Marine community & population ecology

Biological invasions

Conservation biology

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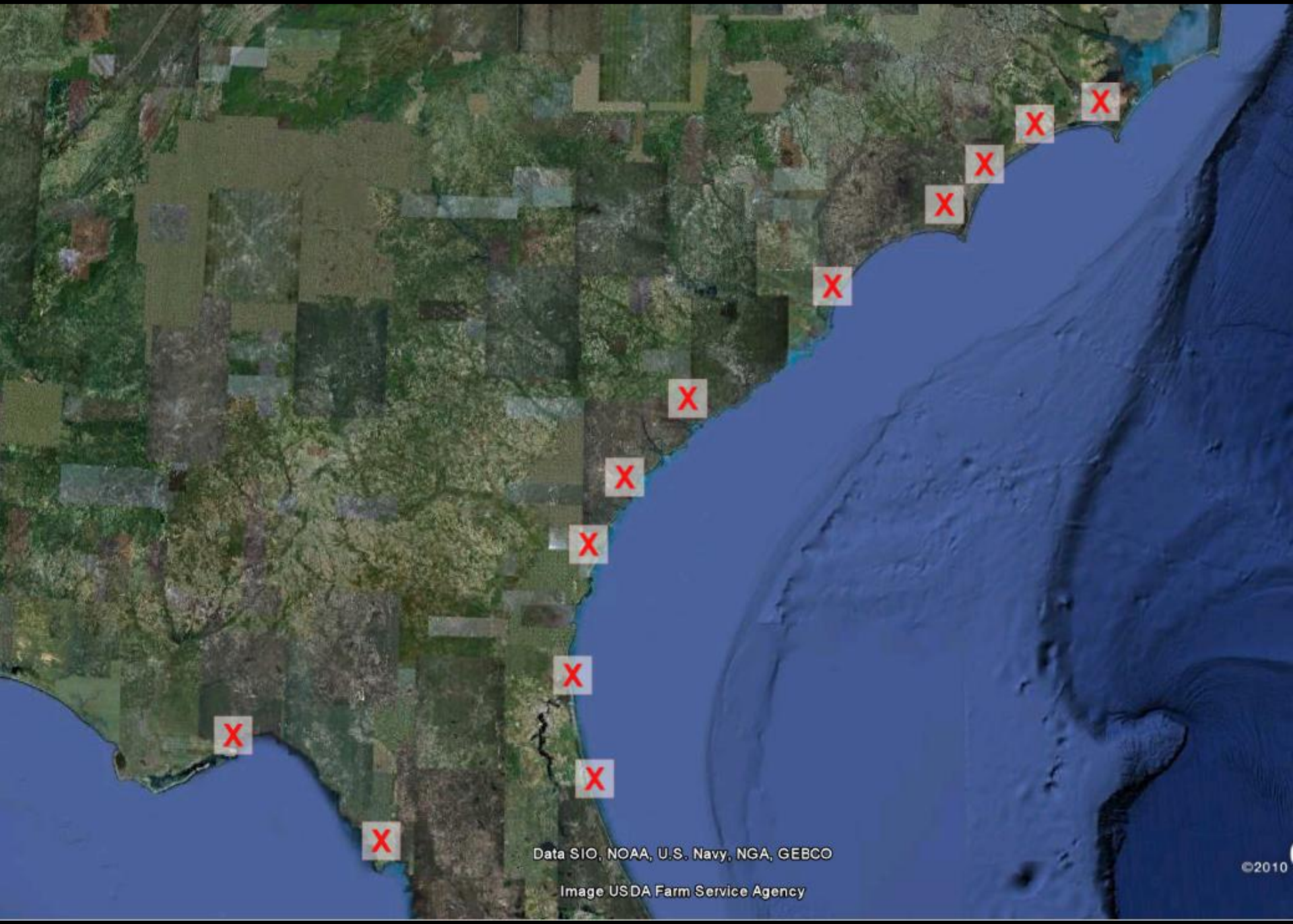
3 Habitat Related Projects

- 1. Biogeography of Oyster Reef Functions
- 2. Ecosystem Effects of Novel Seaweed Invasion
- 3. Marsh-Upland Connections

Ecosystem Functions of Reefs

- Oyster Production (food)
- Fish Habitat
- Sediment stabilization
- Filtration—water quality/denitrification


Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image USDA Farm Service Agency
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Monitored Metrics

- Physical
  - Temperature
  - Salinity
  - Inundation
  - Slope
  - Topography
  - Flow
  - Landscape features

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  - Landscape features
- Biological
  - Benthic Productivity
  - Invertebrates
  - Small, resident fish
  - Transient predators
  - Oysters themselves
    - Density, demography, filtration


