ASSESSMENT OF FAUNAL PATTERNS IN THE CAPE FEAR RIVER PLUME

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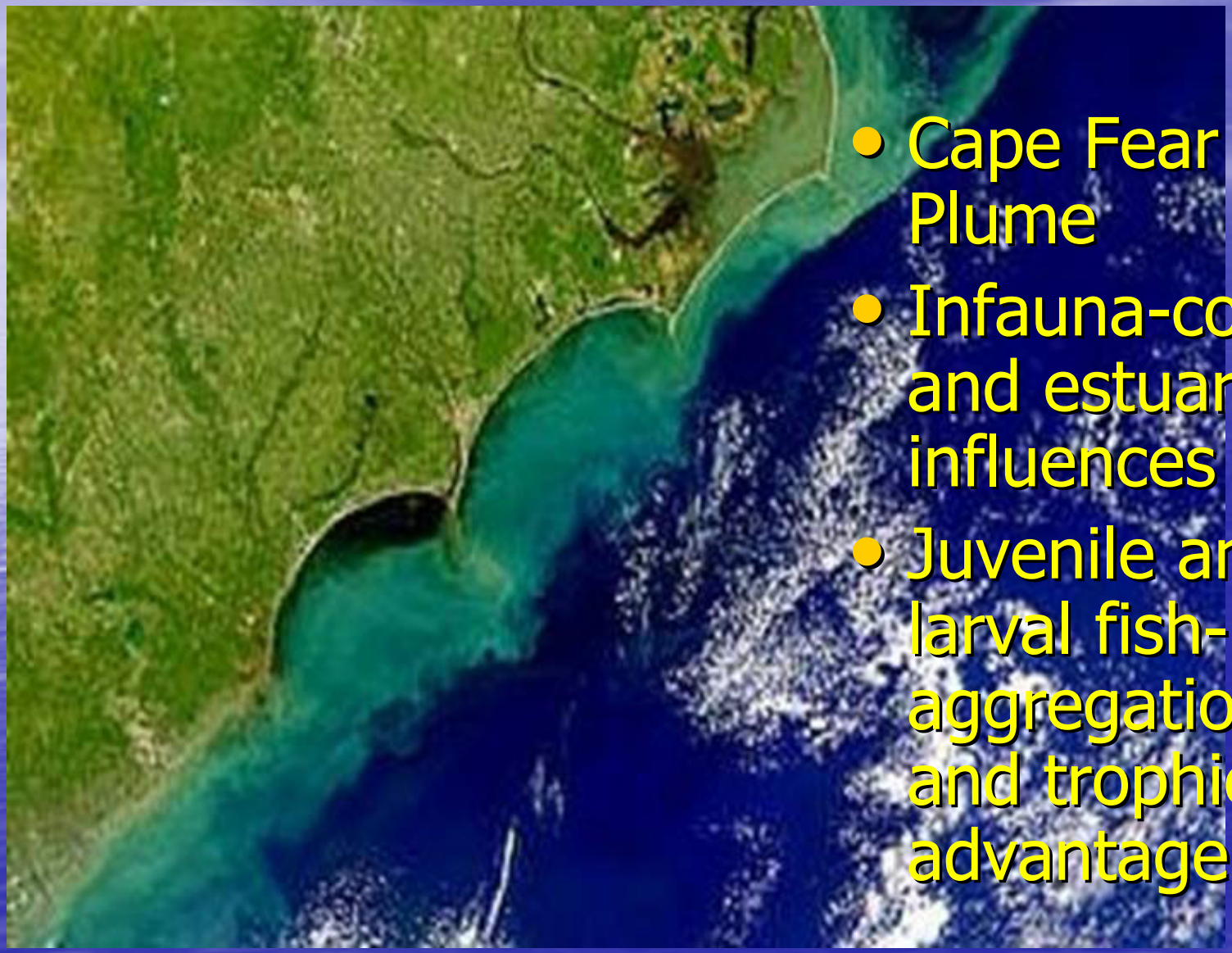


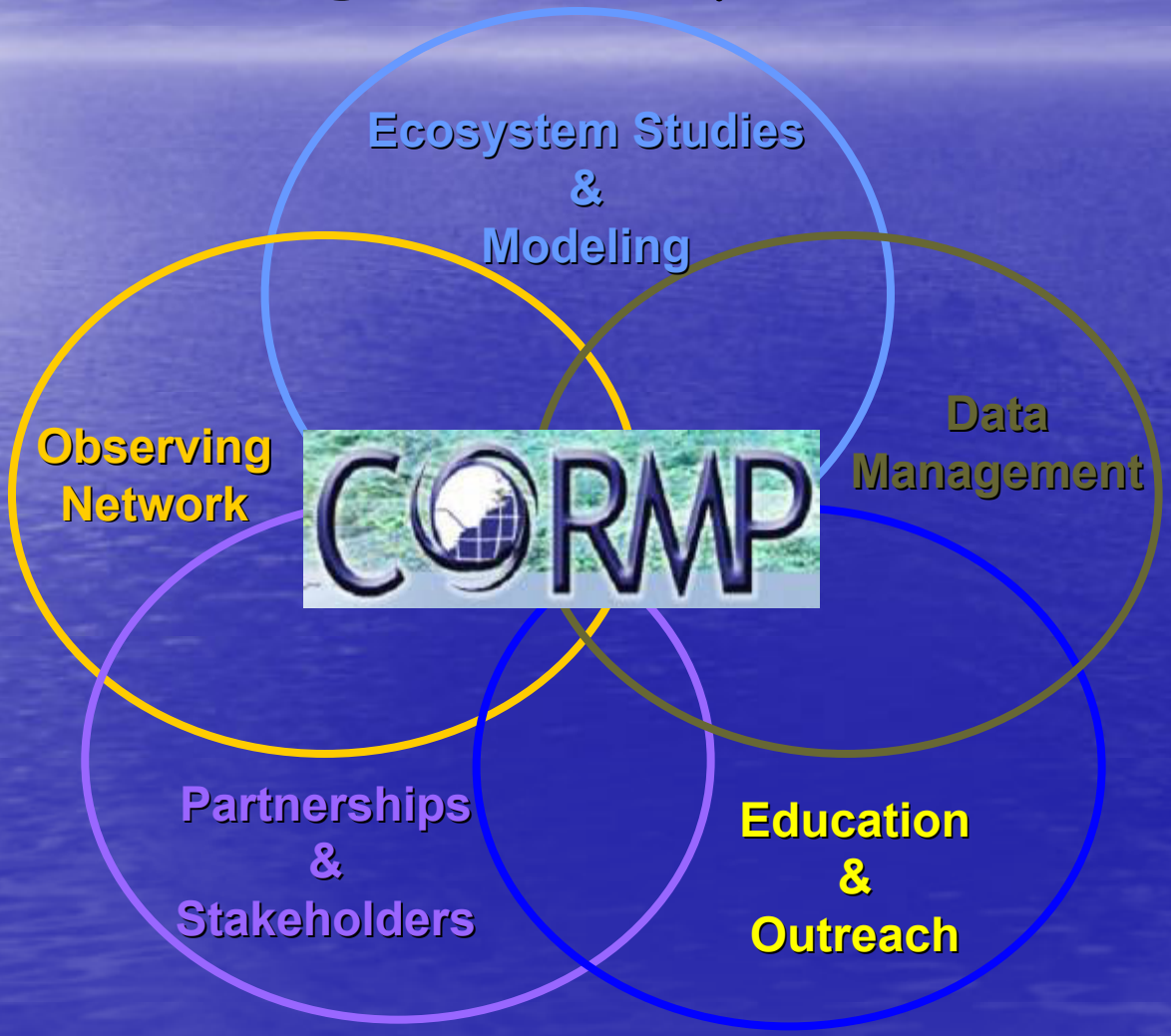
- Cape Fear River Plume
- Infauna-coastal and estuarine influences
- Juvenile and larval fish-aggregation and trophic advantage

