



# Cross-Shelf Sedimentation Patterns and Processes

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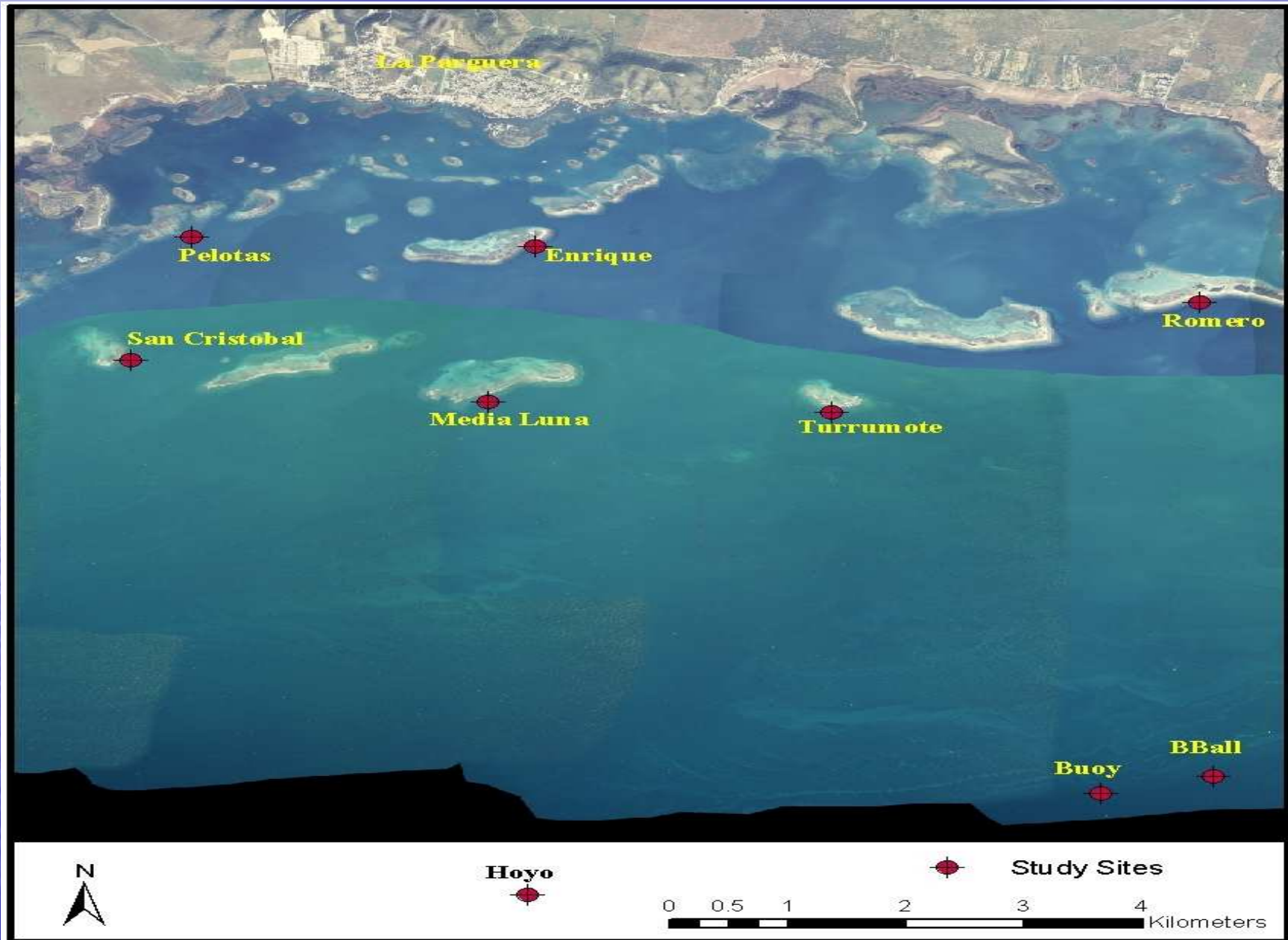
# Why analyze sediments?