WHIRL-PAK
Sapelo
7/28

3 treatments

- Control

3 treatments

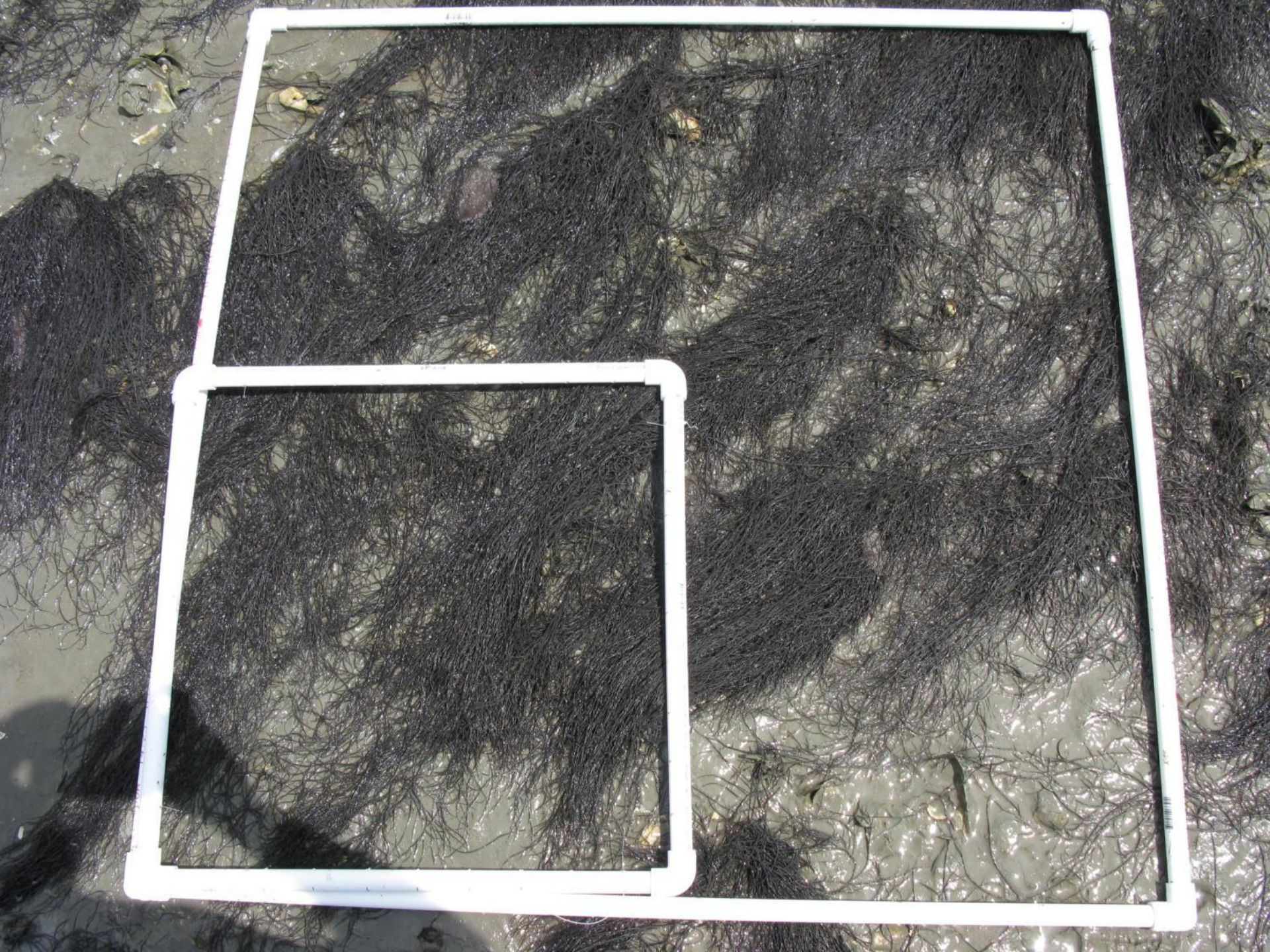
- Control
- Meso-Predators

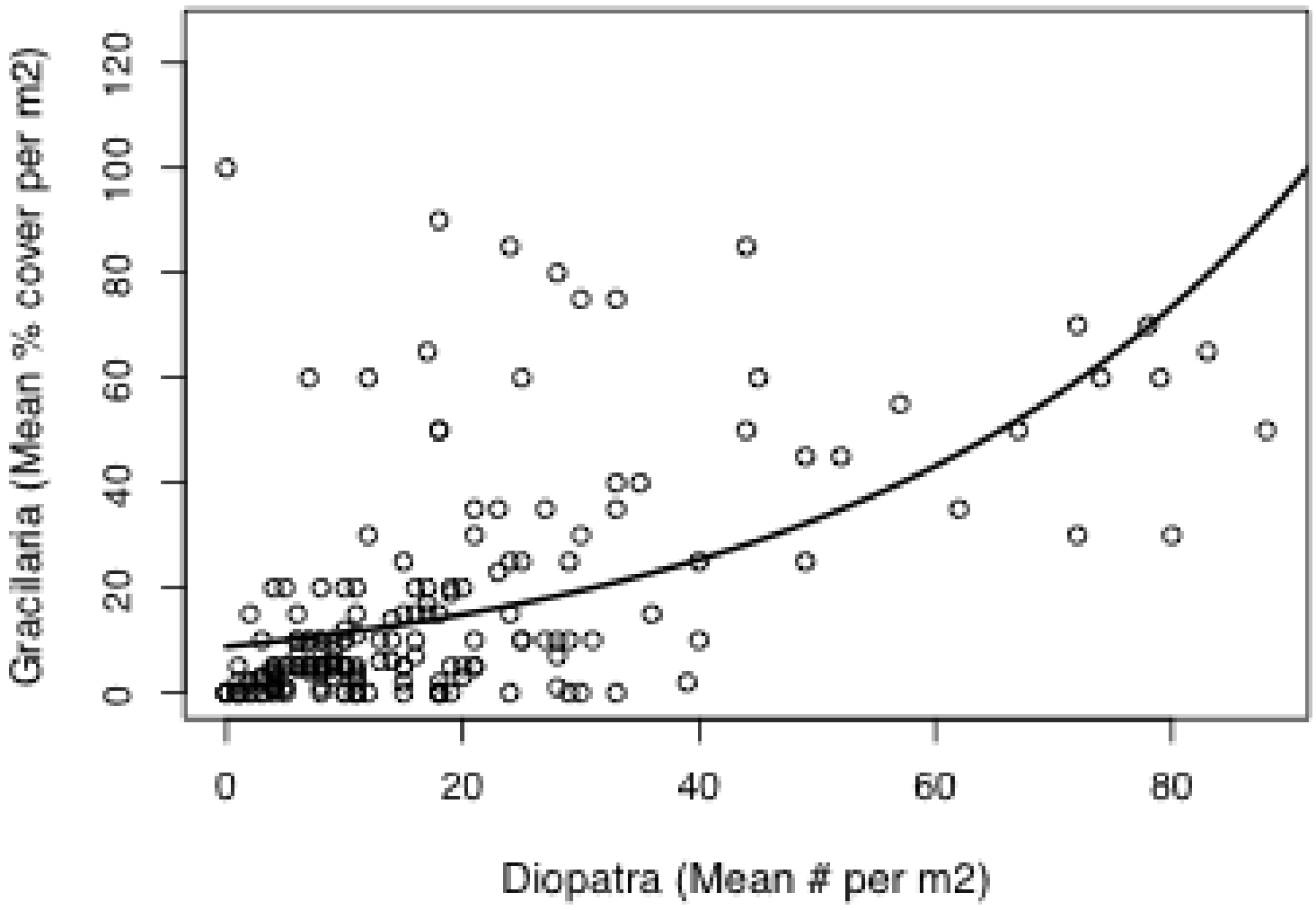
3 treatments

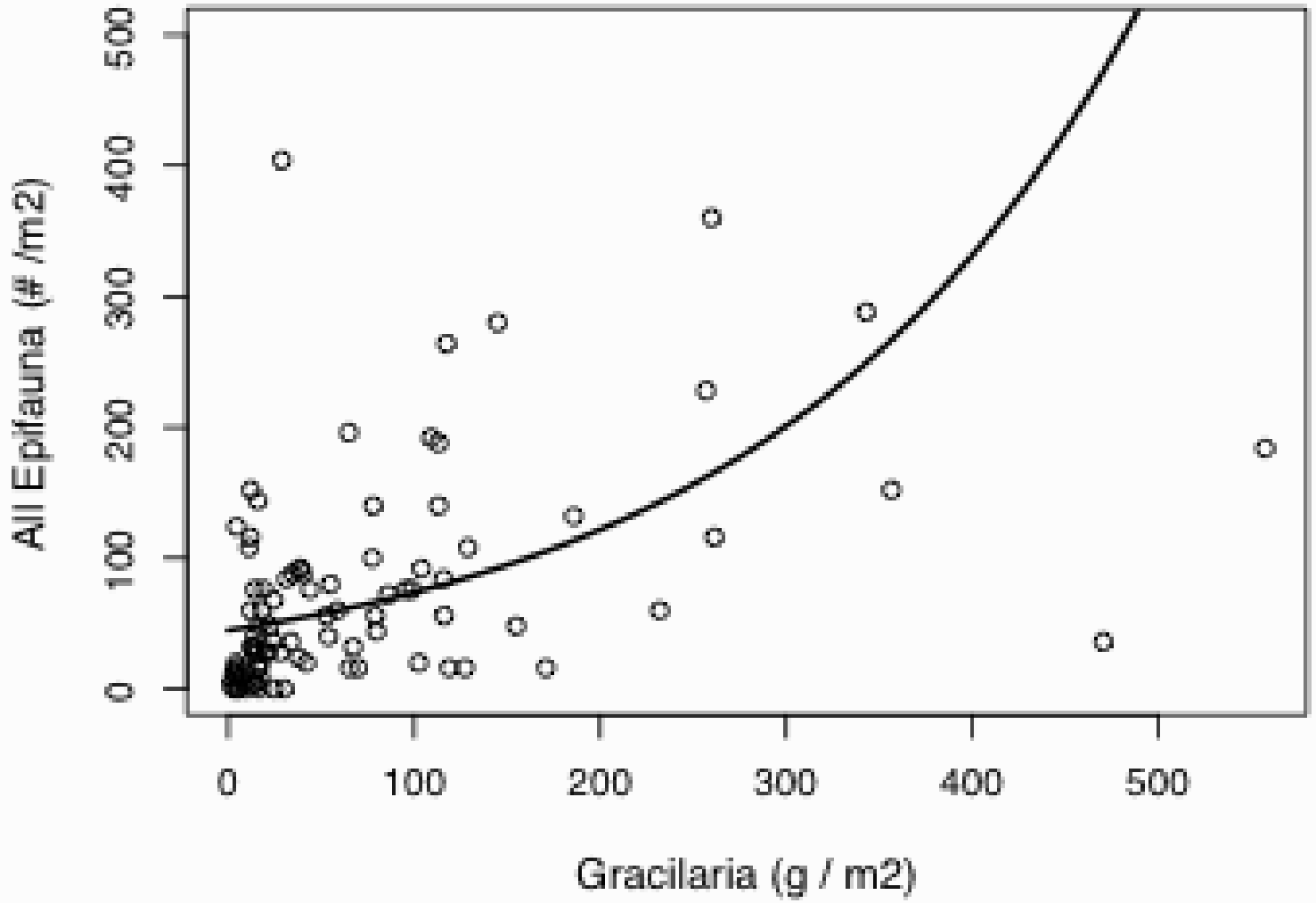
- Control
- Meso-Predators
- Higher Predators

2. Ecosystem Effects of Novel Seaweed Invasion


Gracilaria vermiculophylla




Gracilaria (Mean % cover per m2)
0
20
40
60
80
100
120
0
20
40
60
80
Diopatra (Mean # per m2)

