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Documenting the Impacts of Sawgrass Encroachment in Sloughs of the Central Everglades

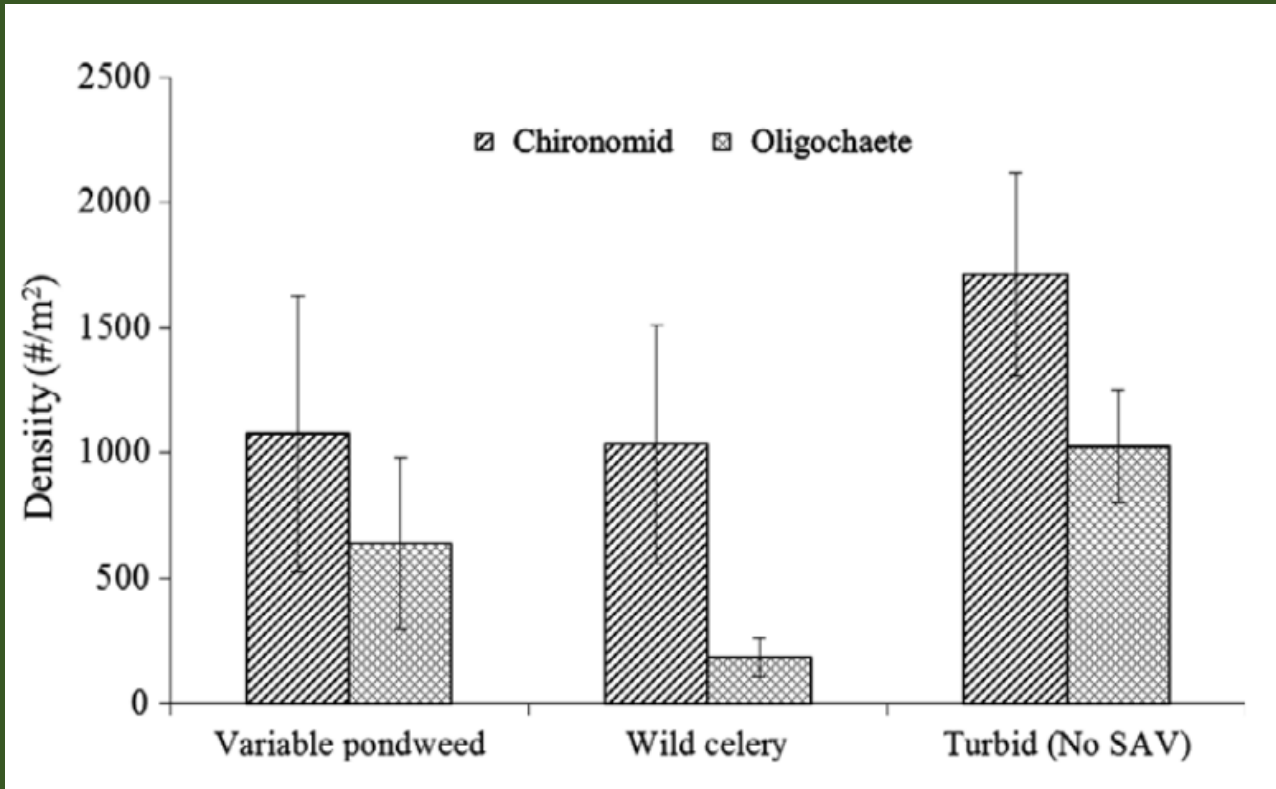


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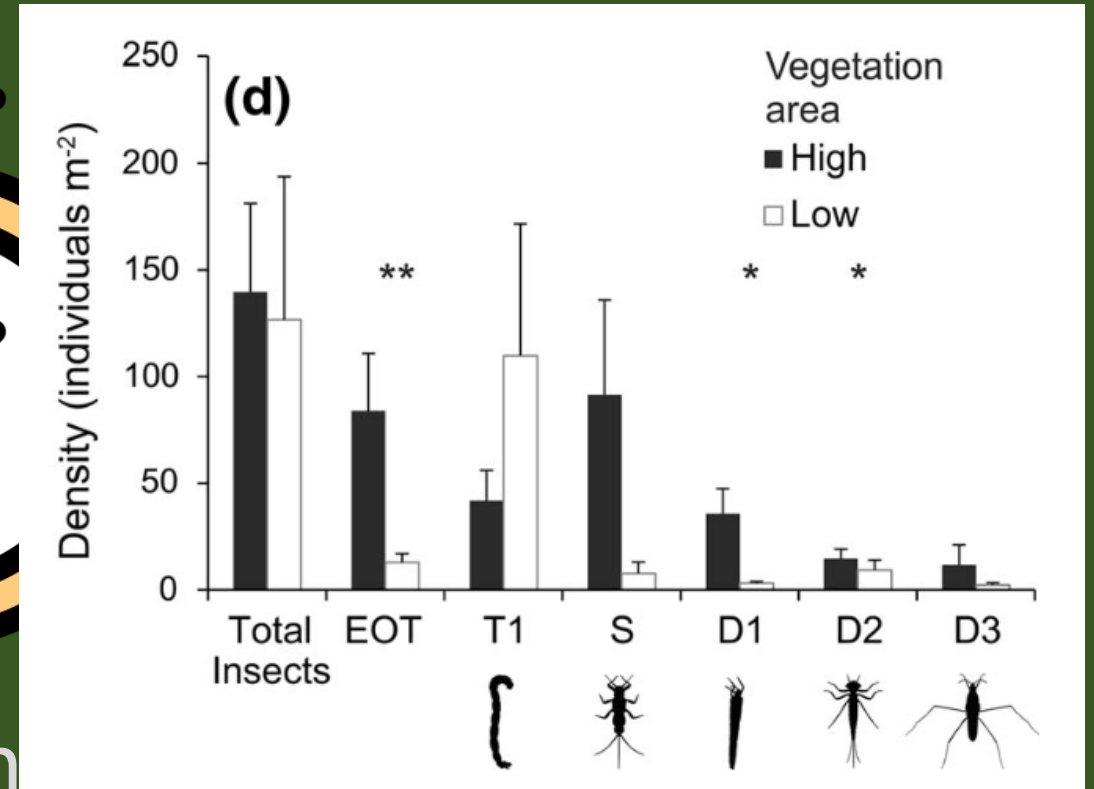
Ariana L. Jonas and Nathan J. Dorn

