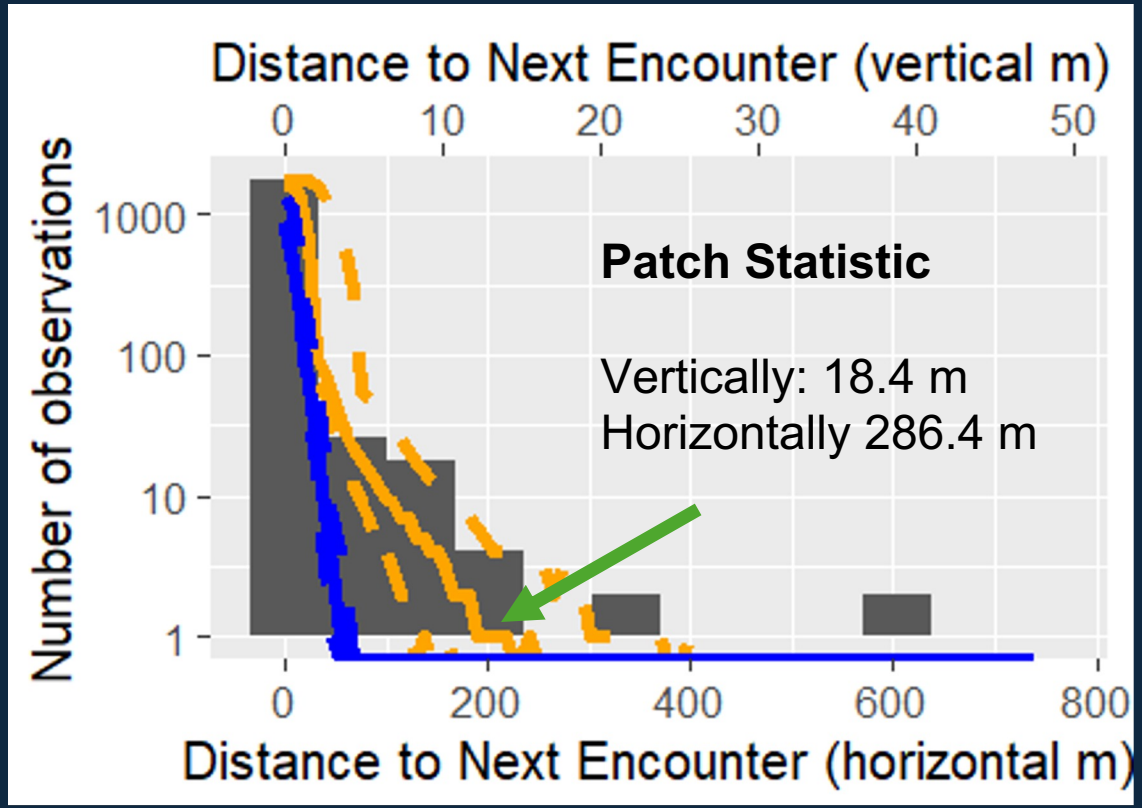


Depth Preference Schematic

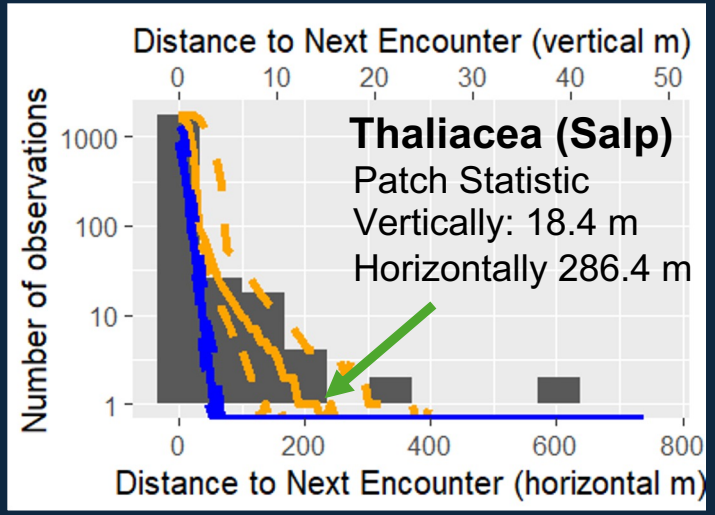


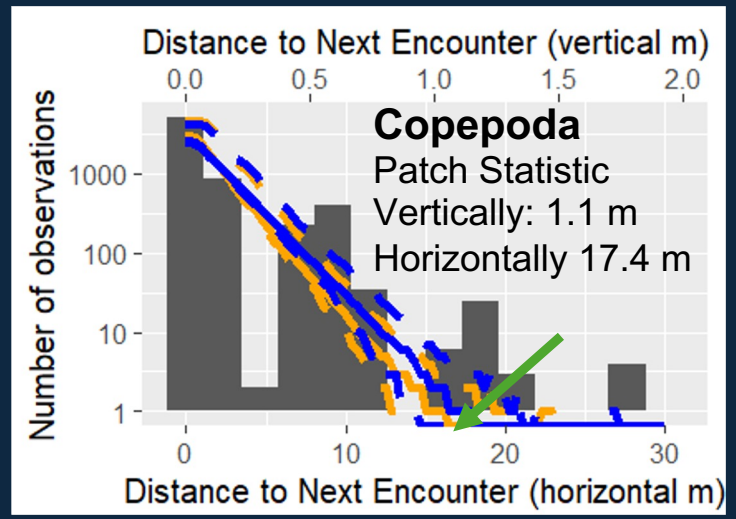
Distance to Next Encounter (DNE) and Patch Statistic

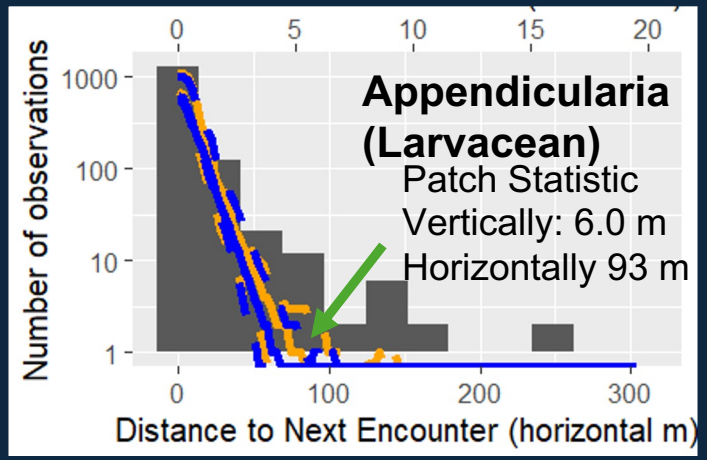
Thaliacea (Salp)