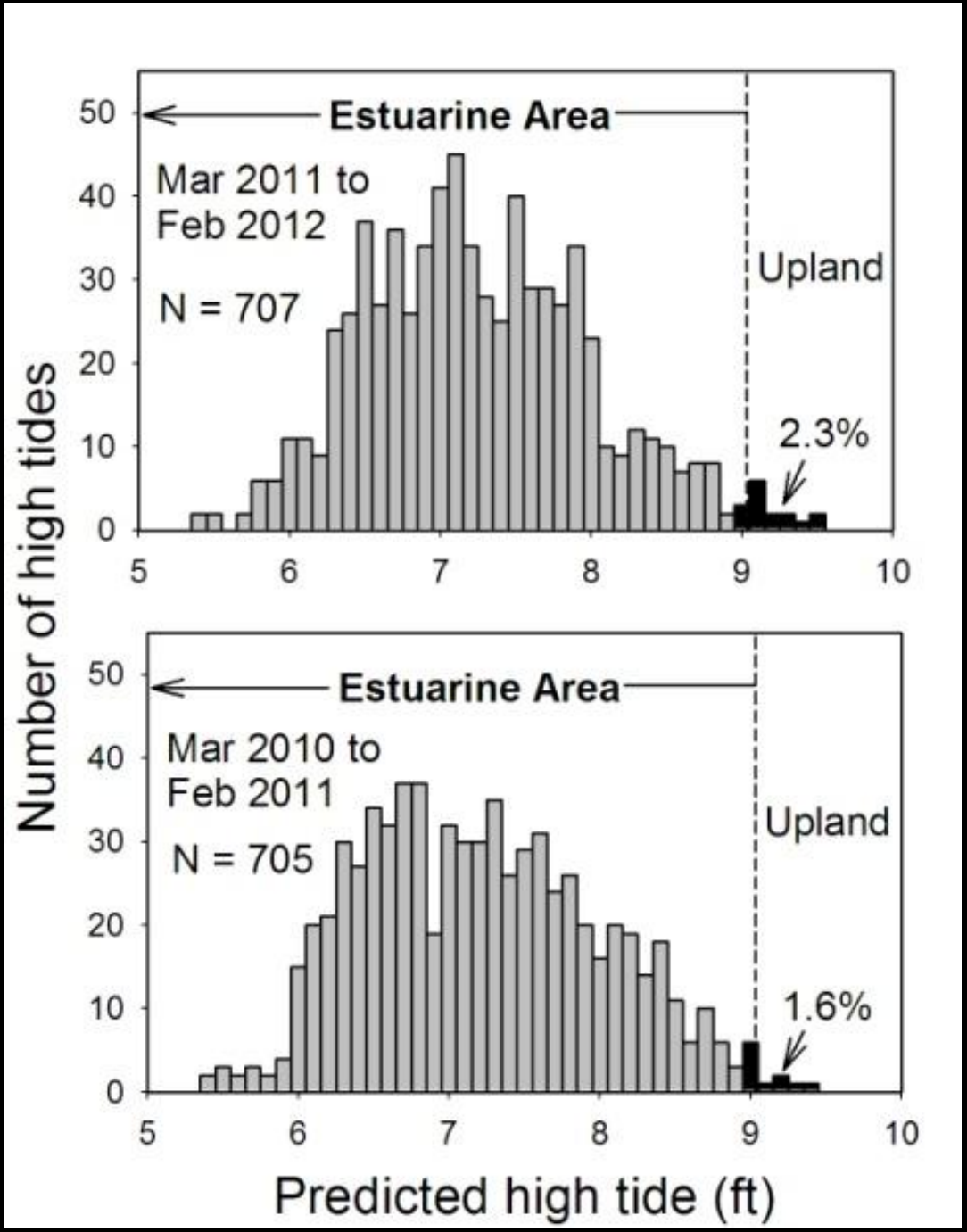

All Epifauna (# /m2)
0
100
200
300
400
500
0
100
200
300
400
500
Gracilaria (g / m2)

Major Findings

- Increasing *Gracilaria* biomass facilitated epifauna, particularly amphipods and snails
- Primary production of *Gracilaria* was variable, but massive in some areas
- The seaweed rapidly degraded upon burial, losing 79% of its mass in 10 days

