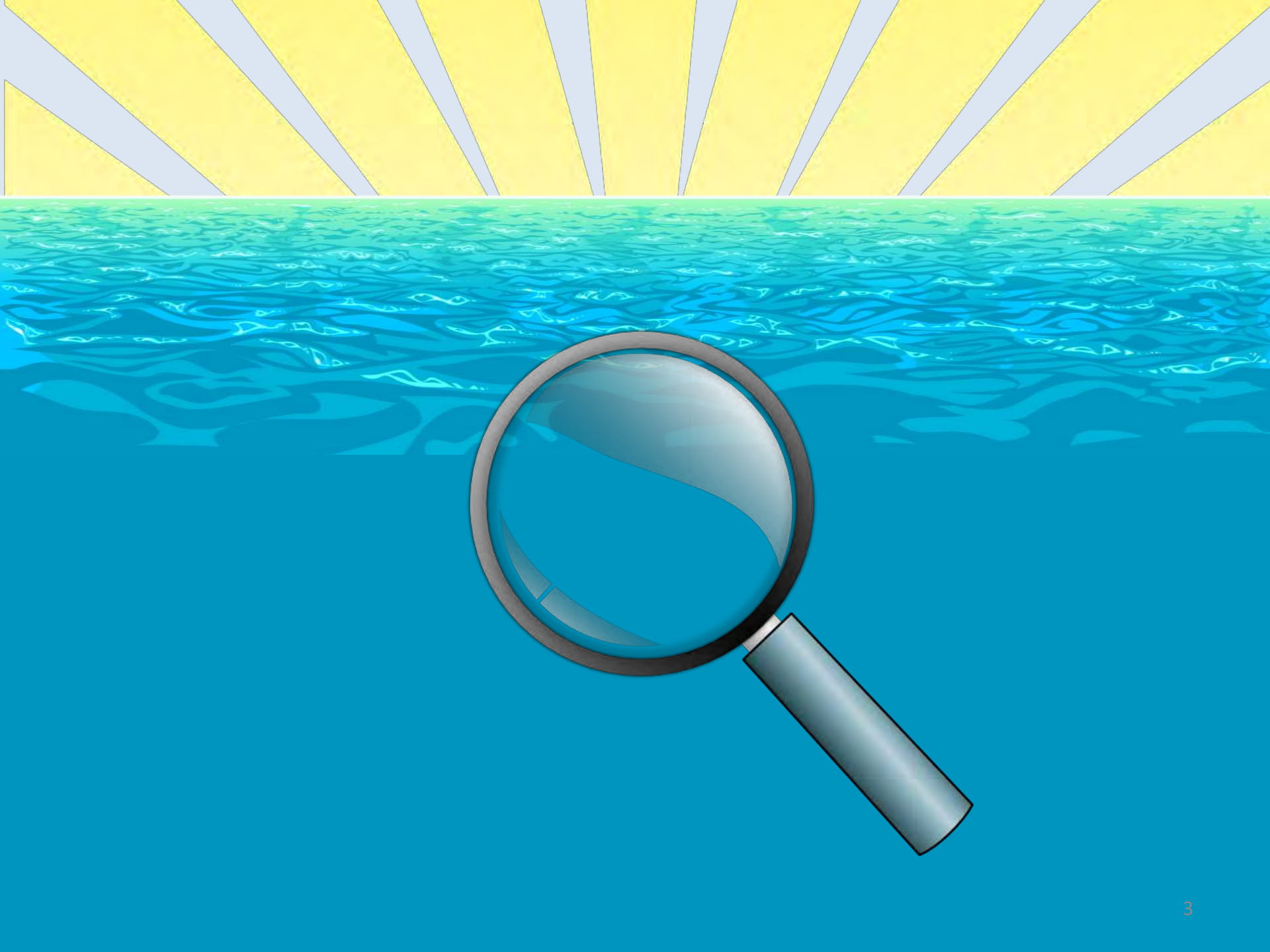


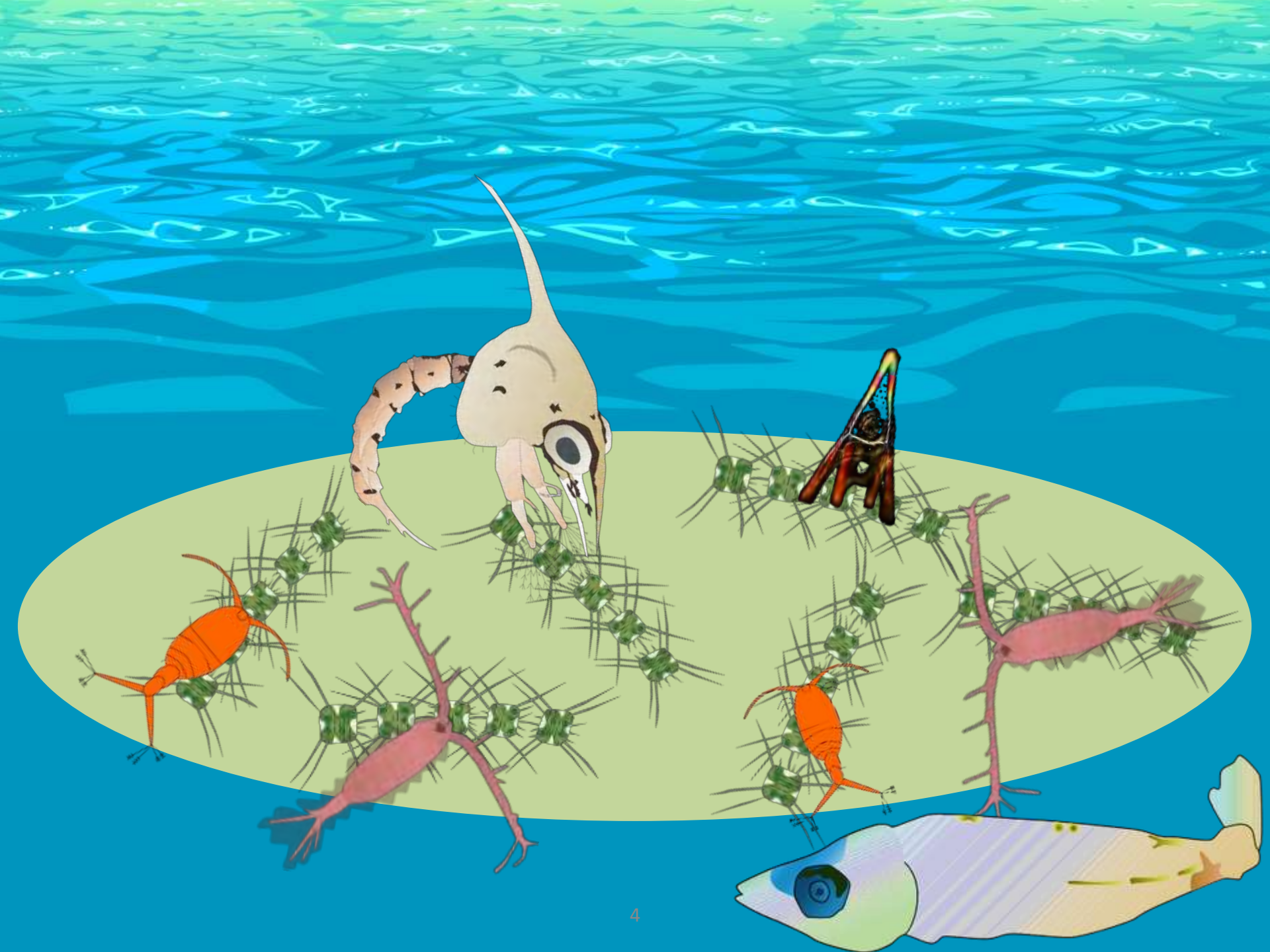


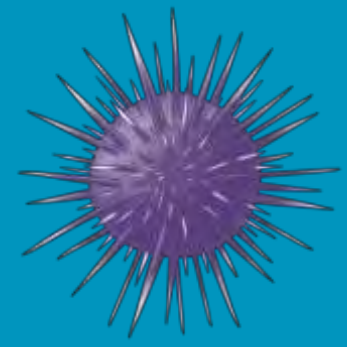