CORMP

COASTAL OCEAN RESEARCH AND MONITORING PROGRAM

UNCW

Program Components

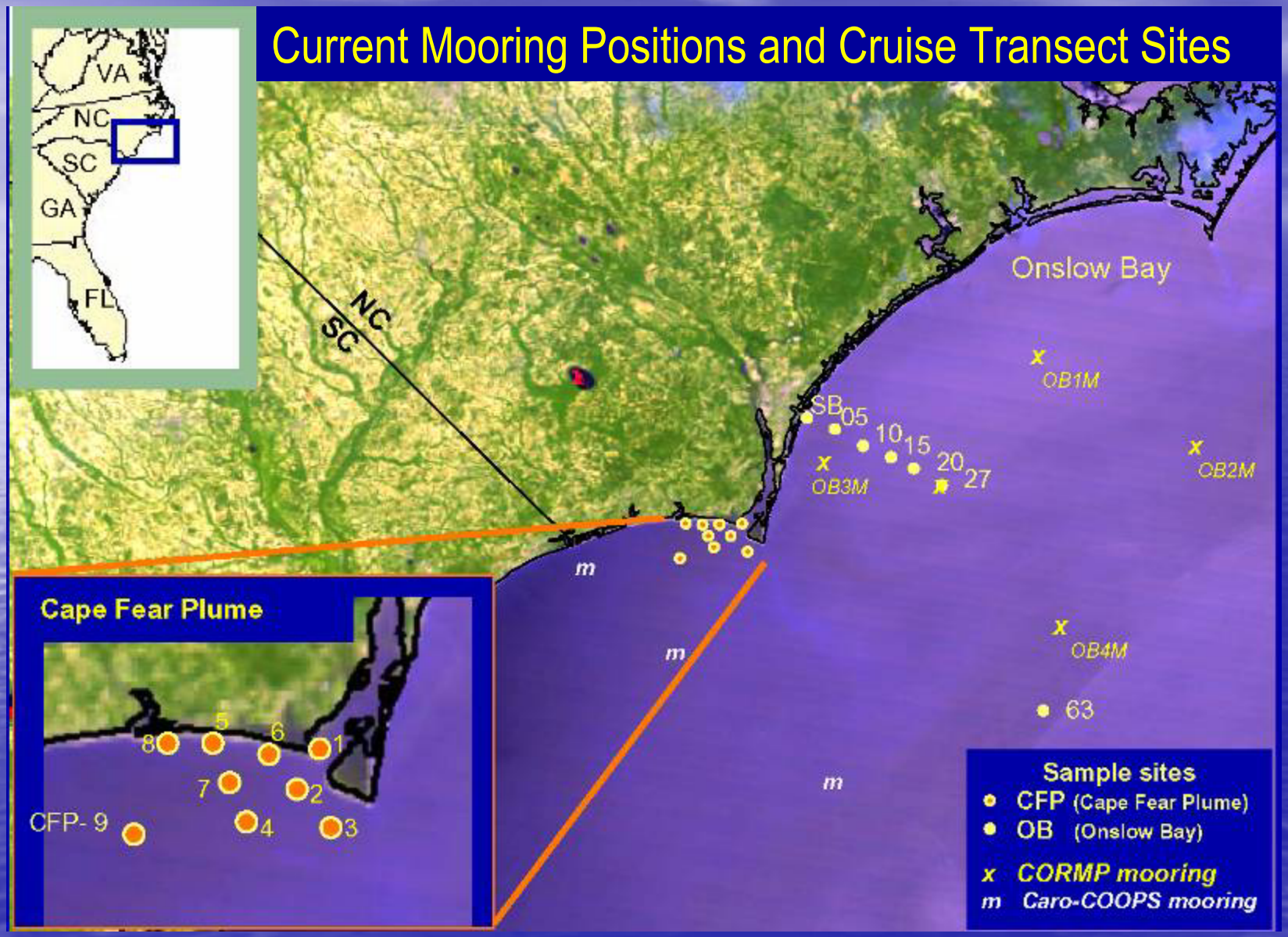


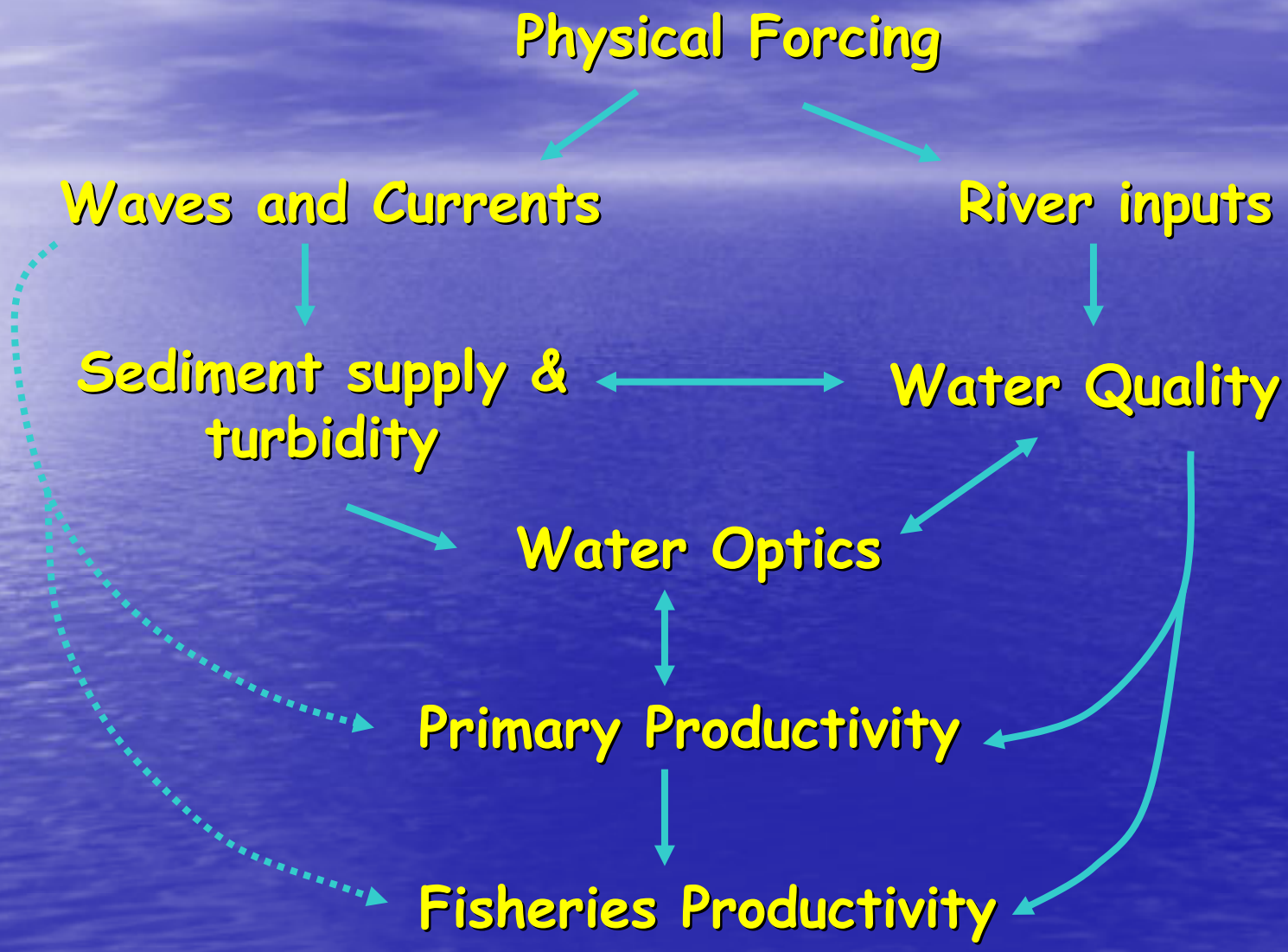
Central CORMP Hypothesis:

"Variation in physical coastal ocean processes and inputs drive ecosystem function and health, including fisheries production"

Water Quality, Fisheries Recruitment and Production, Benthic community structure, Boundary Layer Physics and Sediment Transport, Ocean Optics