3. Marsh-Upland Connections

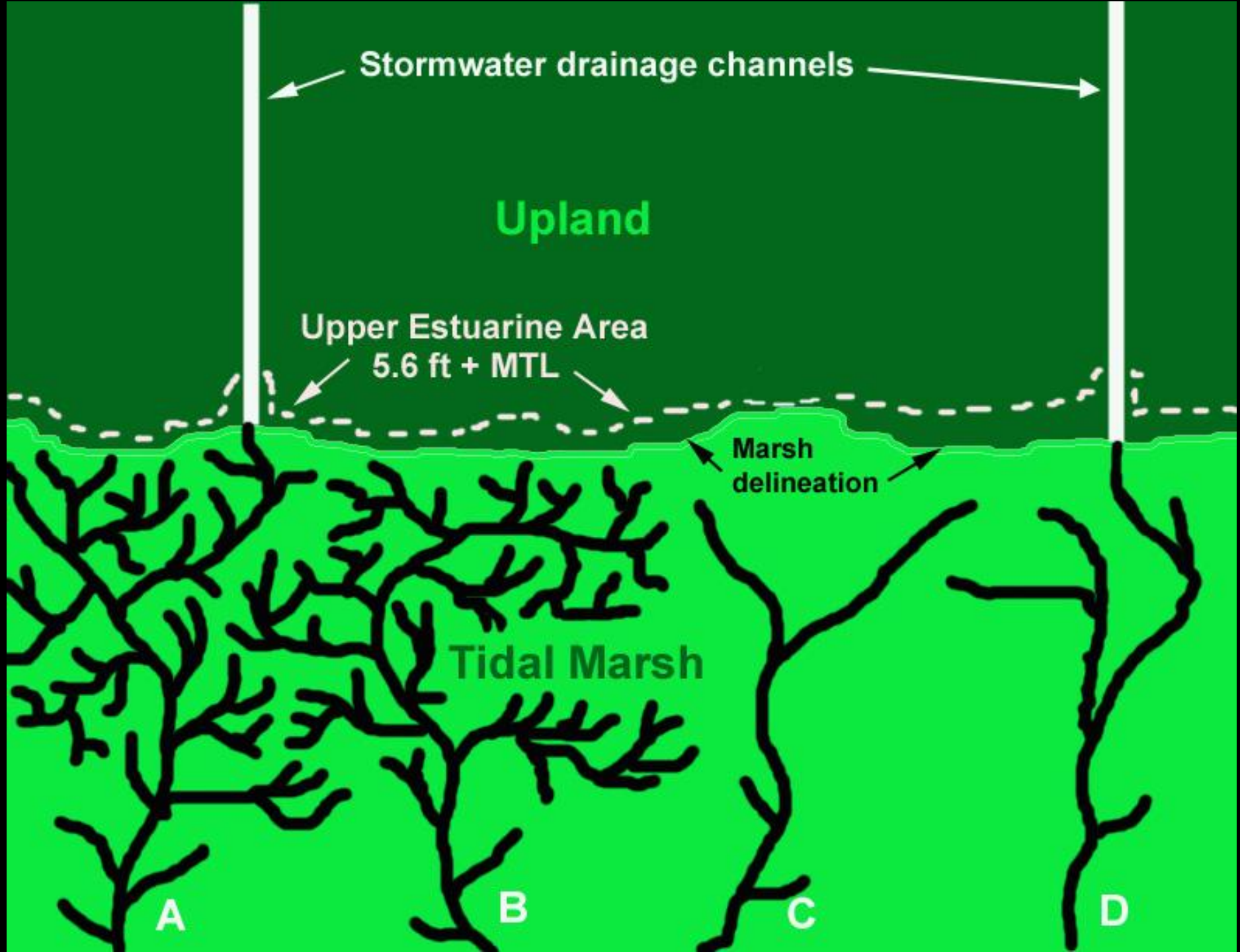
Are marsh areas being delineated correctly?

