Using benthic invertebrates as indicators of water quality in the Indian River Lagoon

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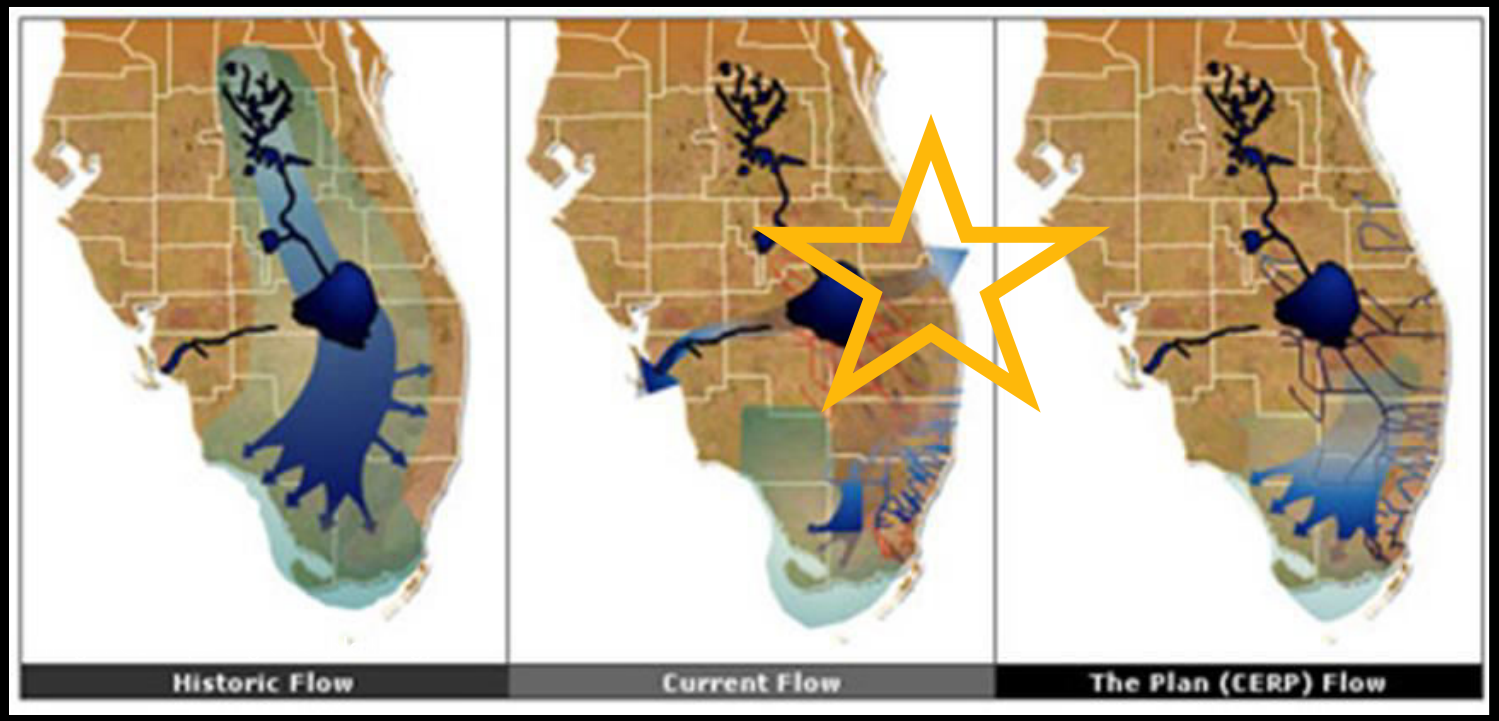
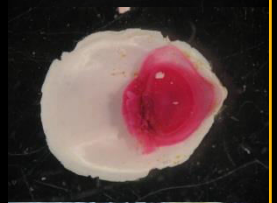
CERP



How will changing water flow patterns affect the natural communities of the St. Lucie Estuary?

Why benthic invertebrates?

- Sessile / Limited mobility
  - Useful when detecting changes
- Link primary producers and higher level consumers
- Diverse life styles / feeding habits
- Presence / absence of indicator species



What can individual species tell us?

Amphipod: *Monocorophium sp.*

Cumacean: *Oxyurostylis smithi*

These crustaceans tell us that the sediment is sandy as opposed to muddy.