Current Mooring Positions and Cruise Transect Sites




Physical Forcing
Waves and Currents
River inputs
Sediment supply & turbidity
Water Quality
Water Optics
Primary Productivity
Fisheries Productivity

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Bi-monthly, Monthly, and other Sampling Cruises:

Water Quality (Turbidity, Nutrients, etc.)

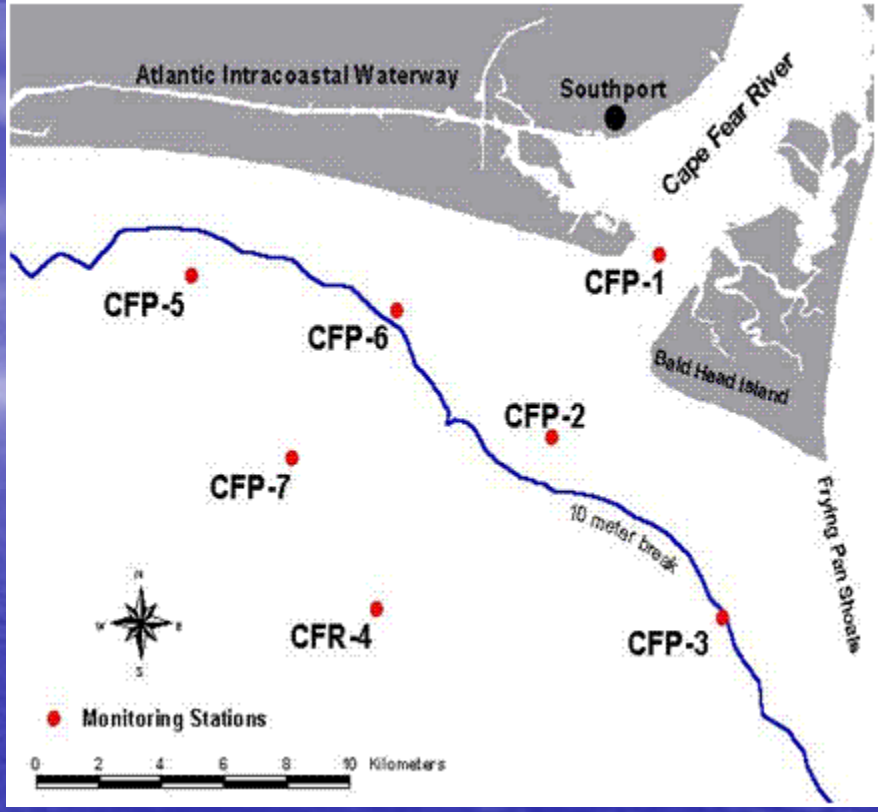
Physical parameters (Temp, Salinity & Currents)

