

Sedimentation Patterns at Reef Sites Adjacent to the Guanica Bay Watershed, Southwest Puerto Rico

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Guanica Bay Watershed Project

- NOAA project to strategically evaluate, design, and implement a watershed restoration project to reduce the effects of land-based sources of pollution
- A primary element of this project includes efforts to characterize reef communities and the physical/chemical/biological stressors affecting them to inform decision-making as well as serve as a baseline to quantify the effectiveness of the implemented project

Guanica Bay Watershed Project

- *Sedimentation Patterns at Reef Sites Adjacent to the Guanica Bay Watershed, Southwest Puerto Rico*
- This project seeks to address Watershed Project needs by determining the composition and accumulation rates of terrigenous materials accumulating in Guanica Bay and on adjacent reefs

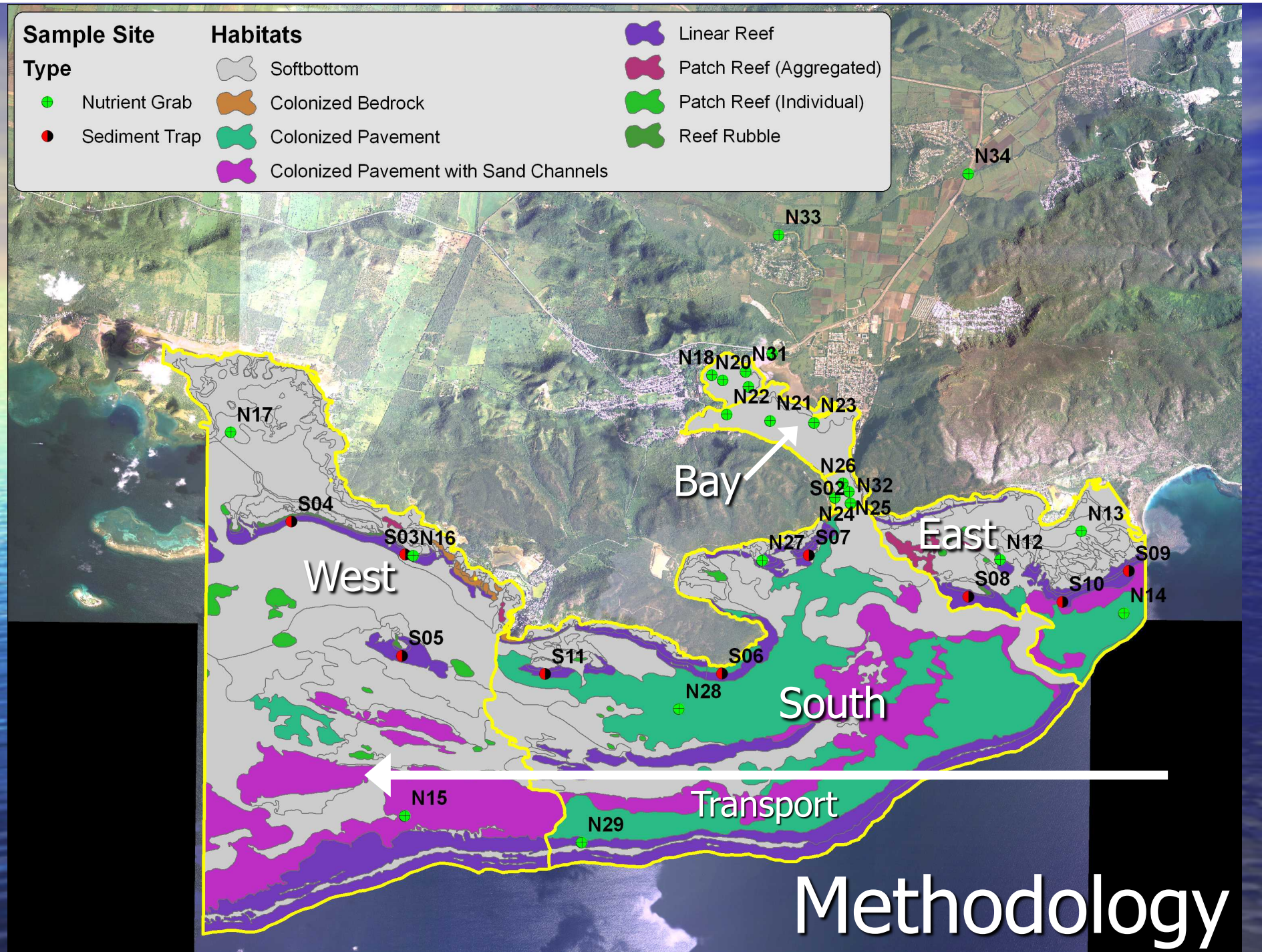
Sample Site

Type

- Nutrient Grab
- Sediment Trap

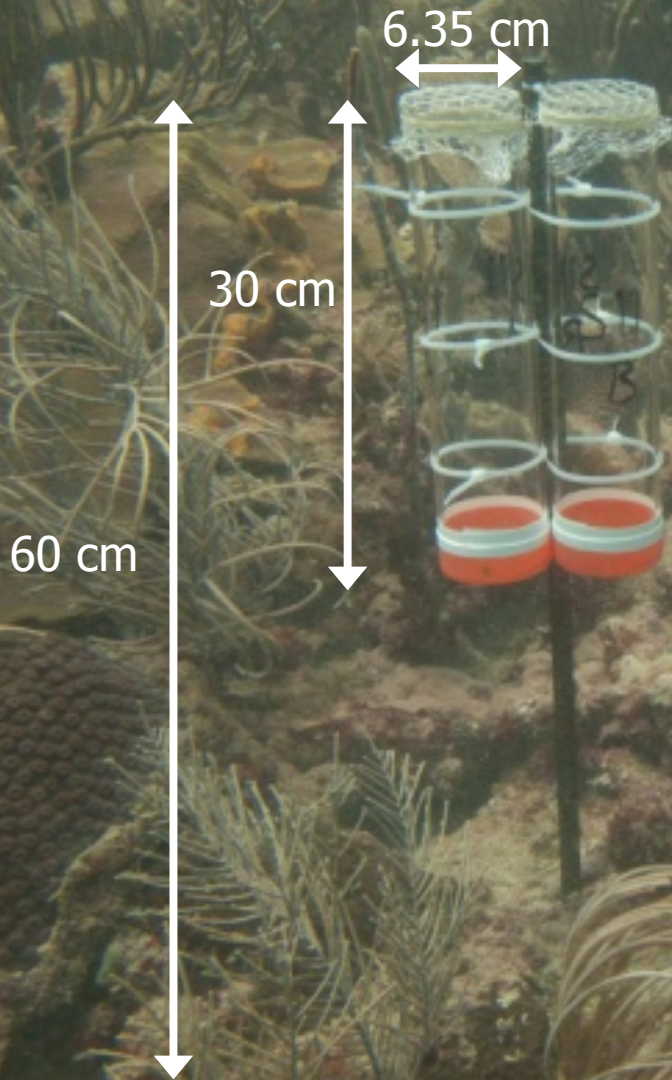
Habitats

- Softbottom
- Colonized Bedrock
- Colonized Pavement
- Colonized Pavement with Sand Channels
- Linear Reef
- Patch Reef (Aggregated)
- Patch Reef (Individual)
- Reef Rubble



Methodology

- Duplicate tube traps at each site
- 10 m water depth