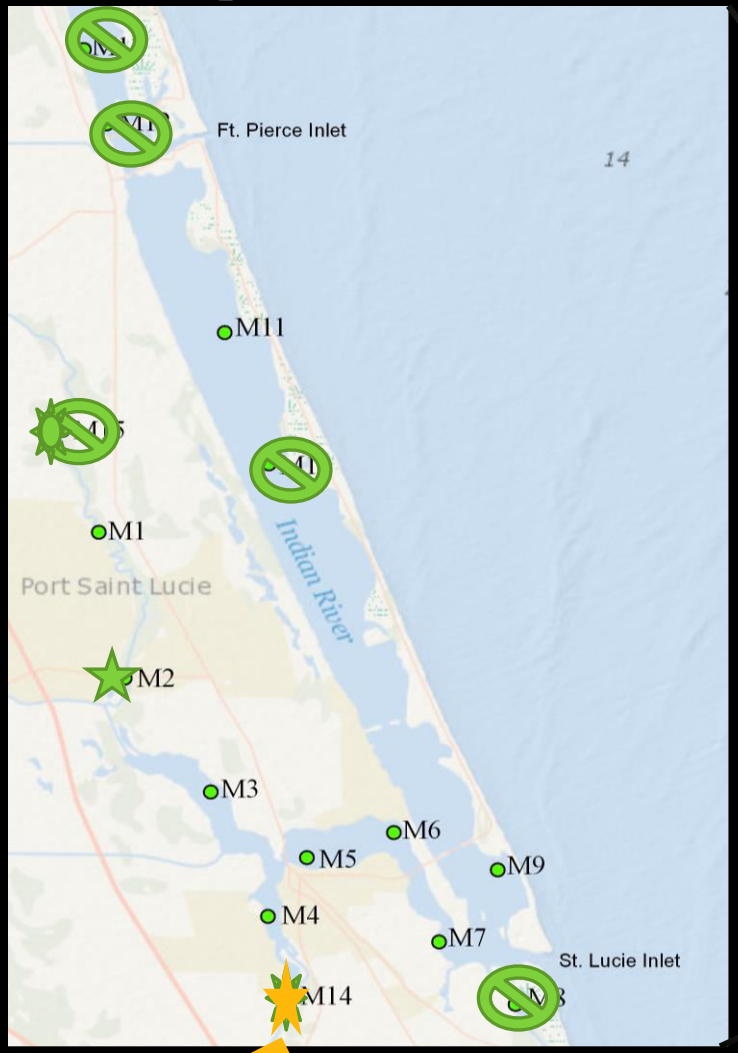
What can individual species tell us?

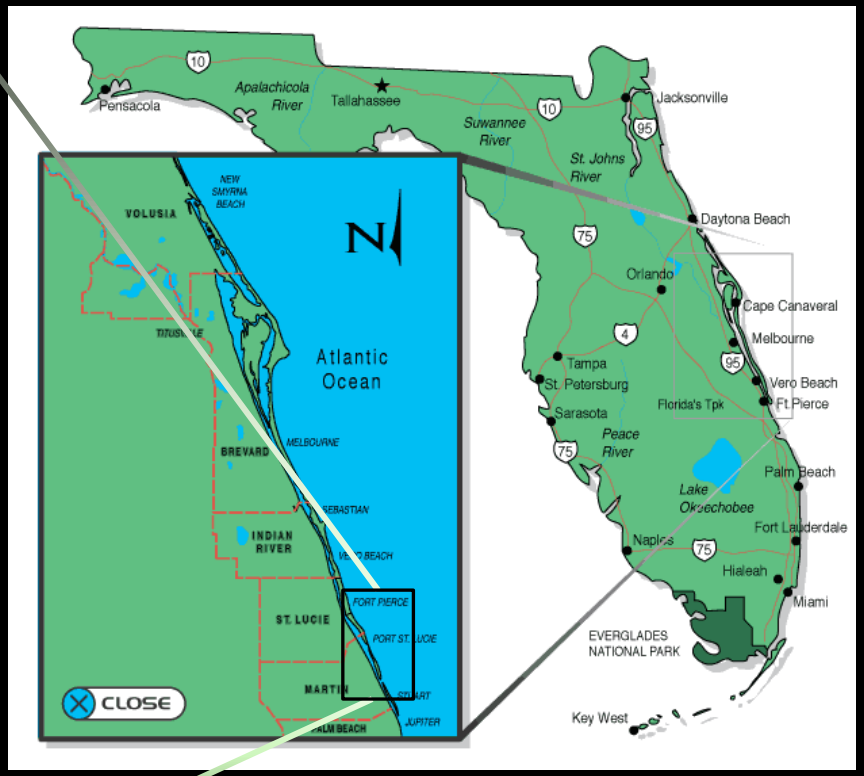
Polychaete:
Streblospio benedicti

Clam:
Mulinia sp.

These species are found in large numbers in low diversity sites. However, they are also found in high diversity sites in lower numbers.

