



# Energetic Pathways and Trophic Diversity Among Macroinvertebrate Communities in Saltmarshes

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**SMOOTH CORDGRASS (tall form)**  
*Spartina alterniflora*

**SALTMEADOW CORDGRASS**  
*Spartina patens*

**BLACKGRASS**  
*Juncus gerardii*

**MARSH ELDER**  
*Iva frutescens*

**SMOOTH CORDGRASS (short form)**

**SPIKEGRASS**  
*Distichlis spicata*

Low Tide

High Tide

**MARSH PEAT**

MEAN LOW WATER

**RIBBED MUSSELS**  
*Guekensia demissa*

**COMMON MUMMICHOG**  
*Fundulus heteroclitus*

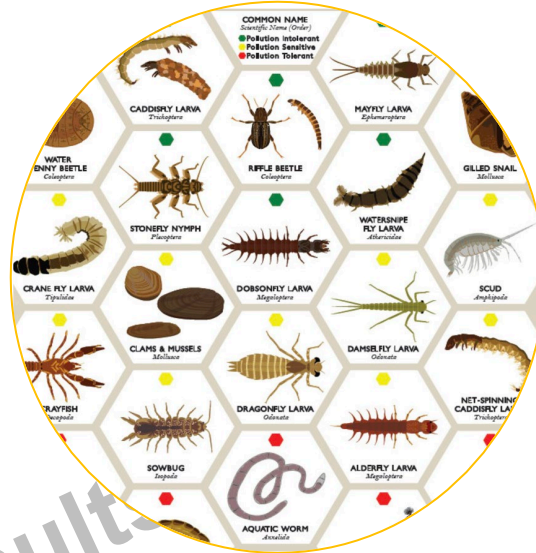


Credit: Brandon L. C. Fuller, courtesy of Watershed Counts

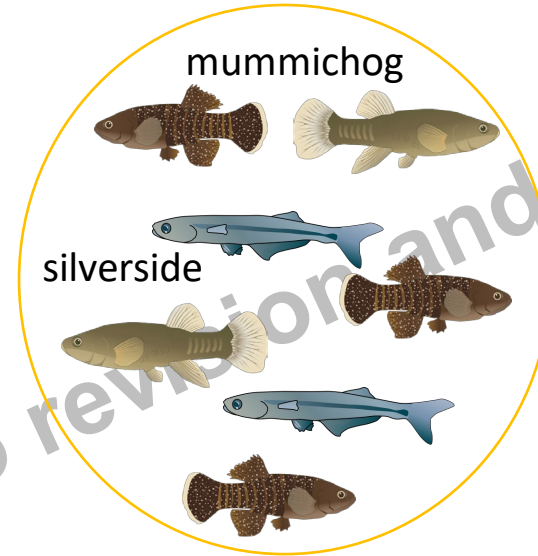
# Saltmarsh Food Relay



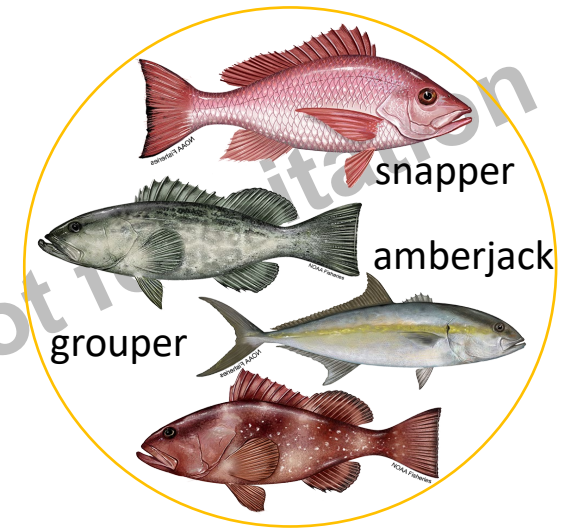
Marsh cord grasses and phytoplankton provide rich food resources.



Macroinvertebrates consume those resources and detritus as well as other invertebrates.



At high tide juvenile fish have access more of the and consume macroinvertebrates.