 - At one site within each sector traps also at 5 m water depth
- Collected monthly



Methodology

The background of the slide is a solid green color. In the upper left corner, the word "Methodology" is written in a white, sans-serif font. The rest of the slide is a blurred image of a laboratory. On the left, there is a rack of test tubes. One test tube in the foreground is clearly visible, containing a yellowish liquid. To the right, another test tube is visible, also containing a yellowish liquid. The background is out of focus, showing other laboratory equipment and a white surface.

Methodology

- For each duplicate set of traps, total weight of material in each trap
 - Monthly total = average of two traps
- Material from one trap separated into coarse/sand ($>63 \mu$) and fine/mud ($<63 \mu$) fractions by wet sieving

Methodology

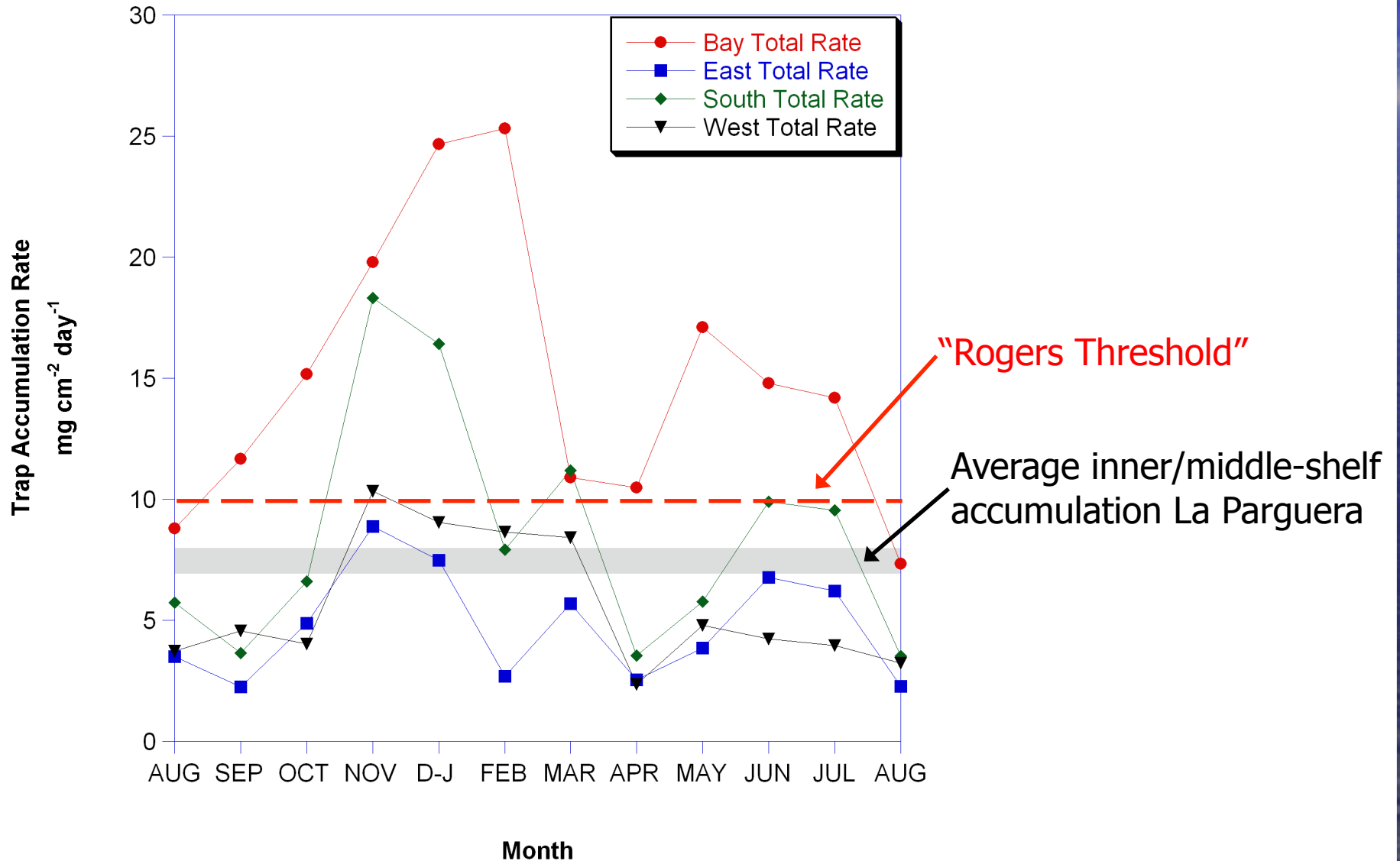
- Bulk carbon composition (TC, TIC and TOC) determined by carbon coulometry at Limnological Research Center/National Lacustrine Core Facility, University of Minnesota
- Coulometric results converted to:
 - Percent calcium carbonate
 - Percent organic material
 - Percent other (i.e., terrigenous)

Methodology

- Eventually, mineralogical composition will be determined by x-ray diffraction
 - Carbonate: Mg calcite, aragonite, calcite
 - Terrigenous: clay minerals, quartz, etc.