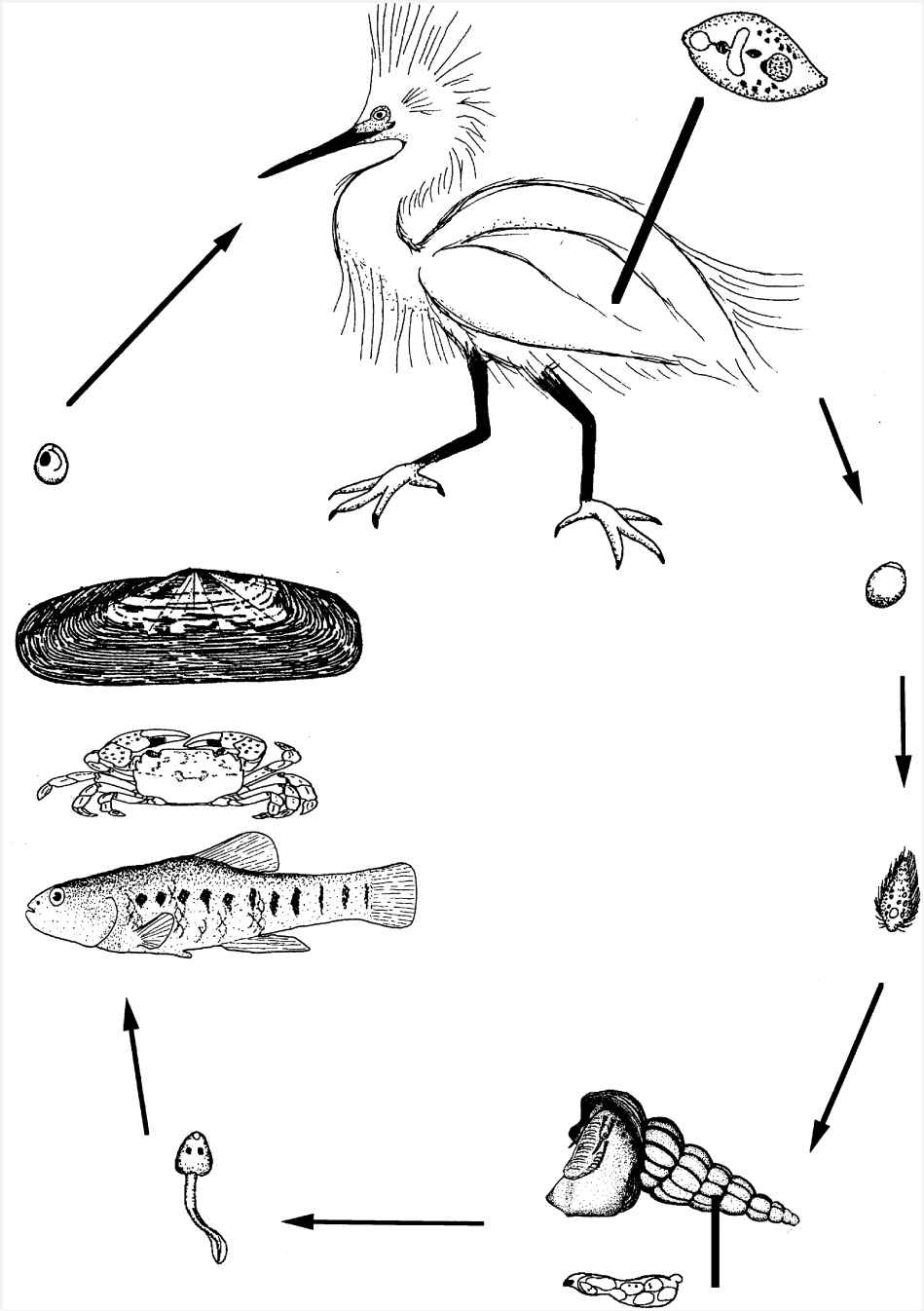

Estuarine Area
Mar 2011 to
Feb 2012
N = 707
Upland
2.3%
Estuarine Area
Mar 2010 to
Feb 2011
N = 705
Upland
1.6%
Number of high tides
Predicted high tide (ft)

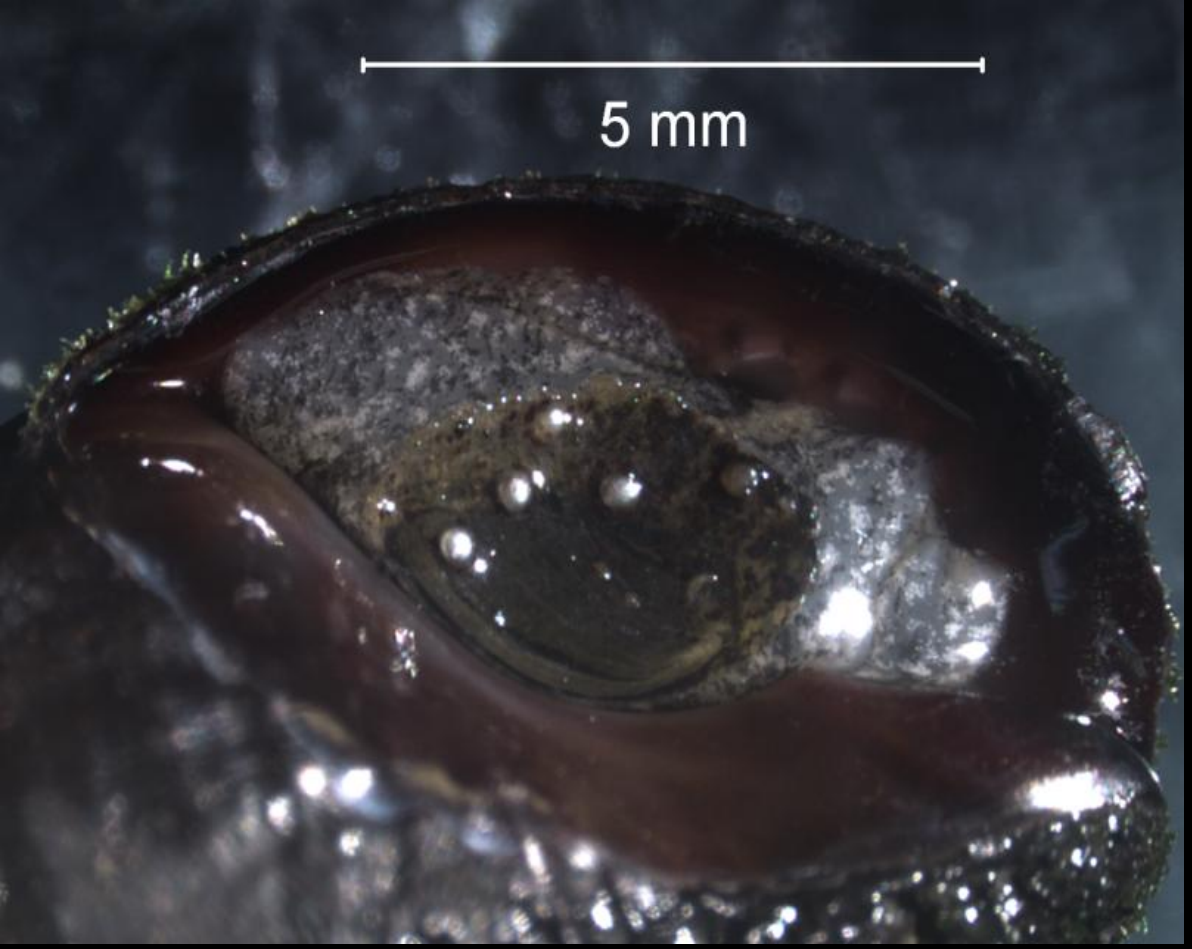
How are energy and species moving between these habitats?

