



# Customized Sampling Methods and Devices for Challenging Estuary Sampling Programs



# Site Setting

- Tidal Estuary
- Extensive system of primary waterway, tributaries, and marshes
- Limitations *and opportunities* provided by...
  - Shallow water
  - Tides
  - Dense *Phragmites* marshes

# High Resolution Sampling of Waterway Sediment

## Sampling Program

- Core depth = 2 meters.
- Subsampling on 2 centimeter intervals.
- Planned analyses required large sample mass.
  - High moisture content.
  - High organic content.



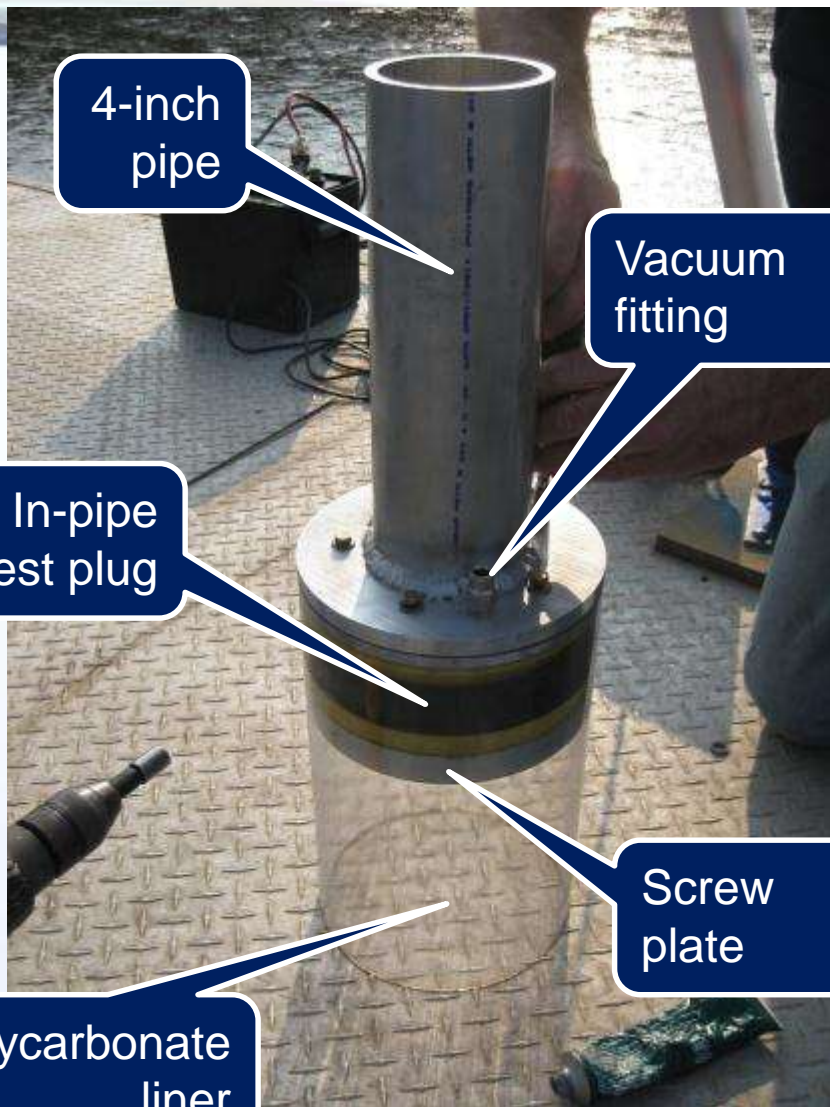
## Complication

- Standard 4-inch Vibracoring would require excessive compositing of multiple cores and significant labor to process.