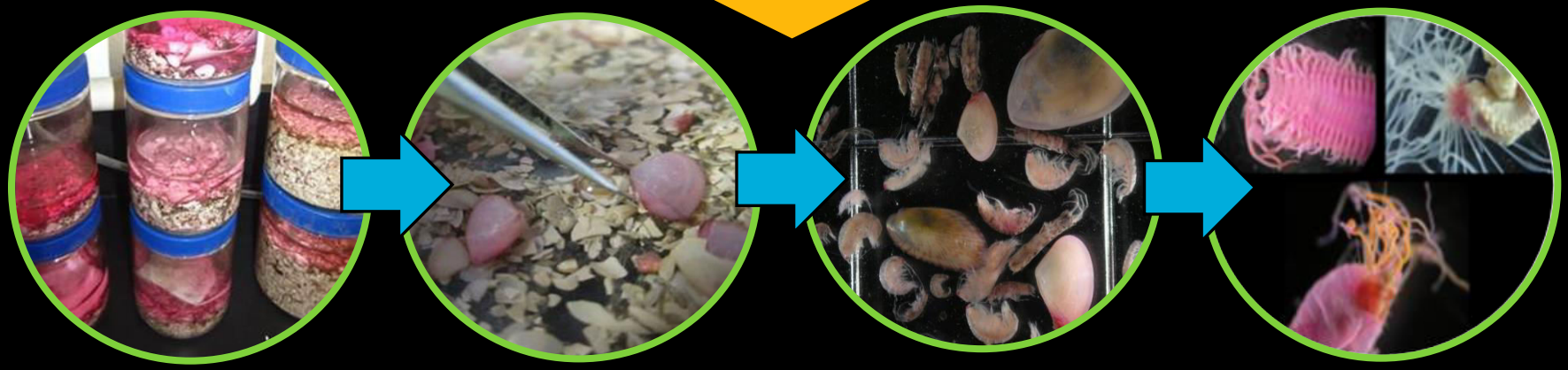
Sample Sites





Infauna Samples

To Lab



Sediment Samples

>1700 Grabs

~800 Taxa

>500,000 Individuals

>500,000 Individuals

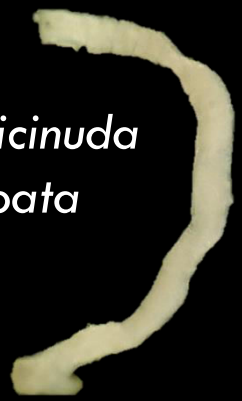
41%: 7 Polychaetes

Lumbrineris sp.

Dipolydora socialis

Sternaspis sp.

Fabricinuda trilobata



Mediomastus californiensis

Streblospio benedicti

Laonome sp.

20%: *Fabricinuda trilobata*

Important Species

- Full Dataset
  - 11 groups = 56.2%
    - Amphipod
    - Gastropod
    - Oligochaete
    - Ostraco
- 9 Priority Sites
  - 16 groups = 53.5%
  - 297,000 individuals
    - Amphipod
    - Gastropod
    - Polychaete
    - Midge