Florida International University

Everglades aquatic fauna driven by hydrologic variables

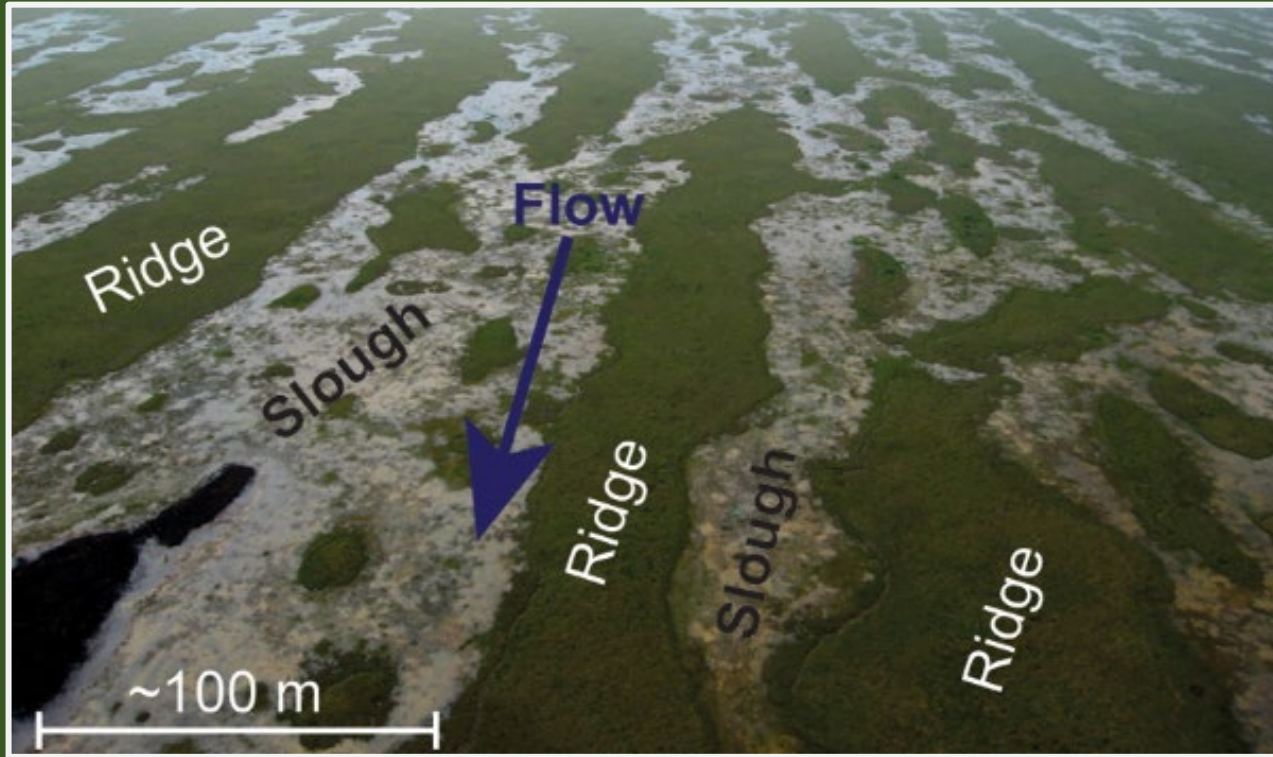


Miller et al., 2018



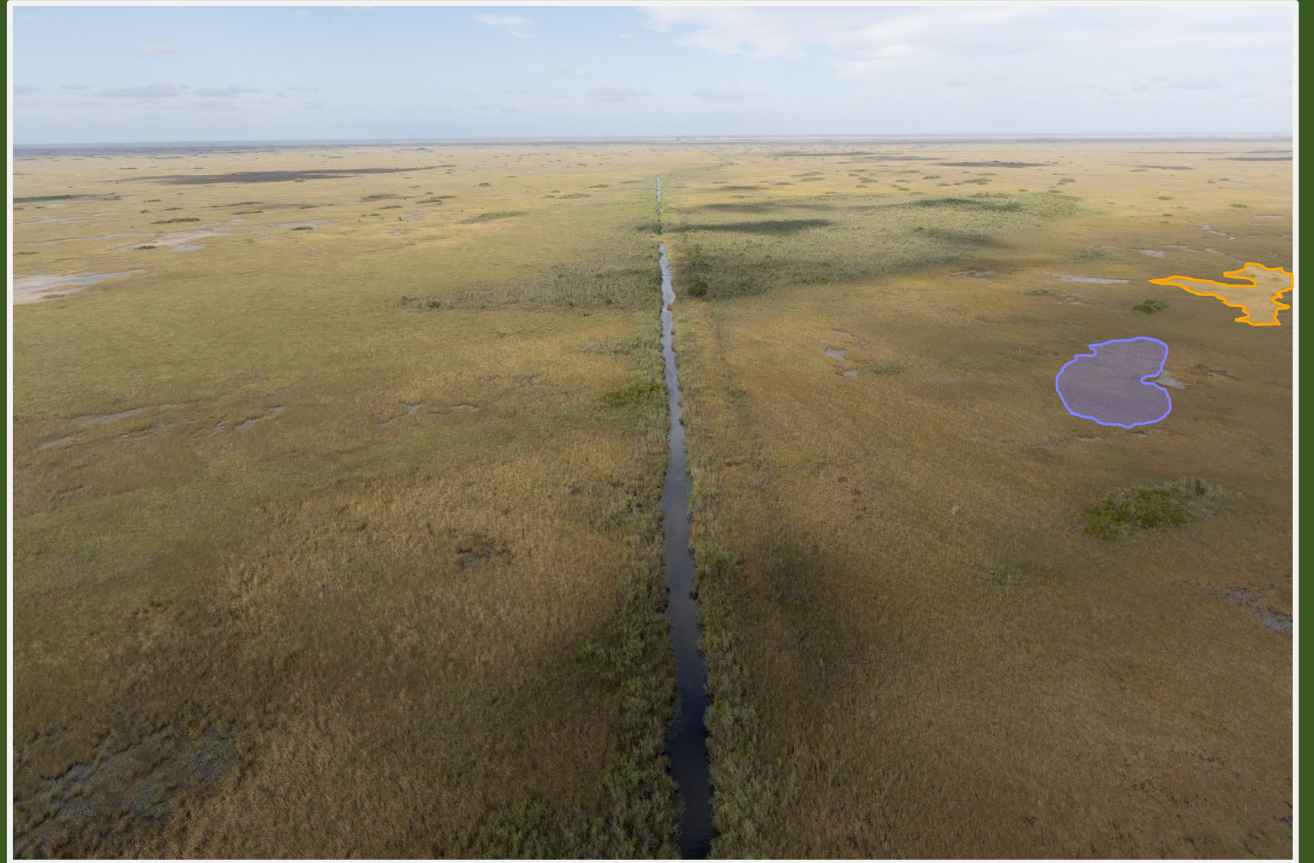
Whatley et al., 2014

Ridge/Slough Degradation

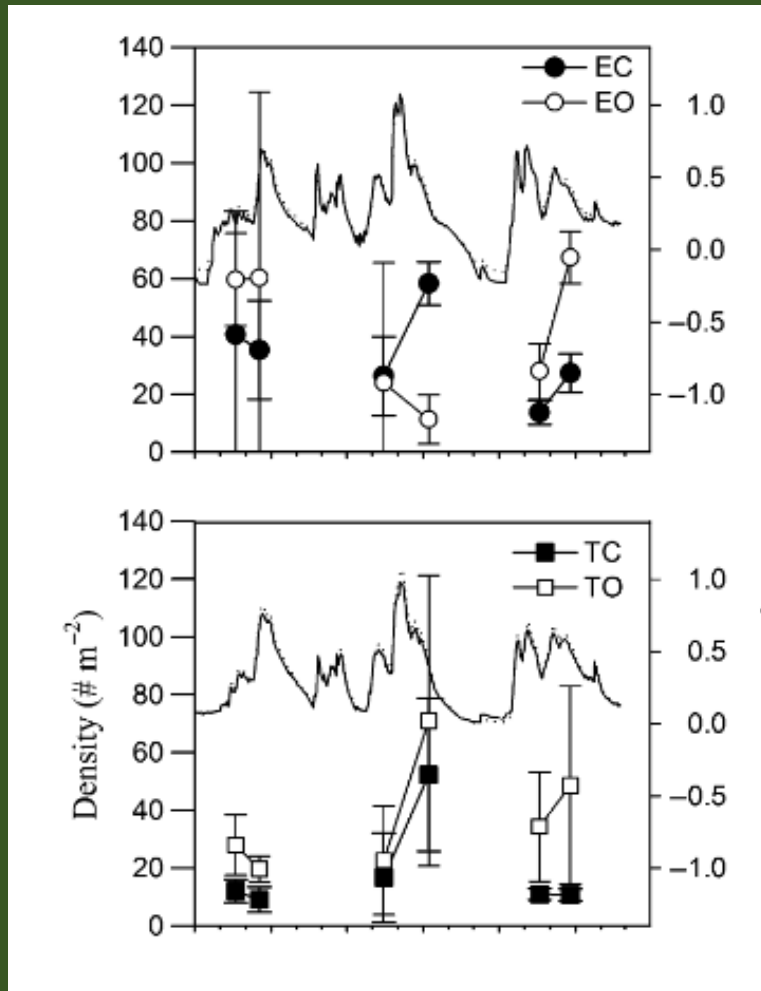


Slough Type Definitions

- **Remnant slough** = remnant of historic slough system, maintained relative historic condition, dominated by spike rushes, only pockets now