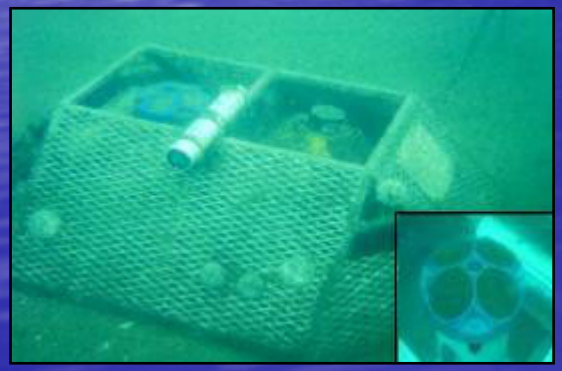
Sea floor characteristics

Bioptical measurements

Primary productivity

Fisheries


Atlantic Intracoastal Waterway
Southport
Cape Fear River
CFP-1
CFP-5
CFP-6
Bald Head Island
CFP-2
CFP-7
10 meter break
Frying Pan Shoals
CFR-4
CFP-3
Monitoring Stations
0 2 4 6 8 10 Kilometers



Plume Environment Provides Unique Habitat

- Distinct Characteristics from both the estuary and coastal ocean
  - Visually characteristic
  - Nutrient characteristics
  - Chemical characteristic
  - Dynamic
    - Seasonal changes
- Essential fish habitat

Top N.C. Commercial Fisheries

($72,000,000)

		2001 Landings (million dollars)	Plume-impacted ?
1.	Blue crab	32.0	****
2.	Shrimps	11.9	****
3.	Southern flounder	5.6	****
4.	Atlantic menhaden	4.6	****
5.	Summer flounder	4.4	****
6.	Atlantic croaker	3.1	****
7.	King mackerel	1.3	
8.	Swordfish	1.3	
9.	Spot	1.3	****
10.	Mullets	1.2	****
11.	Vermillion snapper	1.2	
12.	Bluefish	1.1	****
13.	Oysters	1.1	
14.	Seabasses	1.1	
15.	Weakfish	1.0	****

Working Hypothesis:

1. Infuana will show characteristics of both estuary and coastal ocean

   - seasonal 300+ taxa identified

2. Aggregation hypothesis

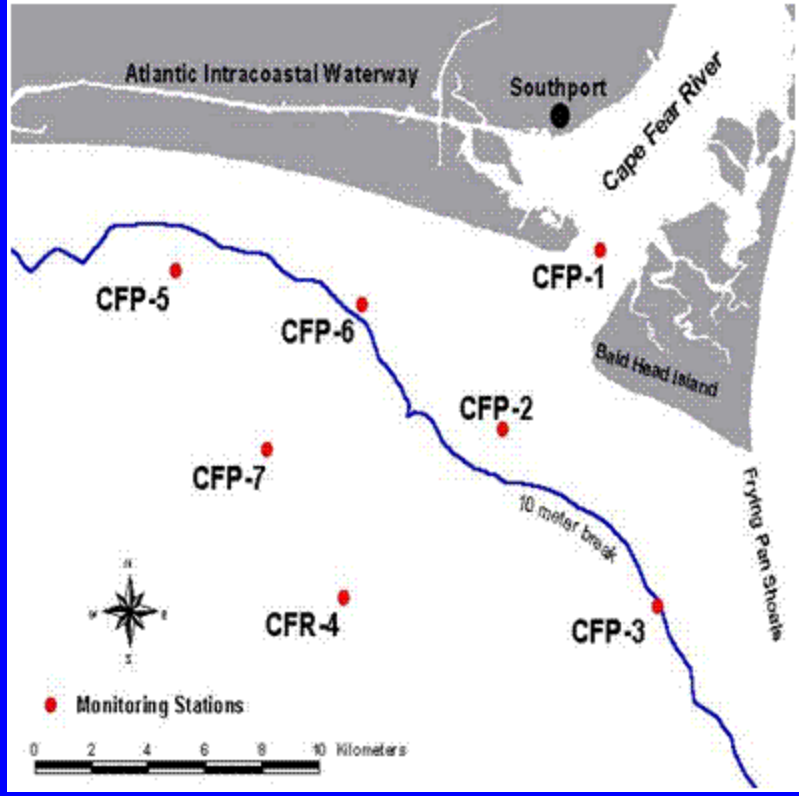
   - Larval and juvenile distribution & abundance