Important Species

- Patchiness
  - Specific habitats
  - Sites

Cytheridae

- Boom and bust cycles

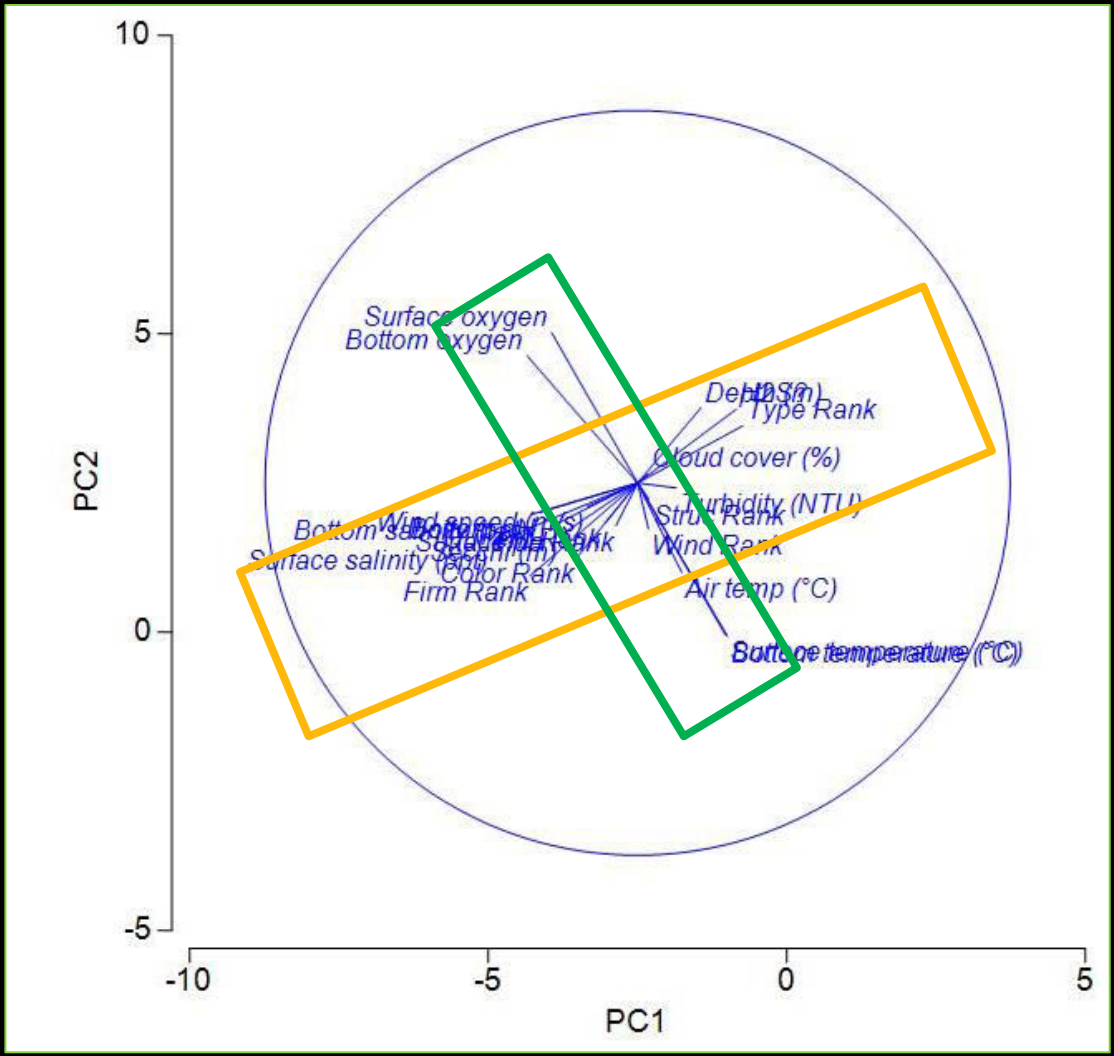
20% → 7%

Fabricinuda trilobata

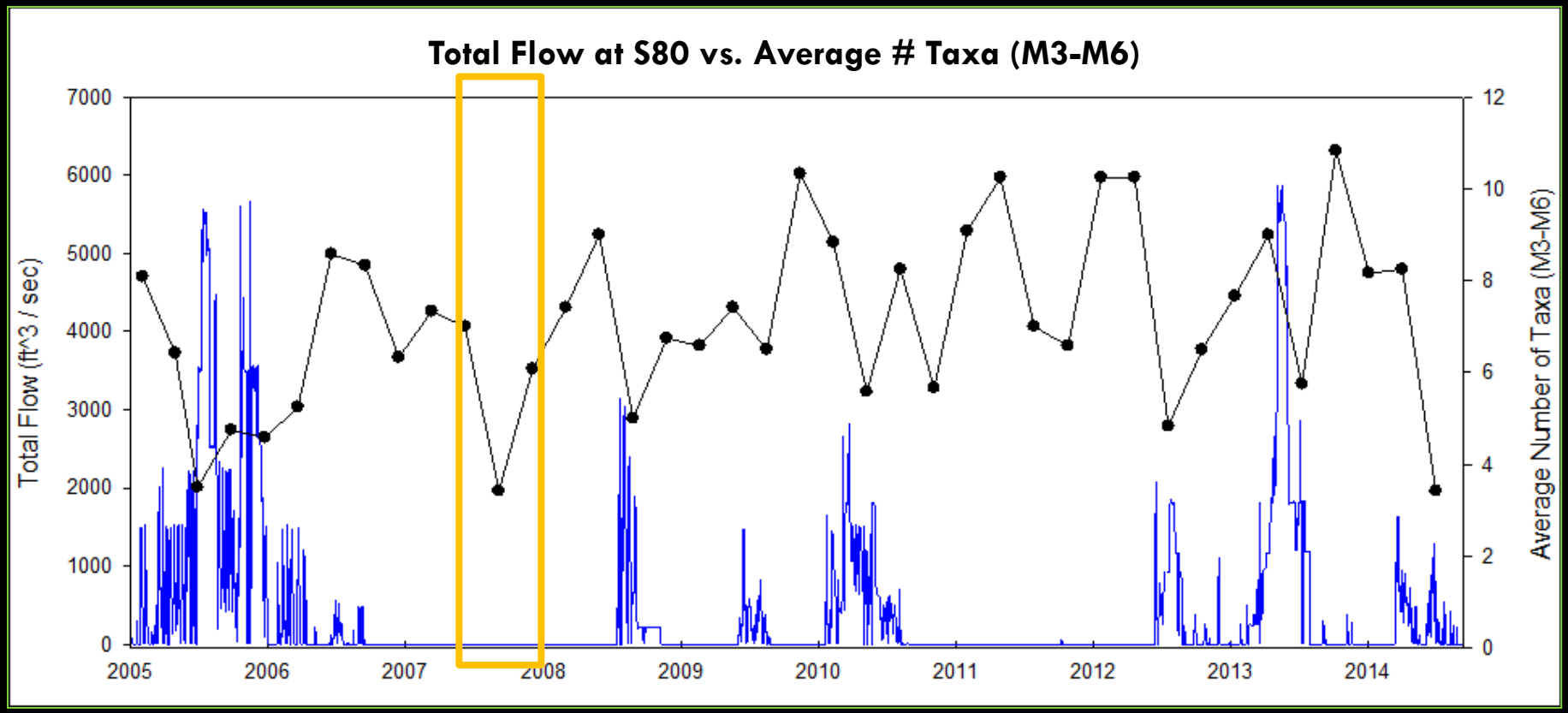
Environmental

- Salinity
- Depth
- Sediment Type

- Seasonality
- Low Oxygen
  - < 6 mg/L- 56%
  - < 4 mg/L- 13%



Outflow effects?