- Terrigenous sediment can pose a serious threat to the health of reef environments
  - Increased turbidity
  - Negatively impact coral settlement sites
  - Physical stress
  - Chemical stress?
    - Increased organic material
    - Nutrients
    - Pollutants

# Is terrigenous material reaching the reefs off La Parguera?

- Locally-derived runoff is probably contained within nearshore areas
- However, offshore reefs may be affected by longshore transport of terrigenous material

# Study Area



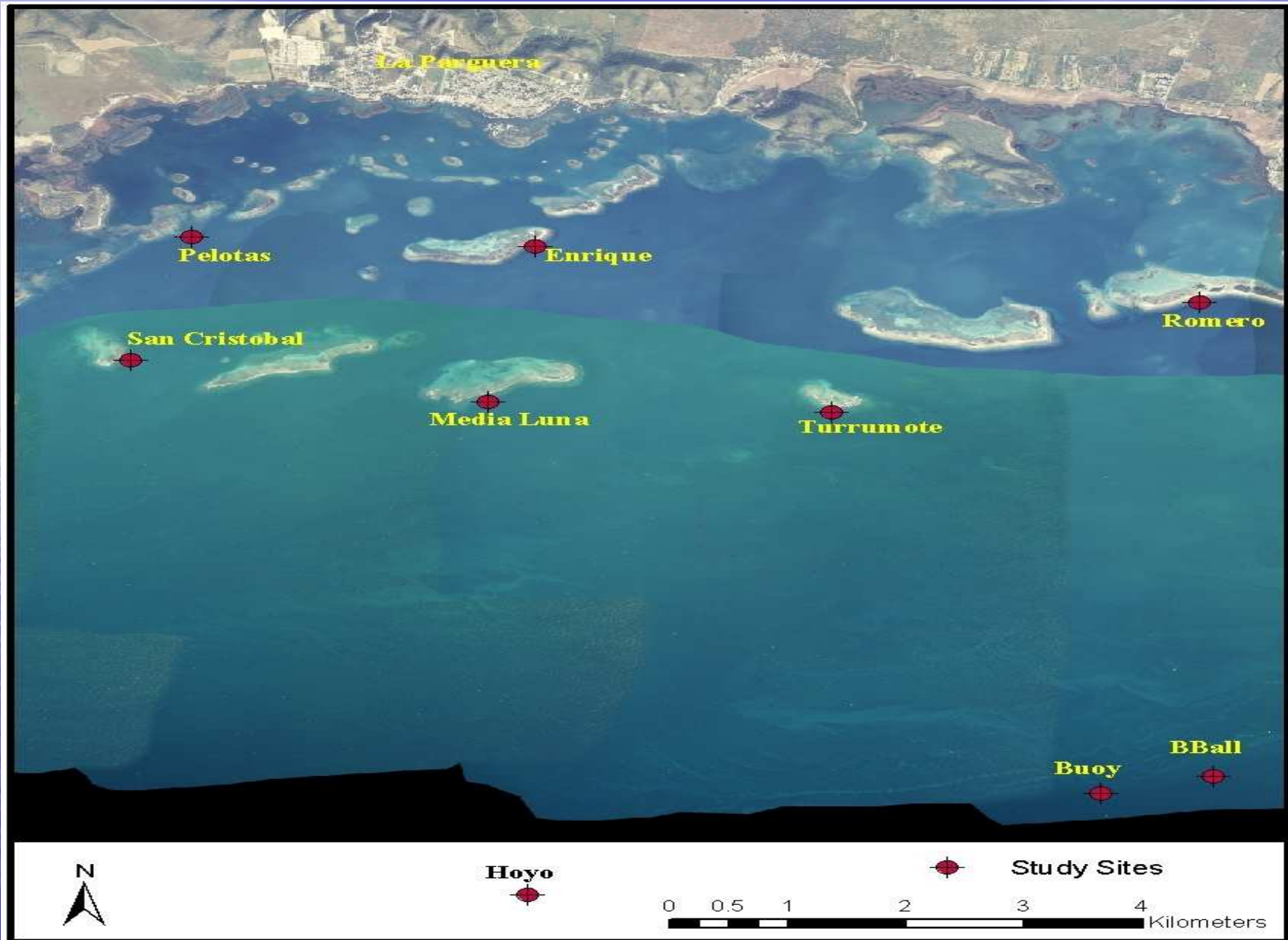
# Goals of Study

- Determine the character and composition of suspended sediments accumulating at offshore reef sites
- Use this information to identify primary sources of suspended sediment
- Identify potential effects on coral communities