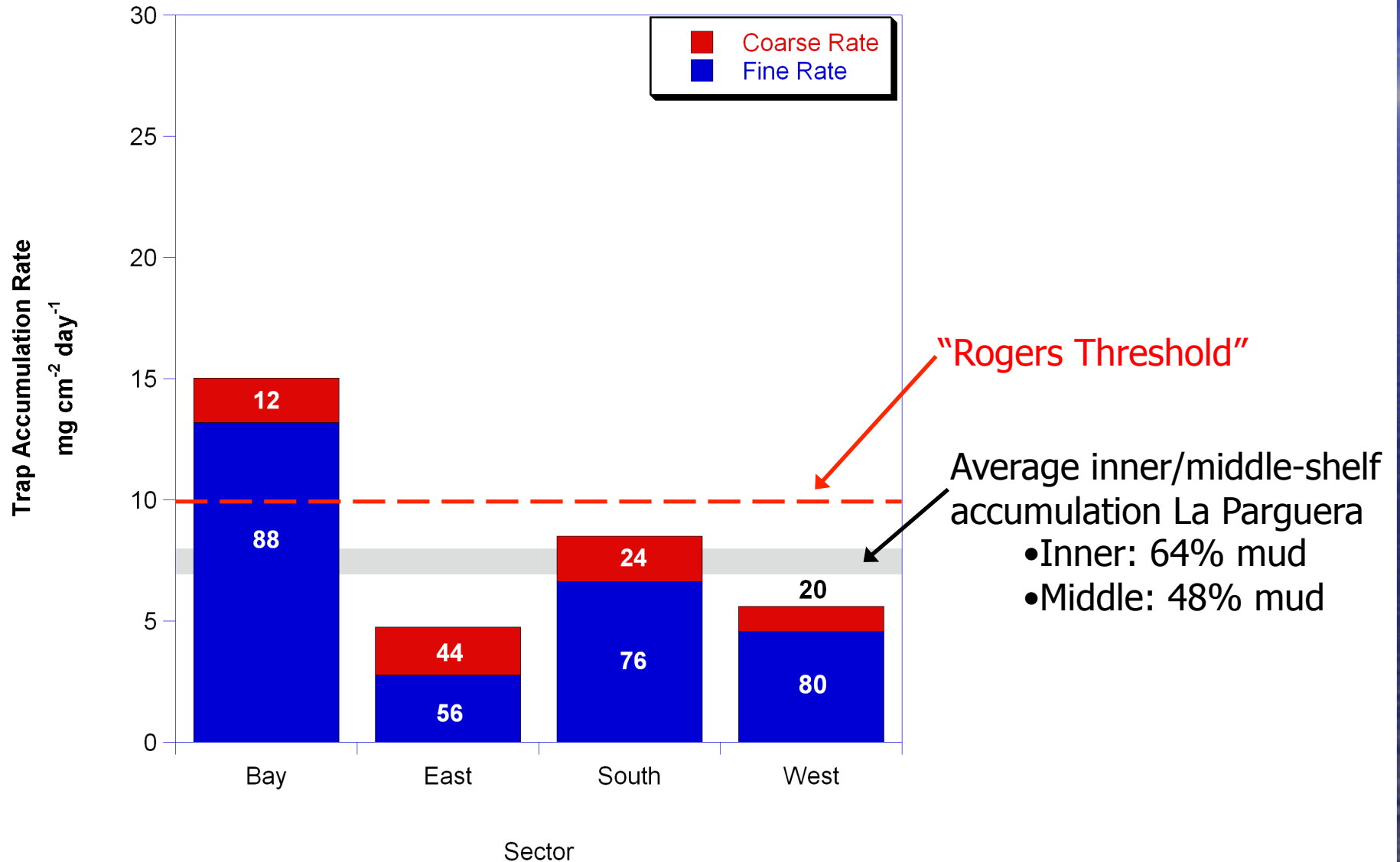
Results (thus far)