- **Encroached slough** = sloughs that have been degraded/choked by sawgrass-part of future “Active Marsh Improvement” sloughs intended to be restored to historic sloughs



Previous study in encroached sloughs



- Conducted in predominantly cattail habitat
- No paired untreated site nearby
- Fish densities greater after treatment (open slough)
- Crayfish densities greater in dense vegetation

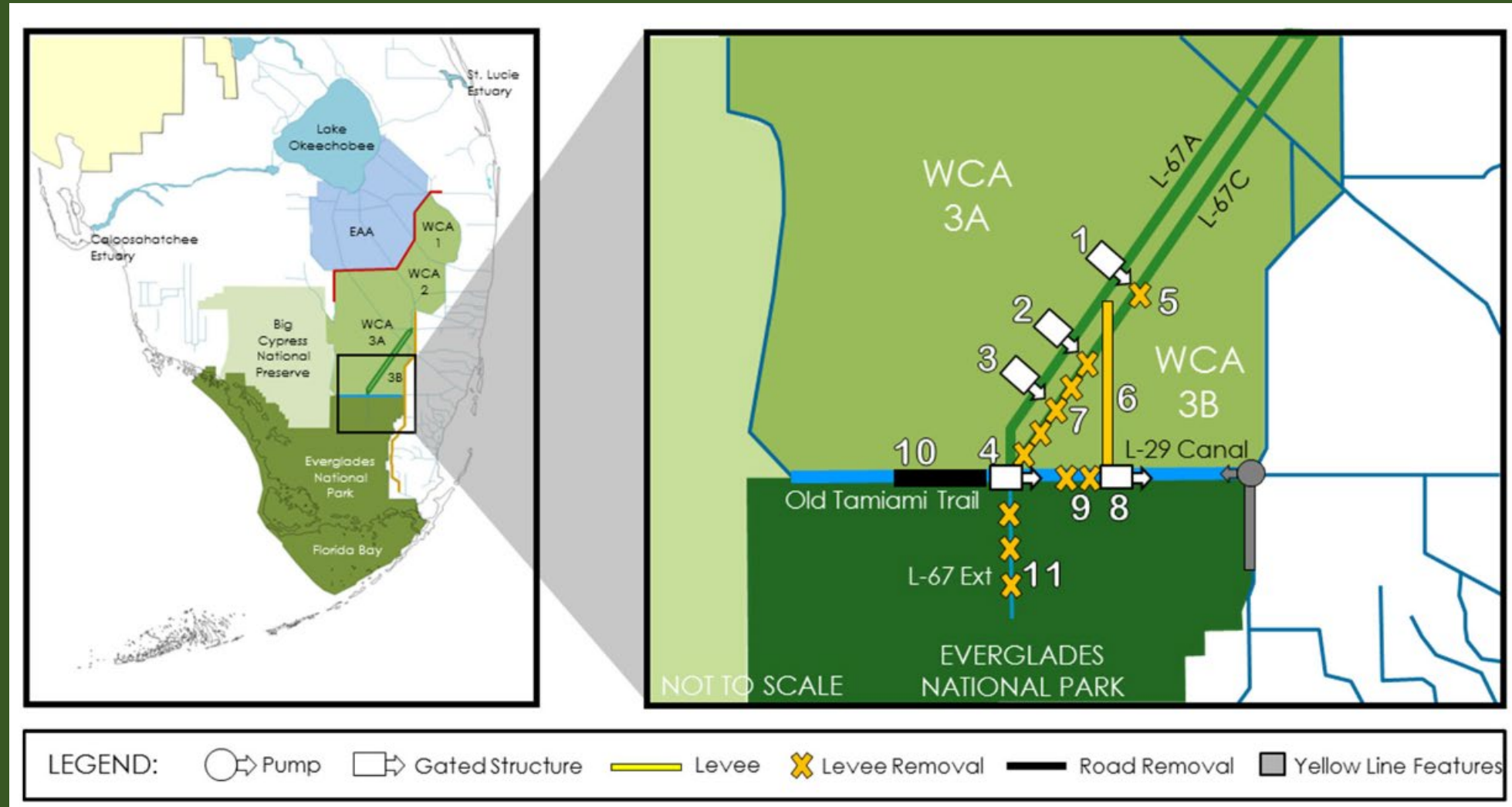
Question

How do the aquatic faunal communities in sawgrass encroached sloughs differ from those in remnant sloughs?