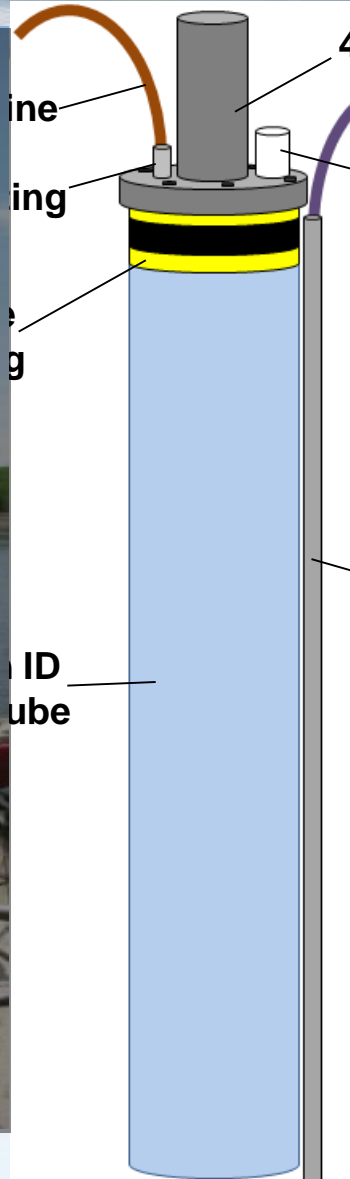
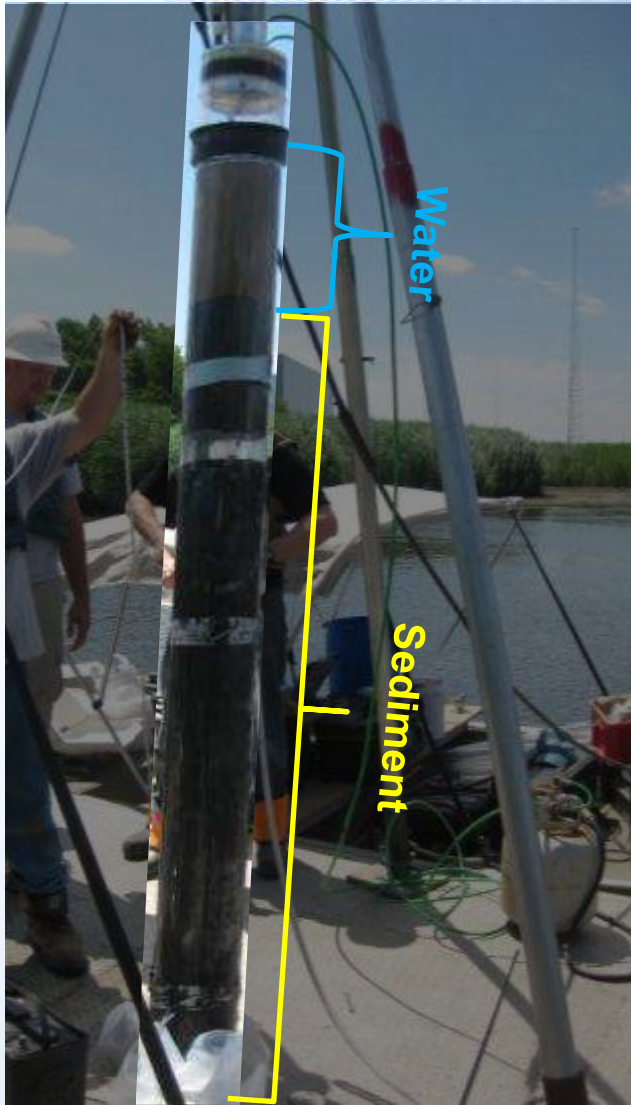
## Solution

- Increase the diameter of the core without extensive cost implications.
- Design around limitations and opportunities provided by the site.

# Custom Vibracore Adapter & Polycarbonate Barrel



# High Resolution Sampling – Vibracoring



## 8-Inch Coring Method

- Polycarbonate barrel inserted to desired depth.
- Suction abatement tube cleared.
- Passive or active suction abatement.
- Vacuum applied in headspace.
- Core lifted to deck of sampling vessel.
- Core cut in half and sealed for transport.



# 8-Inch Core Processing

- 8-inch core transported and processed vertically.
- 1/8th-inch thick sleeve scored with circular saw.
- Top of core covered during processing.
- Adjustable rubber guide used to ensure straight cuts.

