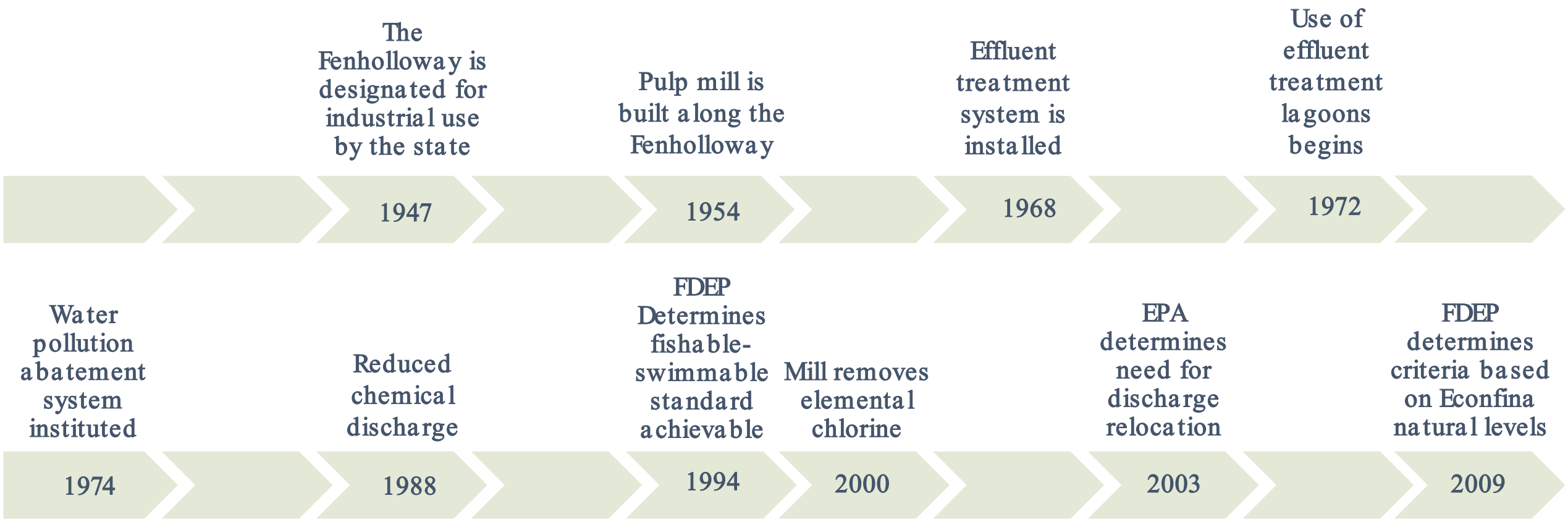
MEIOFAUNA & FUTURE RESEARCH IN THE FENHOLLOWAY COASTAL AREA

Katherine Henning and Dr. Ingels

2022 Robert and Mary Frappier Undergraduate Research Award

TIMELINE


The Fenholloway is designated for industrial use by the state
1947
Pulp mill is built along the Fenholloway
1954
Effluent treatment system is installed
1968
Use of effluent treatment lagoons begins
1972
Water pollution abatement system instituted
1974
Reduced chemical discharge
1988
FDEP Determines fishable-swimmable standard achievable
1994
Mill removes elemental chlorine
2000
EPA determines need for discharge relocation
2003
FDEP determines criteria based on Econfina natural levels
2009

TIMELINE

2010	2013		2014		2015	2019	2020	2021	2022
EPA sets restrictions on N and P values	Oxygen delignification system		More improvements to processing		Permit issued to improve effluent	Sediment samples taken by marine lab	Pipeline relocation completed	Sediment samples taken by marine lab	

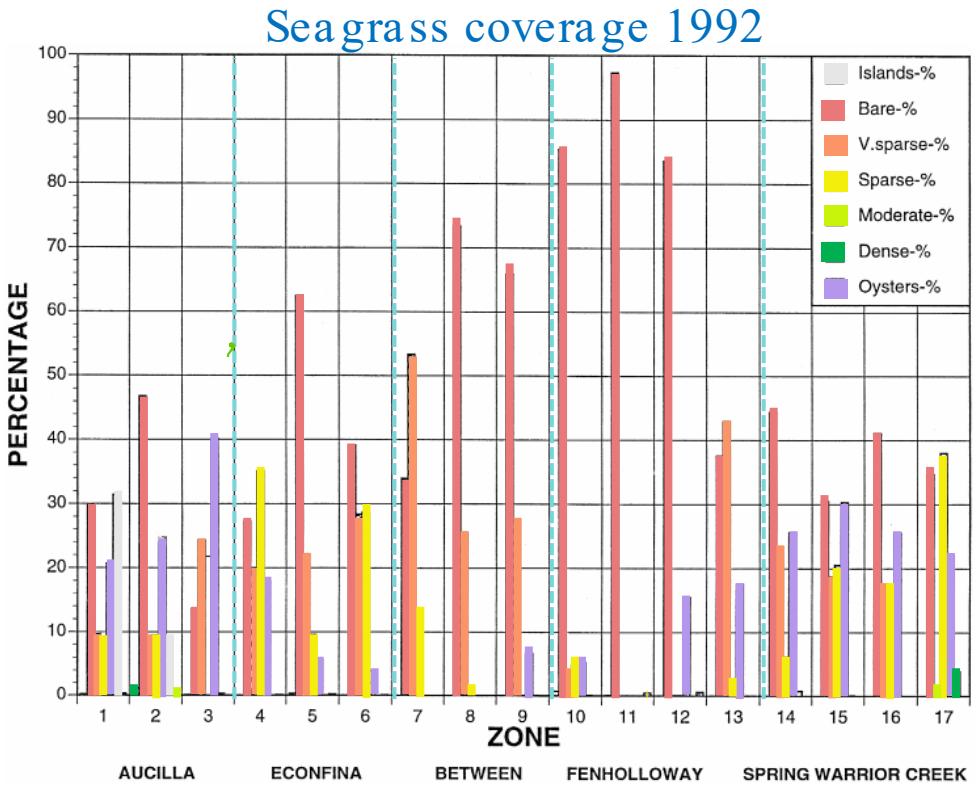
PREVIOUS FINDINGS

BENTHIC INVERTEBRATES

- The Econfina river had more than twice as many benthic invertebrates as the Fenholloway.
- Effluent from the cellulose mill was found to negatively impact community structure.