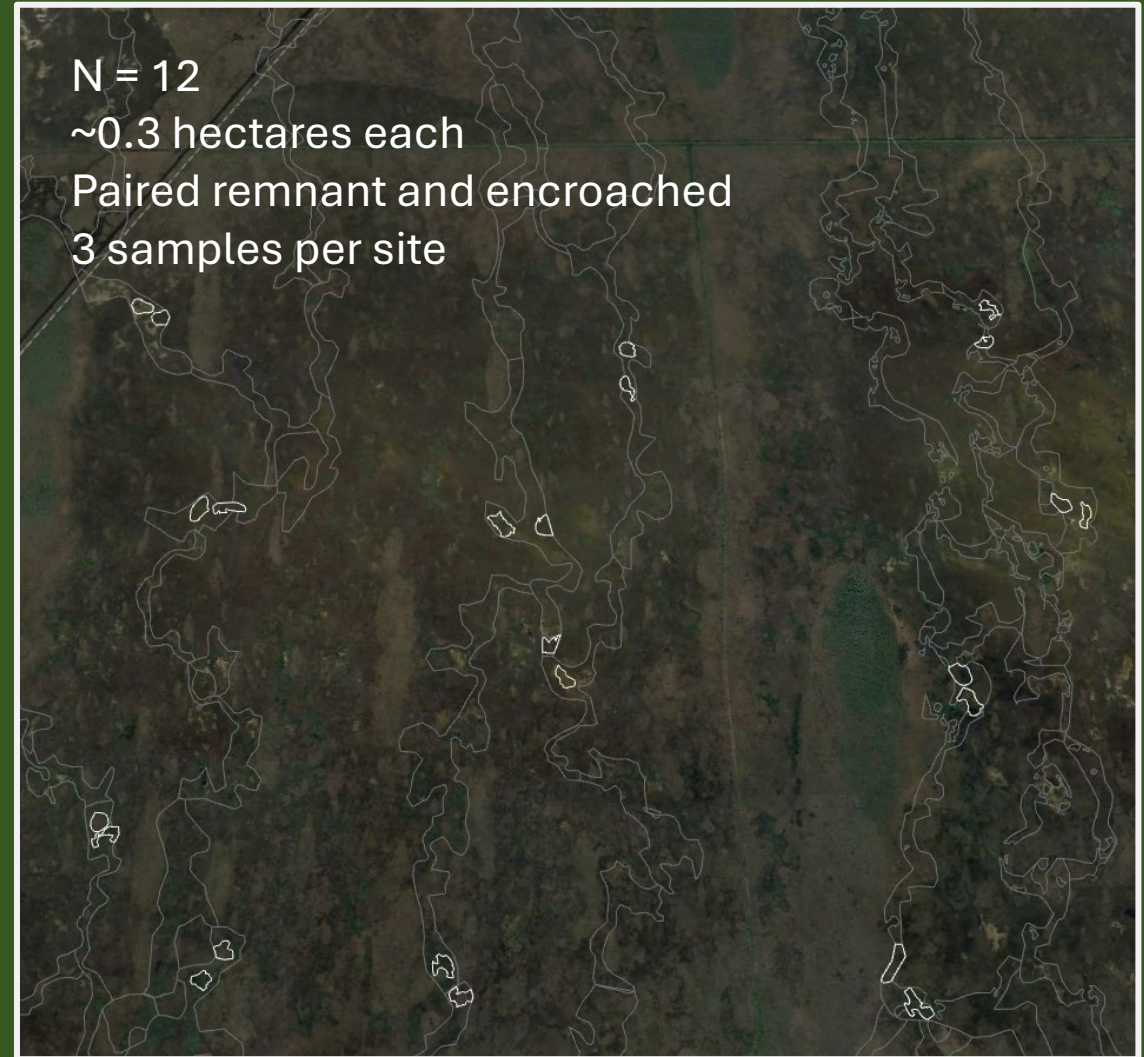
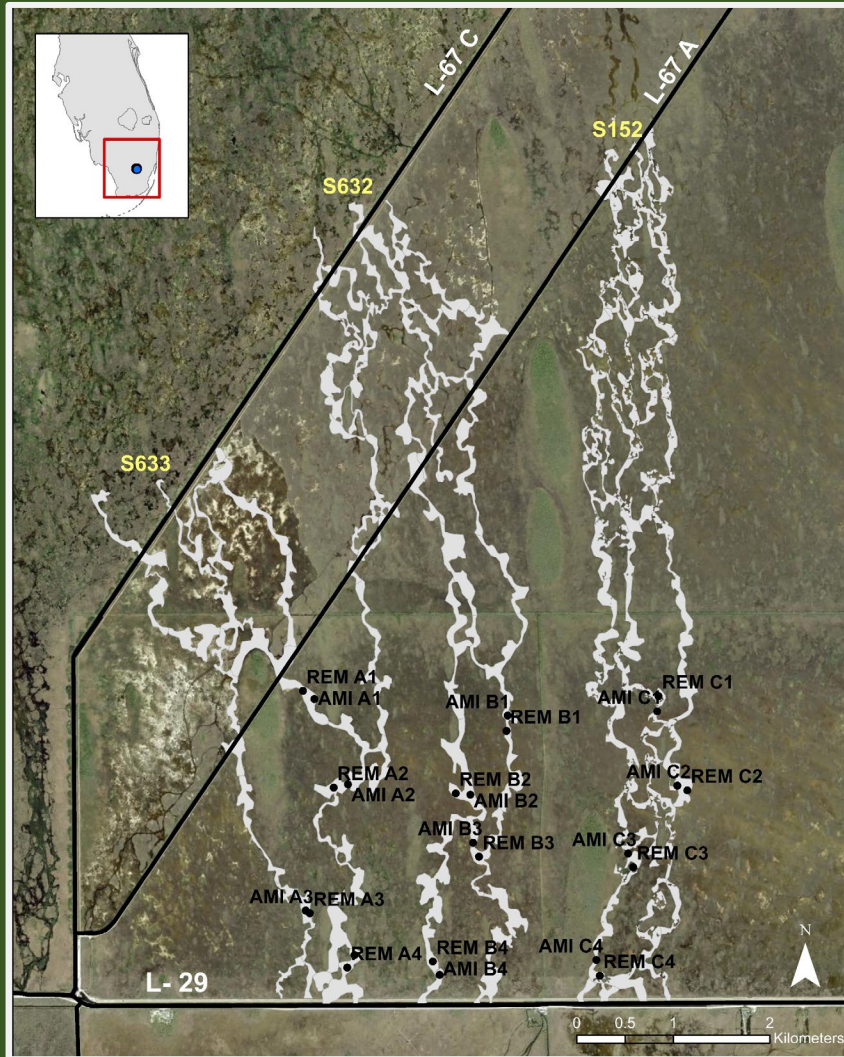
Predictions

- The remnant sloughs will contain higher densities of animals in general and specifically small fish
- There will be significant compositional differences between remnant and encroached sloughs

Central Everglades Planning Project-South (CEPP-S)



Historic Flow-ways and Site Locations



Dataset and Collection



- Throw trapping in remnant sloughs
- Sampled twice annually (one dry one wet season)
- Pull trapping in encroached sloughs
- Method check conducted
 - Corrections applied