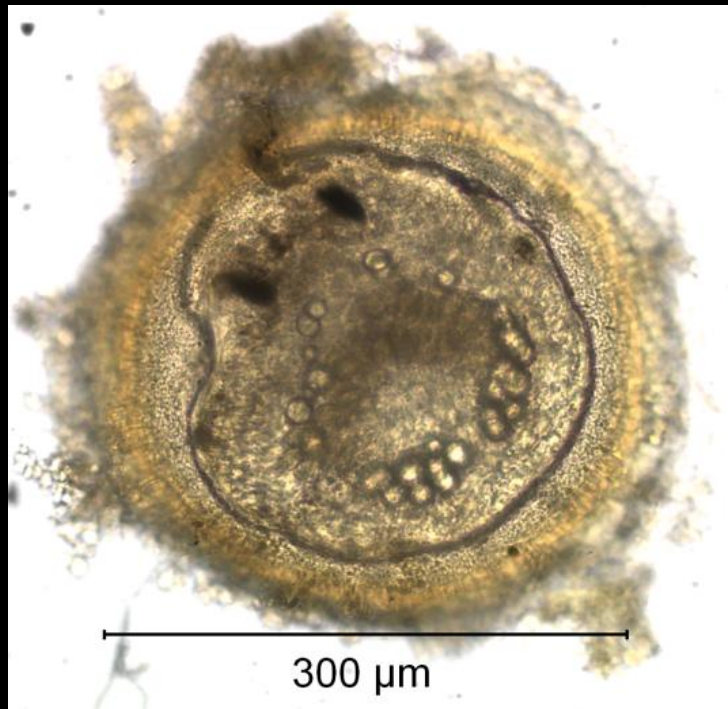
Armases cinereum

Can we detect impacts of uplands on marsh?


Stormwater drainage channels
Upland
Upper Estuarine Area
5.6 ft + MTL
Marsh
delineation
Tidal Marsh
A
B
C
D