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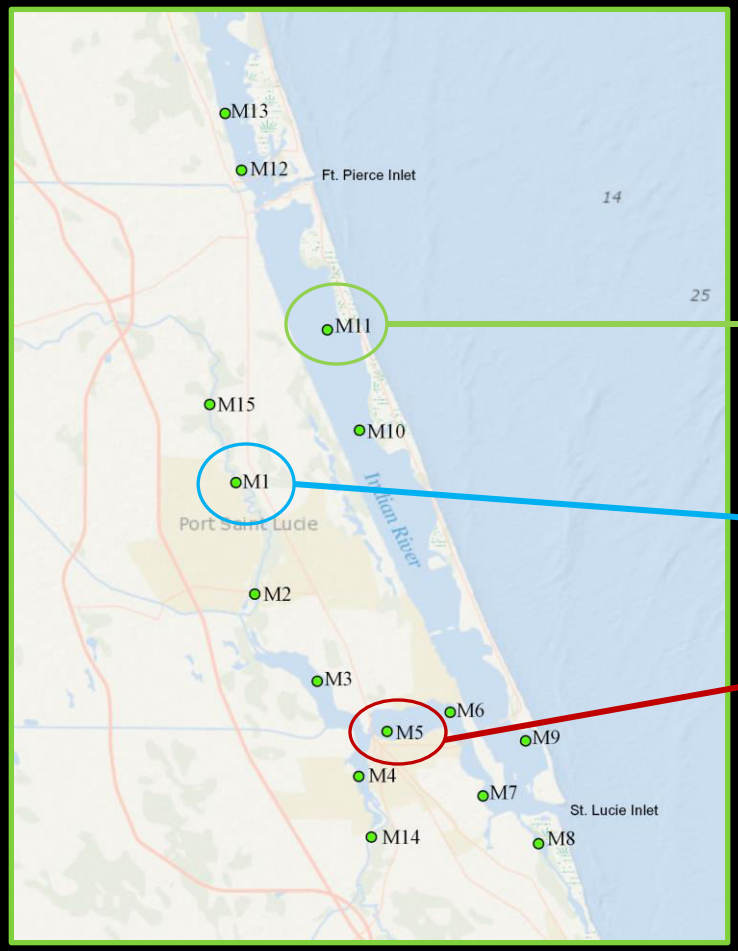