Analyses

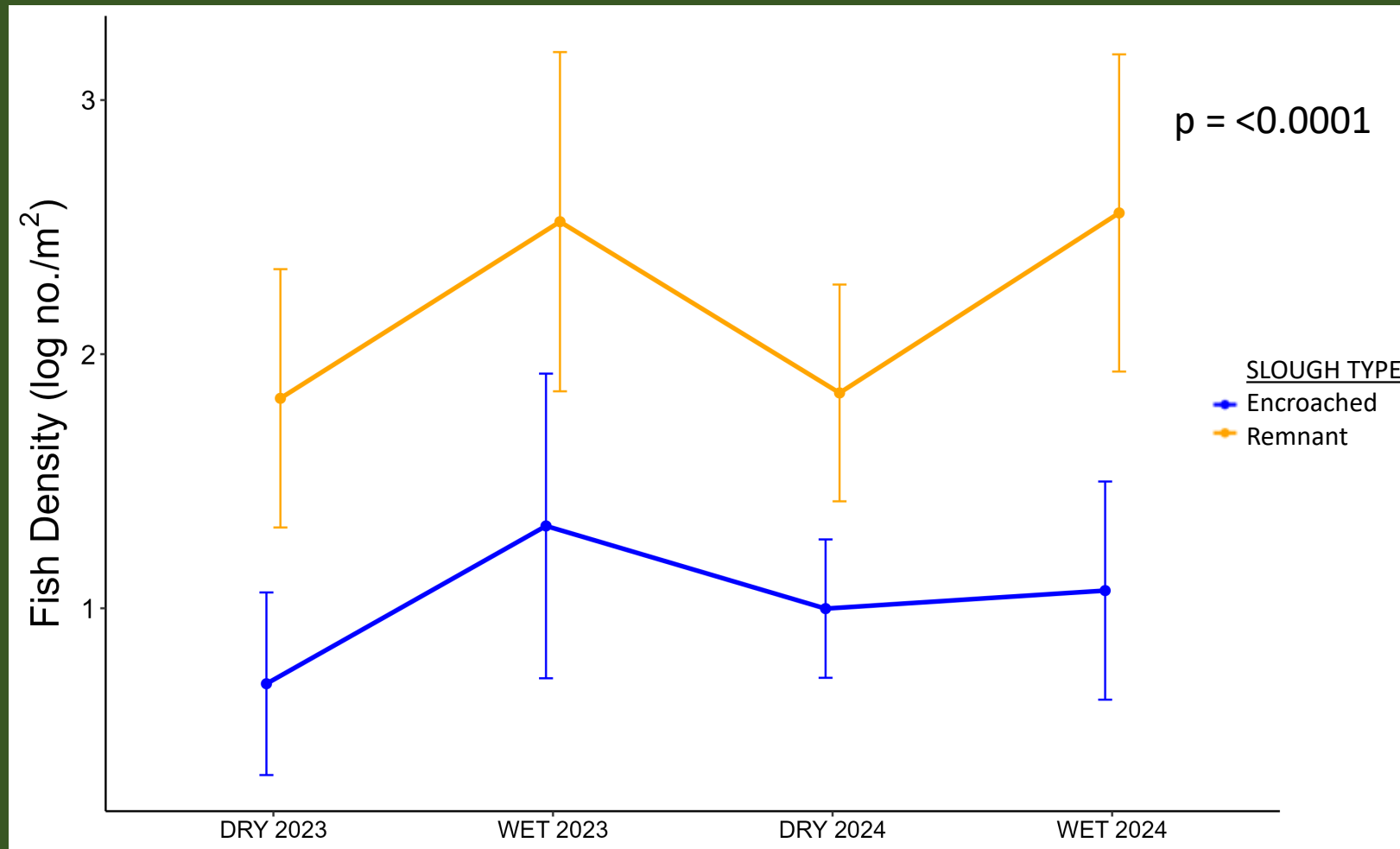
Univariate

- Response variables: Densities (no./m²)
 - Fish
 - Shrimp
 - Crayfish
 - Insects
- Mixed effects model conducted for all response variables in all seasons

Multivariate

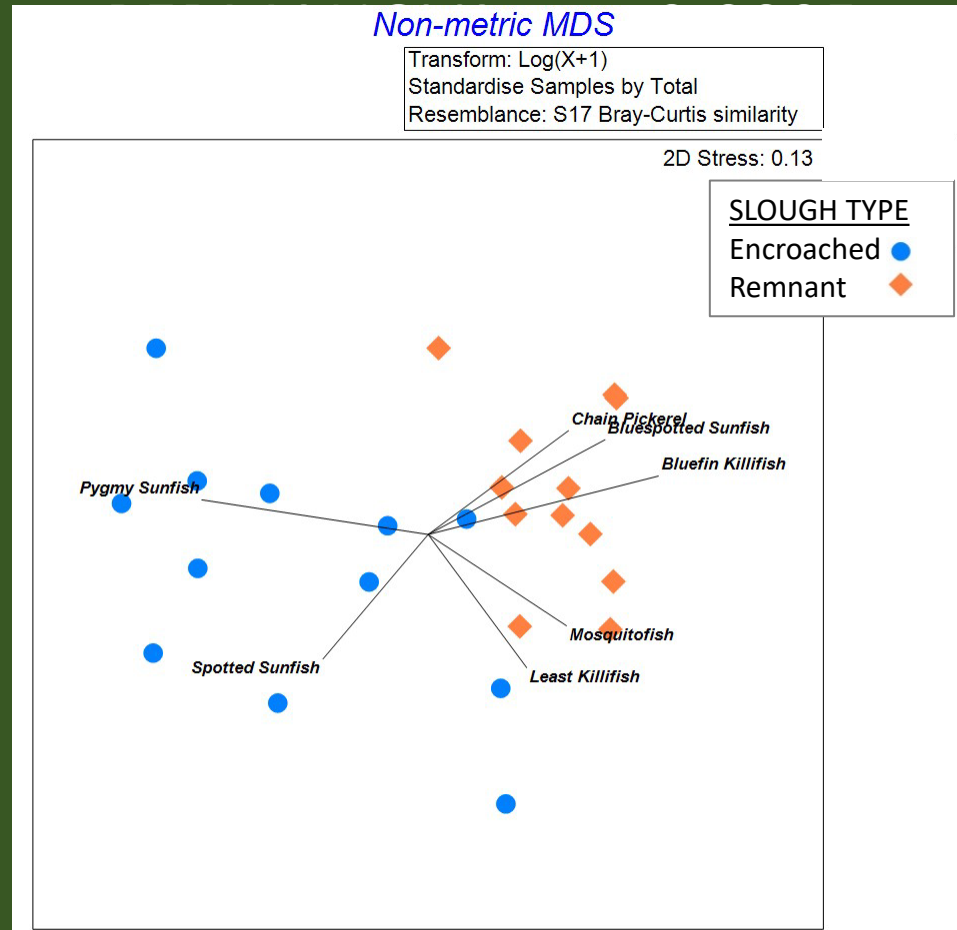
- Community composition of response variables
 - Fish
 - All invertebrates
- PERMANOVA