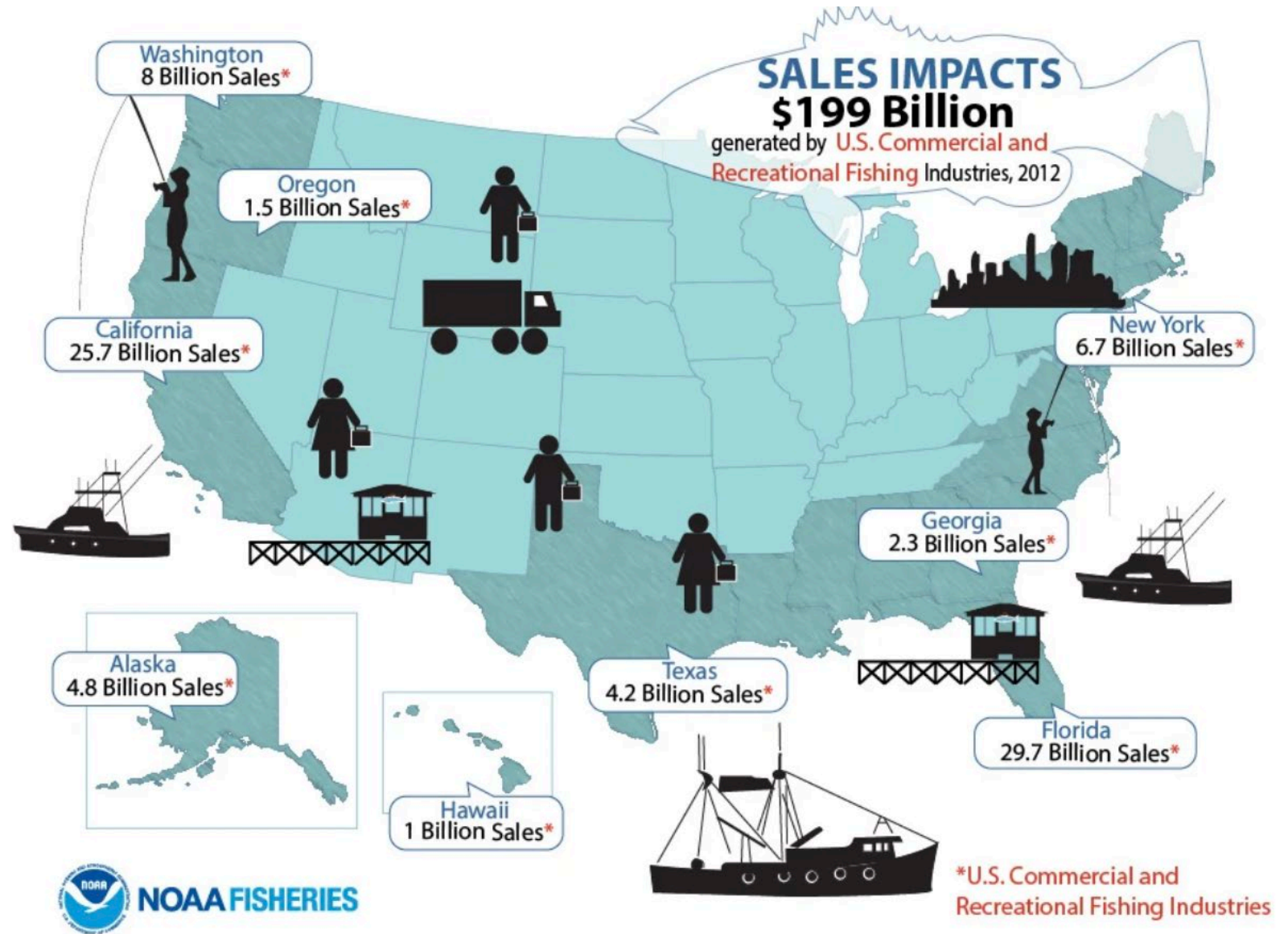
At high tide larger fish species have access to the marsh and feed.



Why Should We Care?