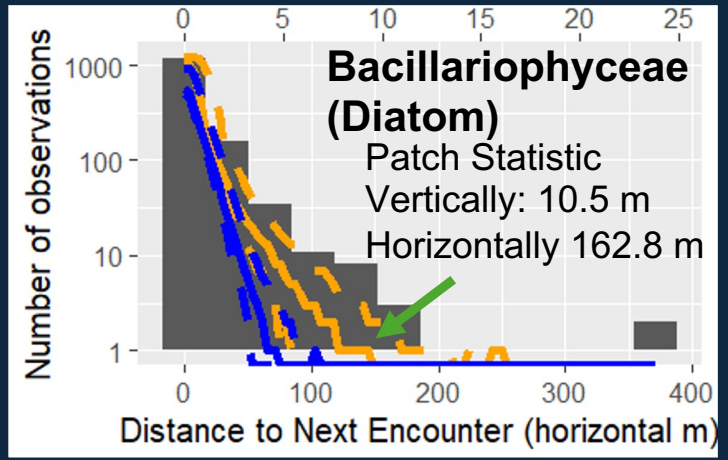


Distance to Next Encounter: All Plankton Groups

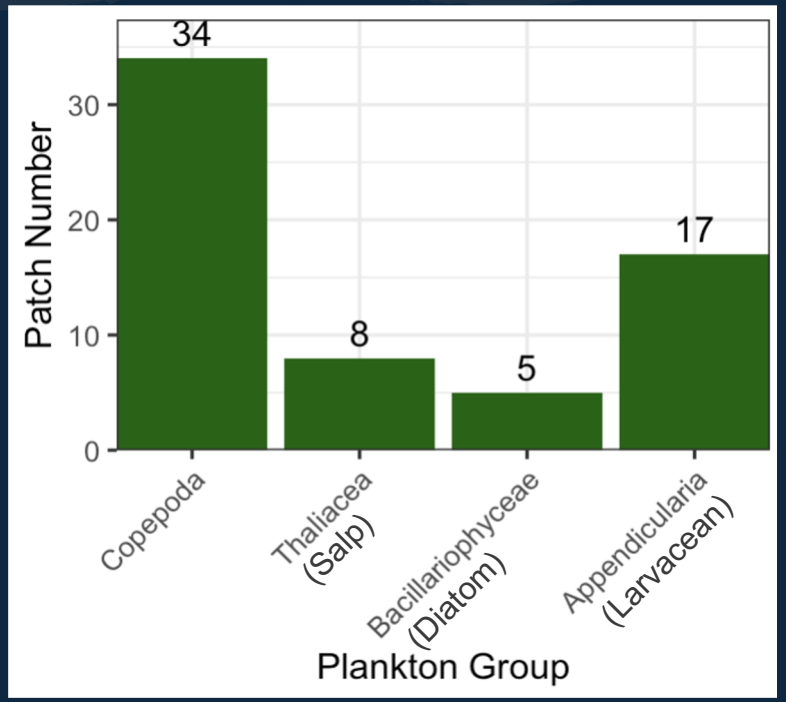




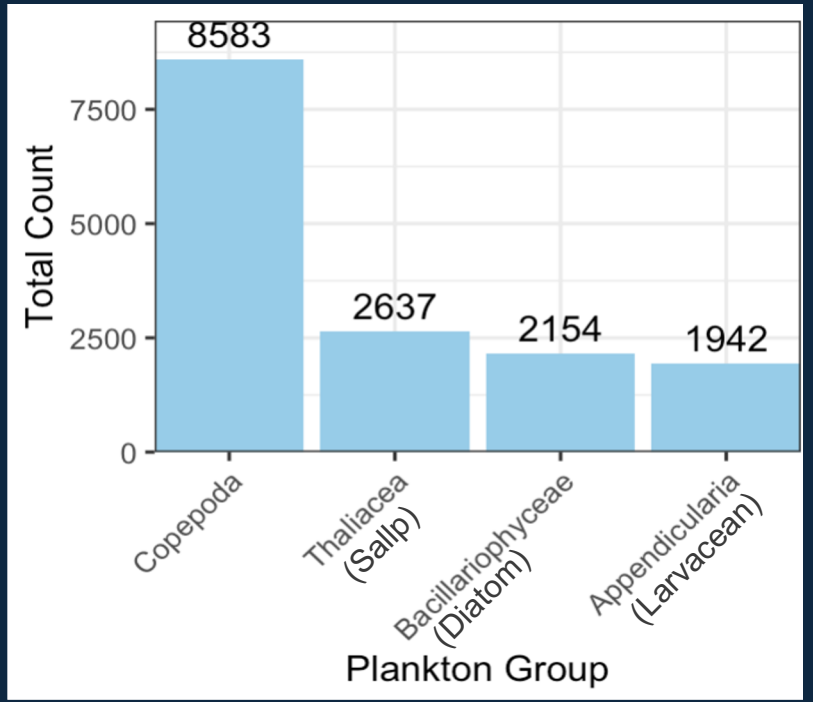




Number of Patches

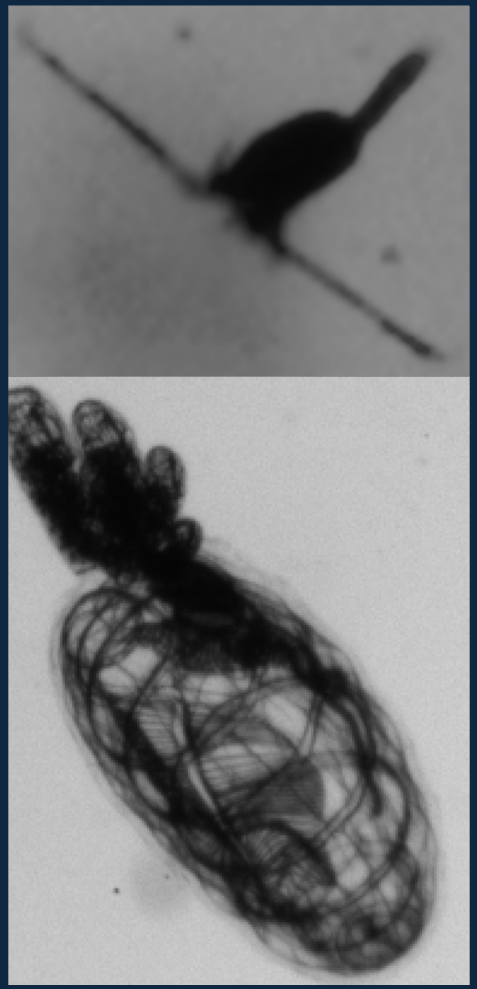


Total Count



Insights Gained

- The separation between the depth ranges of the plankton groups suggests differences in hydrological processes are impacting the plankton interactions.
- The vertical patch statistic reflects vertical migration and trophic influence, while the horizontal patch statistic indicates the presence of plankton patches and the frequency of aggregation among groups.



Northern California Current Insights

- Copepoda primarily inhabit the upper water levels, overlapping with larval fish, highlighting important trophic interactions between plankton and fish.
- The project enhances our understanding of fine-scale interactions between physical and biological responses.

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