# Approach and Methodology

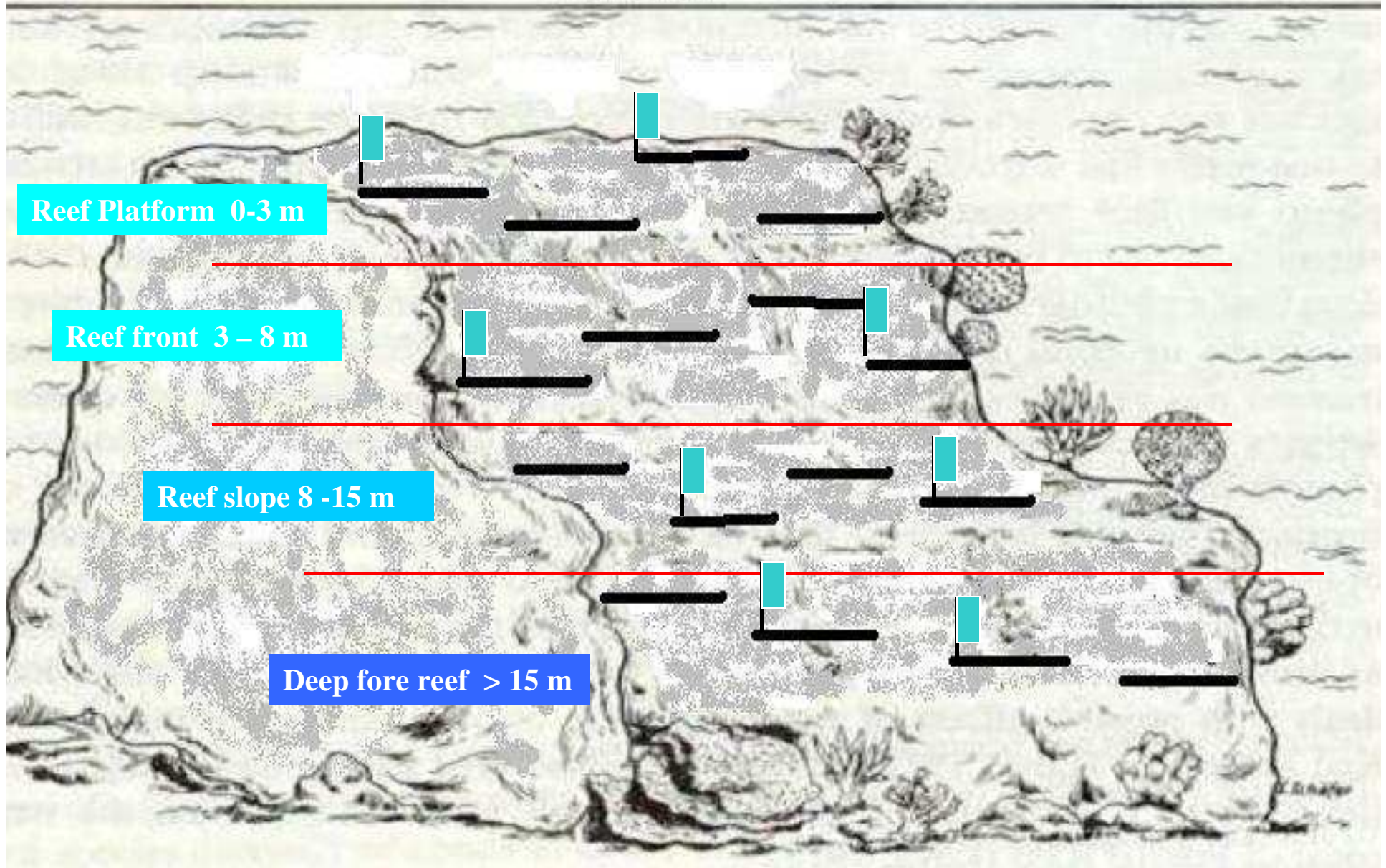
- Sediment traps have been deployed at reef sites along the three reef trends across the shelf
  - I.e., inner shelf, mid-shelf, and shelf edge
- At each site, replicate traps are deployed at four depths
- Sediment trap samples collected monthly