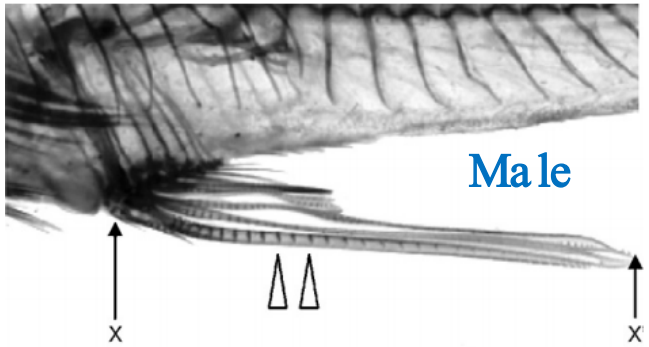
SEAGRASS

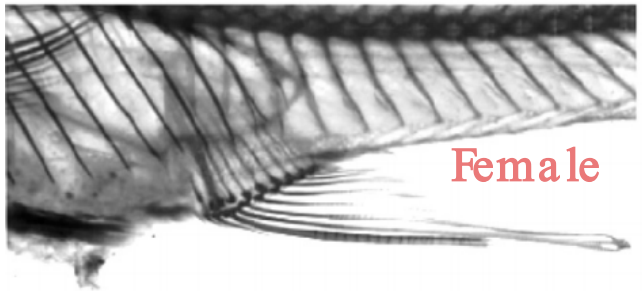
- Release of effluent into the Fenholloway increases color loading, turbidity, dissolved carbon, and nutrients.
- Even at low concentrations, Effluent is harmful to seagrass growth.



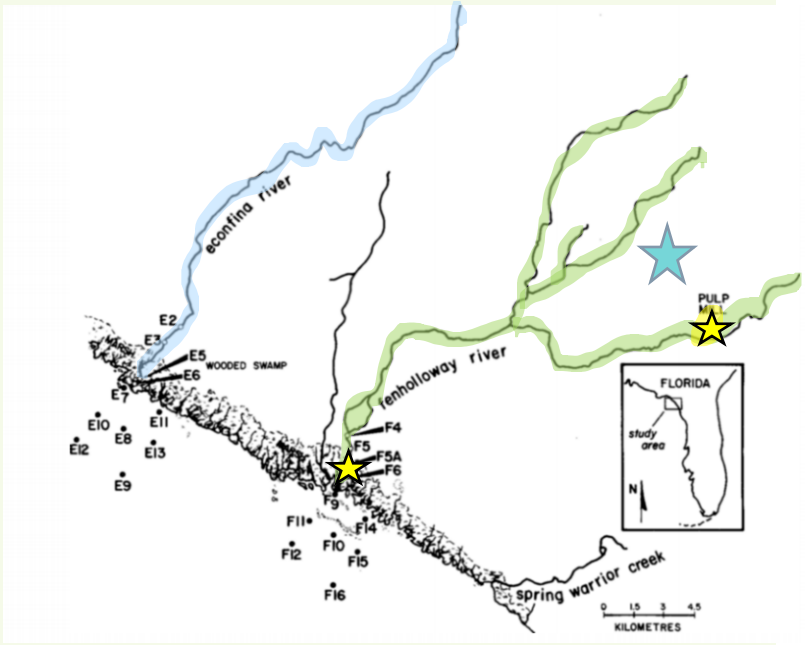
MOSQUITO FISH

- Female mosquitofish in the Fenholloway are found to have masculinized tail fin structures.
- Mosquitofish in the Fenholloway are smaller and have fewer embryos.