Guanica 2009-2010



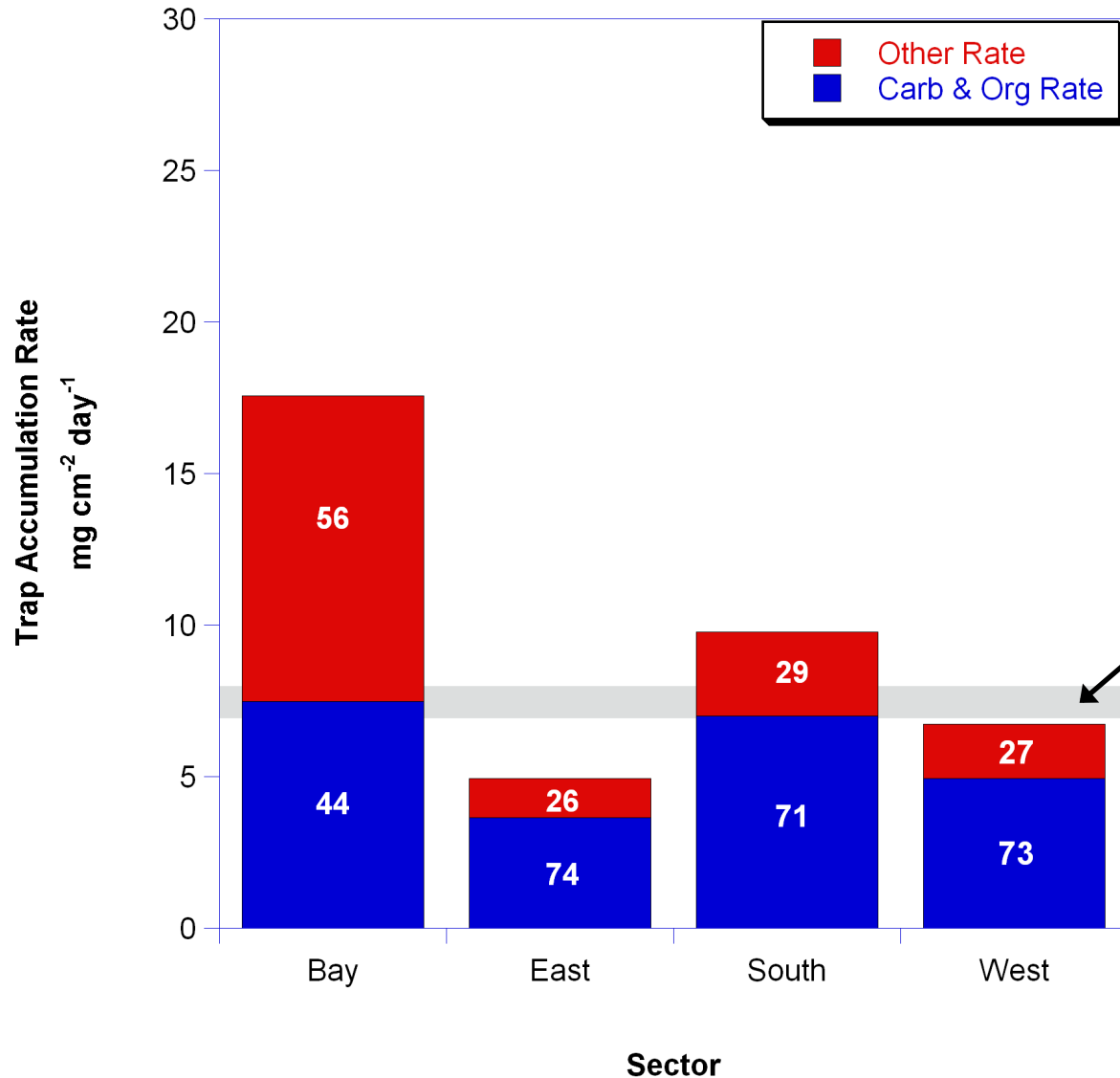
Results (thus far)

Accumulation Aug 2009- Aug 2010



Results (thus far)