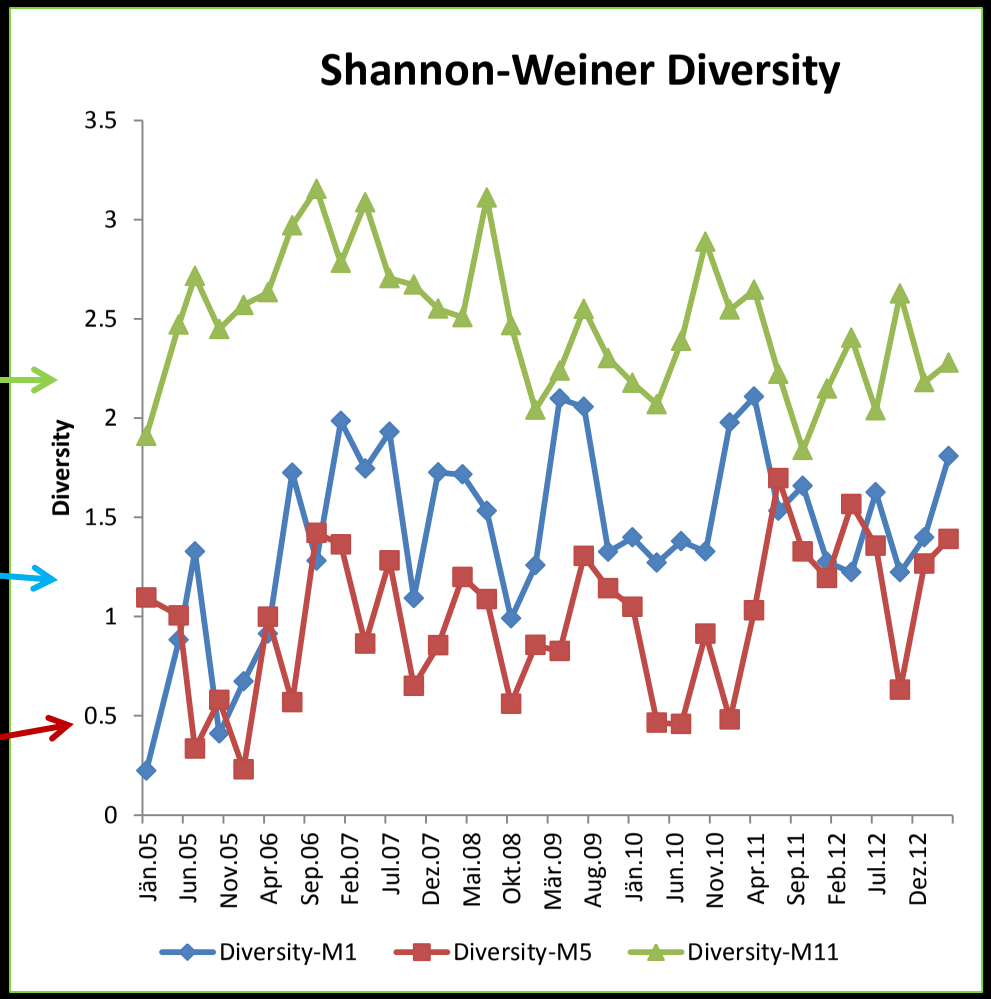

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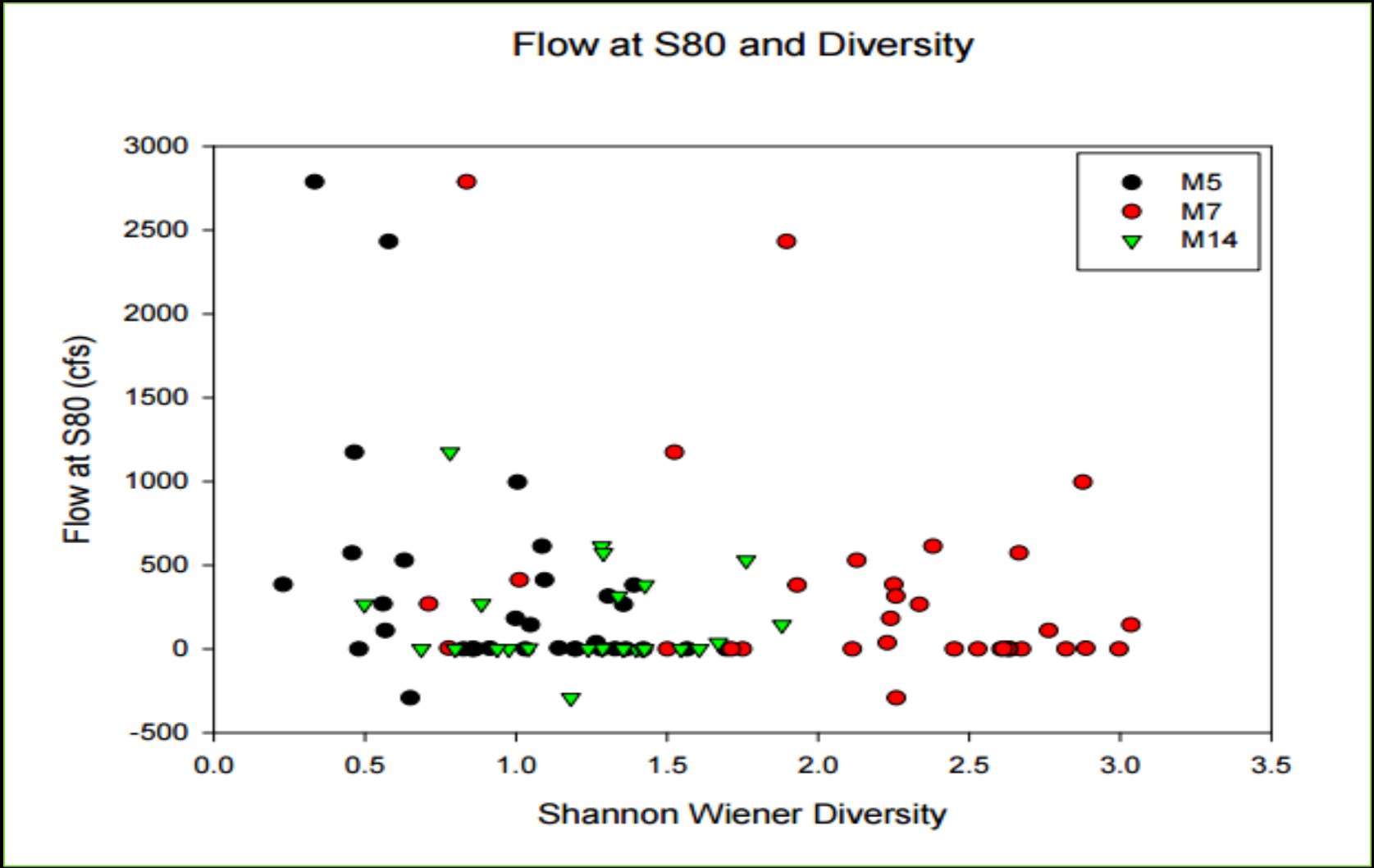