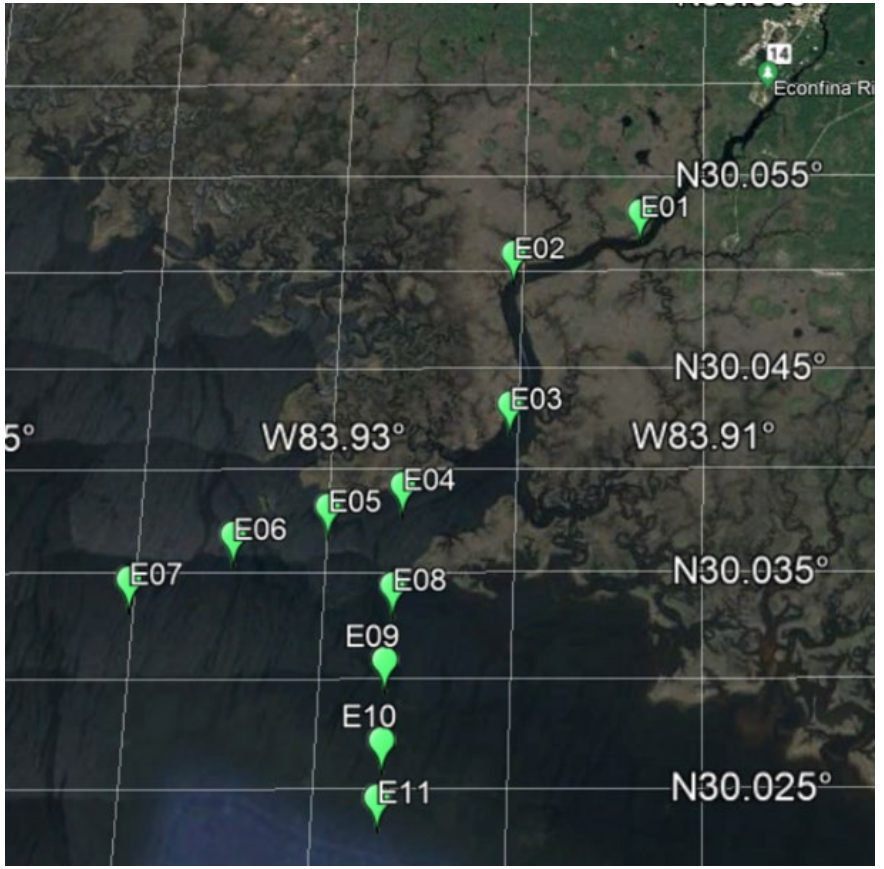




OUR STUDY AREA



The Fenholloway River

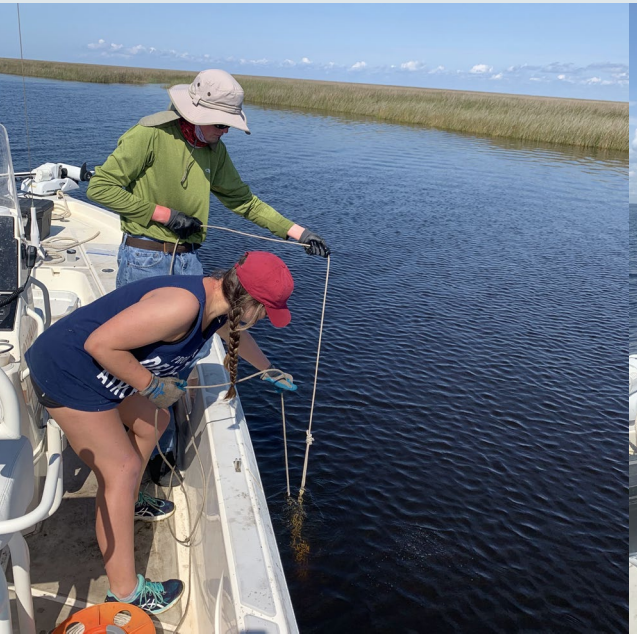


The Econfina River

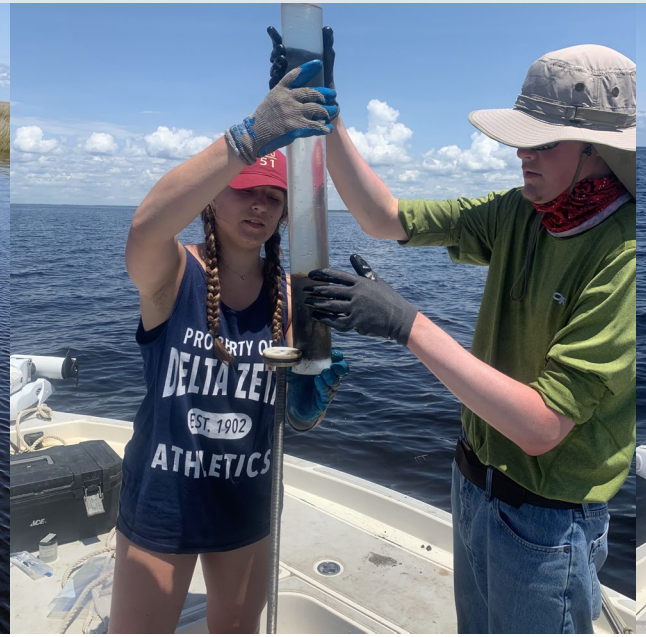
OBJECTIVES

- Sediment samples were taken from the Fenholloway River, and the “Control” Econfina river.
- These samples were taken in 2019 (only Fenholloway), 2021, and 2022 with a handheld percussion corer.
- Environmental measurements were also taken, including sediment samples for sediment parameters, and using a YSI to gather data on dissolved oxygen, temperature, and salinity.
- Ecological indicators already used:
  - Nematode and copepod abundance and biomass
- Ecological indicators that will be used:
  - Nematode taxonomic identification
  - Taxonomic and functional diversity metrics of meiofauna-sized infaunal communities.