Saltmarsh habitats are responsible for 68% of U.S. Commercial Catch

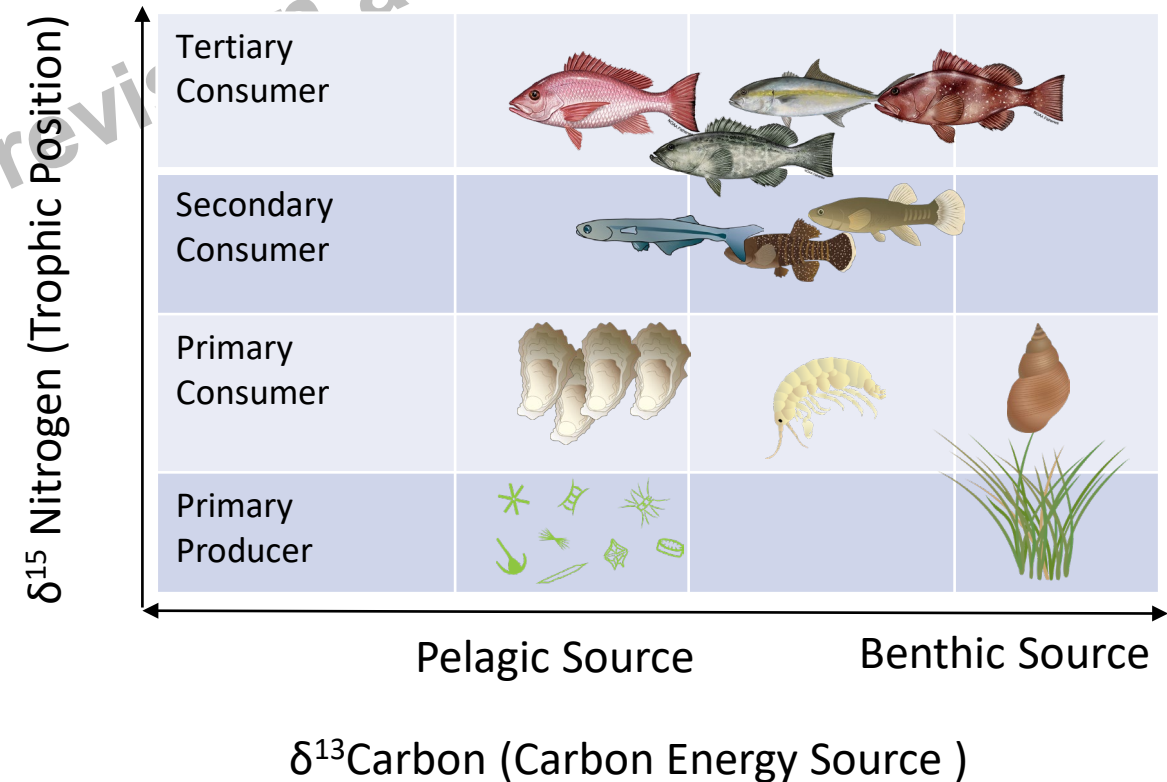
Preliminary results,



Overall Goal: To resolve the trophic structure and