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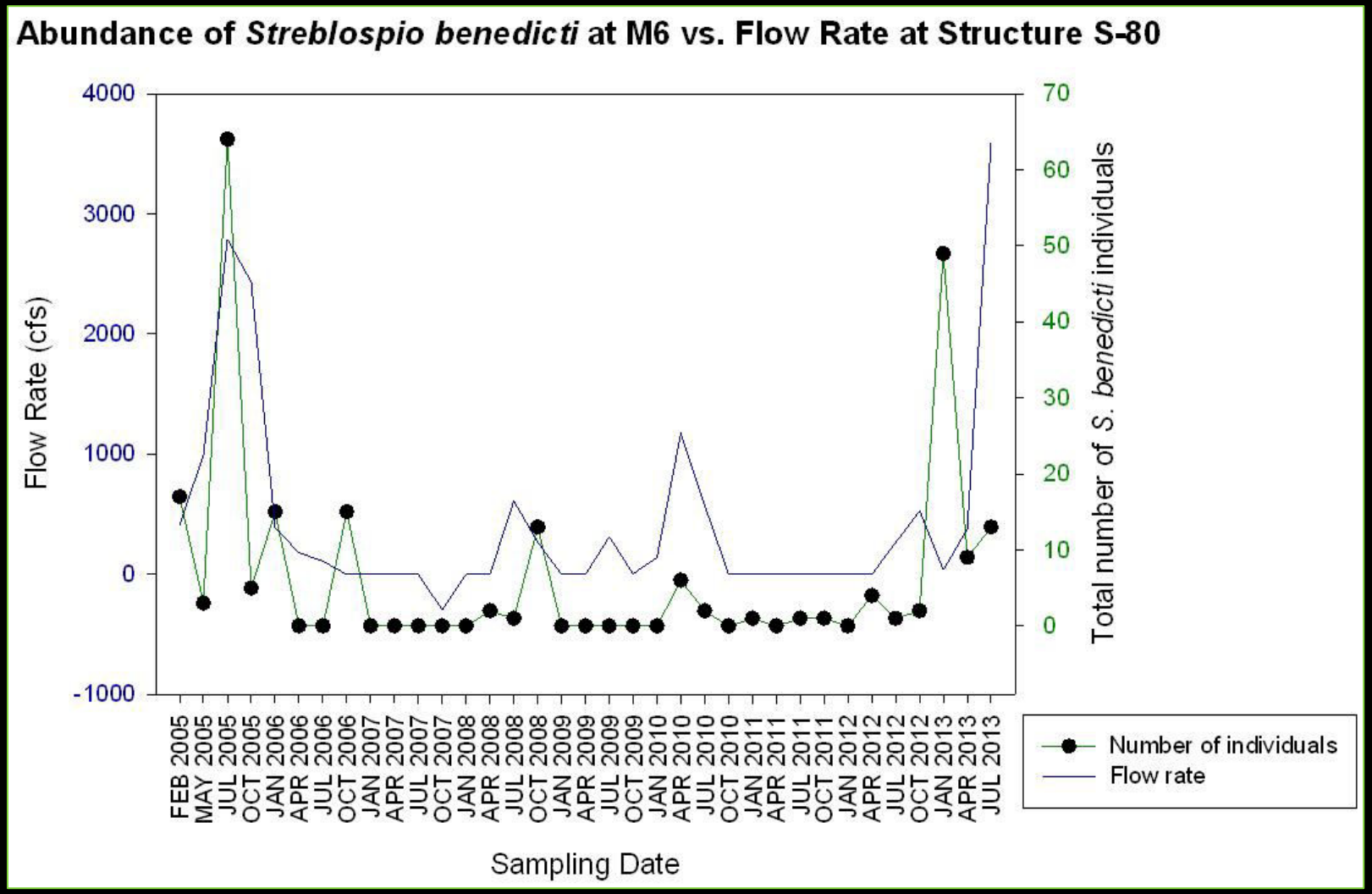


What's Next???

- Back to original hypotheses
  - Extreme salinity shifts impair community development
  - Muck inhibits infaunal community development
  - Fine sediment re-suspension negatively affects certain infaunal species
- Experimental testing?
  - Sediment transects
  - Sediment transplants
  - Paired sampling

What's Next???

- Long term trends
  - Data from 1970's
- Investigating Common Species
  - Abundance Patterns
  - Distribution
- Feeding Strategies

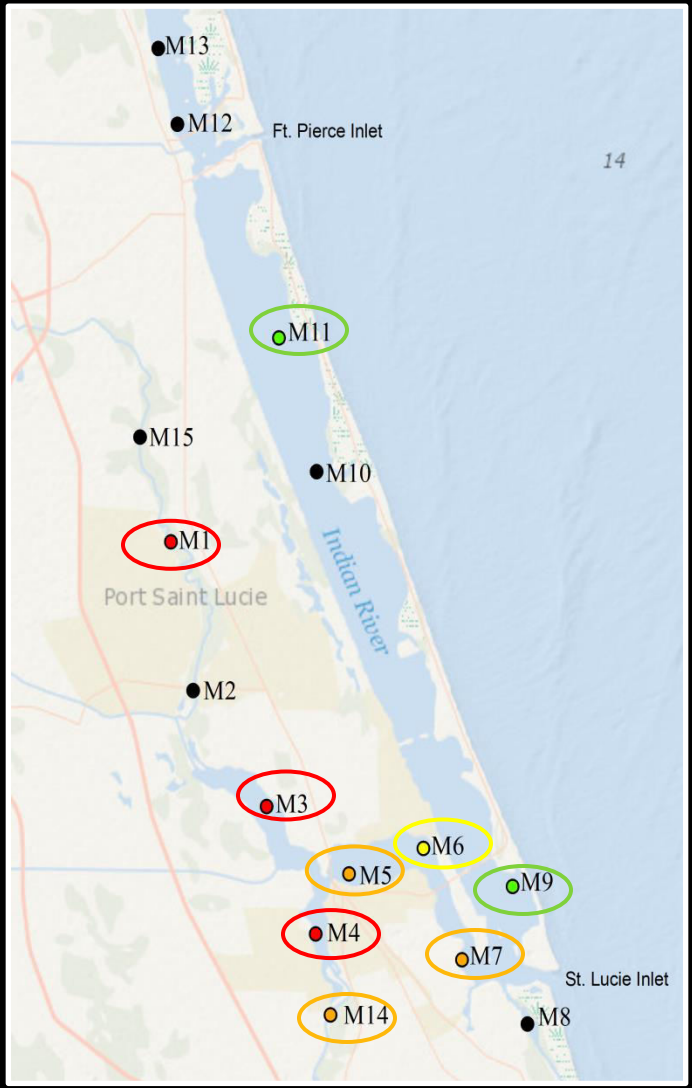
Thank you!