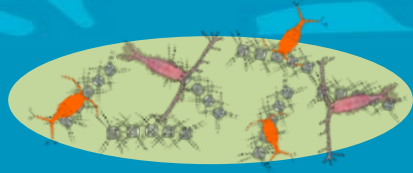
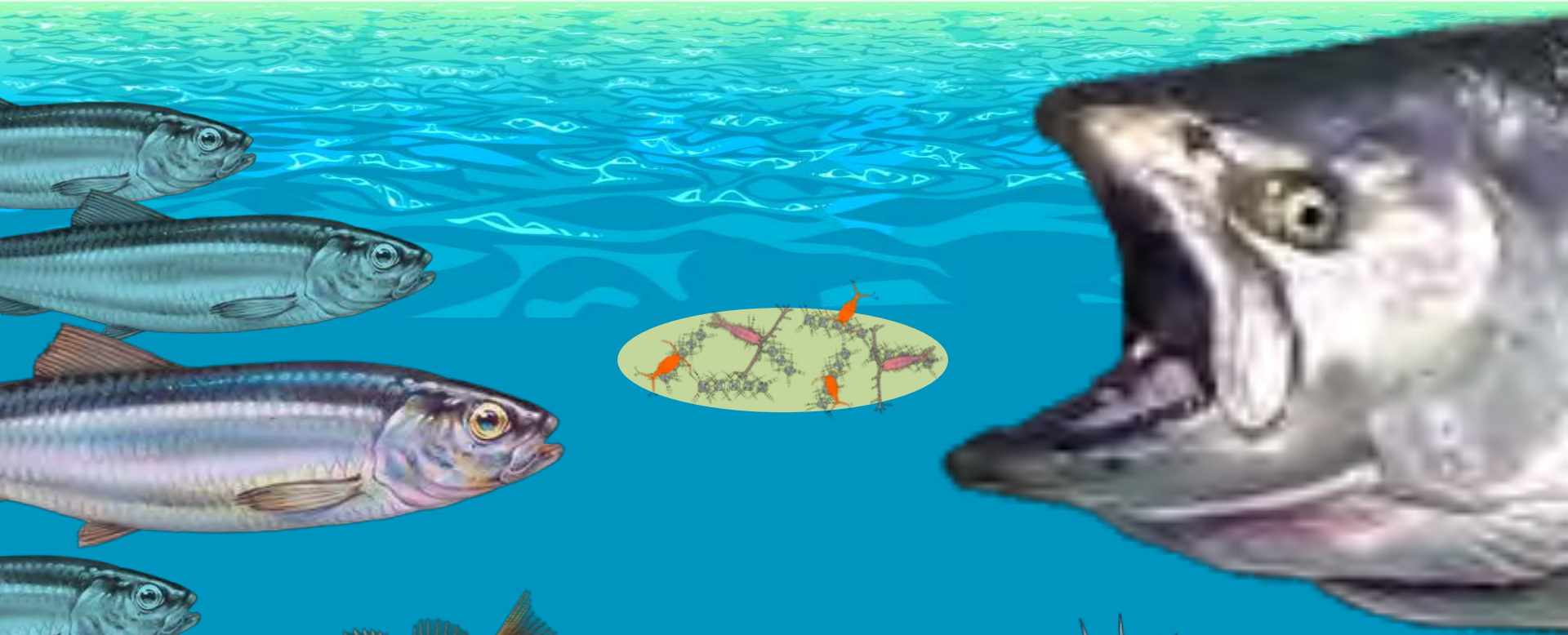
Zooplankton: Big talk about tiny critters