   - monthly

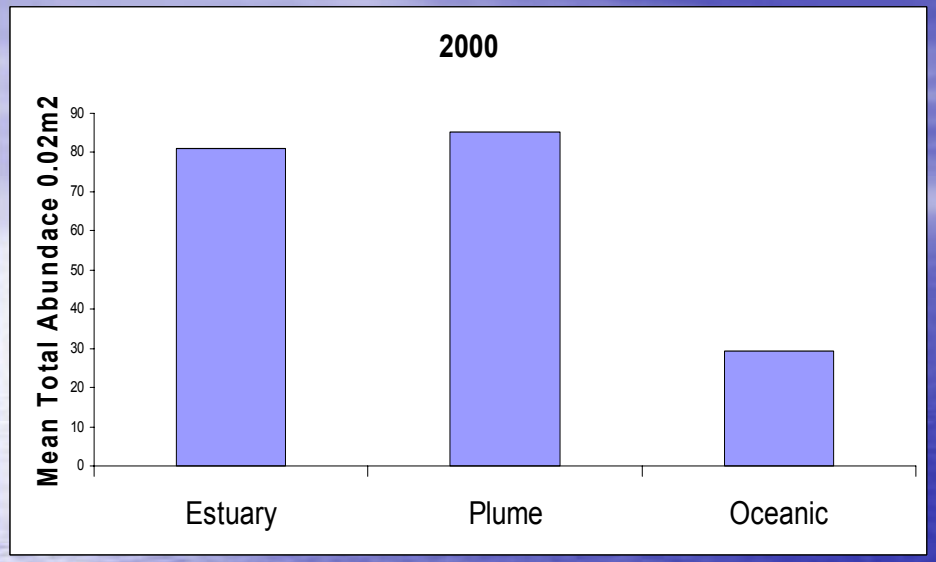
   - estuary vs. plume vs. shelf

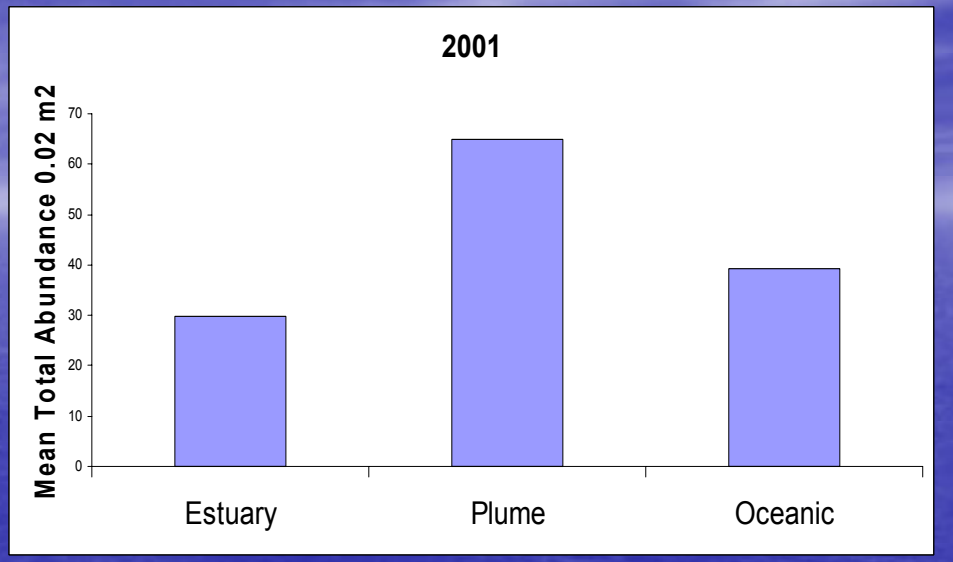
   - surface, 1m, bottom

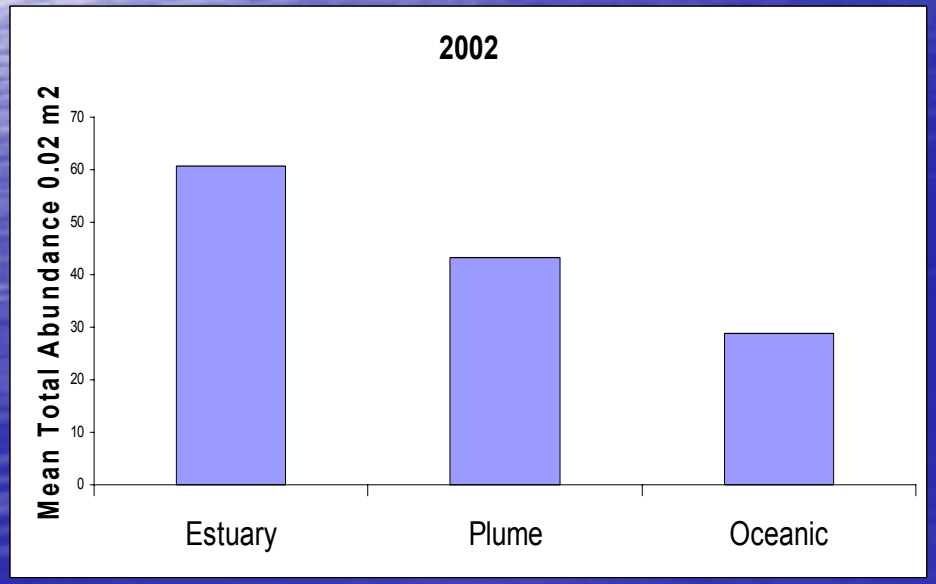
3. Trophic advantage hypothesis

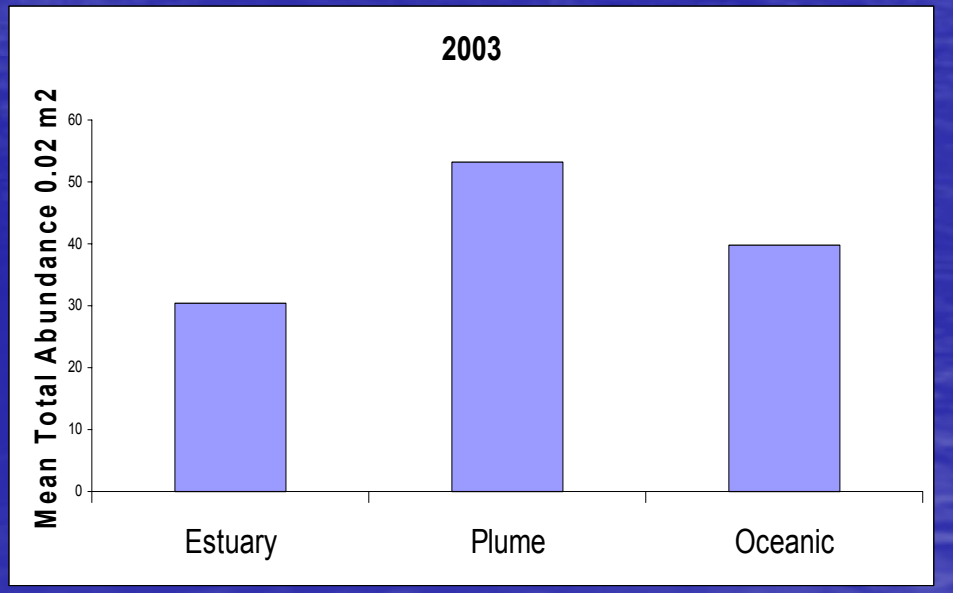