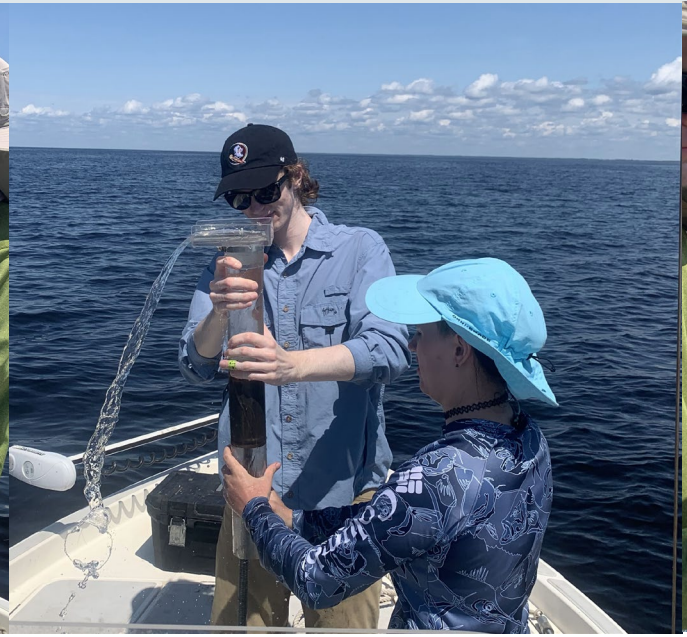
OUR METHODS



CORE EXTRACTION



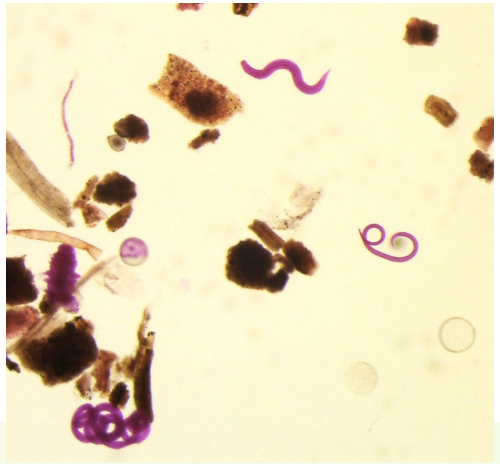
MOVEMENT ONTO EXTRUDER



EXCESS WATER REMOVAL

SAMPLE SLICING & STORAGE

NEMATODES AND COPEPODS



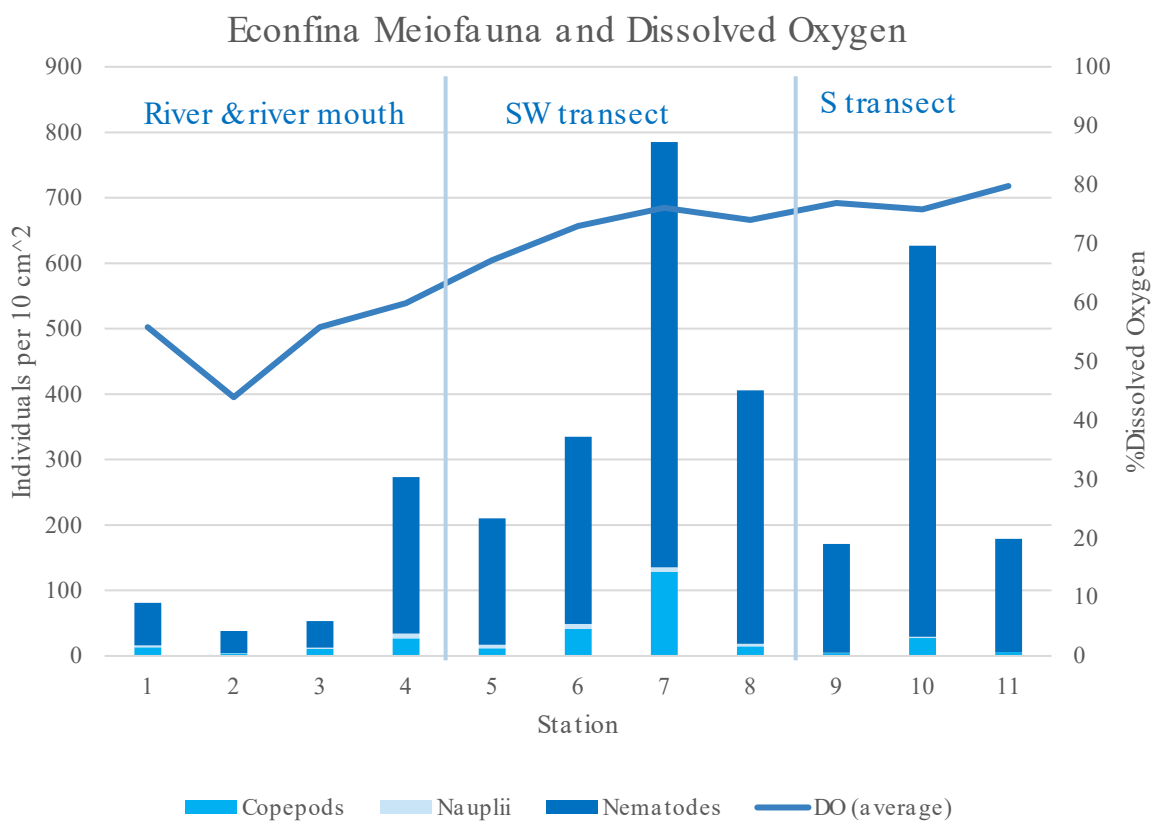
NEMATODES

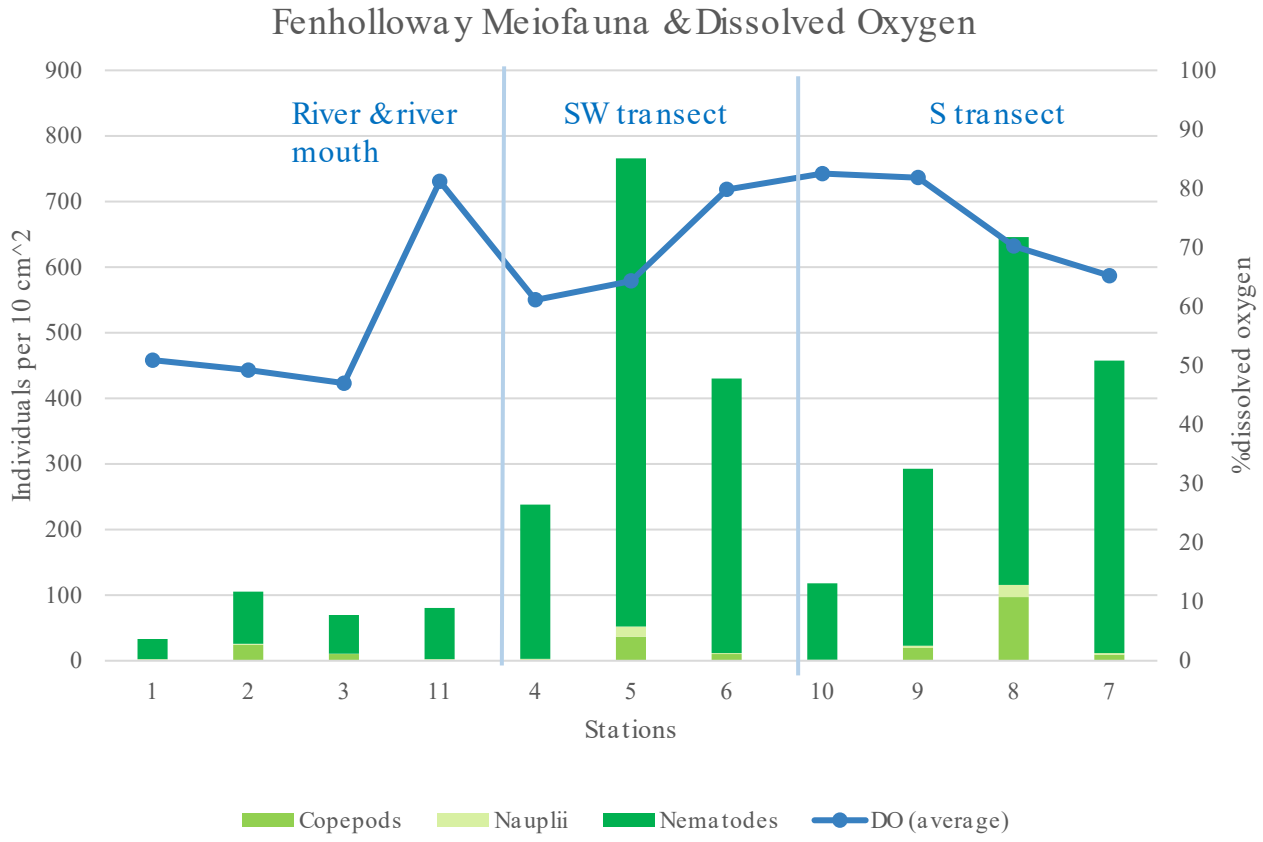
NEMATODE

COPEPODS

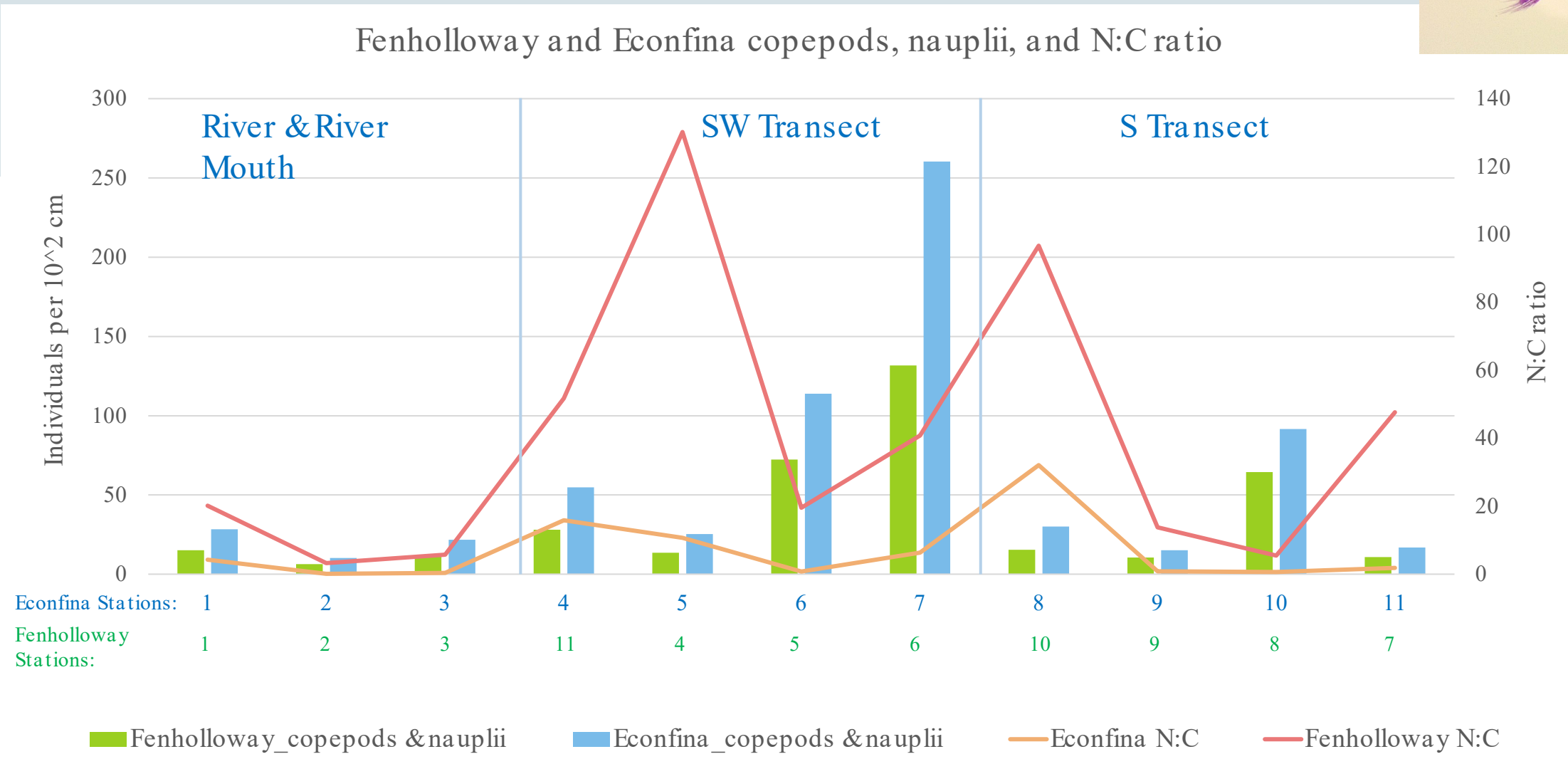
COPEPOD

2021 ABUNDANCE
Measuring the amount of animals in an area

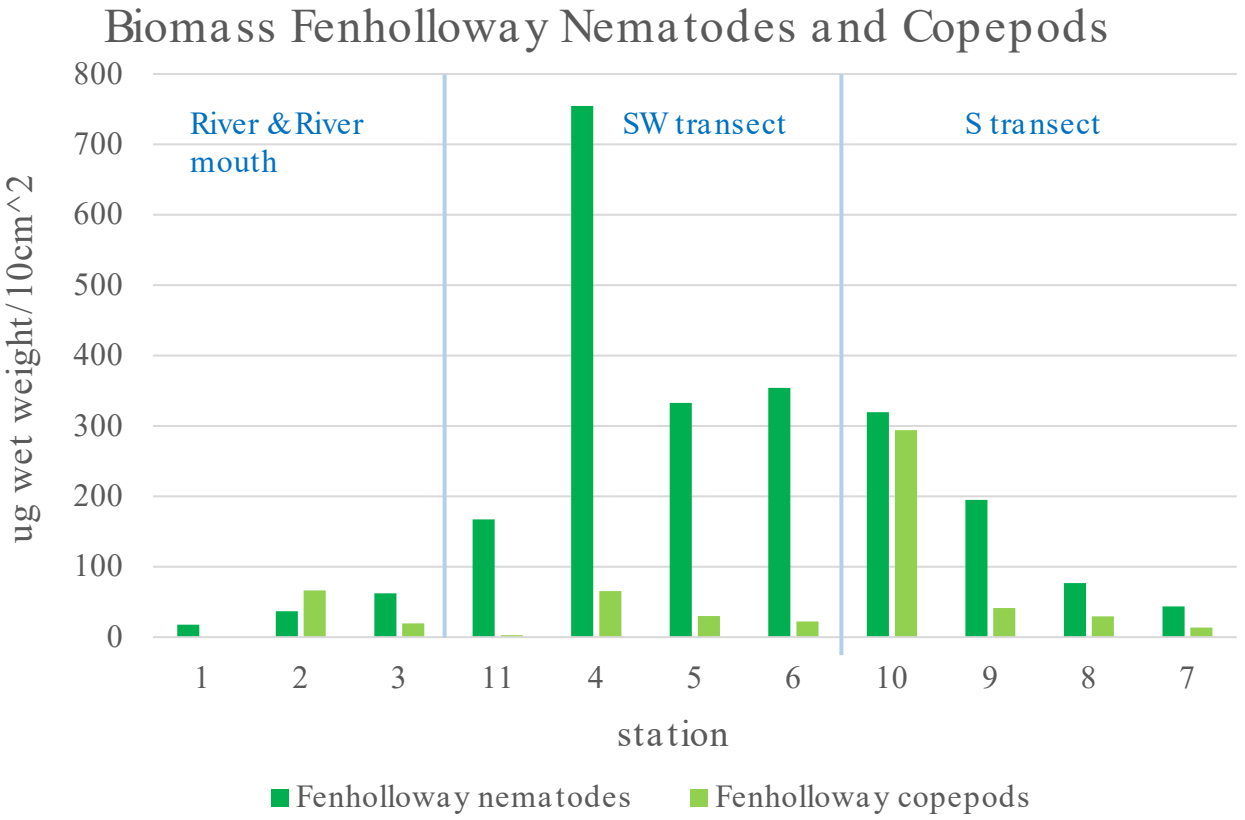


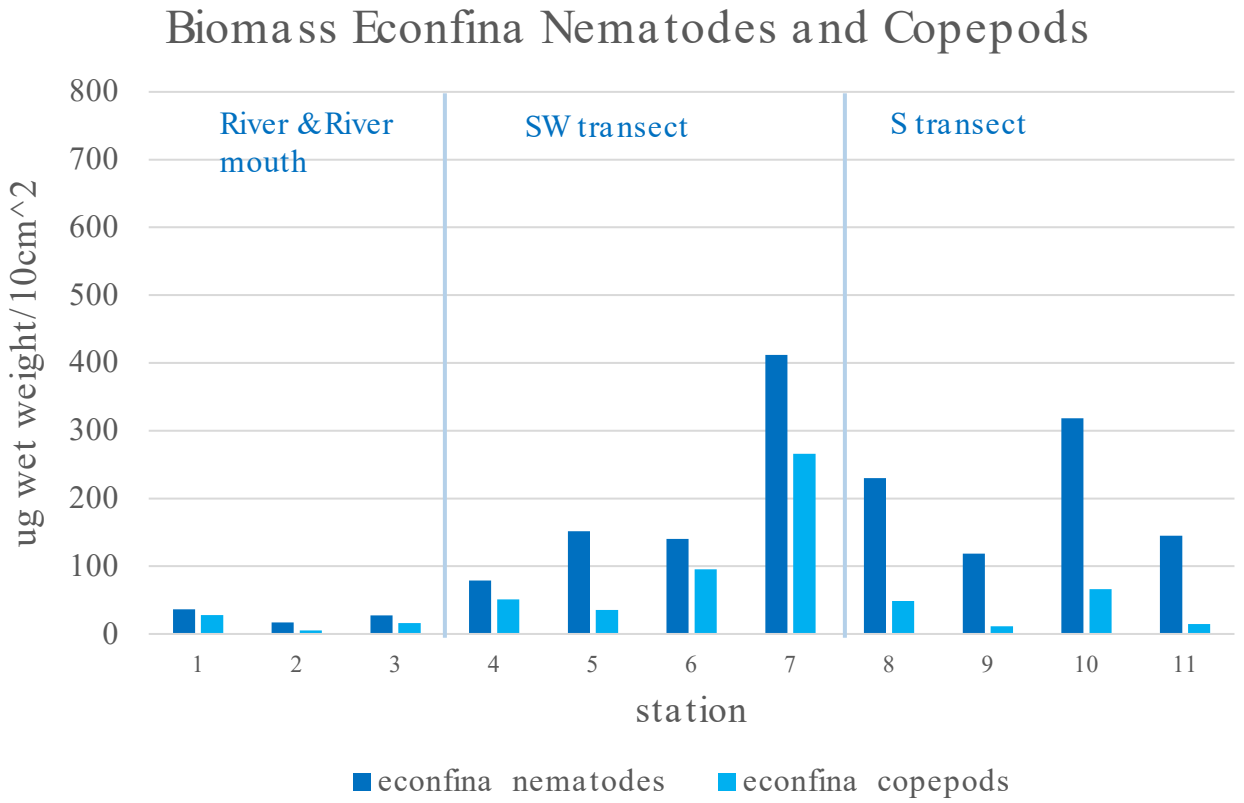