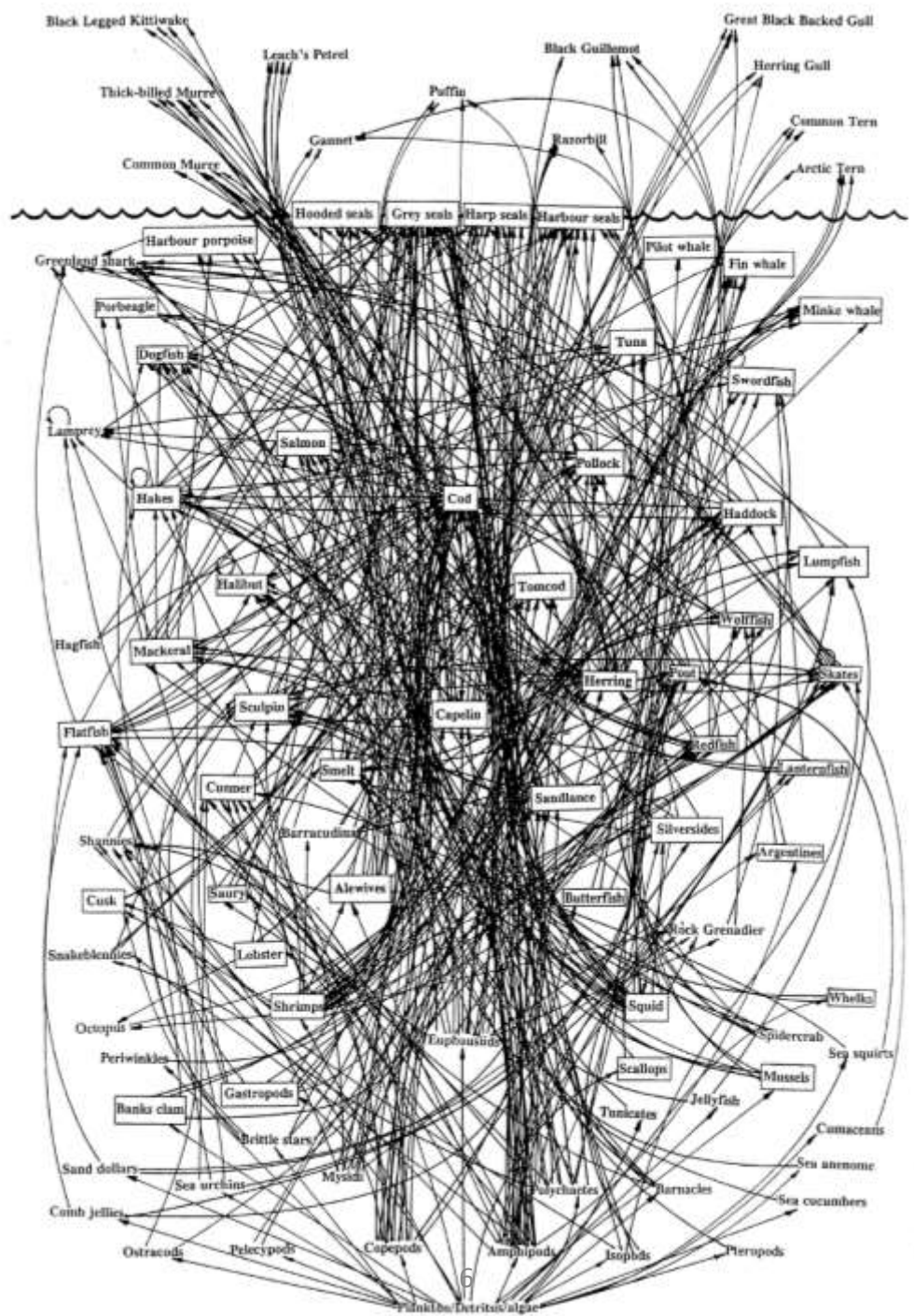
Caitlin McKinstry
Prince William Sound Science Center
Cordova, AK





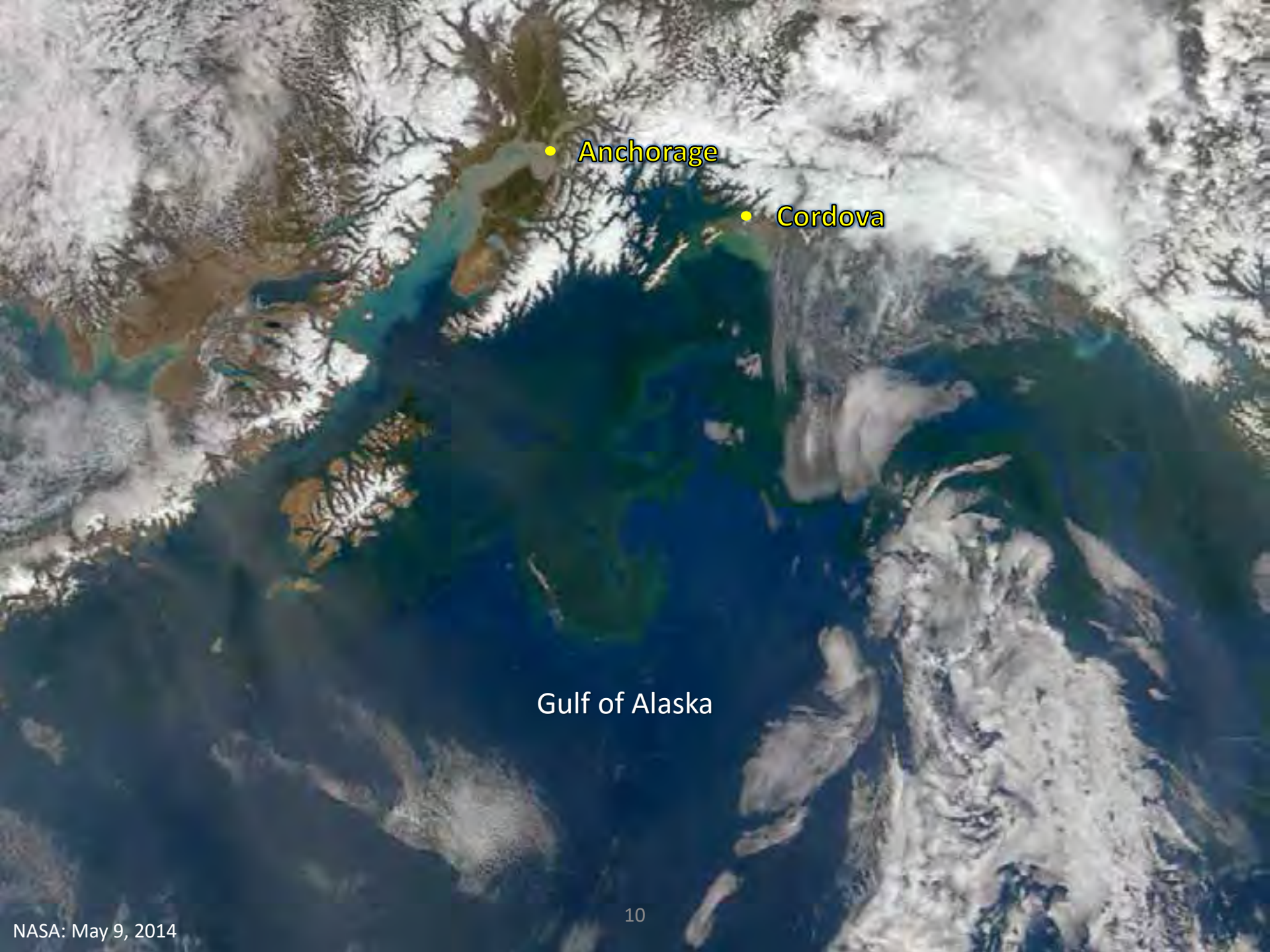






How small is small?