Patterns of Infaunal Abundance

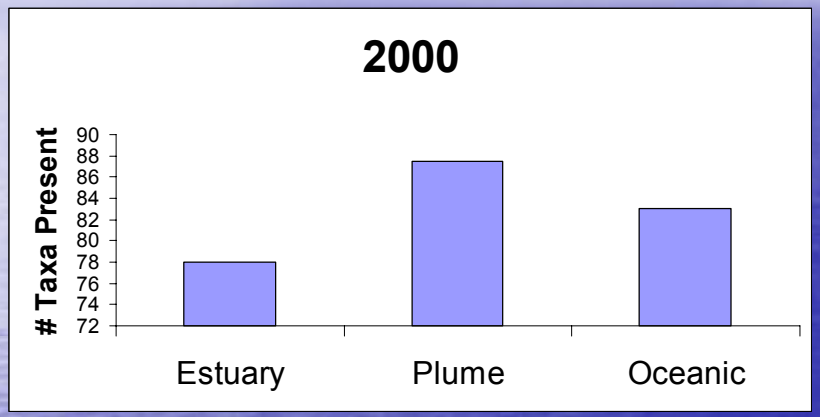


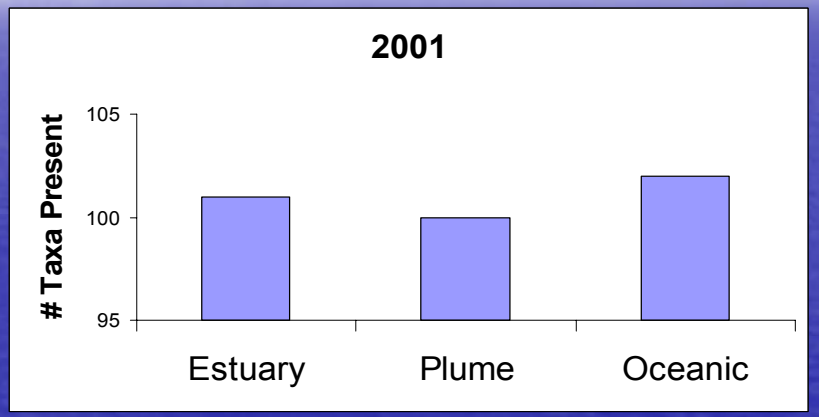


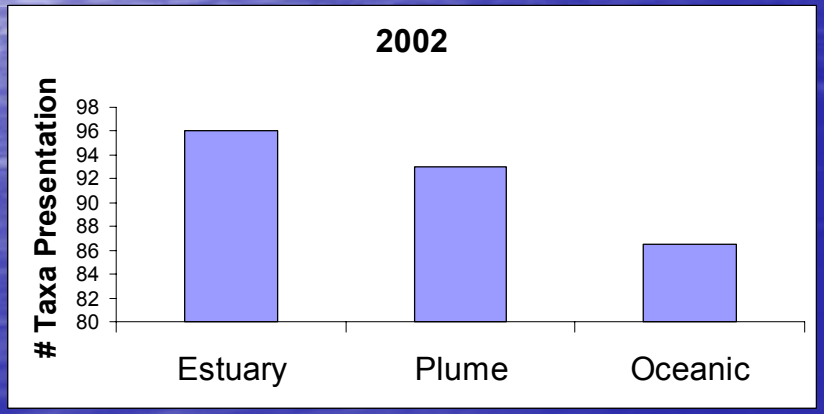


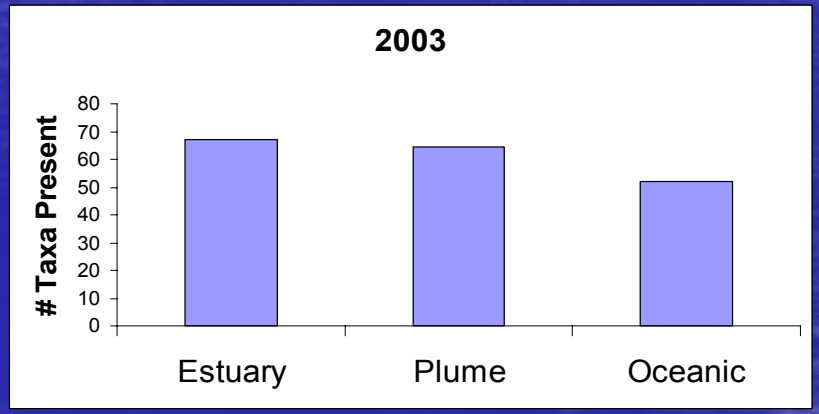


Infaunal Species Richness