2021 ABUNDANCE

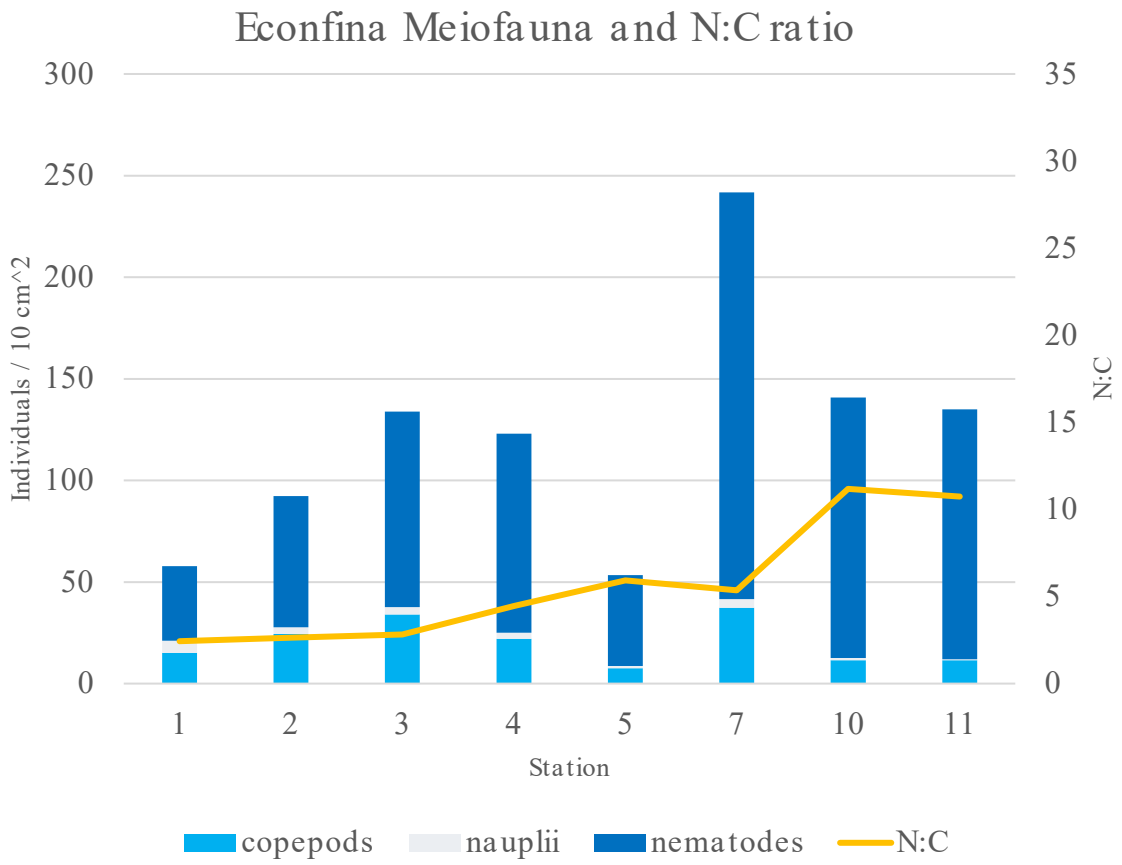


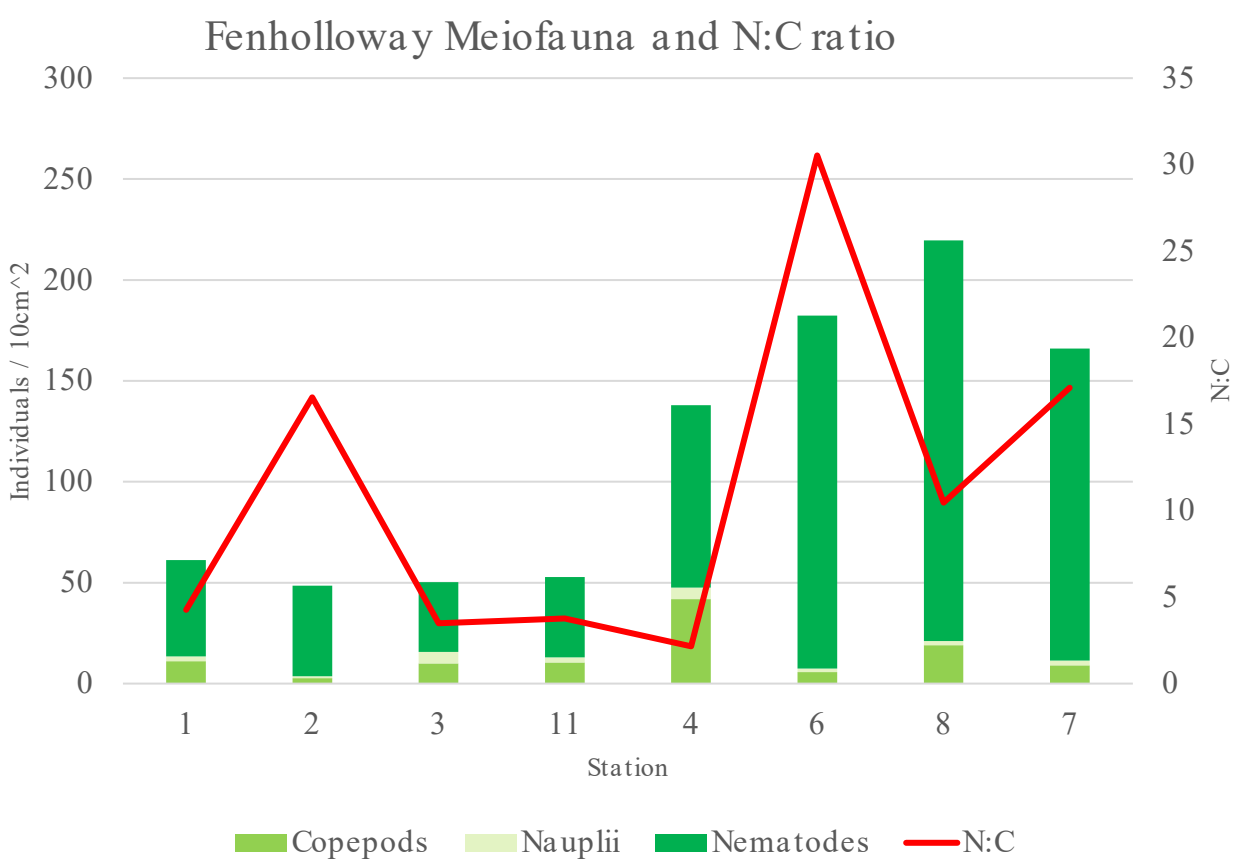
2021 BIOMASS





2022 ABUNDANCE





COMMUNITY OUTREACH EVENTS
HELD IN TAYLOR COUNTY AND WAKULLA COUNTY PUBLIC LIBRARIES

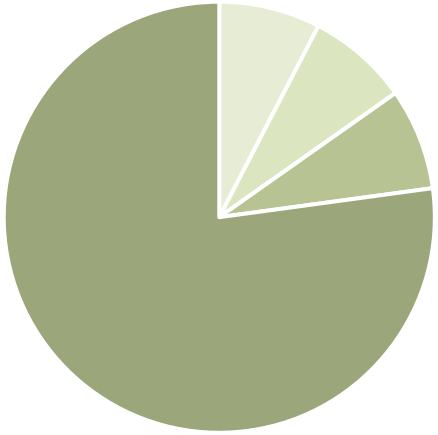
OBJECTIVES

- Make scientific research more accessible to the public
- Present our research in an easily understood way
- Open the floor for discussion and questions
- Gauge the effectiveness of community outreach events by handing out pre and post surveys