• Anchorage

• Cordova

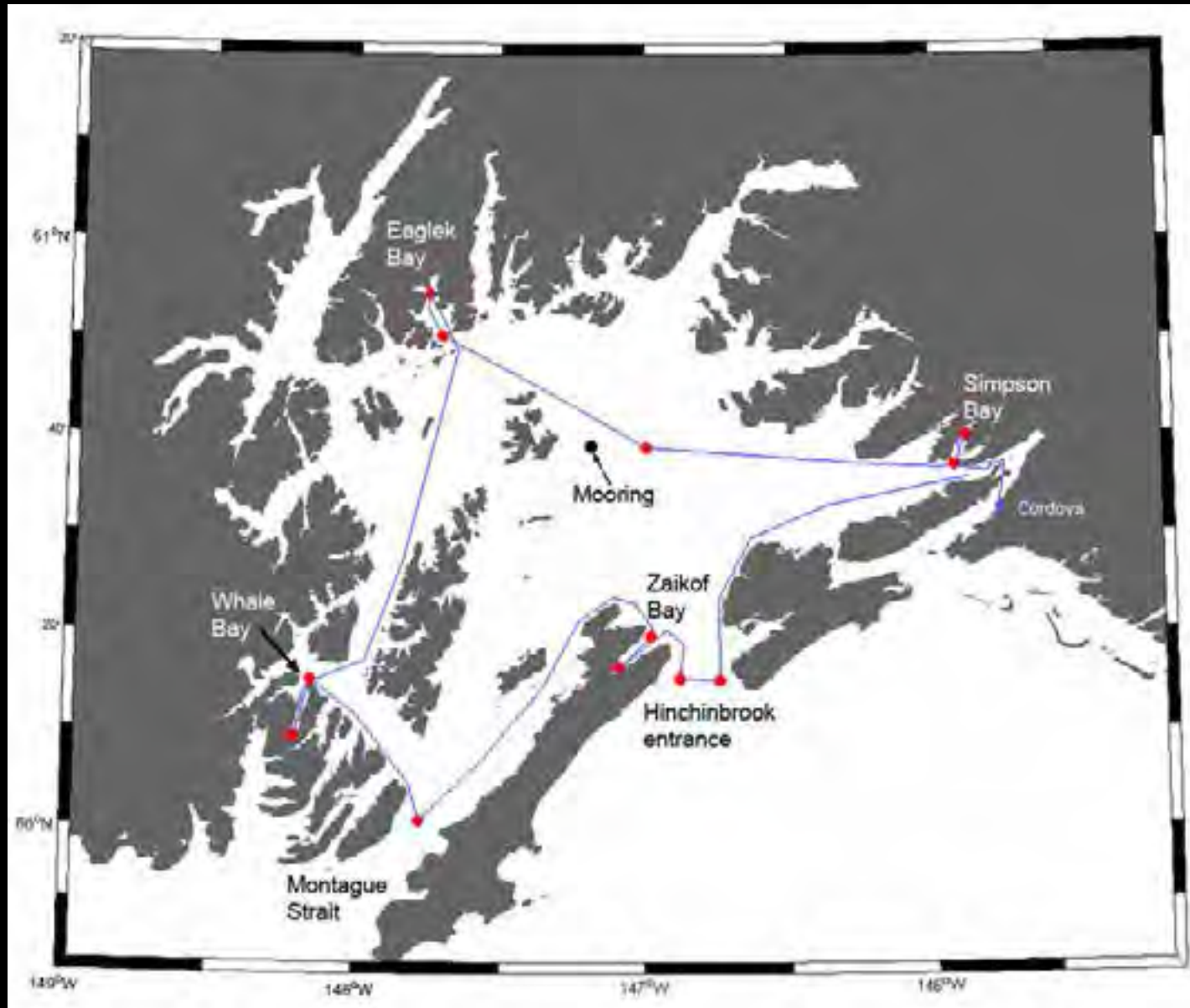
Gulf of Alaska



Cordova, AK



Our study area



How we collect zooplankton

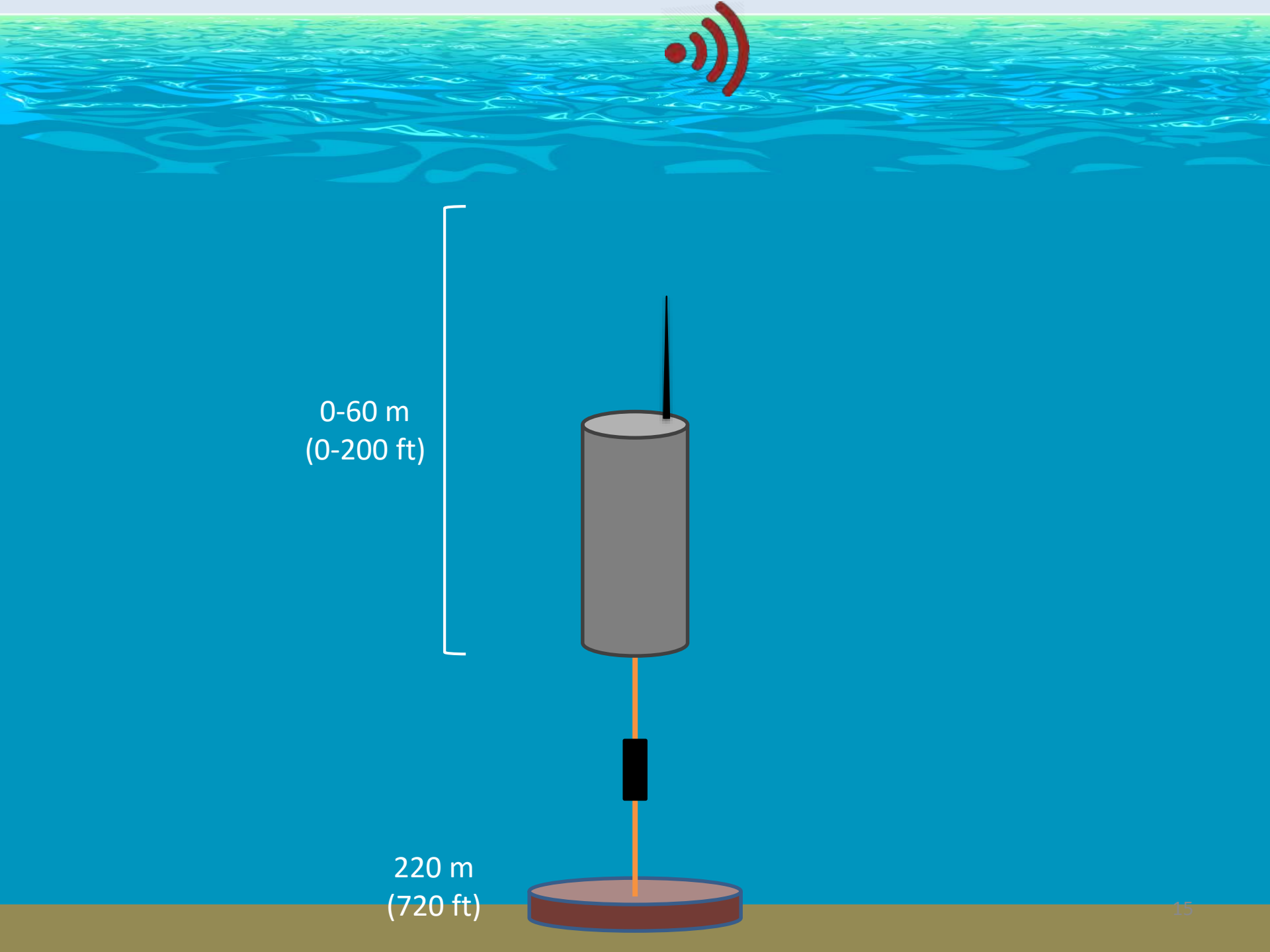
- 6 - 8 cruises per year
- M/V *New Wave*
- Bongo net
 - 202 micrometer mesh
 - 0-50 m vertical tow
 - Flow meter = how much water was filtered