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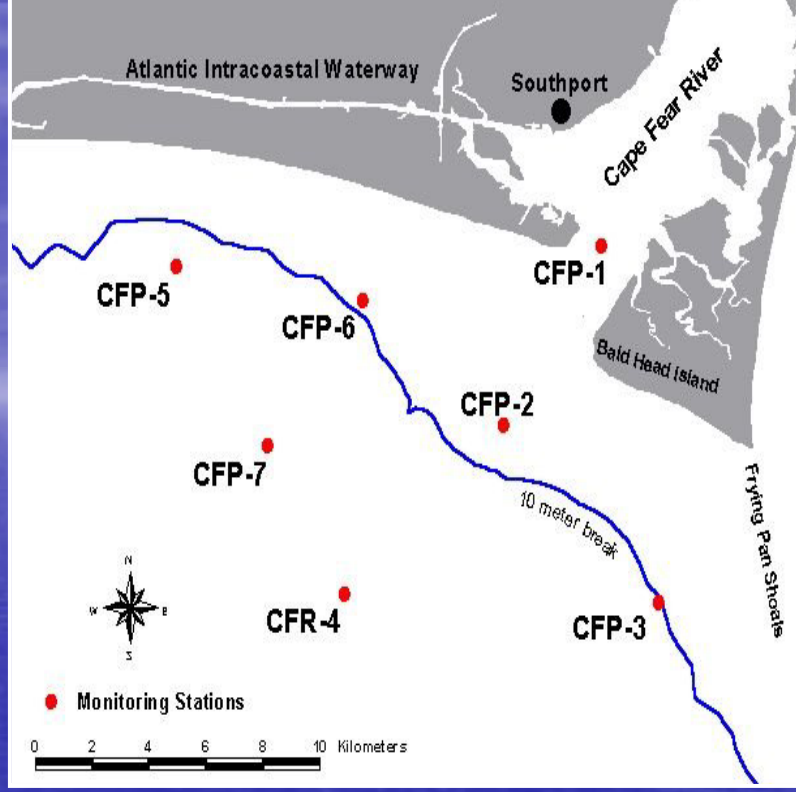
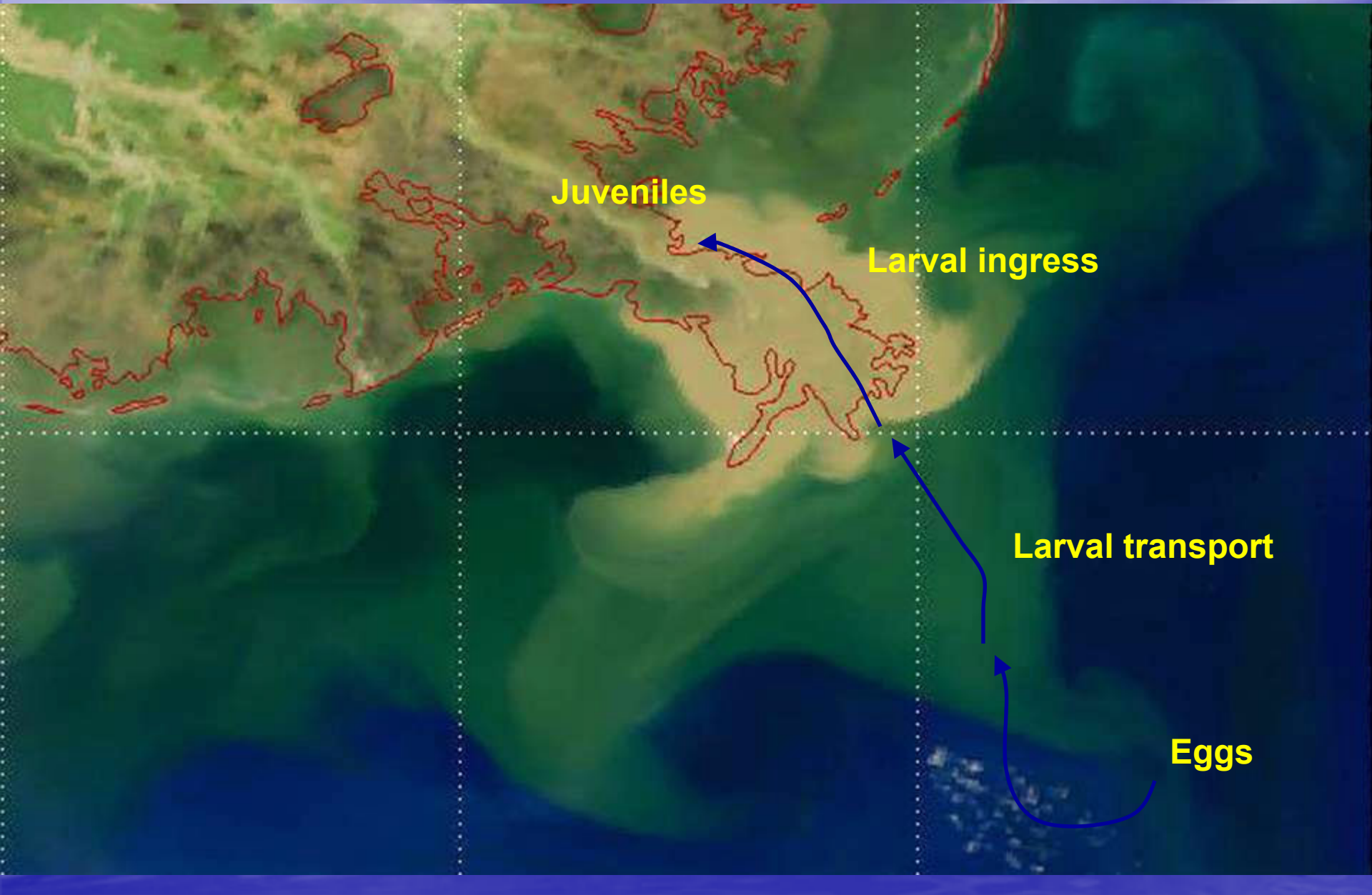
- surface, 1m, bottom

3. Trophic advantage hypothesis

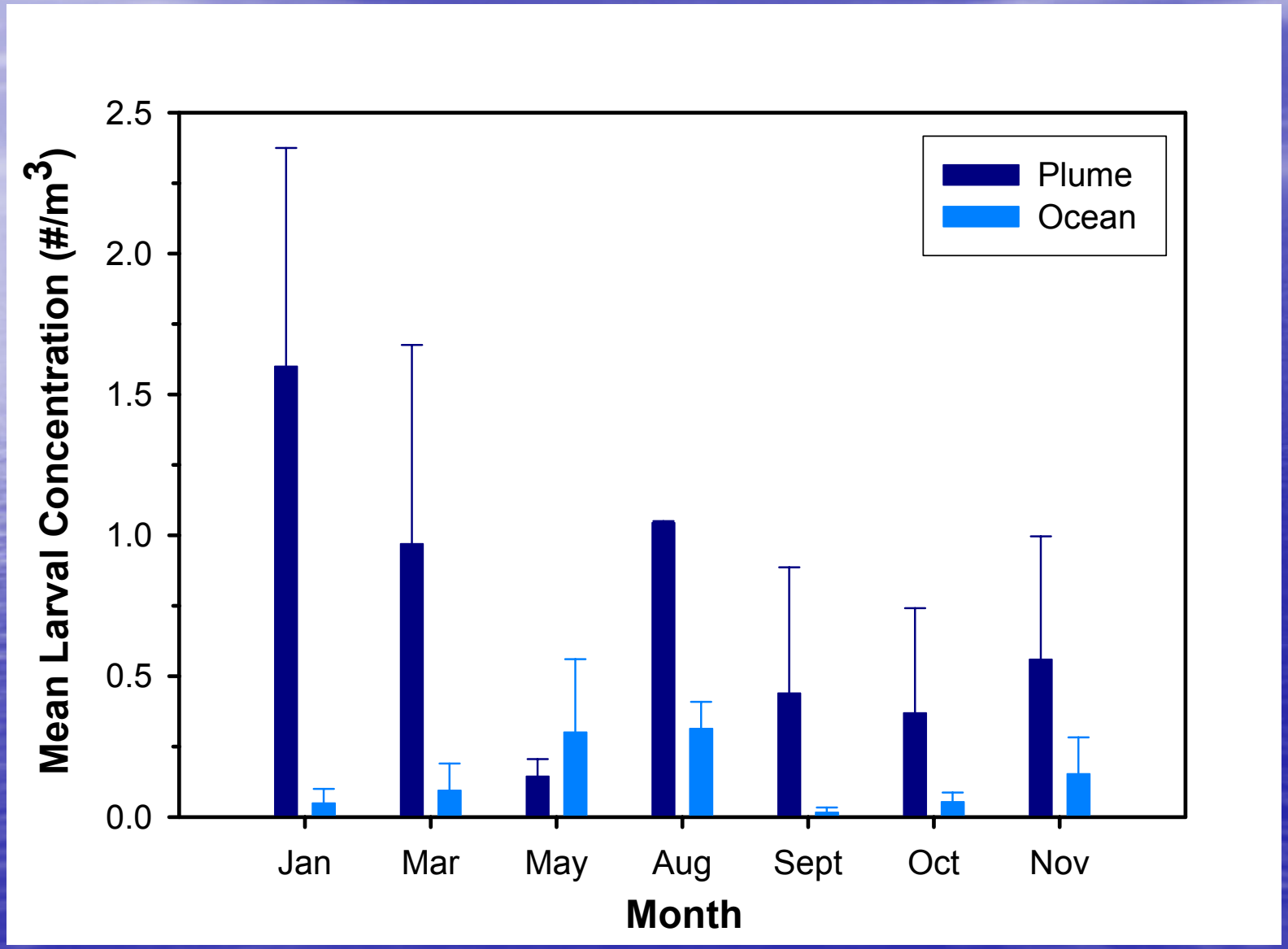
- Biochemical indicators of physiological condition