Greater fish densities in remnant sloughs

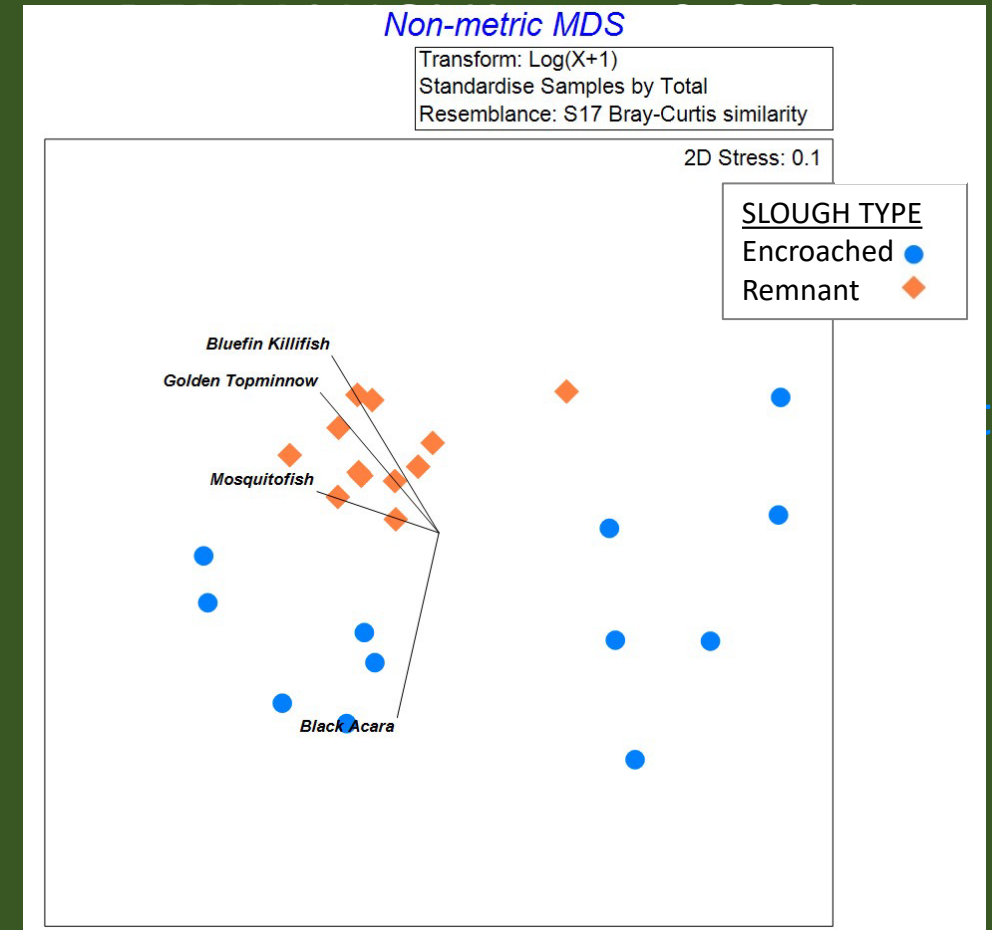


Fish communities differ between slough types

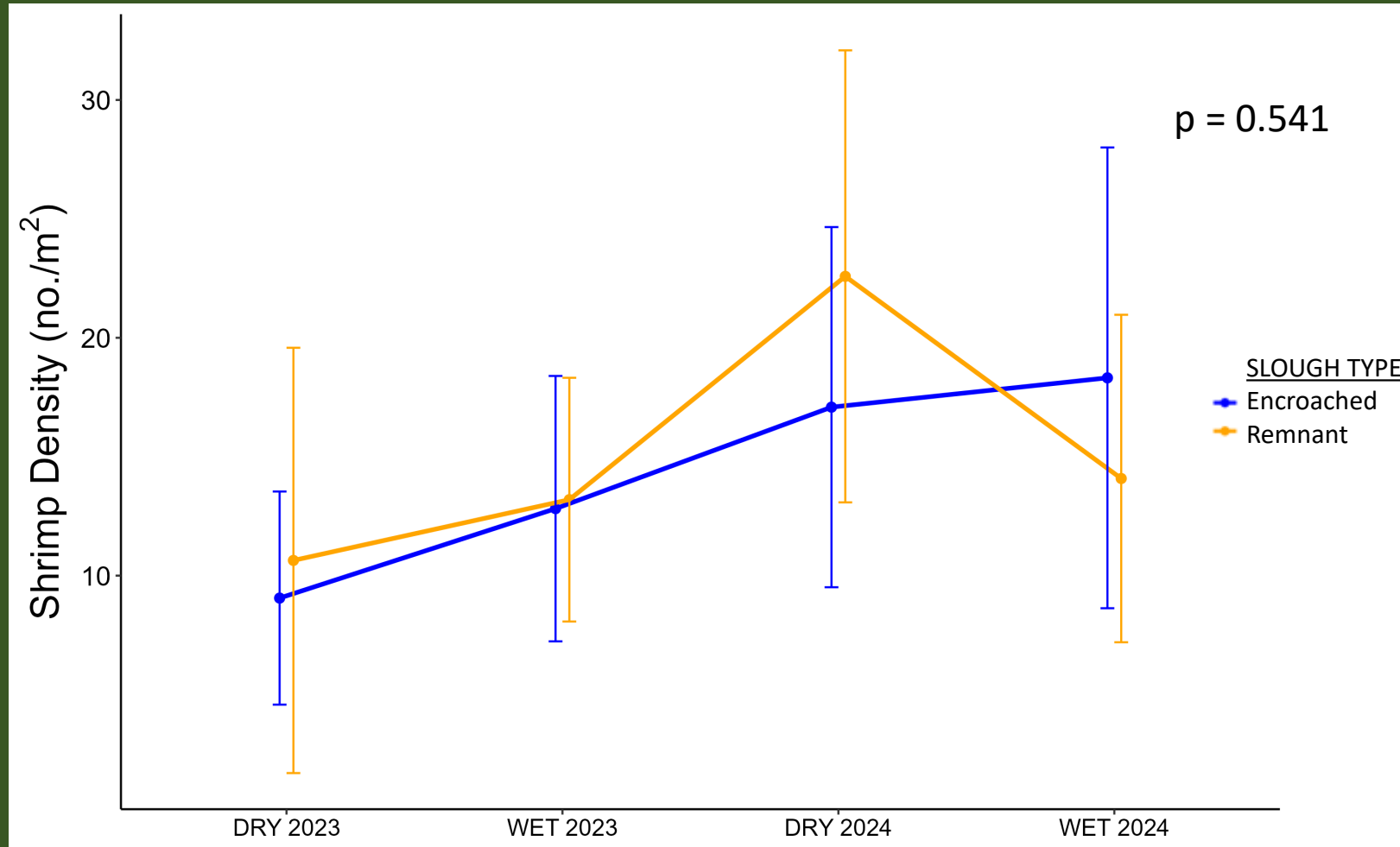