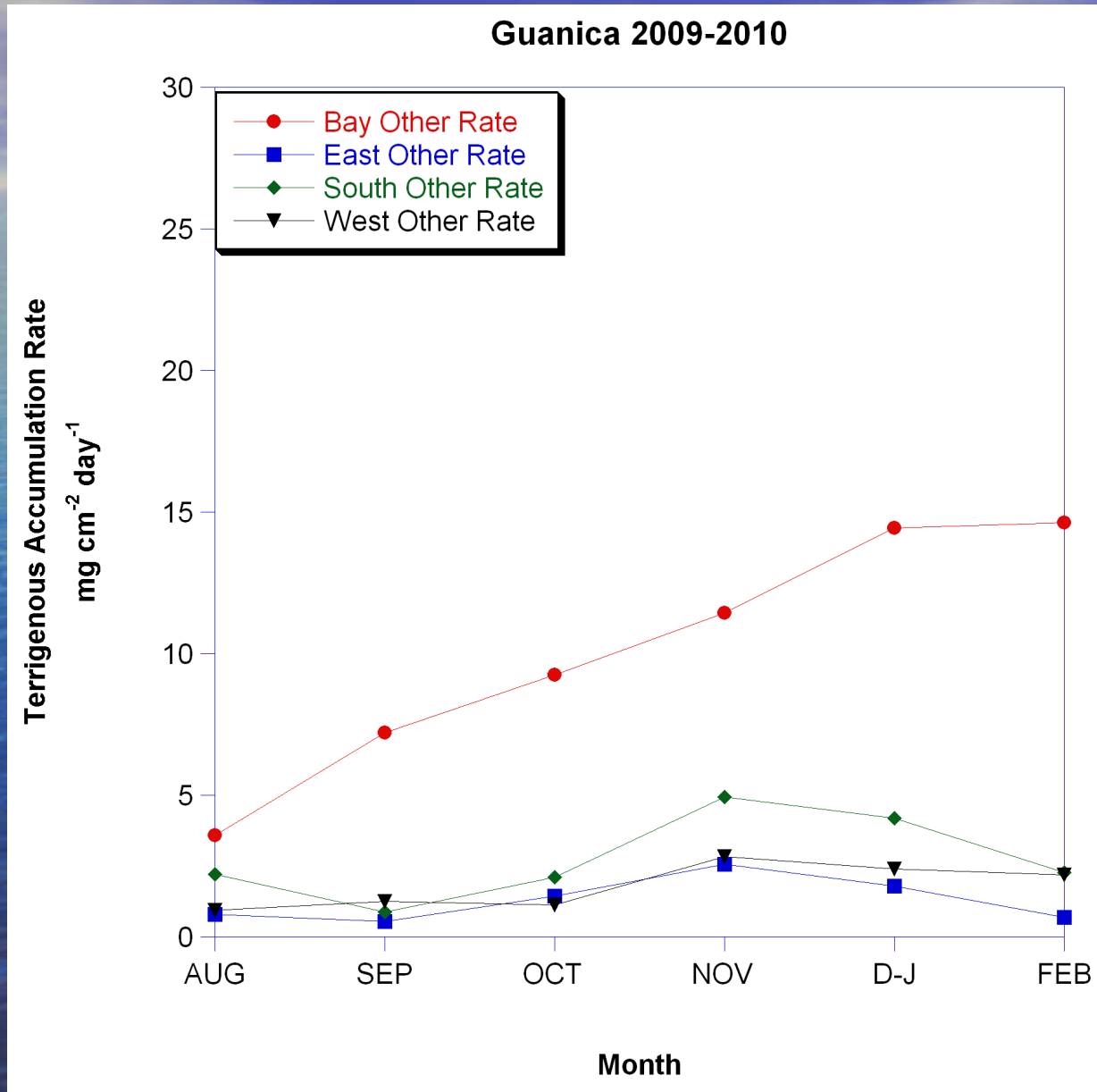
Accumulation Aug 2009- Feb 2010



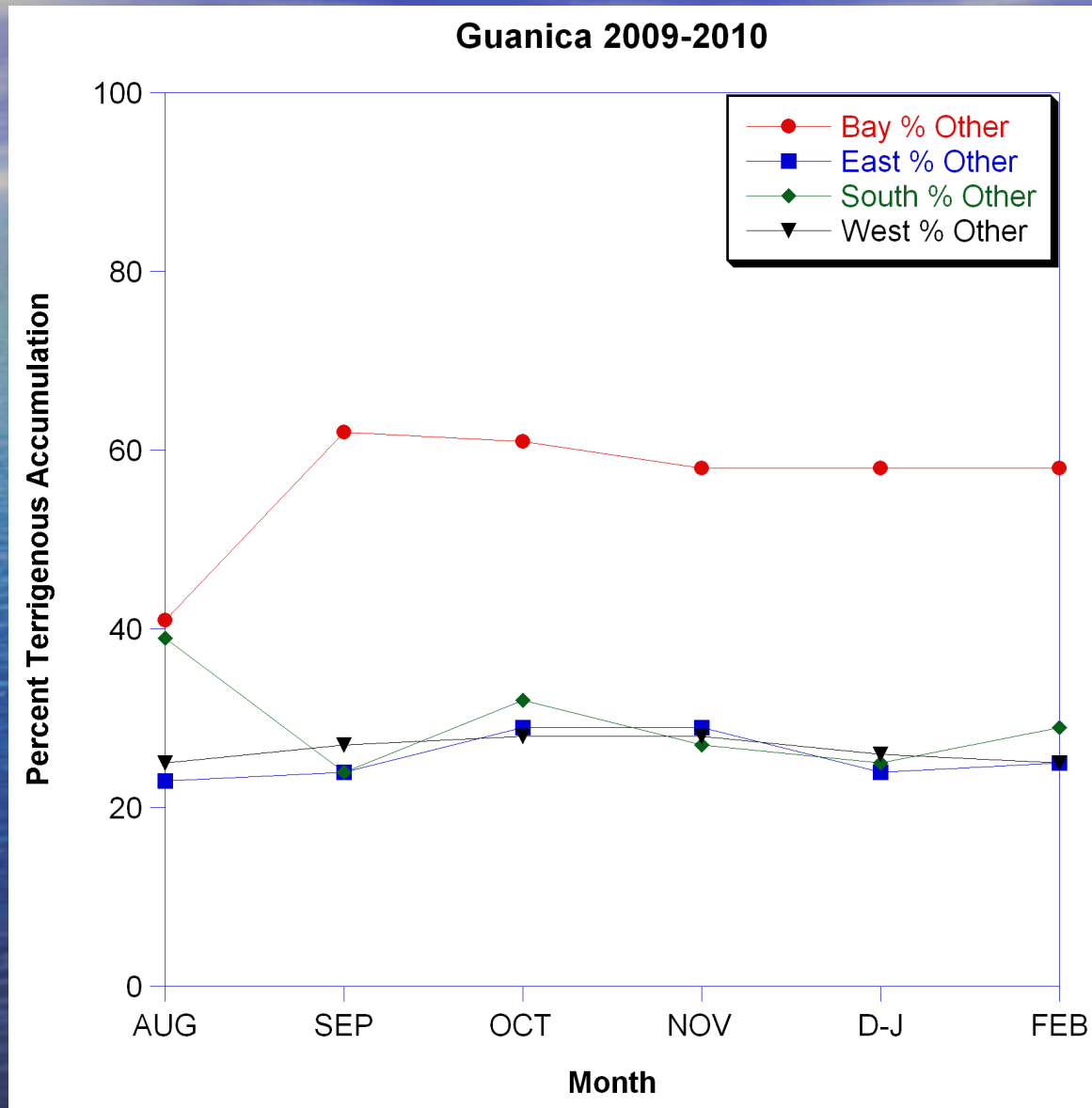
Average inner/middle-shelf accumulation La Parguera