PWS Autonomous Moored Profiler (PAMPPr)

- Moored oceanographic robot
 - 0-60 m everyday
- Suite of oceanographic instruments
 - Nutrients
 - Salinity
 - Temperature
- Now with a microscope camera!





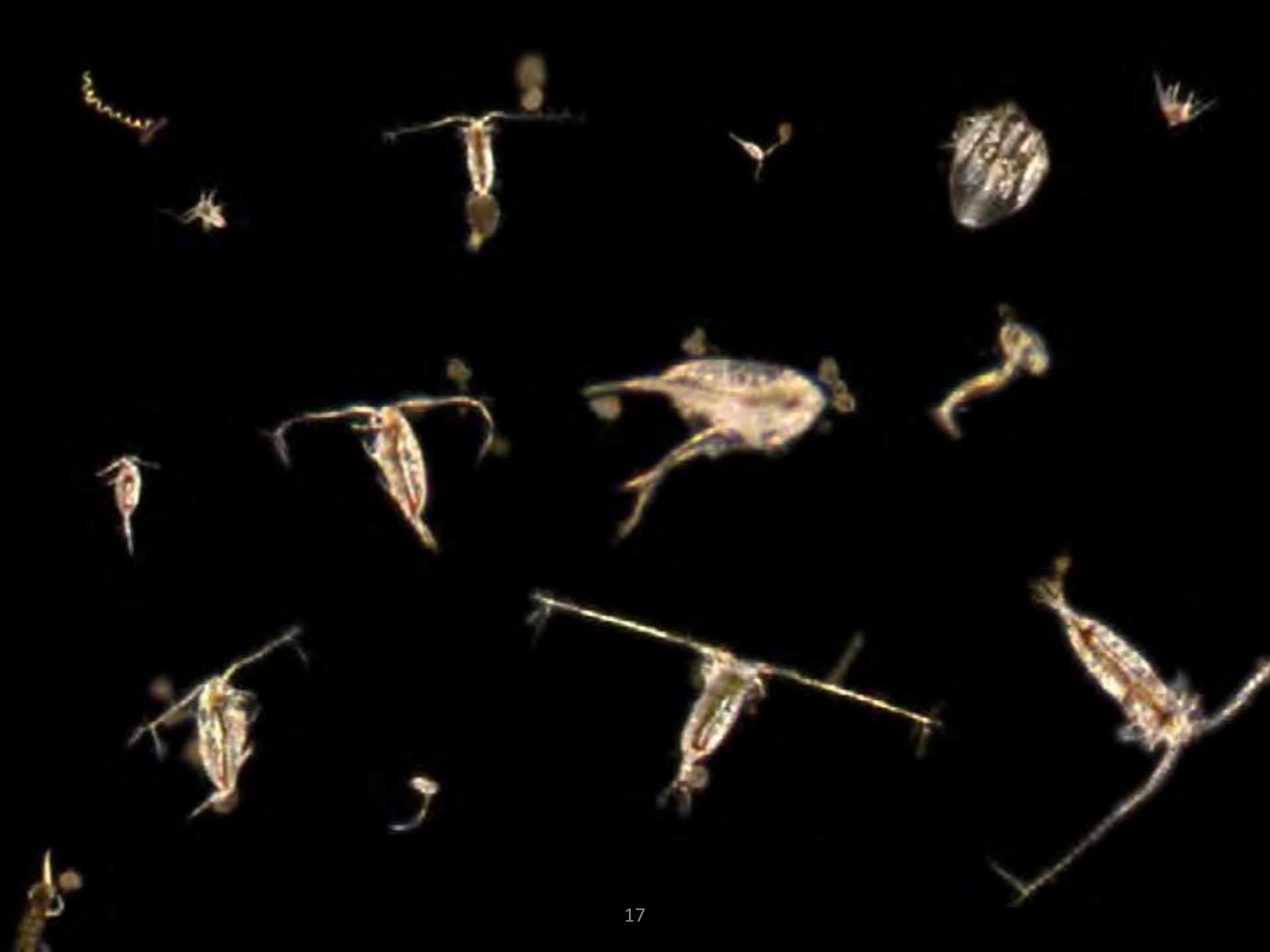
0-60 m
(0-200 ft)

220 m
(720 ft)

PWS Autonomous Moored Profiler (PAMPPr)

- Moored oceanographic robot
 - 0-60 m everyday
- Suite of oceanographic instruments
 - Nutrients
 - Salinity
 - Temperature
- Now with a microscope camera!