energy sources of the macroinvertebrate community.

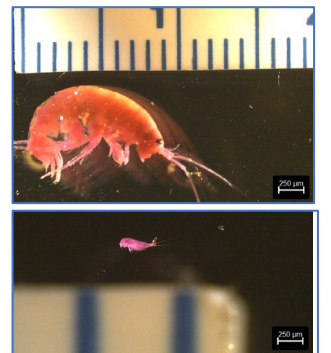
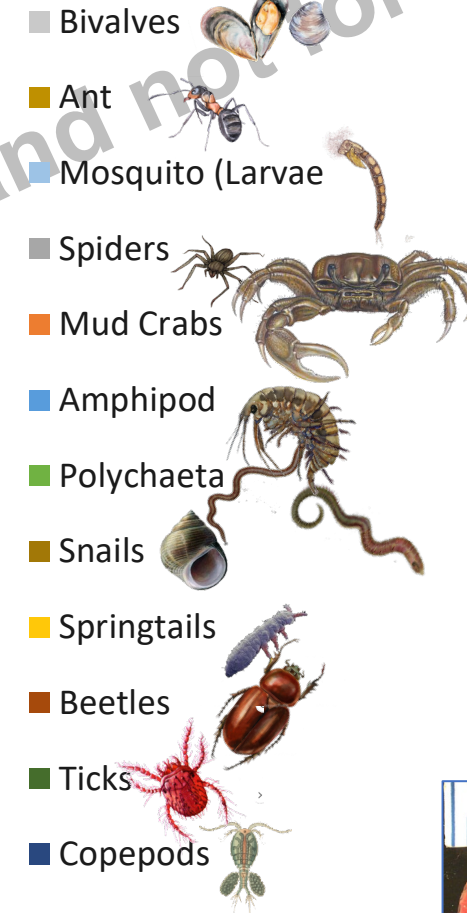
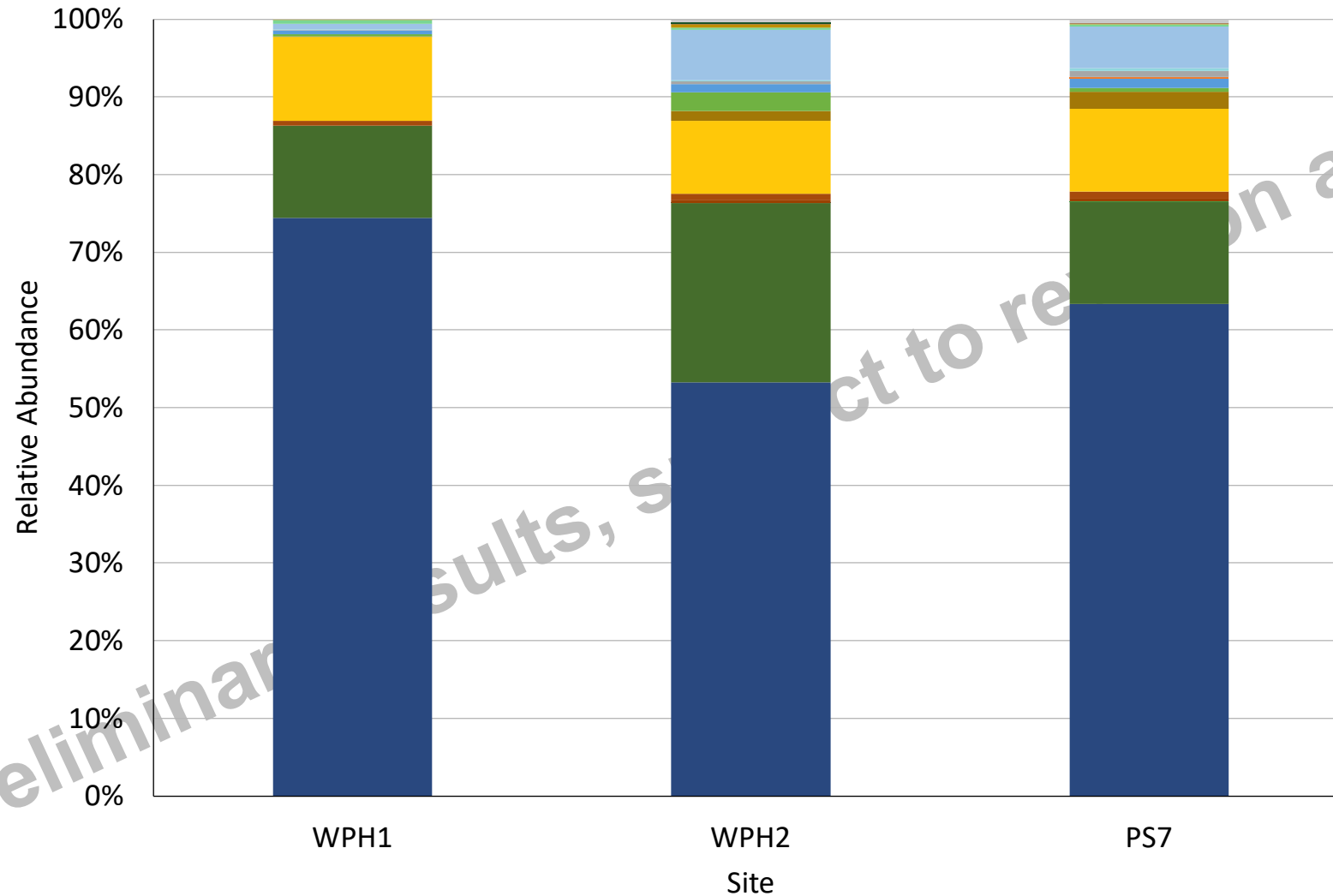
## Aims