# Study Area



# Sampling Design

SEA LEVEL





# Approach and Methodology



- Sediment trap

# Approach and Methodology

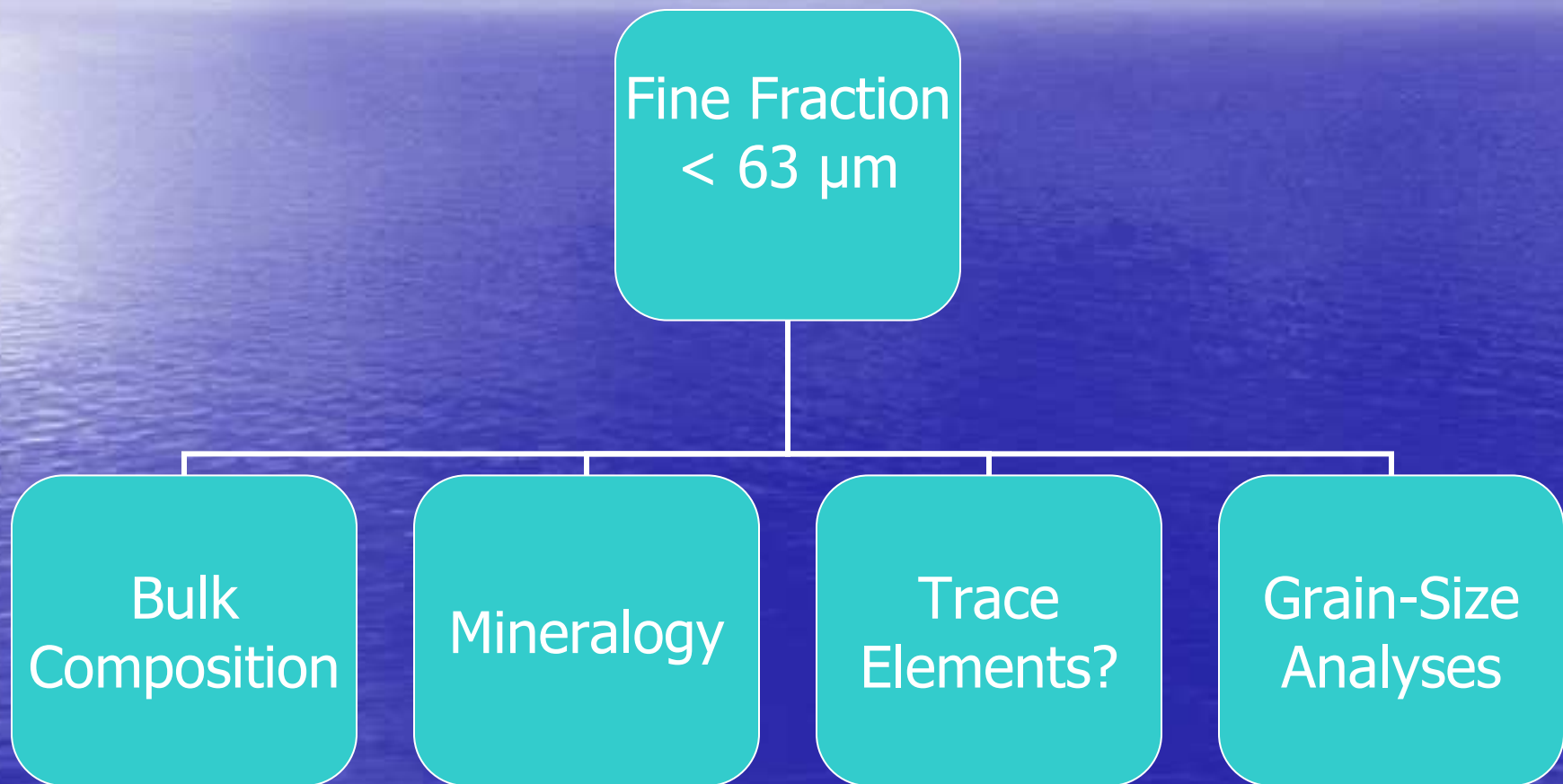
Sediment sample

```
graph TD; A[Sediment sample] --> B[Weight % Fines < 63 μm fraction]; A --> C[Weight % Coarse > 63 μm fraction];
```