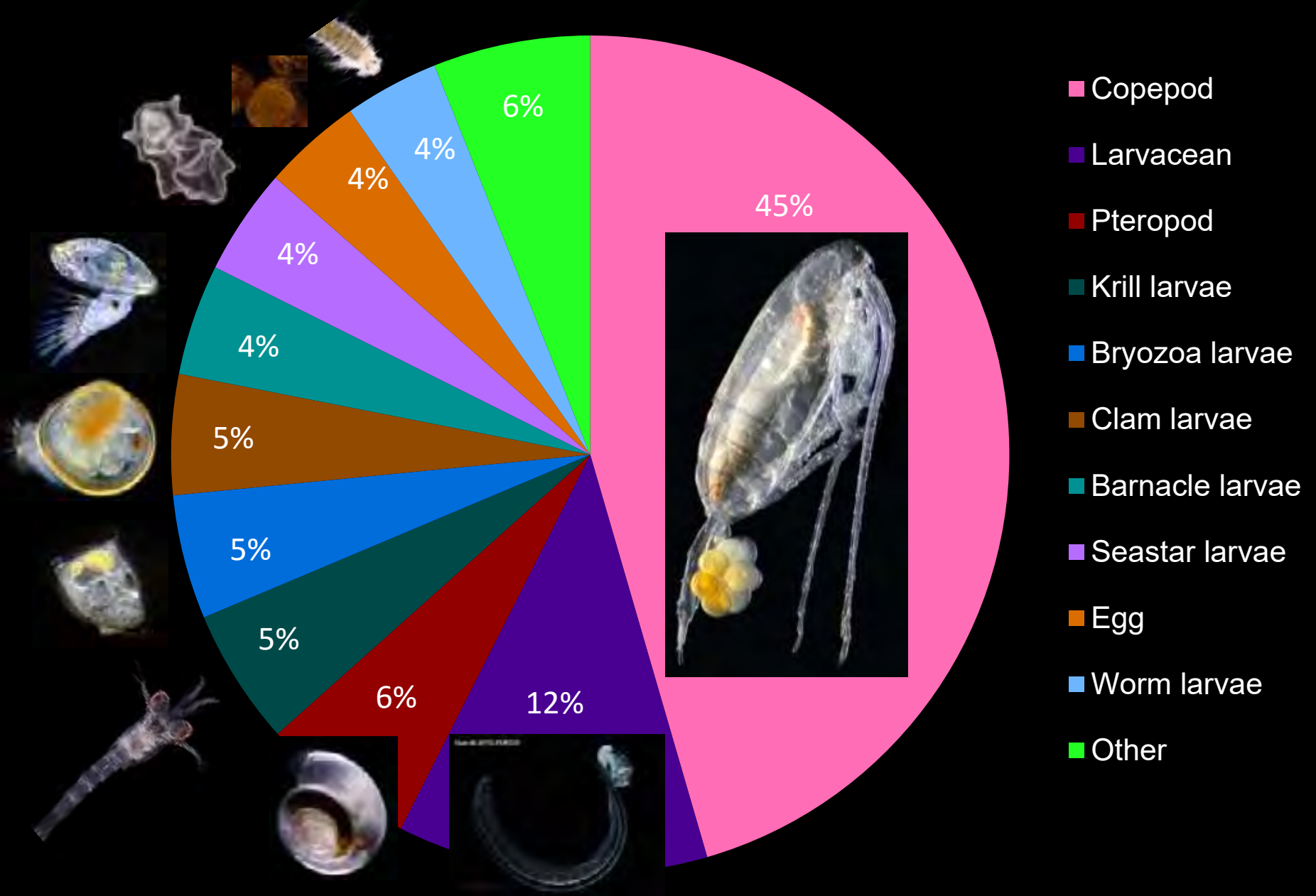


Many hours at the microscope

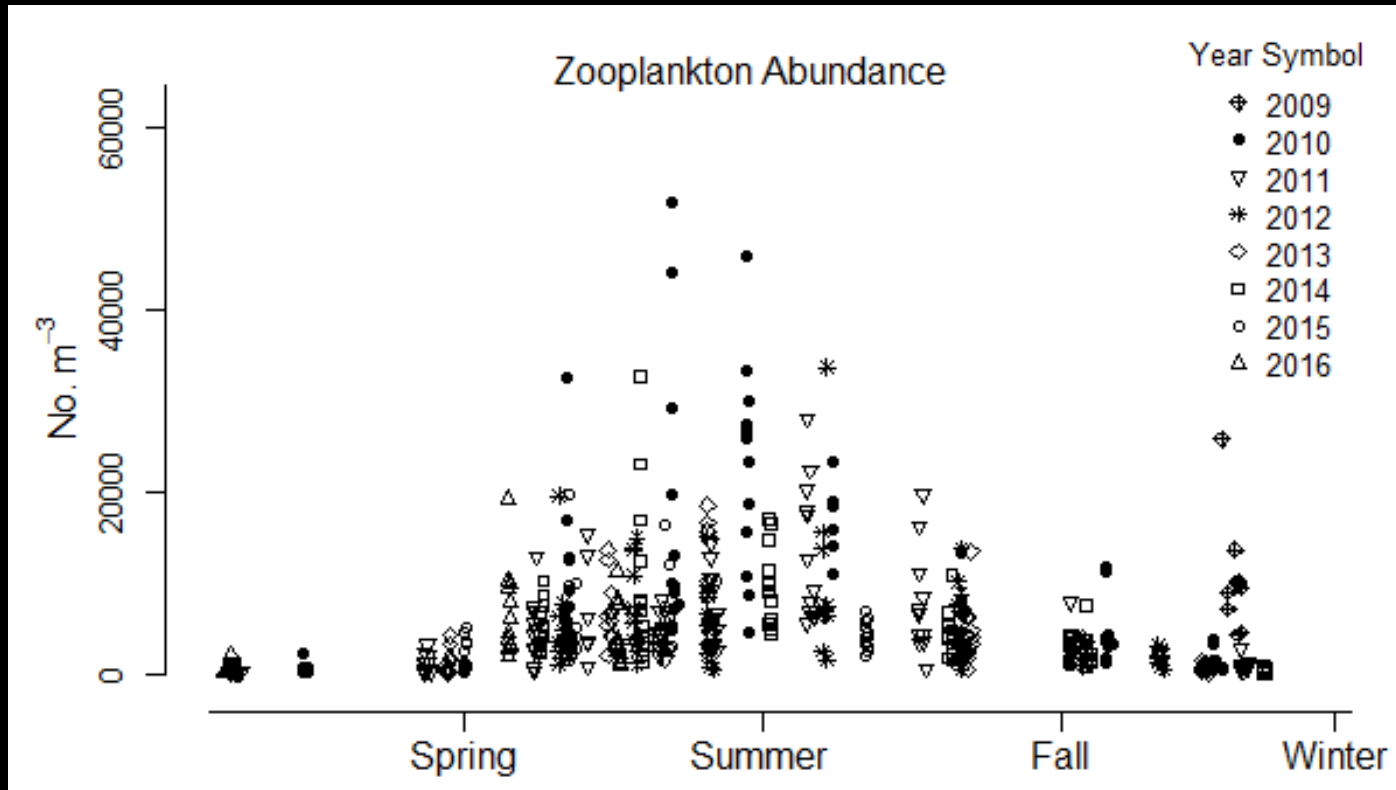
- Zooplankton are subsampled
- Species identification
- Copepod life history stage and sex