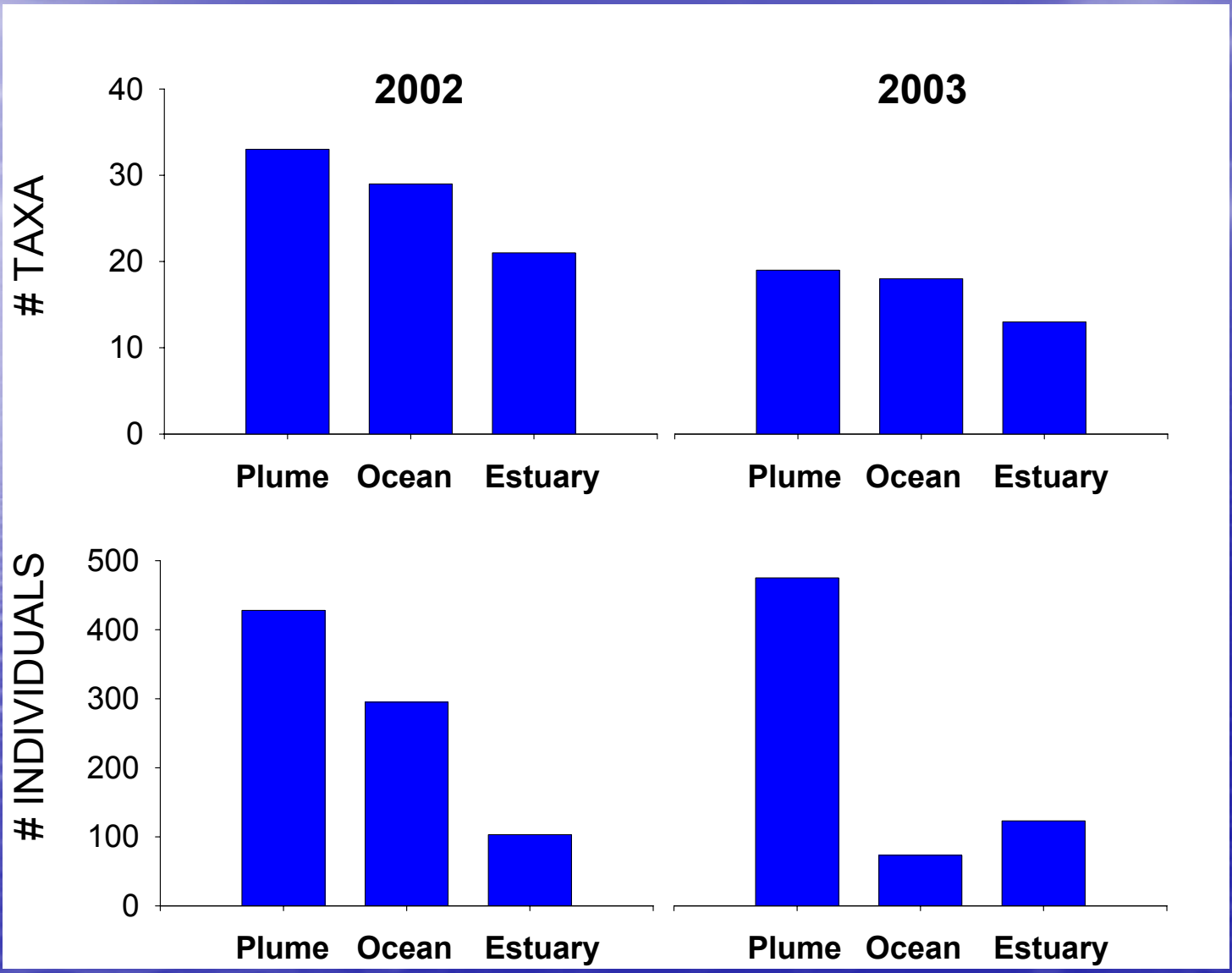


Role of Discharge Plumes in Life-Histories and Recruitment Success



Preliminary Observations: Aggregation Hypothesis




2002
2003
TAXA
40
30
20
10
0
Plume
Ocean
Estuary
Plume
Ocean
Estuary
INDIVIDUALS
500
400
300
200
100
0
Plume
Ocean
Estuary
Plume
Ocean
Estuary

Conclusions

- Larval and juvenile fish seem to cue in on the plume habitat
- Specific cues currently under investigation
- Infauna show a similar pattern but likely caused by a different mechanism
- Infaunal community dominated by river fates
- 300+ taxa reported from the infauna