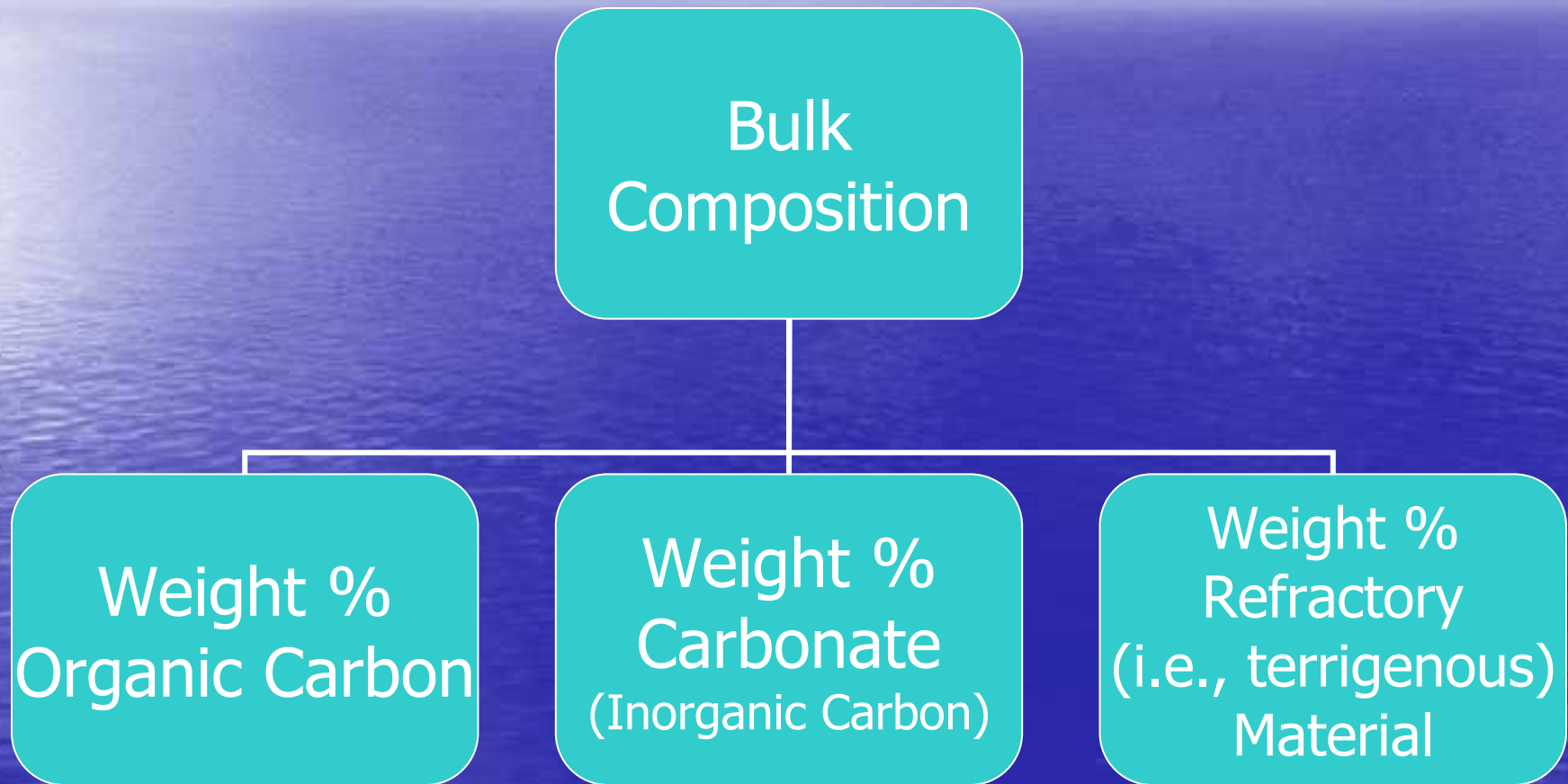
Weight % Fines  
< 63  $\mu\text{m}$  fraction