5 mm


300 µm

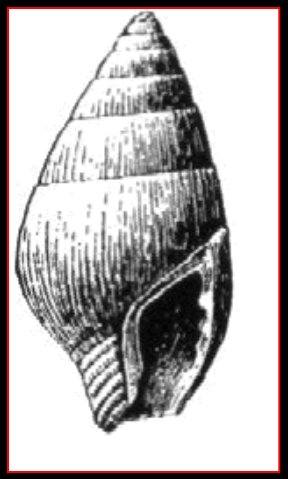
Lepocreadium setiferoides

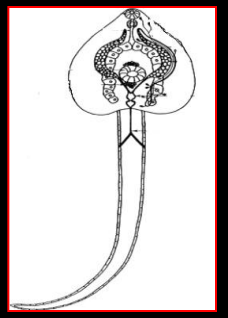
Austrobilharzia variglandis

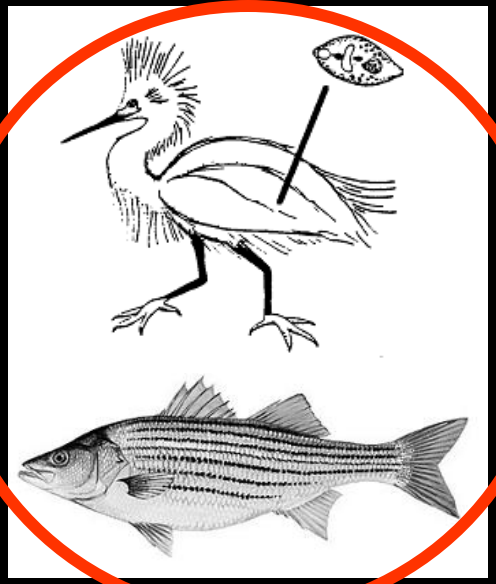
Microphallus similis

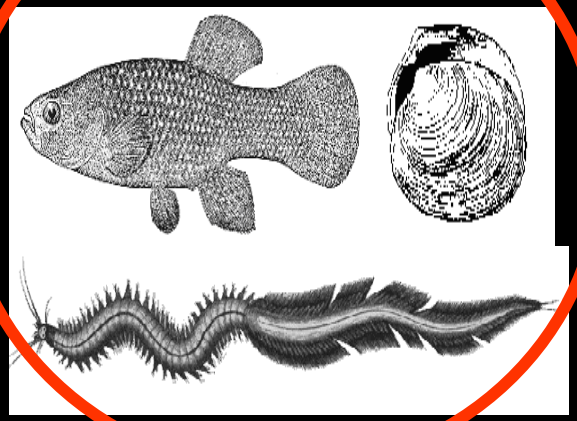
50

Trematode Life Cycle

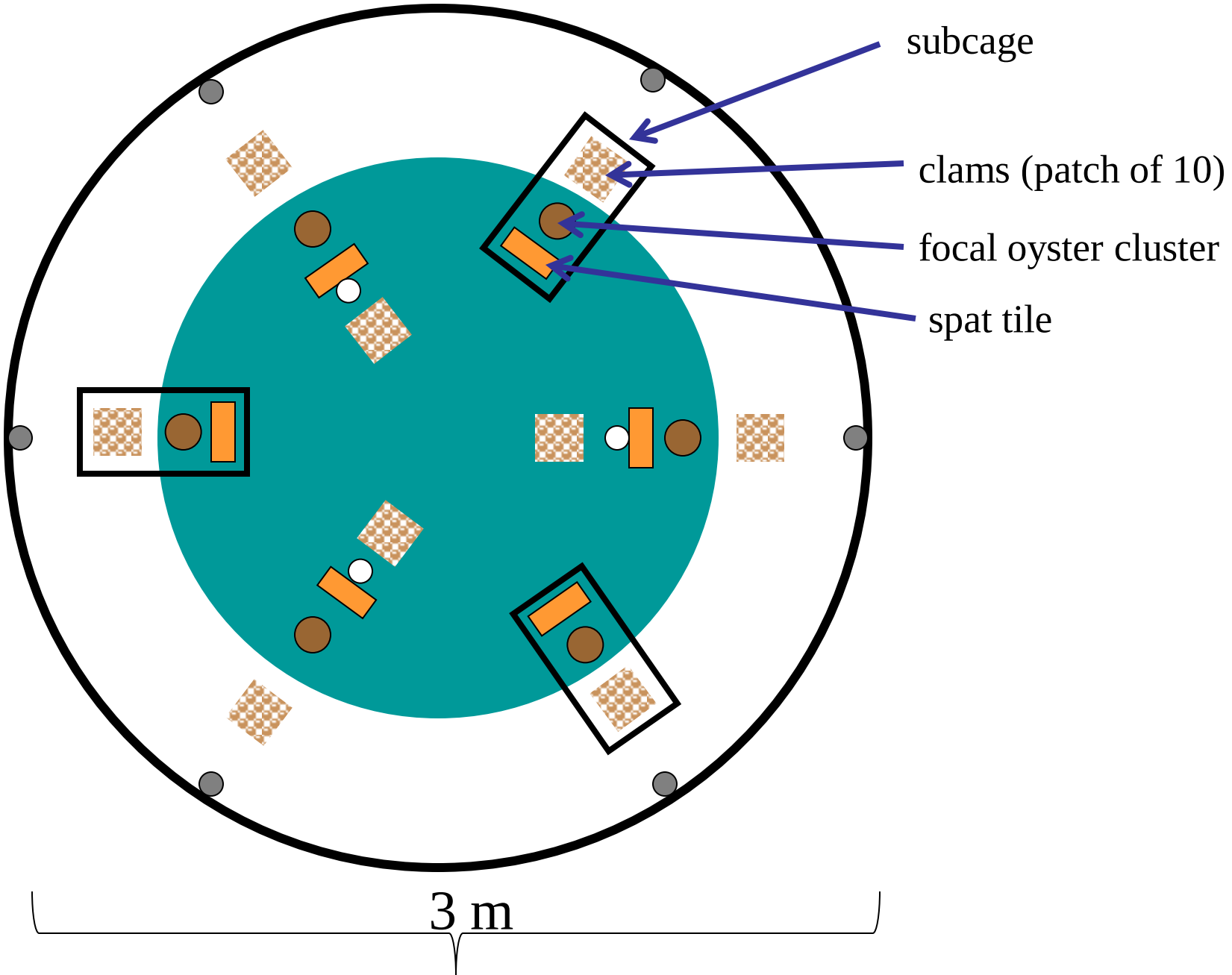




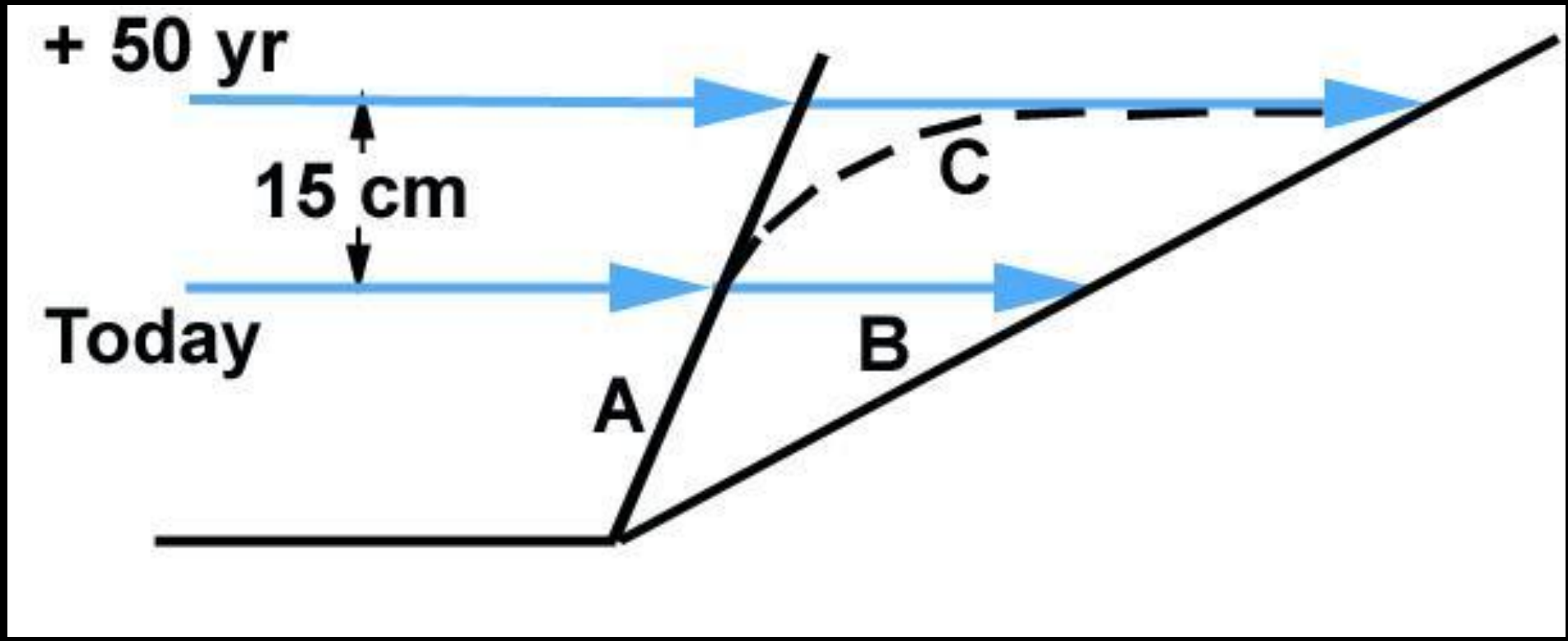




Experimental Oyster Reefs



Slope of interface affects extent of inland migration of marsh edge and estuarine area with sea level rise



4 Areas of Active Research

- Biological Invasions
- Aquatic parasites (trematodes)
- Ecosystem Engineers
- Marine Biogeography