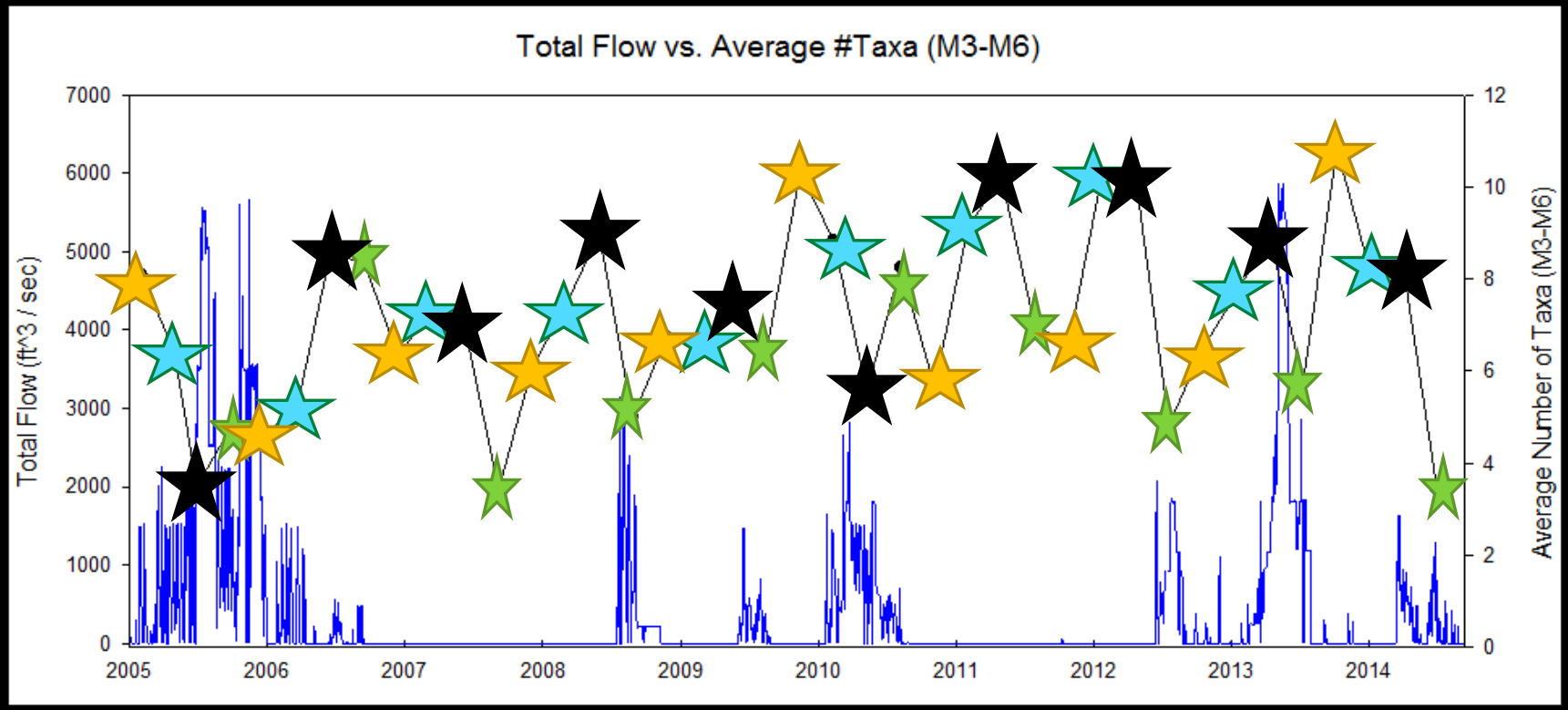
Special thanks to…

- Benthic Ecology Group Past and Present
- All of the staff at the Smithsonian Marine Station for their help and support.

Questions?

MAMBI



- Good Condition
  - M9, M11
- Moderate Condition
  - M6
- Fair Condition
  - M5, M7, M14
- Poor Condition
  - M1, M3, M4

Outflow affects?