Weight % Coarse  
> 63  $\mu\text{m}$  fraction

# Approach and Methodology



# Approach and Methodology



# Approach and Methodology

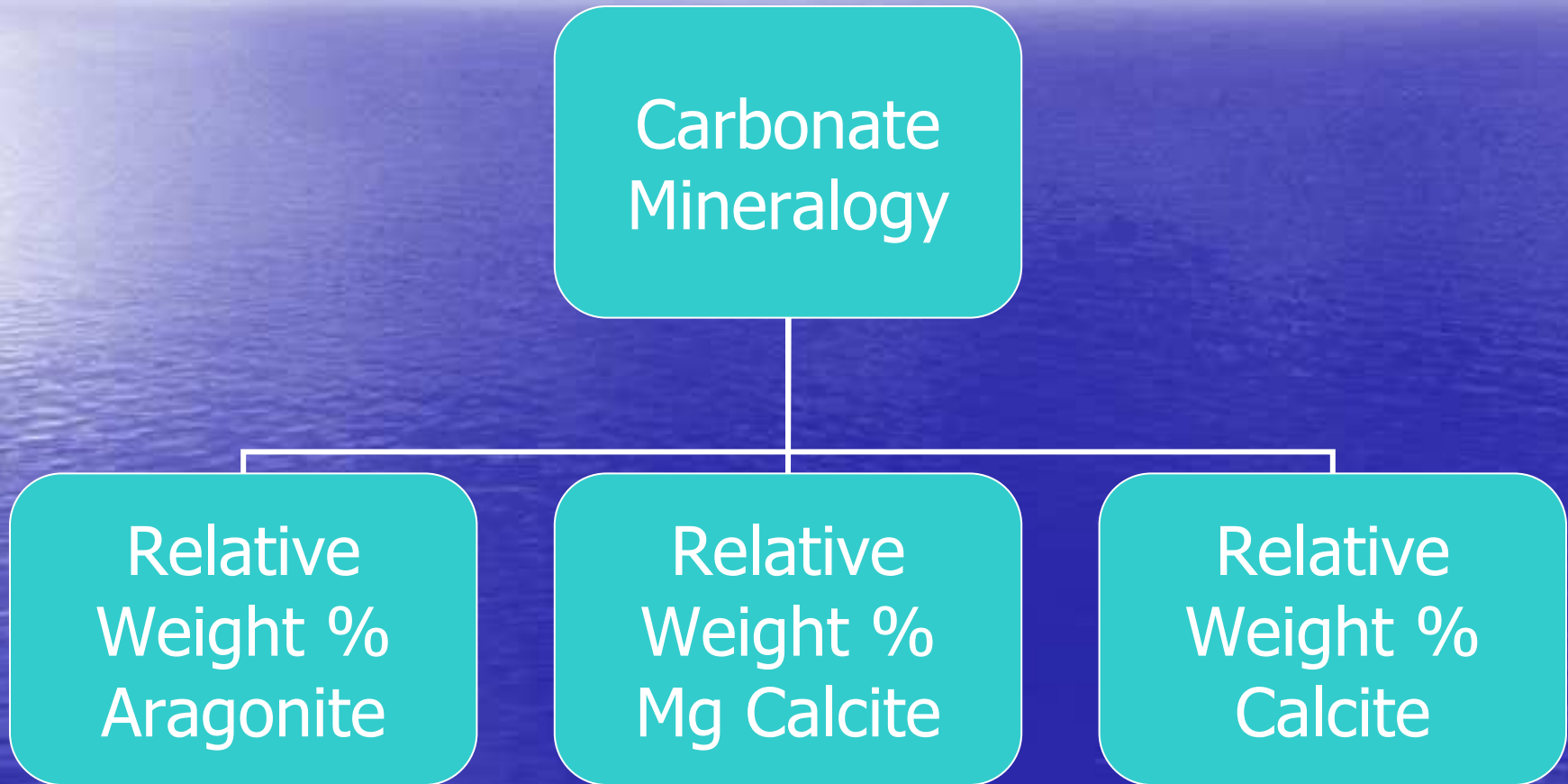
Mineralogy  
(XRD Analyses)

```
graph TD; A["Mineralogy (XRD Analyses)"] --- B["Carbonate Minerals"]; A --- C["Terrigenous Material"]
```