- Inner: 22% terrigenous
- Middle: 19% terrigenous

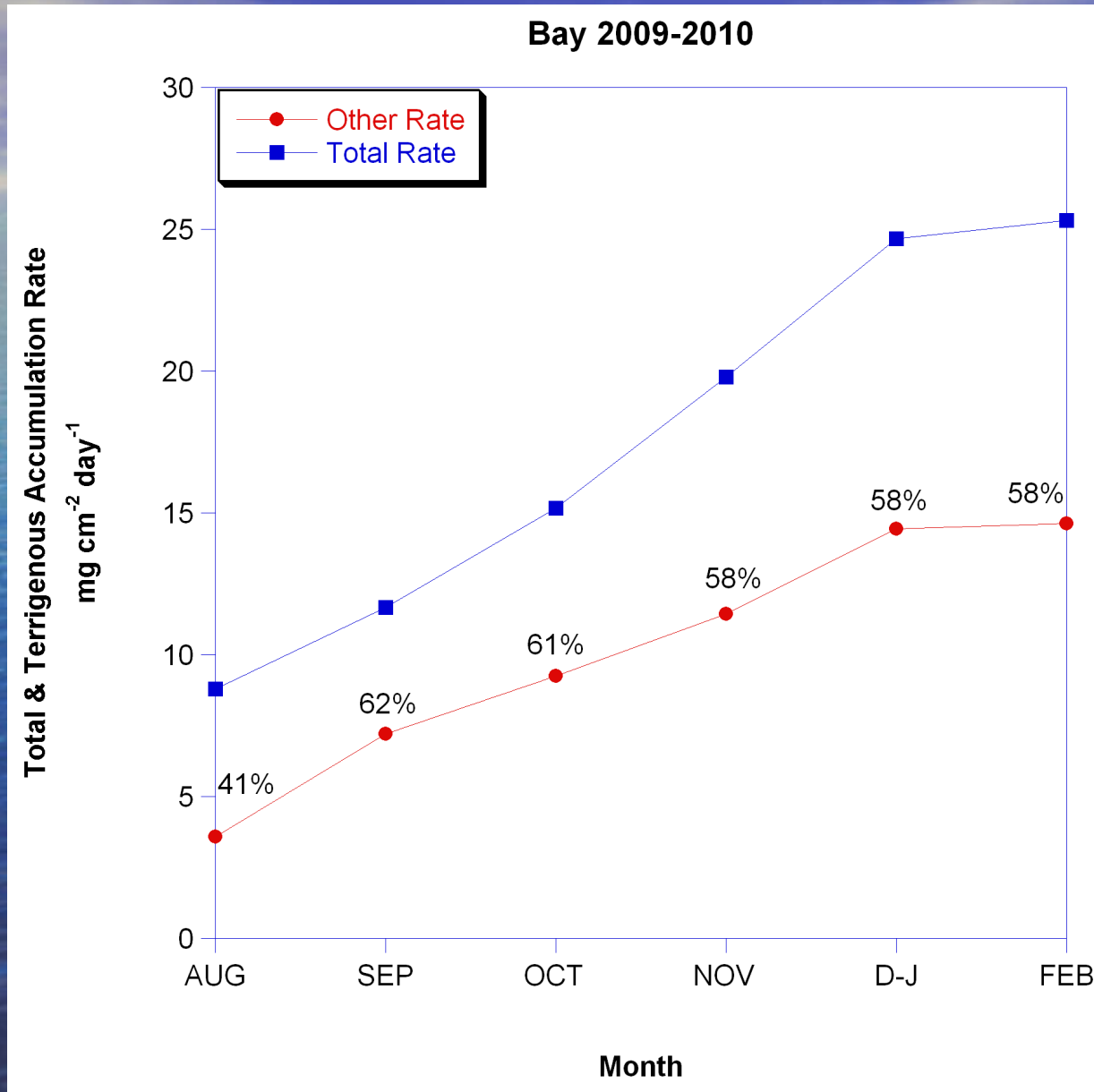
Results (thus far)



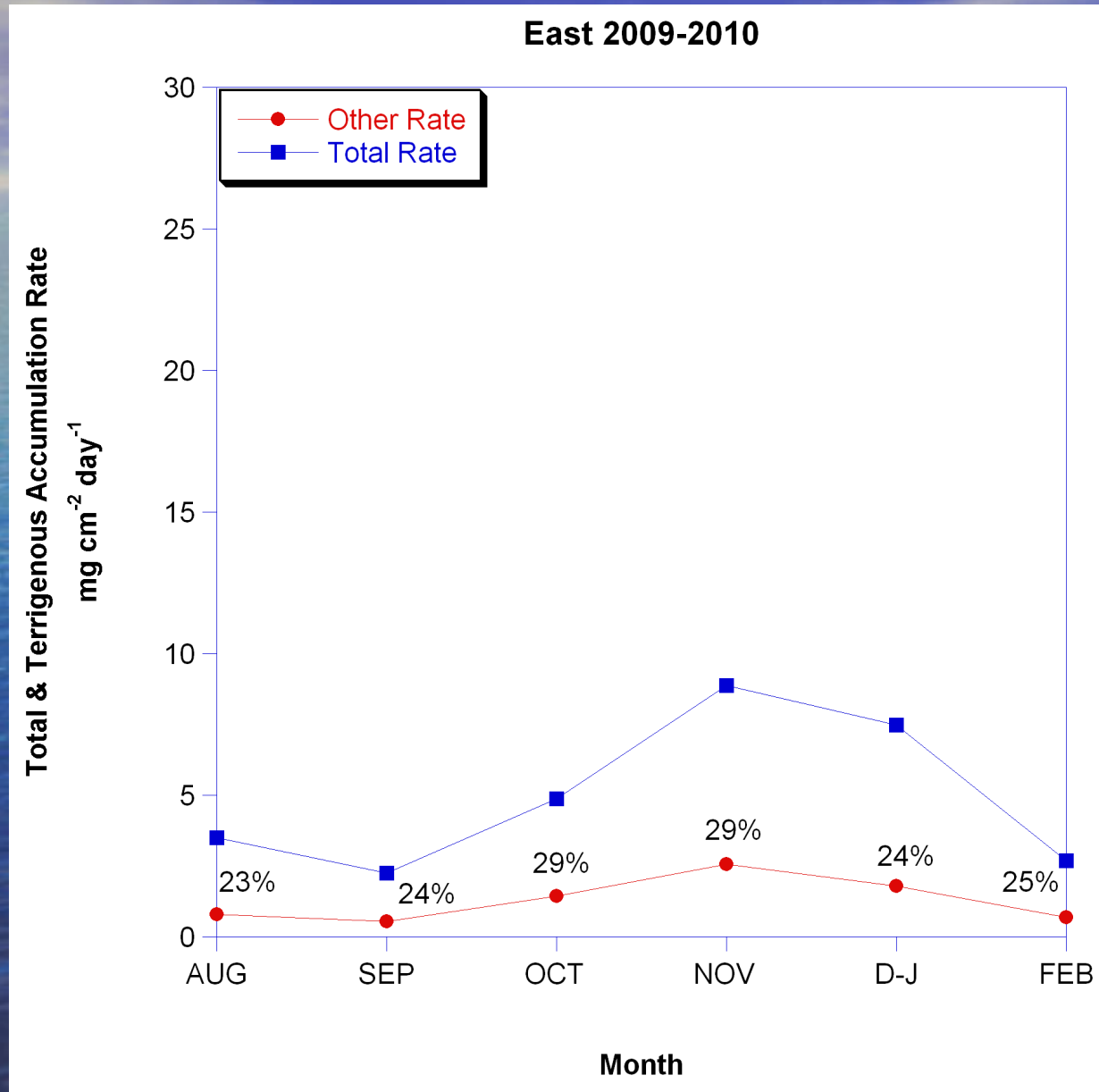
Results (thus far)