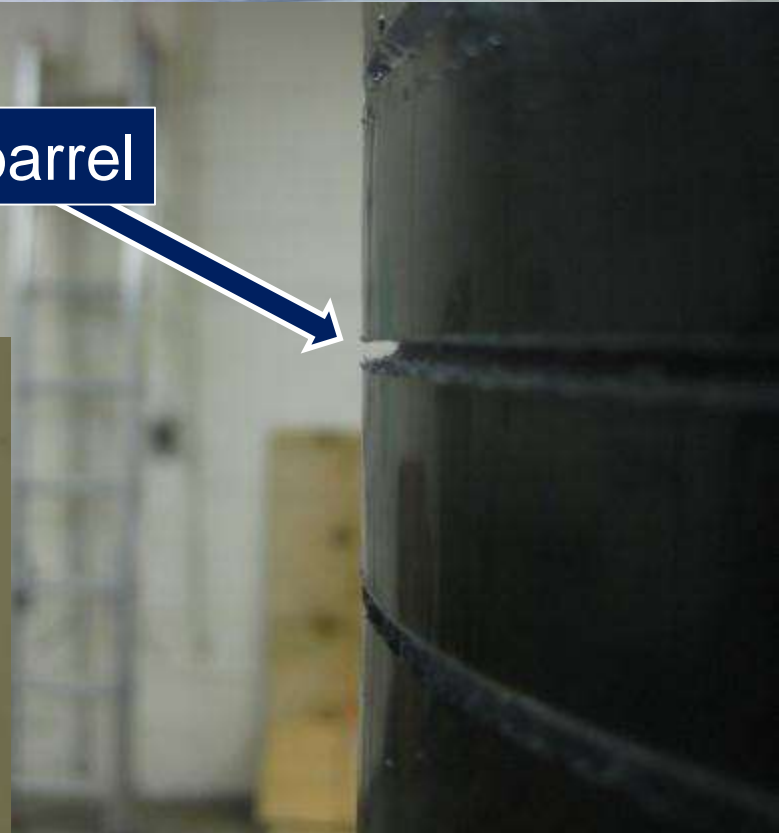


# 8-Inch Core Processing

Scored polycarbonate barrel



Adjustable saw deck guide





# 8-Inch Core Processing

- Intervals are removed using stainless steel plate pushed through scored barrel.
- 600 to 1,000+ grams per section.



# High Resolution Sampling – Box Coring

- Box coring is an excellent method for quickly collecting high quality shallow cores at this site.

## Complication

- Box coring does not facilitate subsampling.

## Solution

- Box core insert sleeve.





Two-piece stainless insert sleeve



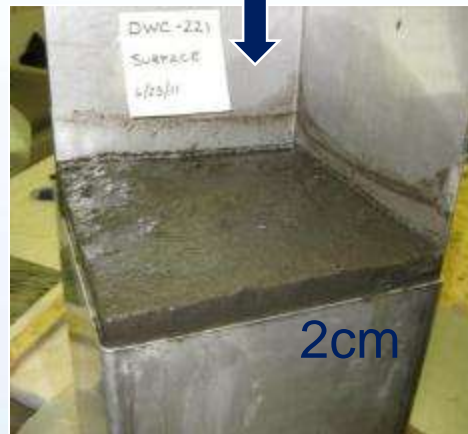


Stainless insert sleeve and “side cheeks” inserted through top opening after box coring.



Cap inserted beneath insert sleeve and secured. Sleeve contains undisturbed 30 to 40 cm sediment column.

- Sectioned by sliding one side vertically to expose desired interval and removing with stainless plate.



- Design holds two independent sections together during processing.
- Promotes level sectioning (2 flat sides as a guide).
- Simple and inexpensive.



## Sampling Program

- Similar sampling goals to waterway sampling, (large sample volume, 2 to 3 cm intervals).

## Complications

- Access to locations
- *Phragmites*
  - Extremely dense root mat resistant to precise coring and sectioning.
  - Roots and water can be a significant percentage of recovery.