- Determine relative contribution of pelagic vs. benthic carbon energy sources and trophic positions of different taxonomic groups.
- Compare taxonomic groups to representative predators in the system.
- Compare niches of functional feeding groups.



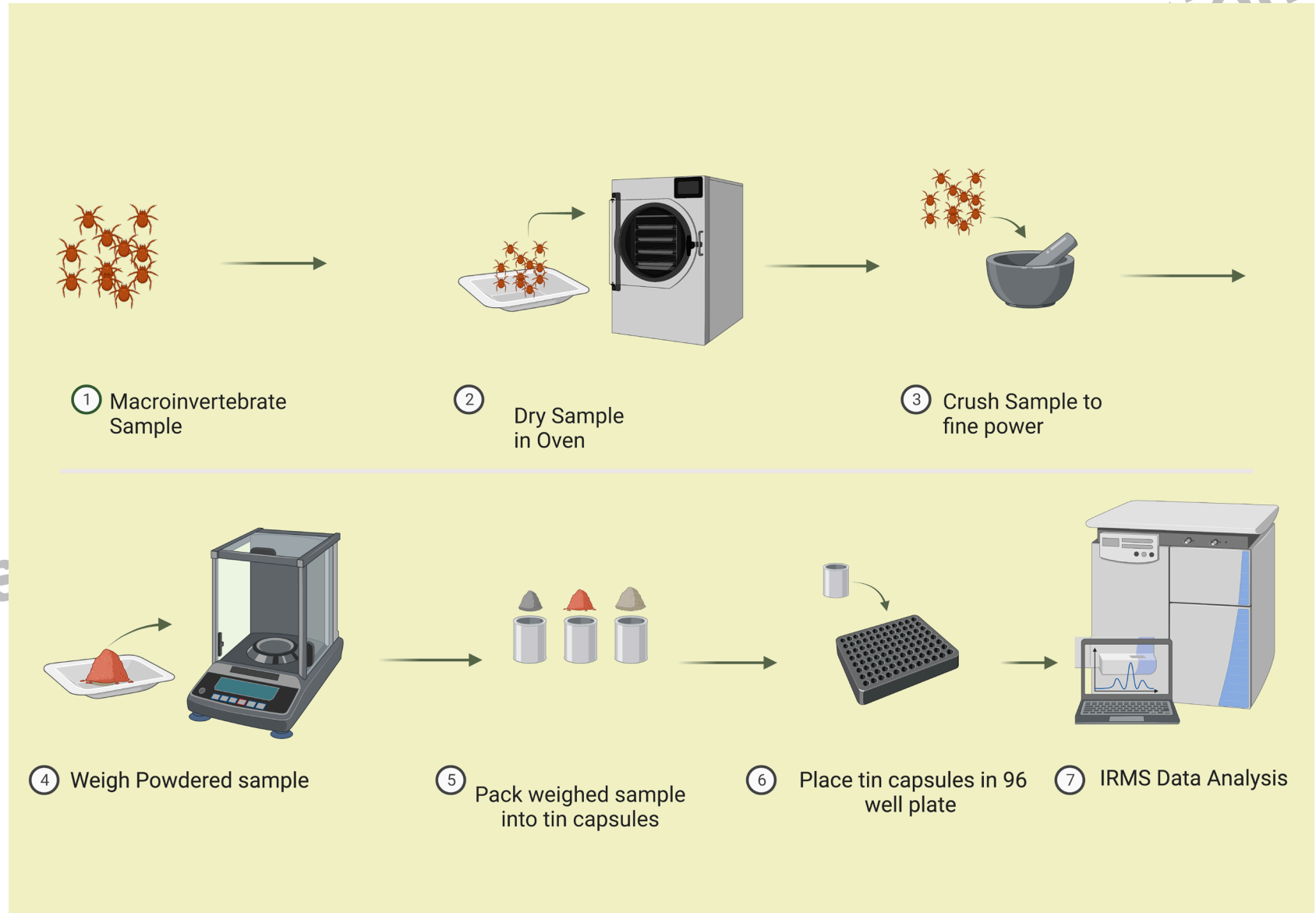
# How and Who to Sample?