Taxonomic Frequency

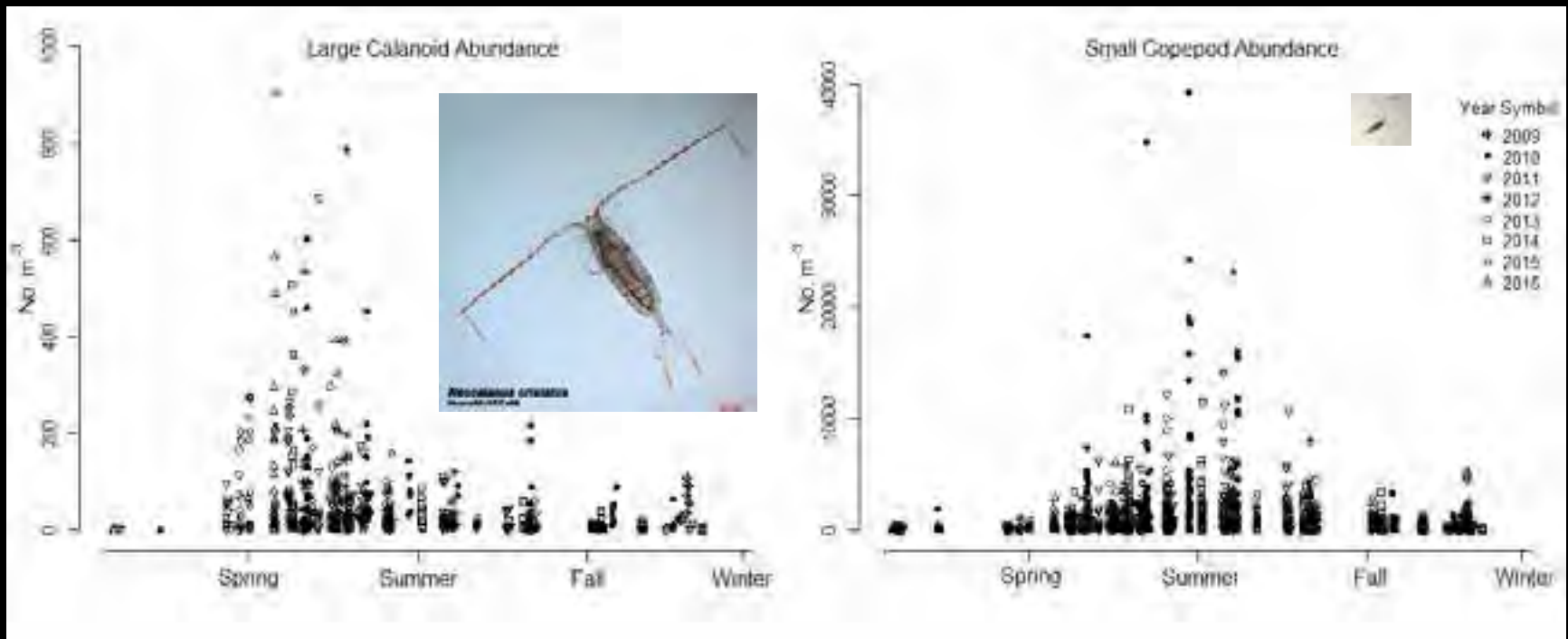


Seasonality



- Seasonality in abundance
- Abundance peaks between mid-spring and early-summer
- Quickly declines through summer
- Sometimes fall uptick

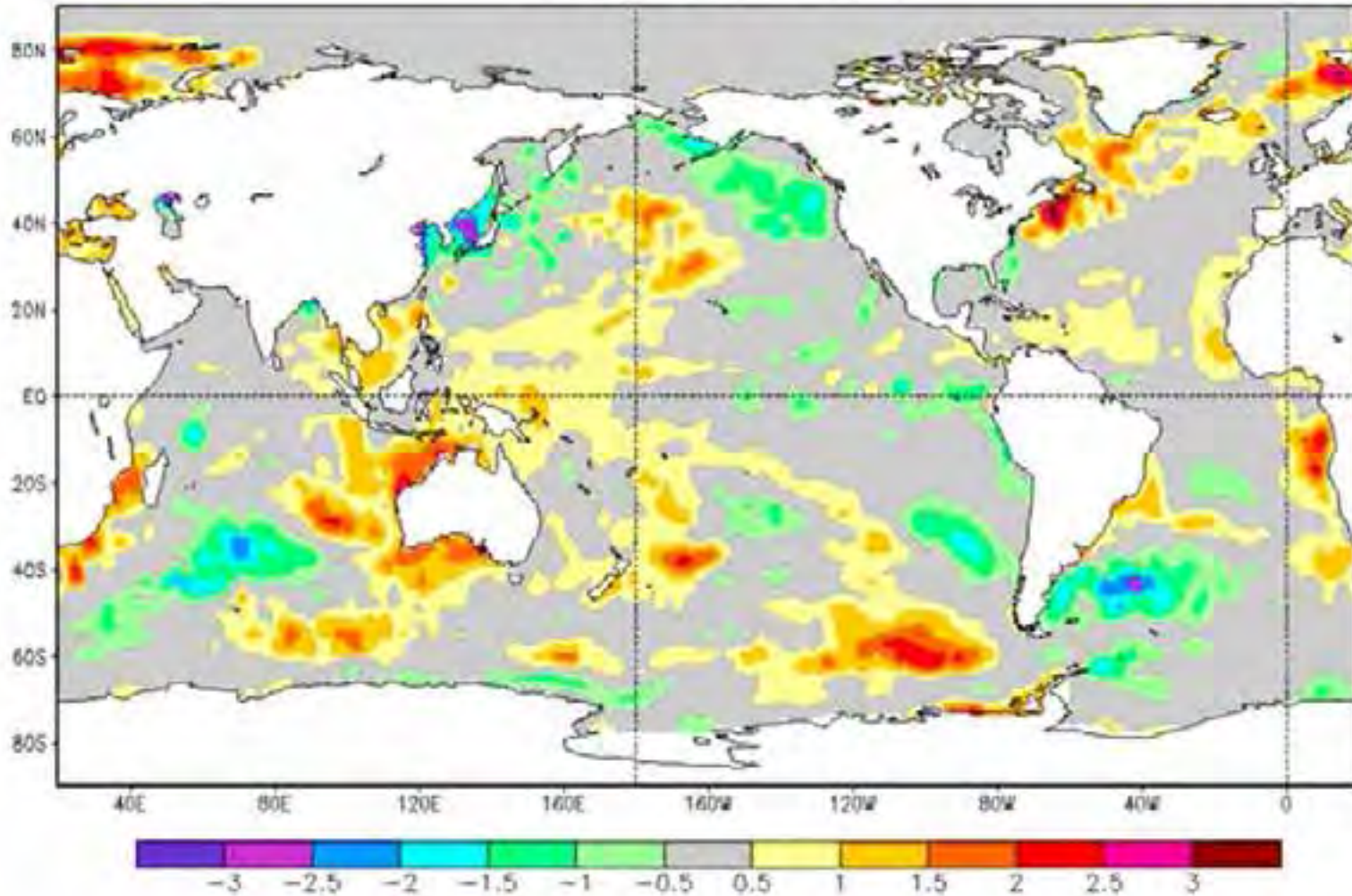
Seasonality



- Seasonality to community structure
- Large copepods prominent in early spring
 - During bloom of large bodied phytoplankton
- Smaller copepods prominent afterward
 - Can efficiently exploit smaller phytoplankton (Frost 1993)