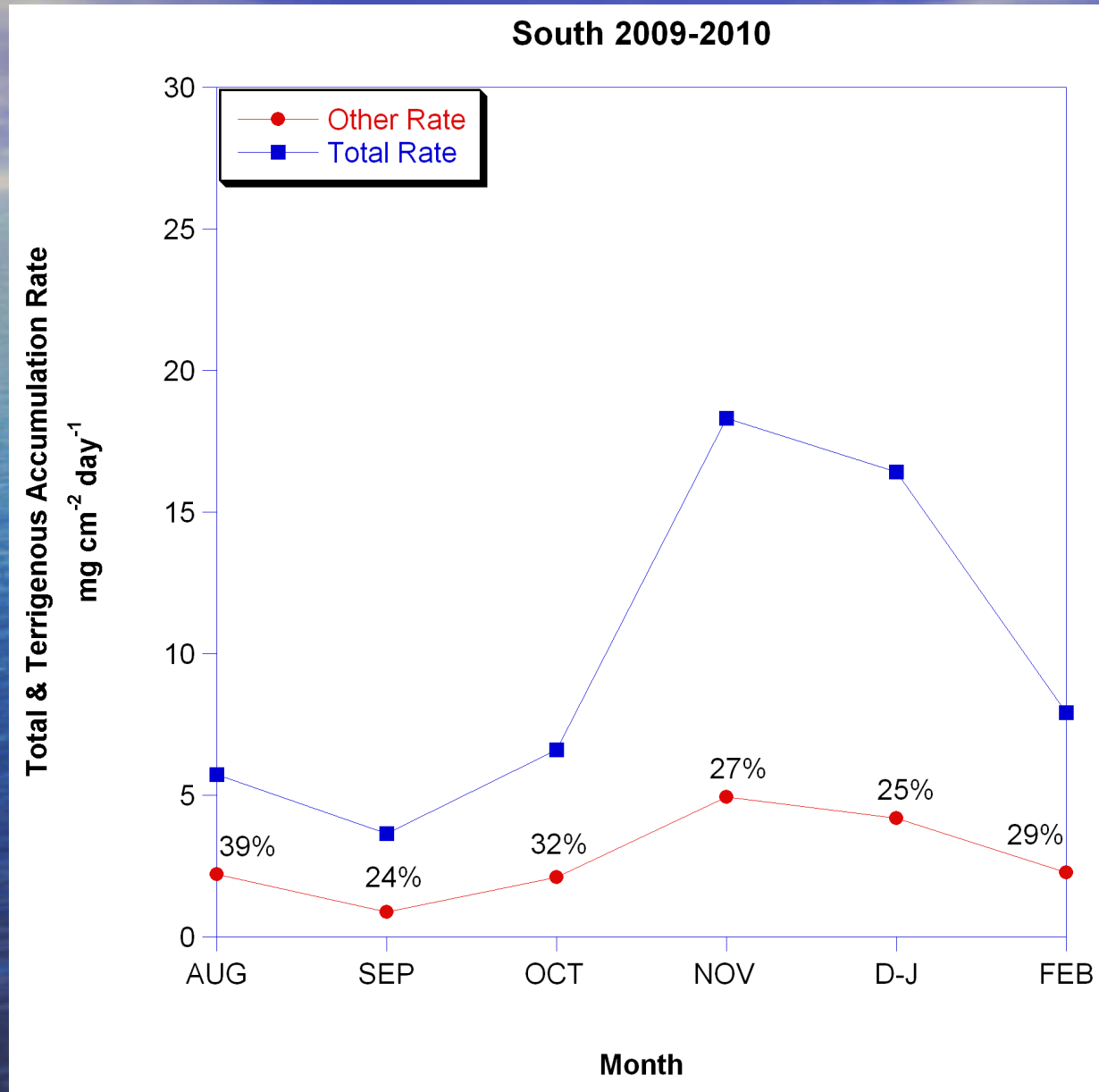
Results (thus far)



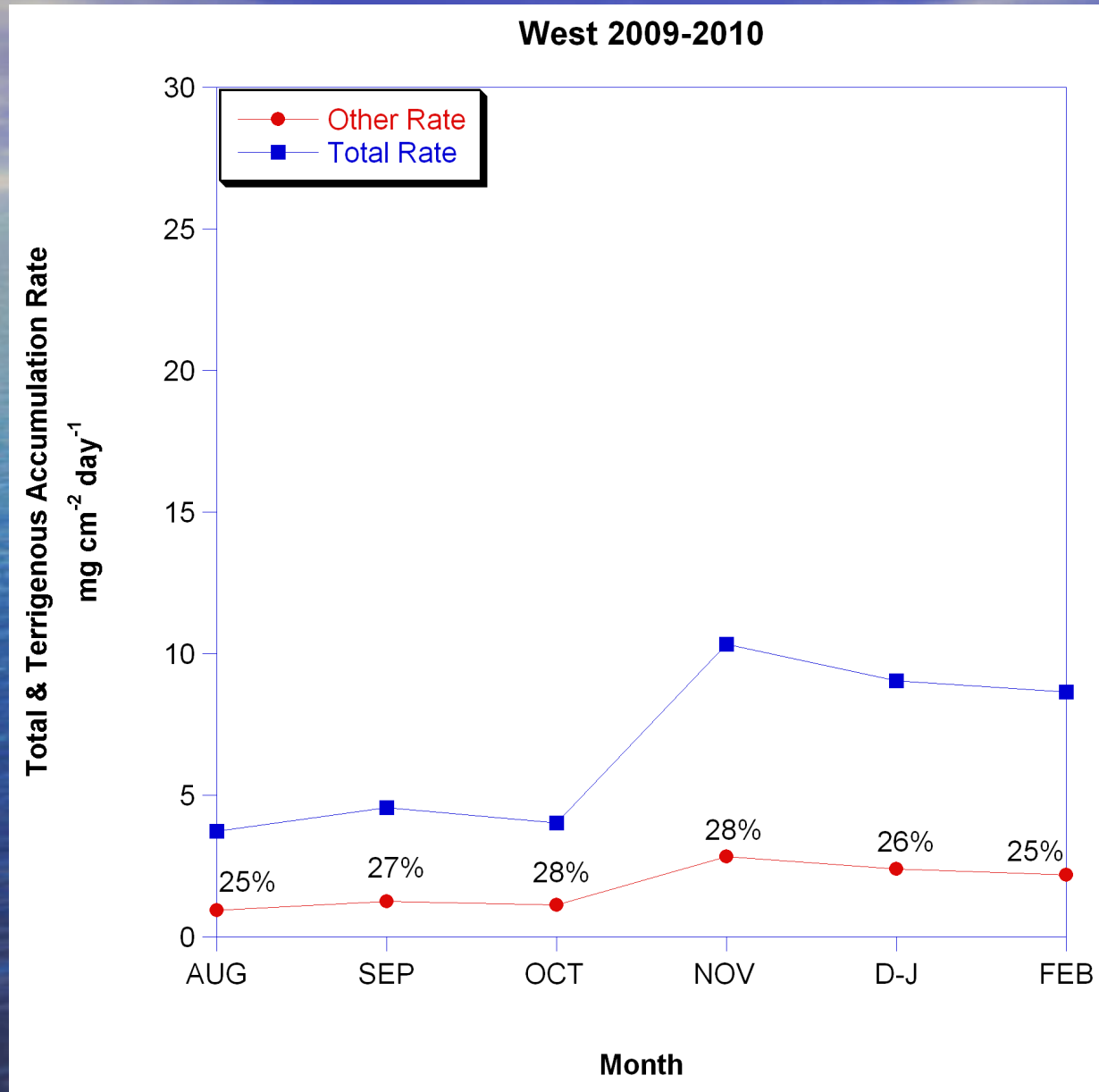
Results (thus far)