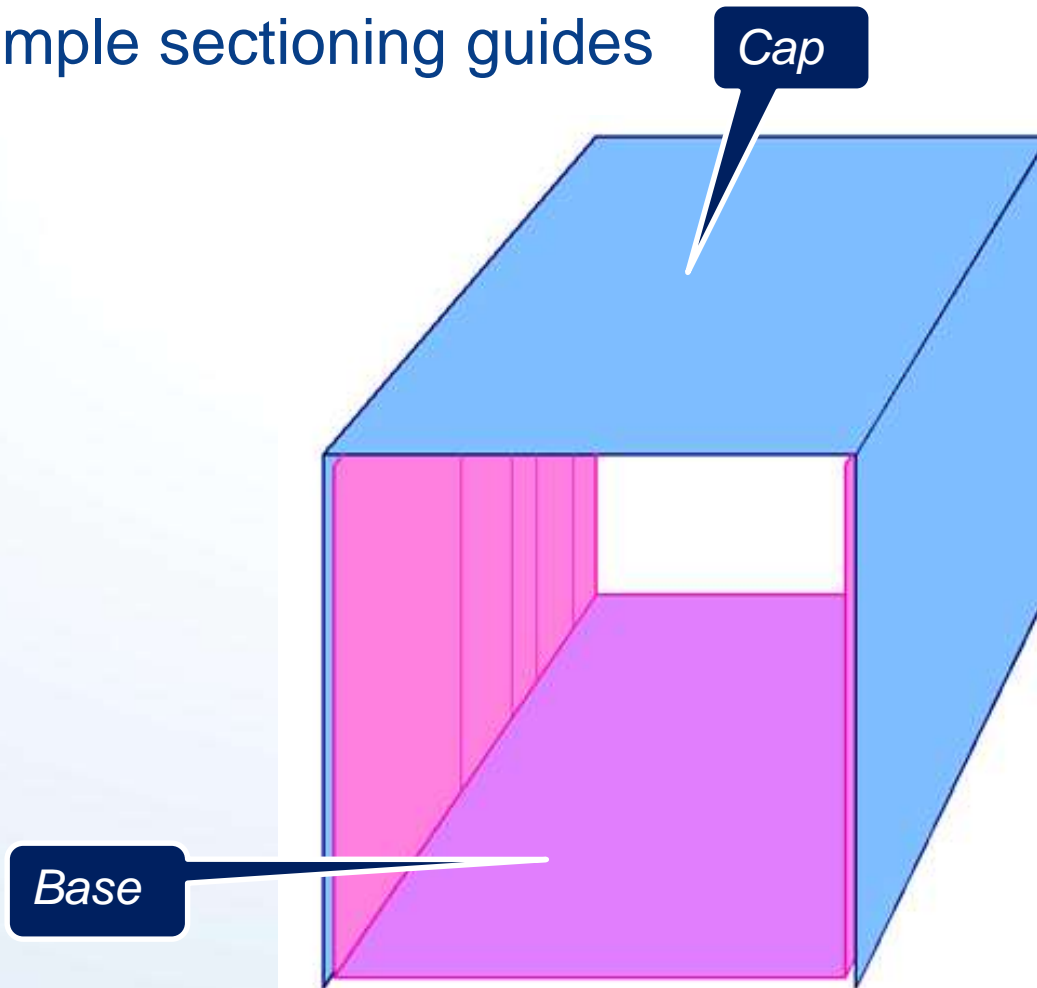
## Solution

- Custom marsh box core sampler designed for *Phragmites* marsh.



# Marsh Box Core Design

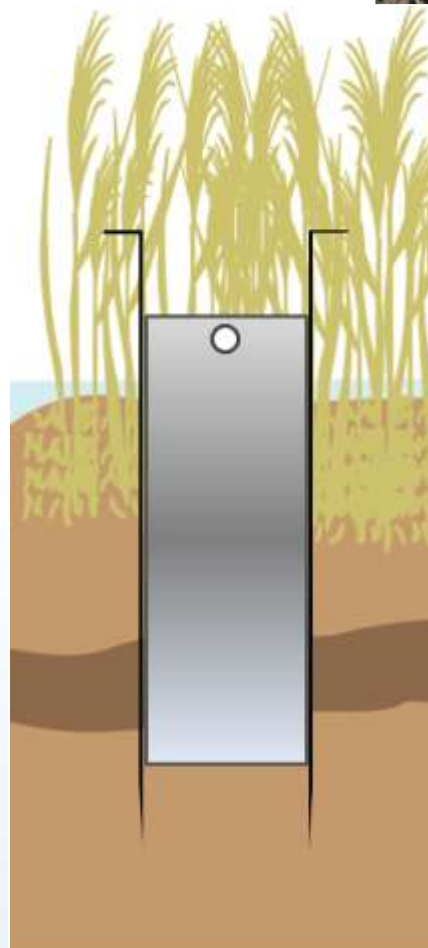
- Dual channel design
- Sample sectioning guides