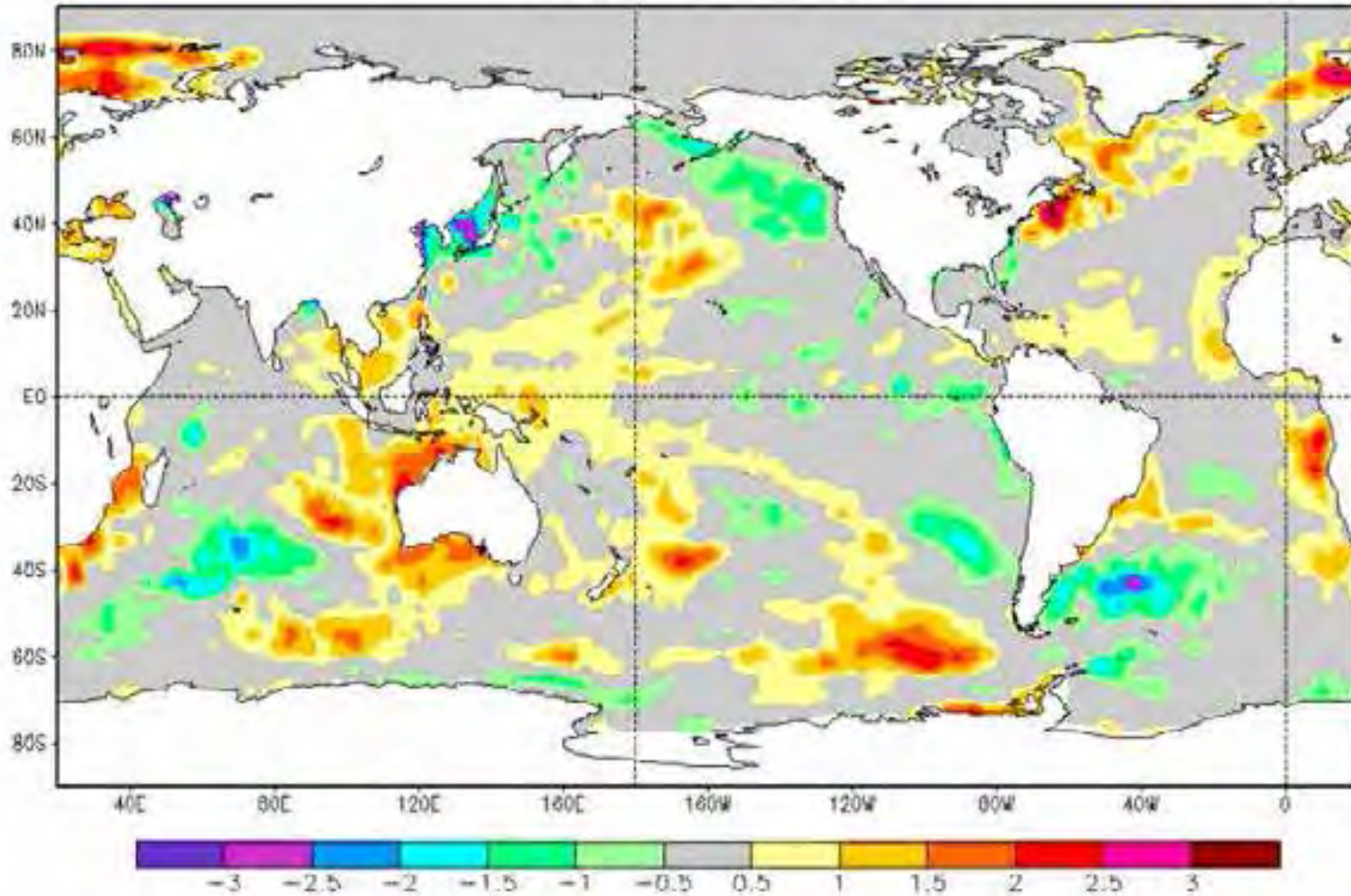
“The Blob” Jan 2013 – Aug 2015

Sea Surface Temperature Anomaly ($^{\circ}\text{C}$), Base Period 1971–2000
Week of 2 JAN 2013



“The Blob” Jan 2013 – Aug 2015

Sea Surface Temperature Anomaly ($^{\circ}\text{C}$), Base Period 1971–2000
Week of 2 JAN 2013



Fall/Winter Zooplankton Community

- Increasing numbers of smaller, southern, warm-water associated copepods
 - *Calanus pacificus*
 - *Mesocalanus tenuicornis*
 - *Paracalanus parvus*
- Indicative of warm water masses possibly from WA/OR coast
- Climate change and events such as “The Blob” may create warmer habitat in PWS for species such as these



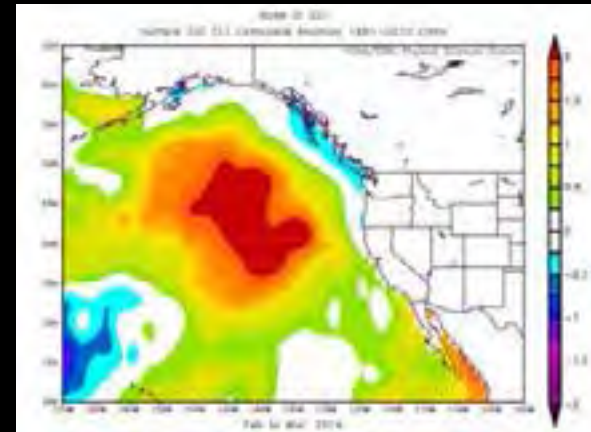
The Fats of Life

- Copepod lipid sacs – small guys vs. big
- Warm water = smaller body size
- Herring & pollock eat juvenile pink salmon
 - Switch to big fatty copepods in spring at peak abundance
 - PWSAC juvenile pink salmon released at this time
 - More predators and less prey?



Future Directions

- Analyze copepod lipid sac size from PAMPr images
- Further explore the relationships between “The Blob”, climate change, and zooplankton community structure in PWS
- Continue Gulf Watch Alaska’s monitoring program to better understand ecosystem dynamics in PWS – baseline data



Thank you for having me!



And thank you to:

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- North Pacific Research Board



EVOS Trustee
Council