

Kyla BradyLong^{1,3}, Steven Westbrook^{2,3}, Julien Moderan³ and Wim Kimmerer³

¹California Polytechnic State University, San Luis Obispo, ²California State University, Chico, ³Romberg Tiburon Center for Environmental Studies, San Francisco State University

Introduction & Objectives

Declines in the abundance of several pelagic fish species have prompted investigation into food web interactions within the estuary and delta. This area is characterized by low primary production and pelagic food webs much longer and reticulated than previously thought. As consumers stable isotope composition reflects that of their food, we use it to identify the sources of organic matter and to describe trophic relationships among the different species.

Pseudodiaptomus forbesi

- General particle-feeder on ciliates and phytoplankton
- Most abundant in freshwater

Tortanus dextrilobatus

- Predator on other copepods
- Most abundant in >8 salinity

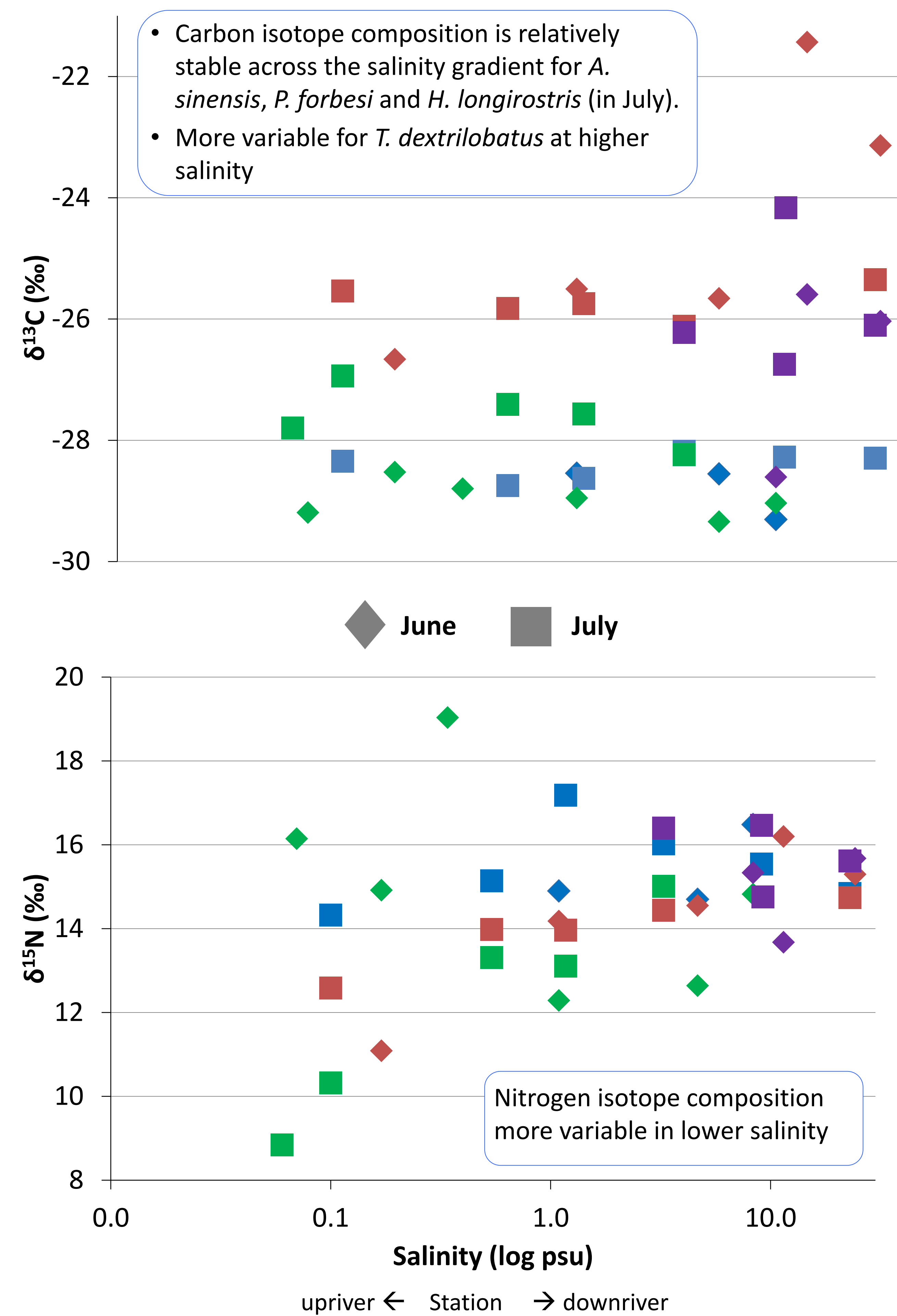
Acartiella sinensis

- Predator on other copepods
- Most abundant at salinity ~2

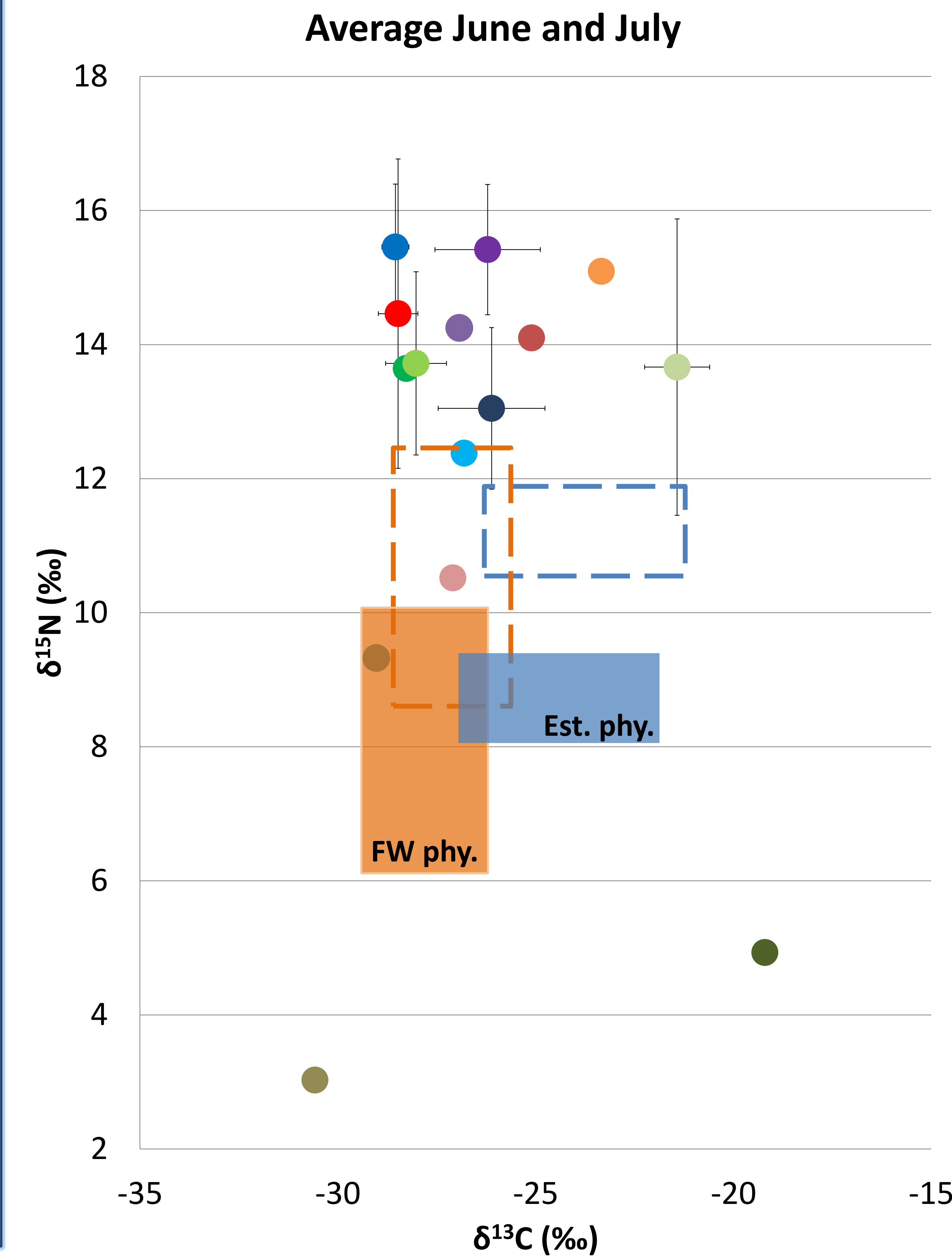
Hyperacanthomysis longirostris

- Unknown food source
- Most abundant <10 salinity

Results for June and July (2012)