2024 Dry Season



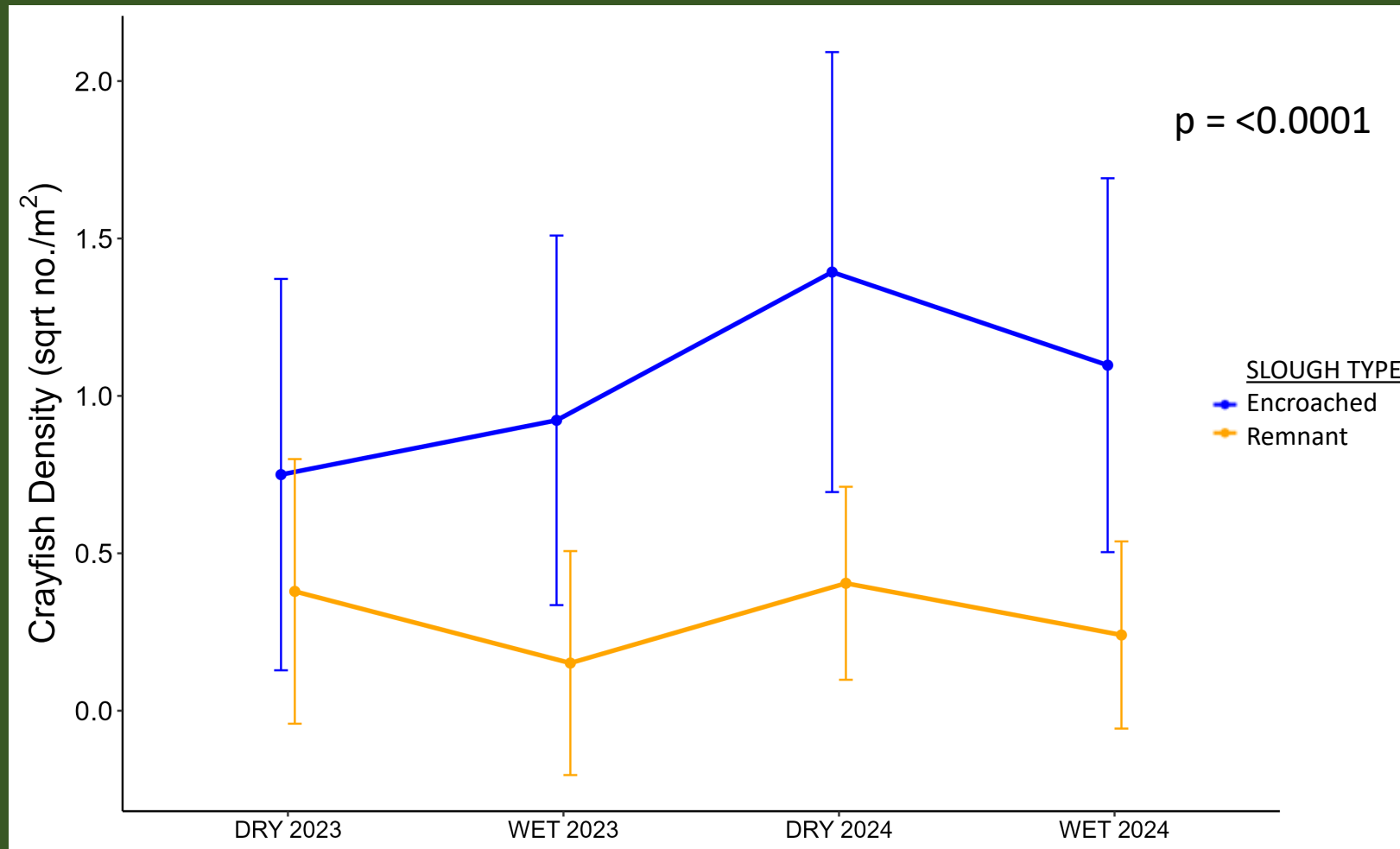
2023 Wet Season



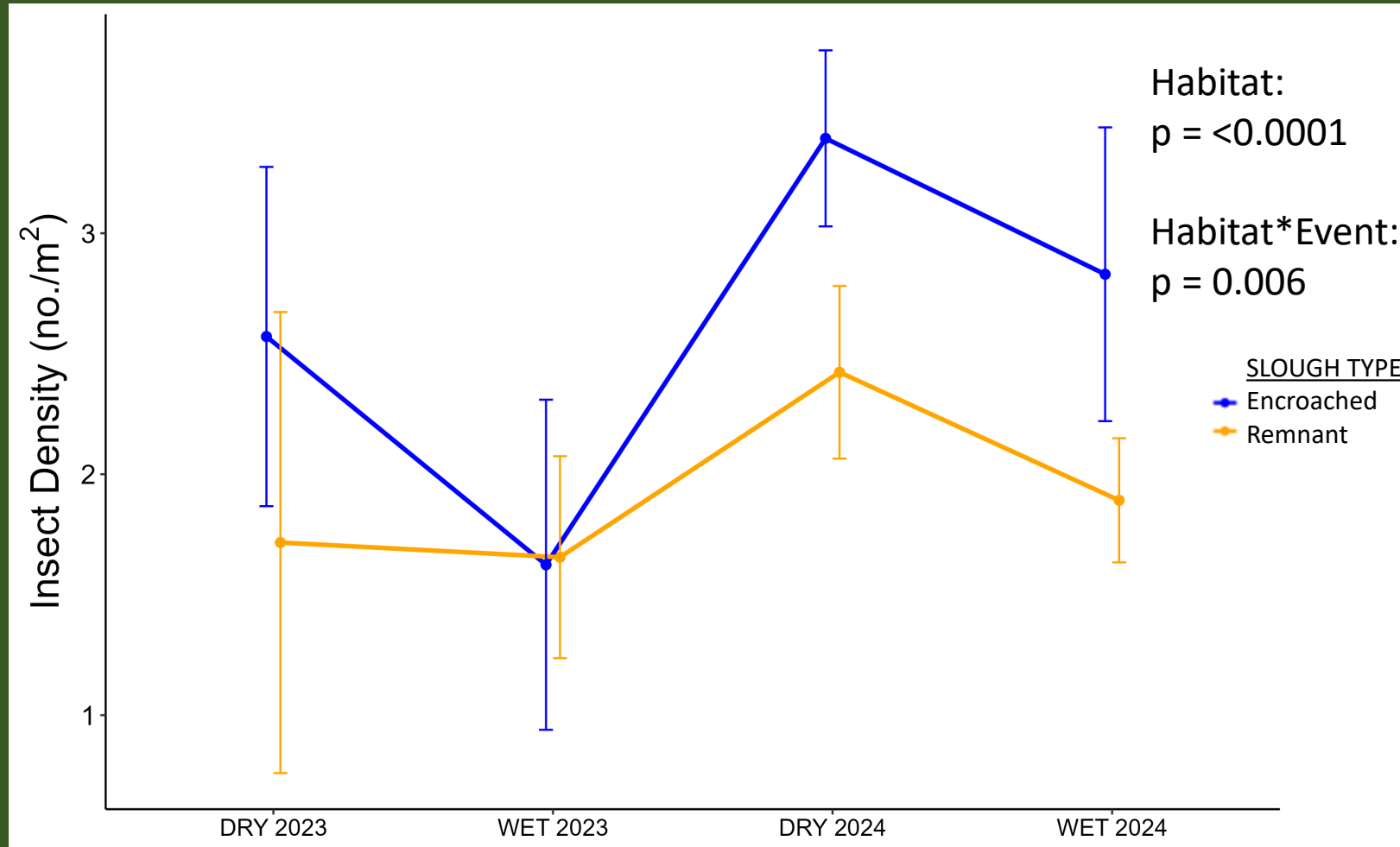
Shrimp densities do not differ between slough types