Sample Type	Organism
Blood	Birds, Mammals
Muscle	Fish
Whole Organism	Invertebrates

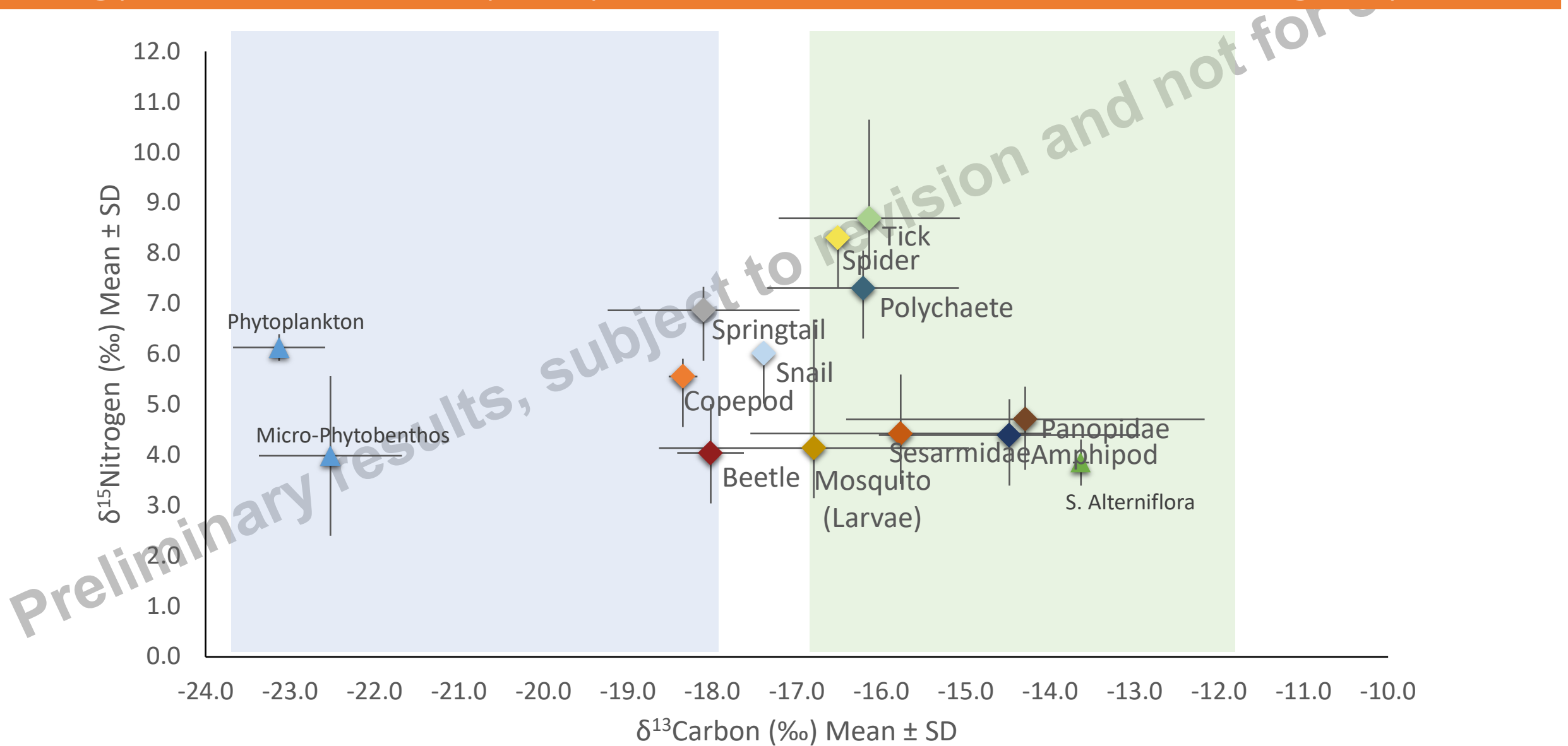


# Stable Isotope Analysis Workflow

Preliminary results

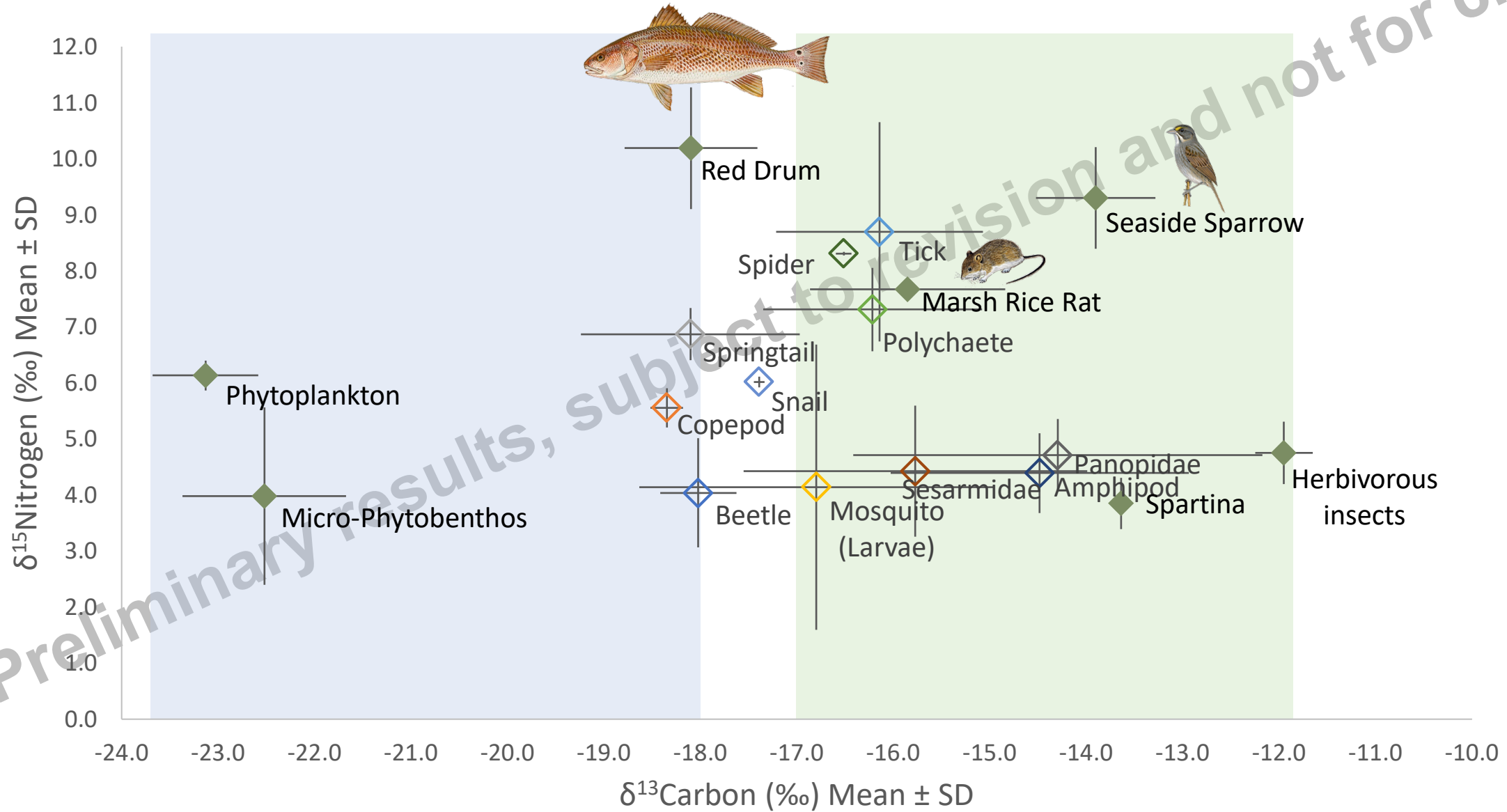


Aim 1: Determine relative contribution of pelagic vs. benthic carbon energy sources and trophic positions of different taxonomic groups