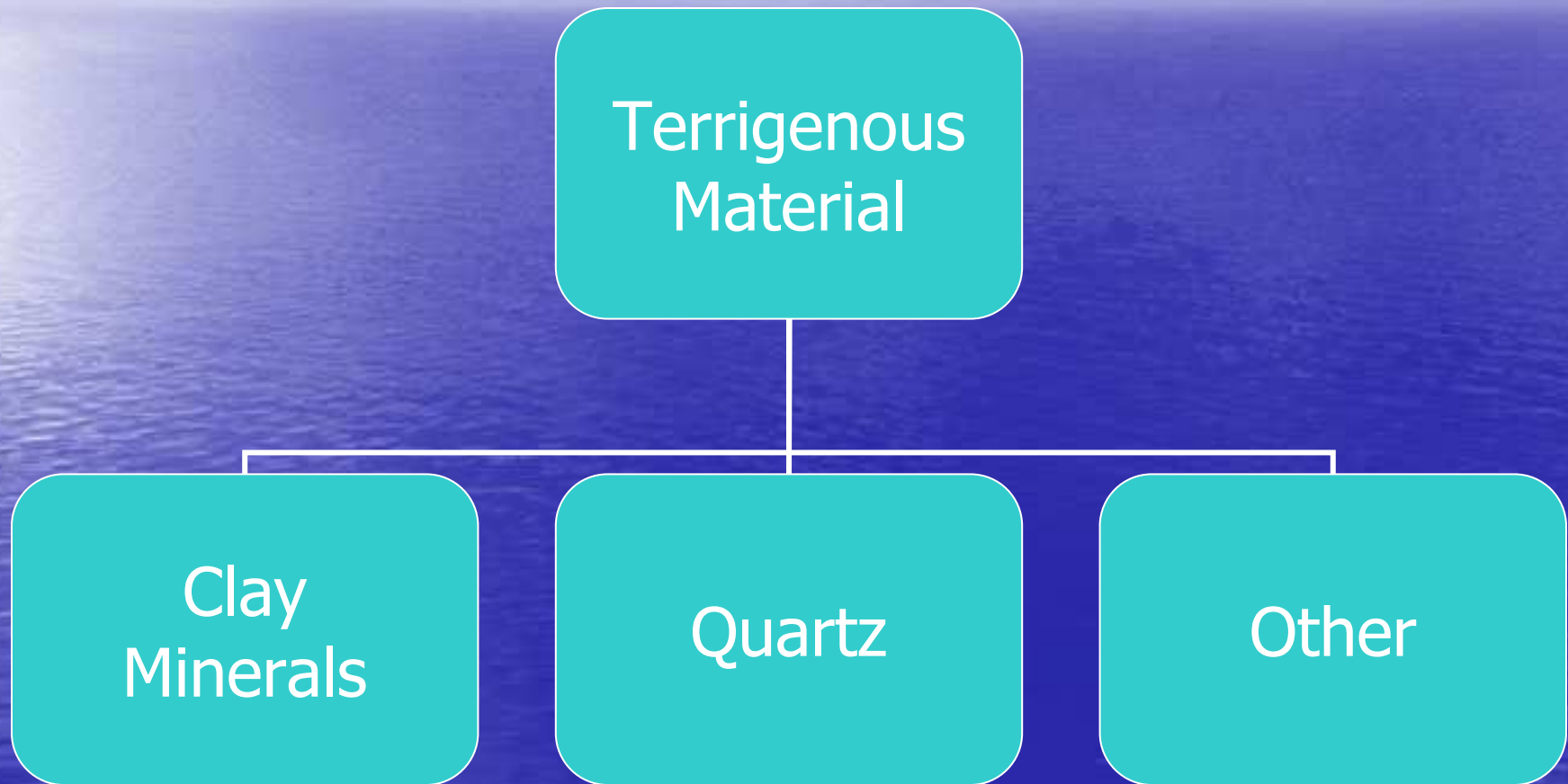
Carbonate  
Minerals

Terrigenous  
Material

# Approach and Methodology



# Approach and Methodology



# Approach and Methodology

- Trace element analyses on terrigenous sediment?
  - Will depend on amount of sample available
  - Concentrations of trace elements
- Elevated concentrations of heavy metals would indicate pollutants reaching reef environments.
- Techniques?
  - X-ray Fluorescence
  - SEM
  - ICP-MS



# Approach and Methodology

## Grain-Size Analyses

```
graph TD; A[Grain-Size Analyses] --> B["< 63 μm fraction Sedigraph"]; A --> C[> 63 μm fraction Sieving]
```

< 63  $\mu\text{m}$  fraction  
Sedigraph

> 63  $\mu\text{m}$  fraction  
Sieving

# Expected Results

- Sediments will be composed mostly of calcium carbonate
  - With much lesser amounts of organic and terrigenous material largely restricted to the fine ( $< 63 \mu\text{m}$ ) fraction
- Composition and character of the refractory portion of the fine fraction will be critical in determining the ultimate source of the terrigenous material and the influence of terrestrial runoff on offshore reefs

The image features a blue gradient background. The top portion is a lighter, hazy blue with wispy white clouds, suggesting a sky. A horizontal line separates this from the bottom portion, which is a darker, more uniform blue representing water. The word "END" is centered in the middle of the image in a white, bold, sans-serif font.

END



END