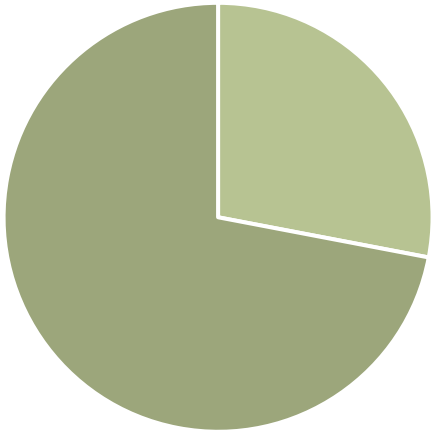
COMMUNITY OUTREACH EVENTS

SURVEY RESULTS

Pre-Survey: Do you think that microscopic organisms are important to the environment?



Post-Survey: Do you think that microscopic organisms are important to the environment?



not at all somewhat nuetral yes absolutely not at all somewhat nuetral yes absolutely

POST SURVEY QUESTIONS

100%of participants said they learned something new

64%of participants said that the presentation made them think differently

96%said they would attend a similar event in the future

WHAT NEXT?

PIPELINE RELOCATION

- Recovery of meiofauna communities could take years or decades
- Unclear what the effects of pipeline relocation may have on river and estuary communities, whether these be positive or negative

FUTURE WORK

- picking, counting, and measuring of meiofauna from 2019 & 2022 sampling
- Calculation of biomass from 2022 sampling
- Identification of nematodes from 2021 and 2022 samples

OTHER RESEARCH (PENDING)

- Foraminifera analyses: Prof. Michael Martinez, FAMU
- Hydrodynamic Modelling: Dr. Steven Morey, FAMU

ACKNOWLEDGEMENTS

SPECIAL THANKS TO:

- The IDEA Grant program, and specifically the Frappier family
- Dr. Jeroen Ingels, Chenoah Dubree, Aaron Riddall, and all other members of the meiolab
- Dr. Tyler McCreary for providing assistance when planning the outreach events
- The staff of the Taylor and Wakulla County public libraries
- My family and friends

SOURCES

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