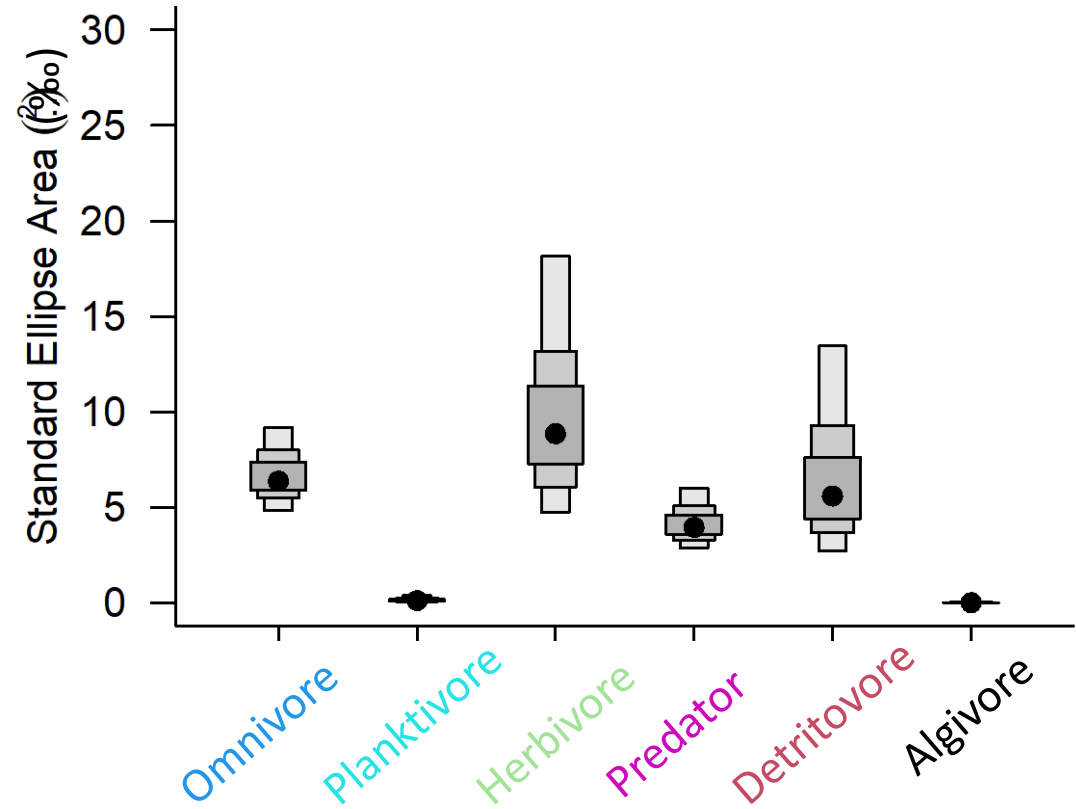
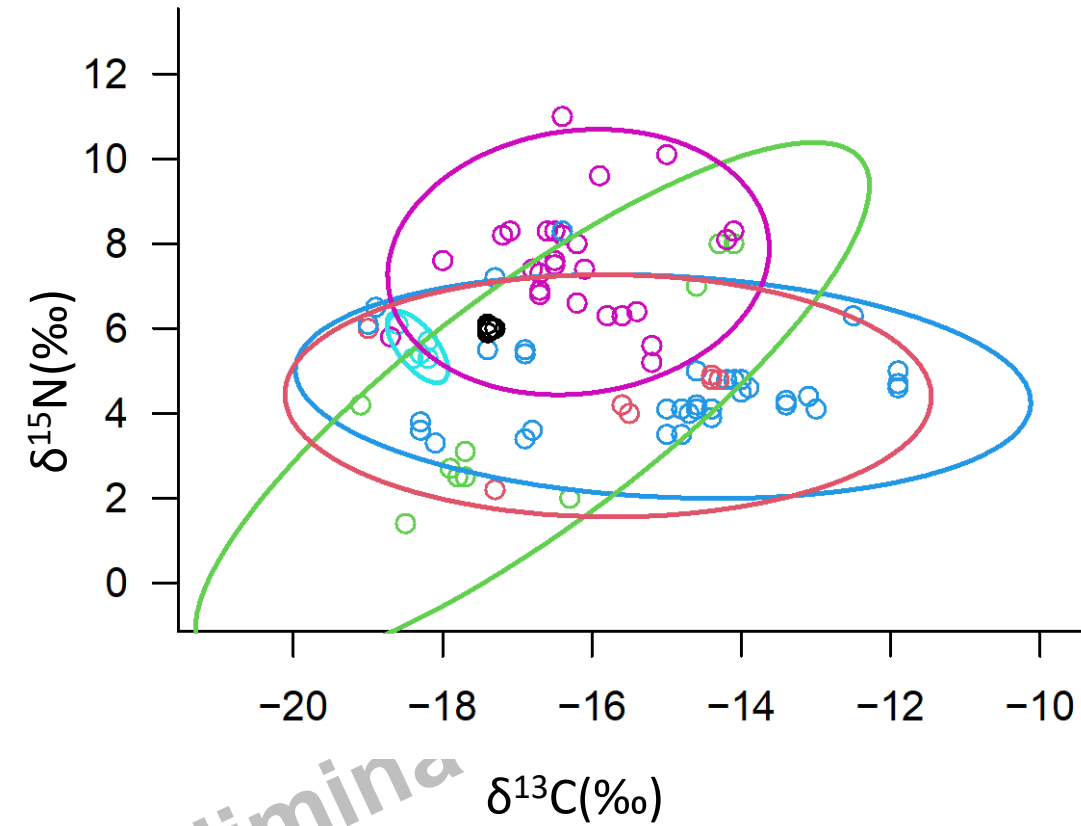