- Species Key:**
- *Acartiella sinensis*
 - *Hyperacanthomysis longirostris*
 - *Pseudodiaptomus forbesi*
 - *Tortanus dextrilobatus*
 - *Acartia hudsonica*
 - Amphipod
 - *Bosmina* sp
 - *Corophium* sp
 - *Crangon crangon* (adult)
 - *Limnoithona tetraspina*
 - *Microcystis*
 - *Oithona davisae*
 - *Palaemon macrodactylus* zoea
 - *Sinocalanus doerrii*



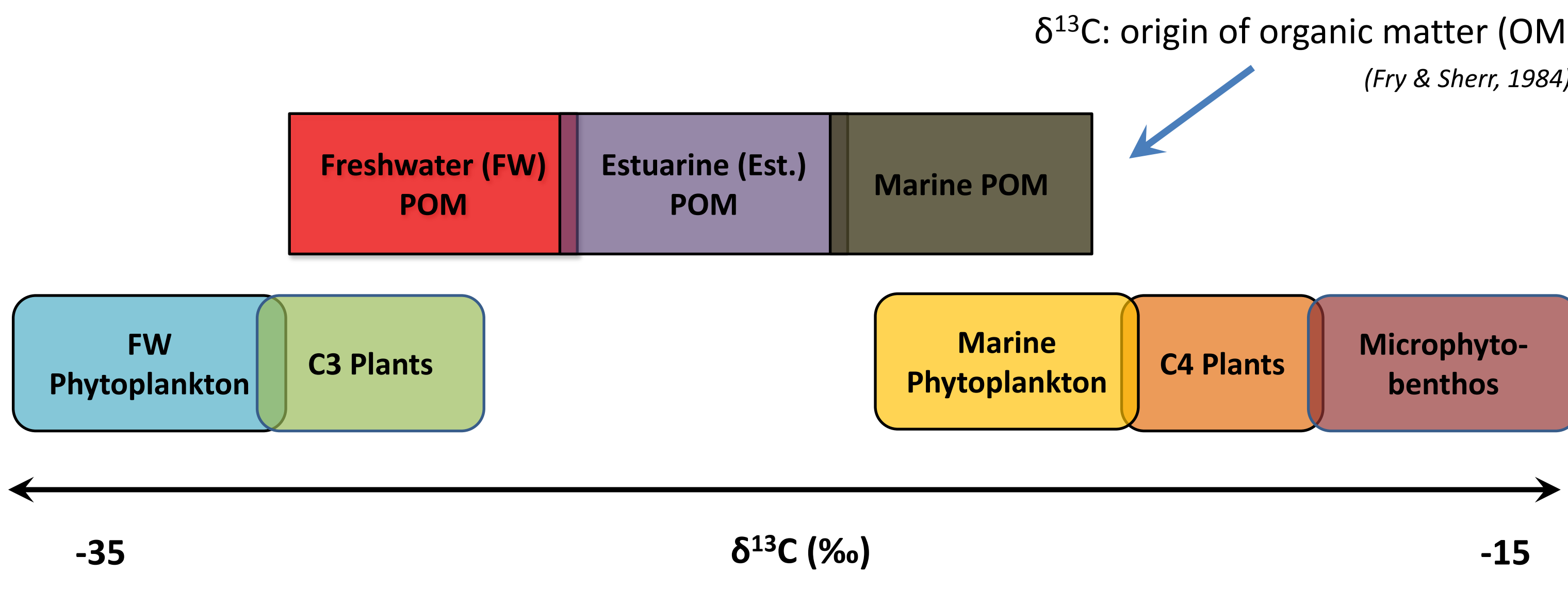
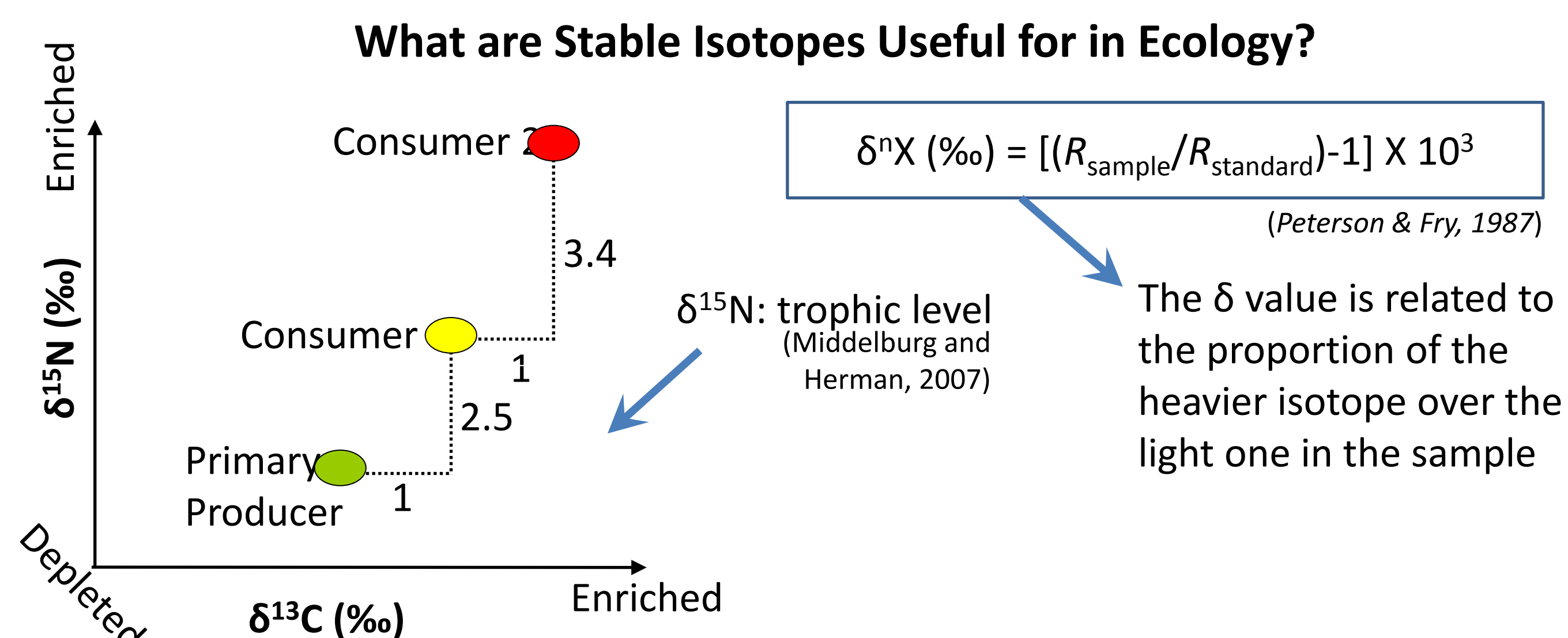
- *Microcystis* and *Aphanizomenon* are more ¹³C enriched than all other organisms.
- *Tortanus dextrilobatus* and *Acartiella sinensis* are both ¹⁵N enriched as compared to the other zooplankton sampled.

Methods

- Collected samples of zooplankton larger than 100µm and particulate organic matter (POM) along the estuary from freshwater to ~25 psu from June 2012 to February 2013.
- Preserved zooplankton samples at -20°C.
- Zooplankton species were sorted into ~0.5mg samples for isotope analysis.
- Stable Isotope Analysis by EA-IRMS (Elemental Analyzer- isotopic ratio mass spectrometer)



Stable Isotopes Analysis



Conclusions & Implications

- High ¹⁵N variability at low salinity: varying bacterial degradation of organic matter at the base of the food web and/or human impact (N from sewage, fertilizers...)
- Low ¹⁵N variability at high salinity: lower diversity of trophic pathways and trophic levels
- *Microcystis* not a good candidate for being a primary food source for any of the zooplankton due to its ¹³C enriched state
- Evidence confirms carnivorous nature of *Tortanus dextrilobatus* and *Acartiella sinensis*.
- Given the ¹⁵N enrichment for trophic levels, *T. dextrilobatus* and *A. sinensis* most likely feeding on *A. hudsonica* and *P. forbesi*, respectively
- More data from the remaining months needed to support conclusions, to document seasonal variations and relate them to environmental drivers