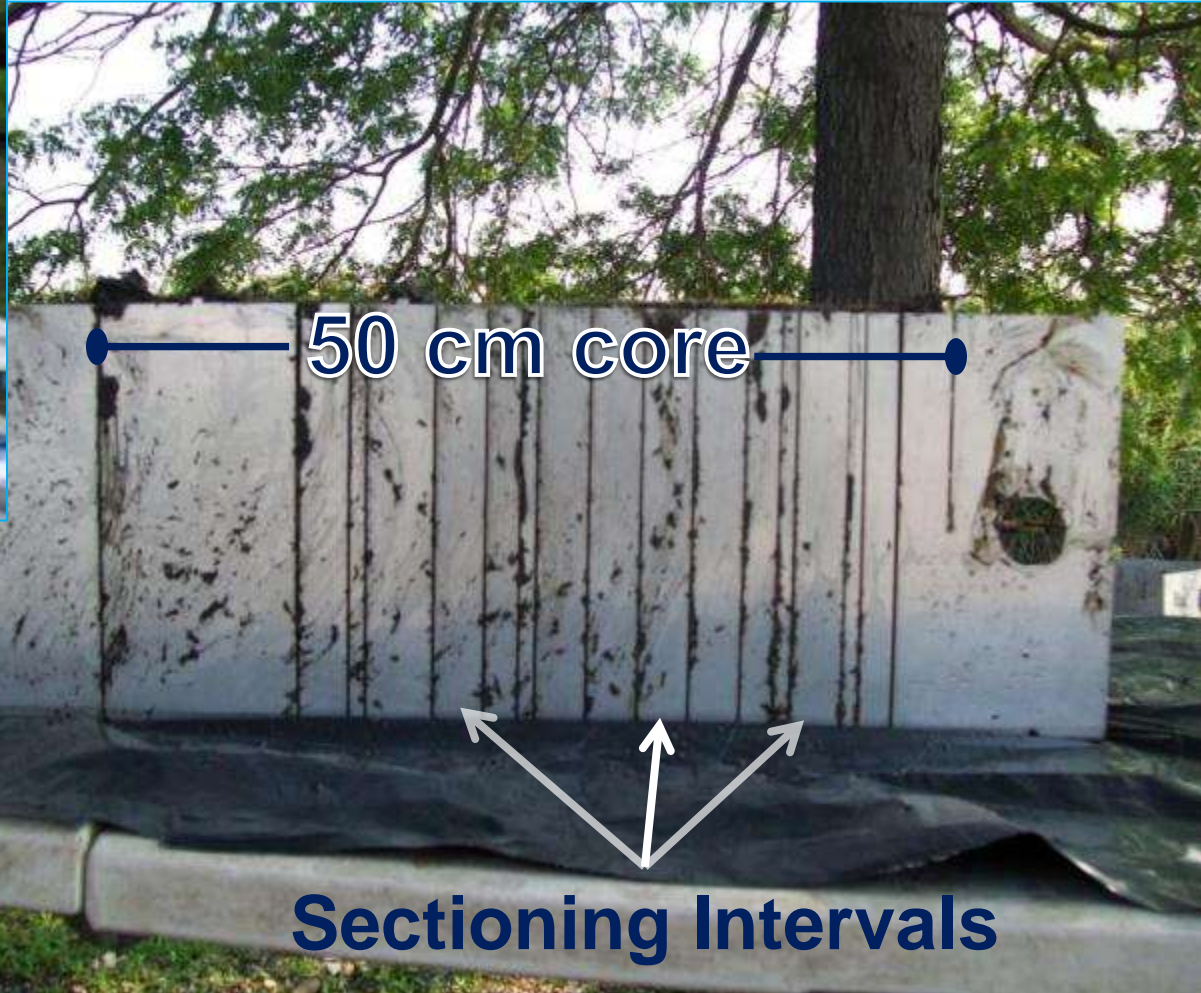
# Marsh Box Core Process

- Box core advanced to refusal.
- “Guillotine” cuts roots on all sides in advance of box core.
- Access holes dug beside core.
- Core lifted out from the bottom



Guillotine

# Marsh Box Core Process



# Marsh Sediment Processing



Intact core sectioned cleanly on desired intervals.

# Marsh Sediment Processing



Extensive Root Mat



50 cm marsh box core



60 cm Vibracore