## Aim 2: Contributions to Predators in the Larger Food Web



### Aim 3: Comparison of Functional Feeding Group Niches



# Conclusions of the Community Structure

## Research Questions

1. What are the trophic positions and carbon energy resource contributions to the macroinvertebrate taxonomic groups?

Secondary Consumers

Benthic Contributions 63%

Pelagic contributions 27%



2. How does the macroinvertebrate community compare to the representative predators in the system?

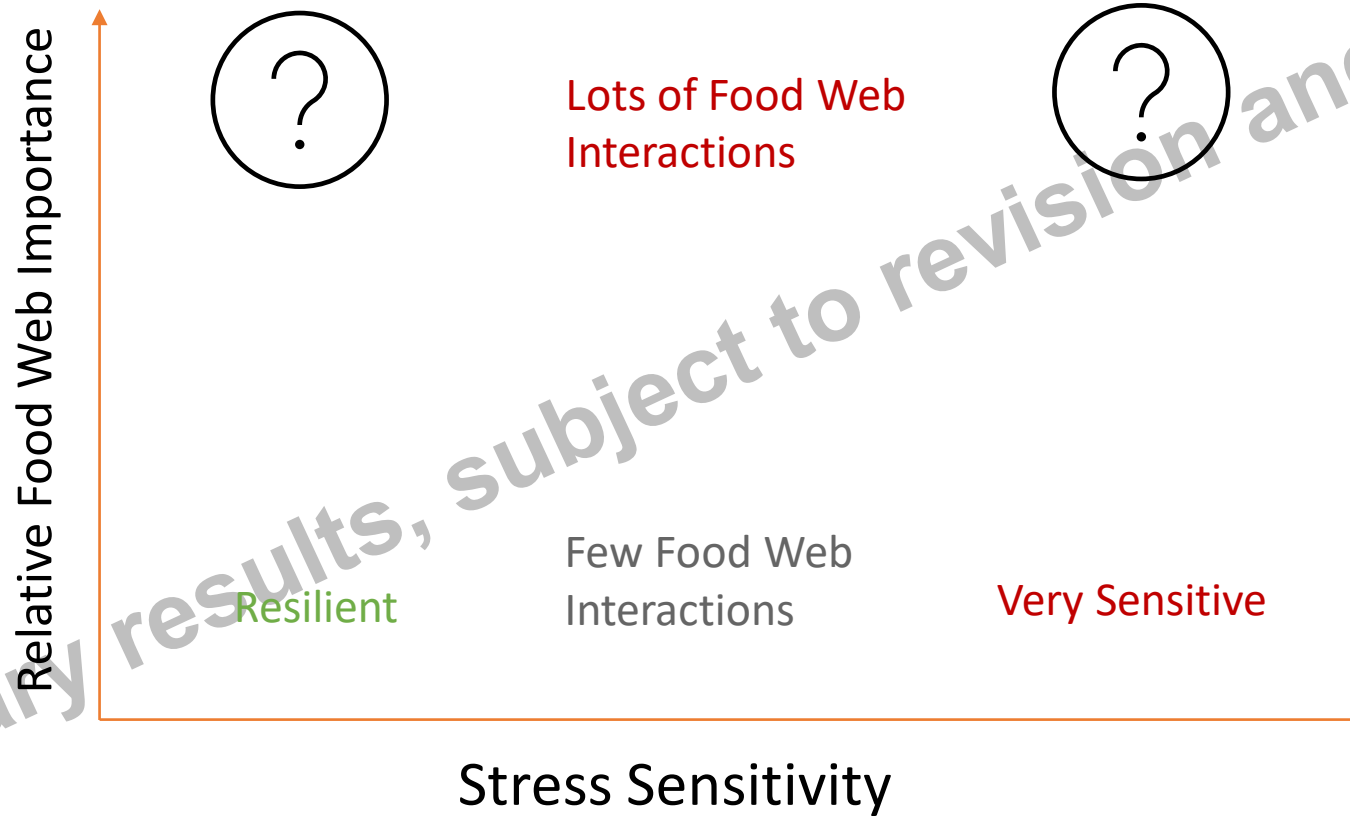


3. What are the sizes of the trophic niches of functional groups?

- Herbivores have largest niche & span wide trophic ranges diet comprised of diverse carbon sources
- Omnivores and detritivores have similar sized niches, but detritivores have wider trophic range
- Planktivores and Algivores have the smallest niche & more specialized diet



# Next Steps



# Acknowledgements

Thank you to all the undergraduate students who have contributed to this project by sorting and identifying the macroinvertebrate samples.

Sherry Dijkstra and YGR took the pictures.

Stable Isotope analysis was performed at Michigan Technological University.

Invertebrate and plant icons were obtained from the Integration and Application Network ([ian.umces.edu/media-library](http://ian.umces.edu/media-library)) and the Noun Project ([thenounproject.com](http://thenounproject.com)).

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