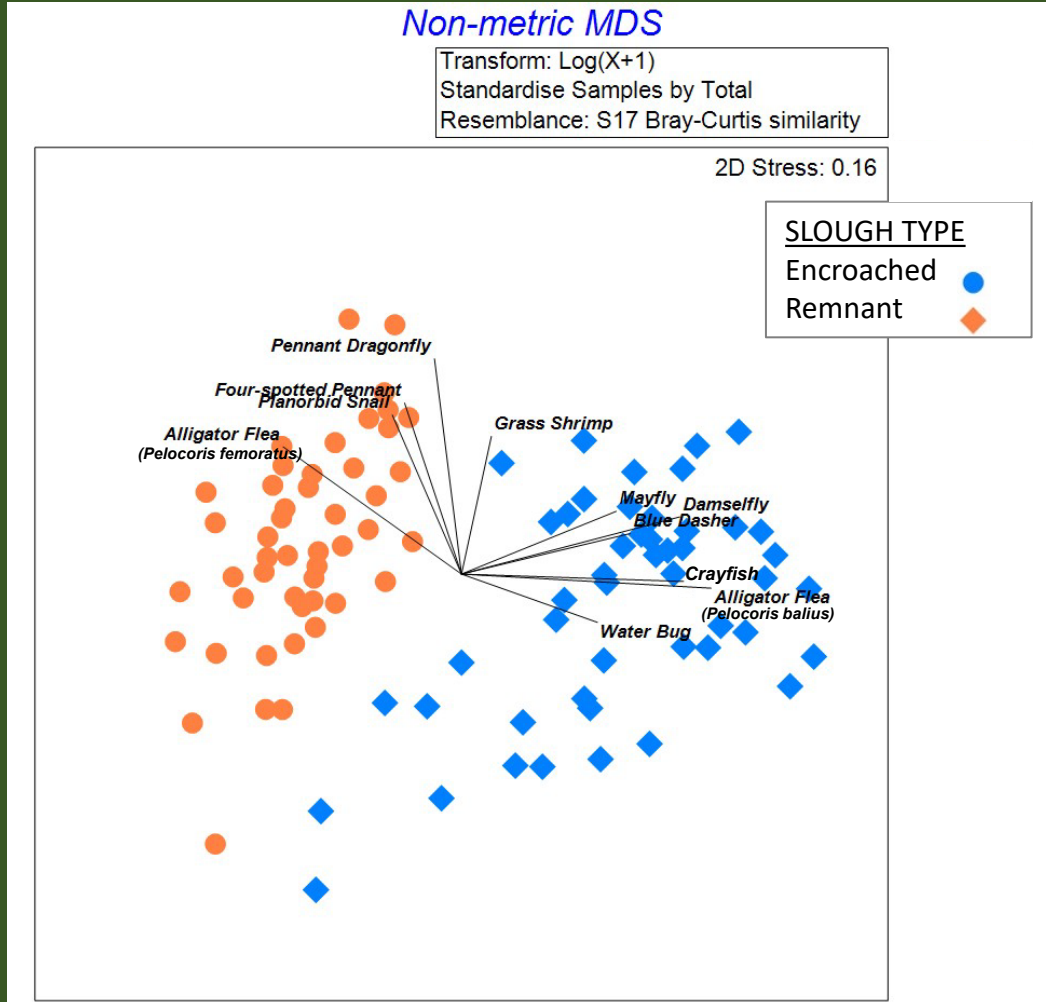
Greater crayfish densities in encroached sloughs



Greater insect densities in encroached sloughs some seasons



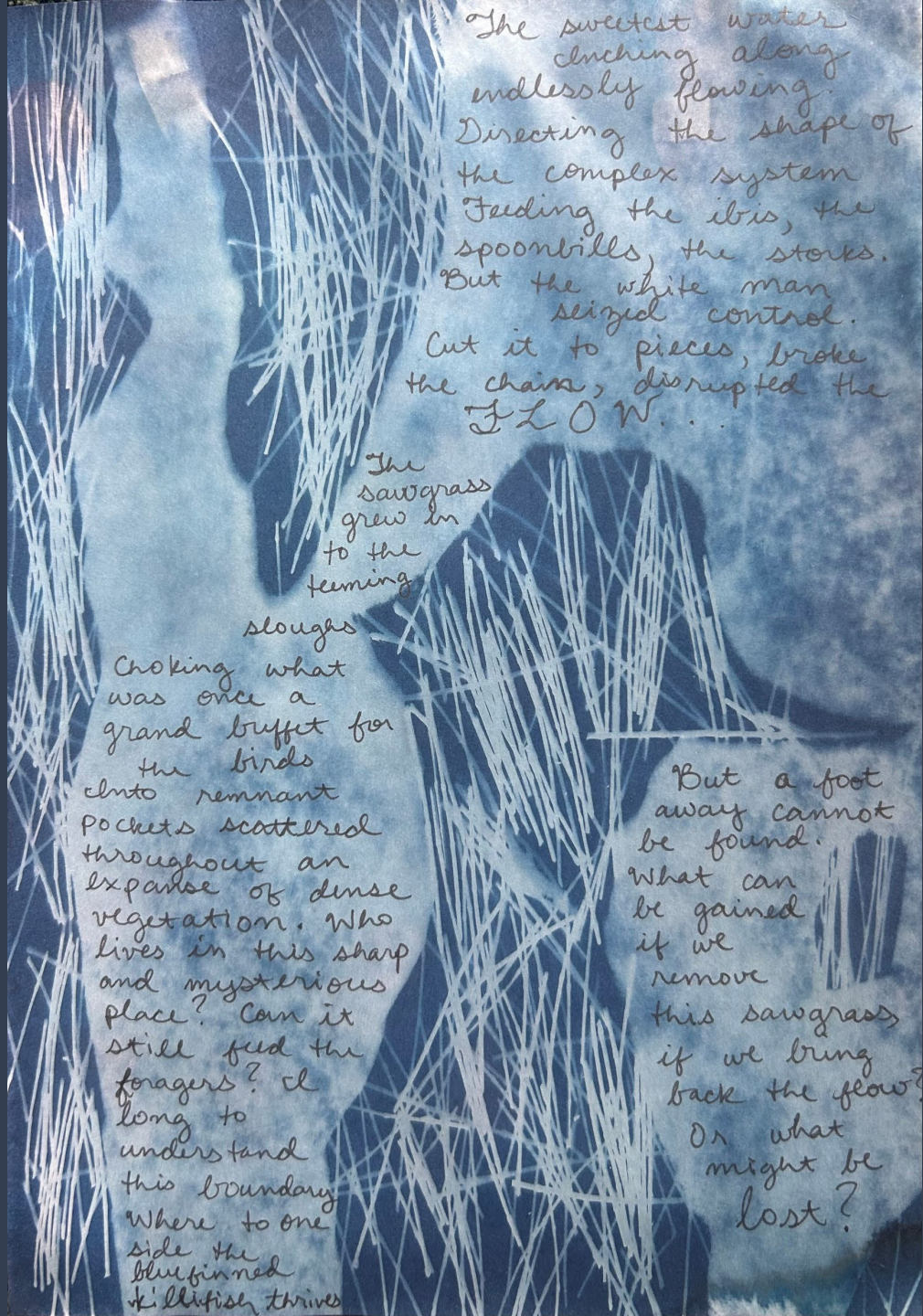
Macroinvert communities differ between slough types



- PERMANOVA: $P = 0.0001$
- Vector correlation > 0.4
- Dissimilarity contributors:
 - Remnant
 - Grass shrimp
 - Pelocoris femoratus*
 - Pennant dragonfly
 - Planorbis snail
 - Encroached
 - Damselfly
 - Pelocoris balius*
 - Crayfish
 - Blue dasher dragonfly

Conclusions

- Remnant sloughs do contain higher densities of animals in general, and especially small fish
- There are faunal community compositional differences between slough types
- Indicates CEPP-S flow-way restoration may increase fish densities
- Next steps:
 - In process of biomass analysis to more directly address wading bird prey differences
 - Post-spray community analysis



Questions?

Acknowledgements

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Lab Technicians & Students



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