Results (thus far)



Results (thus far)



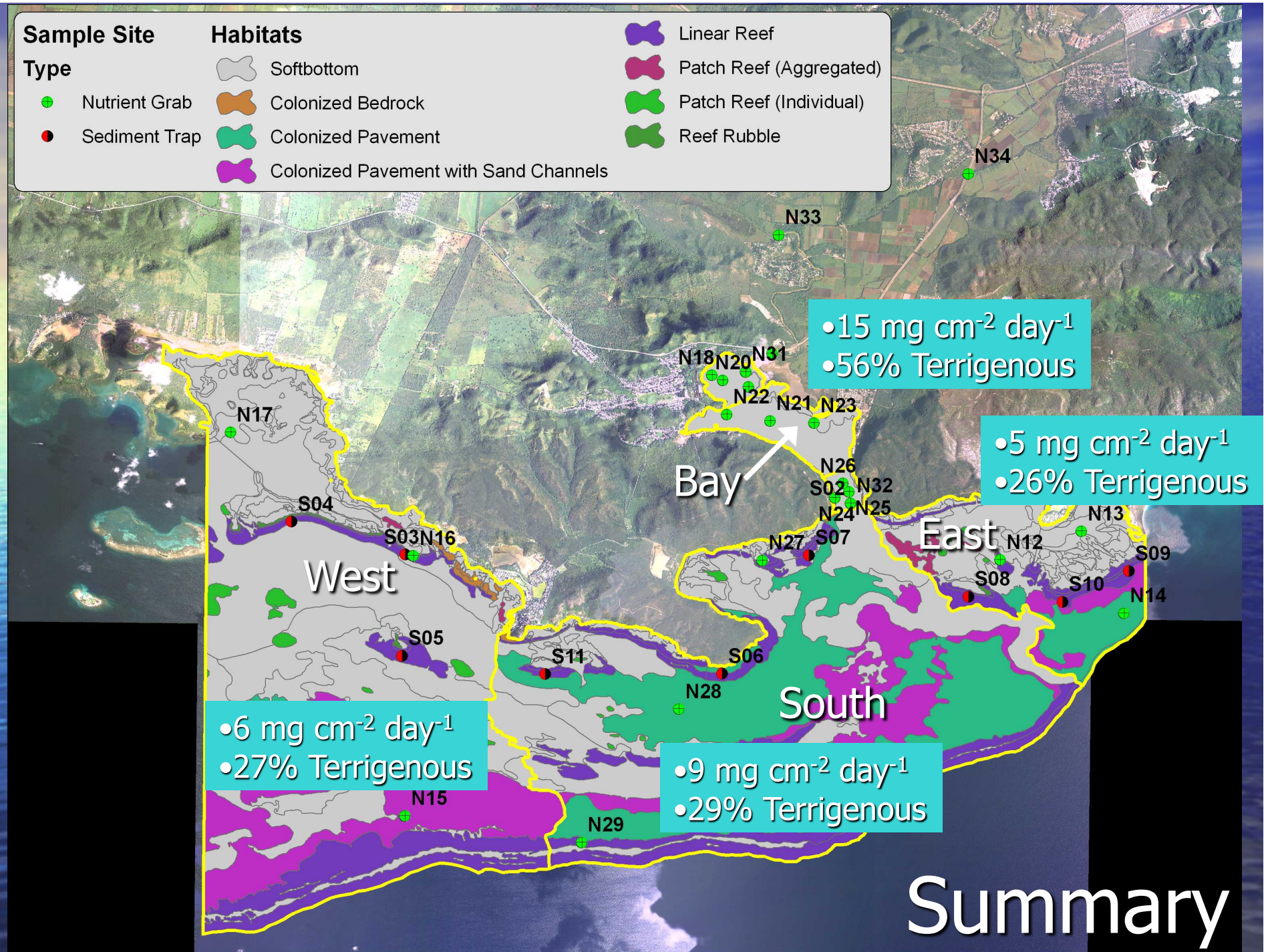
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An underwater photograph of a coral reef. The scene is filled with various types of coral, including branching and plate corals. A diver's hand is visible in the upper left, holding a piece of equipment. The water is clear and blue, and the overall atmosphere is that of a scientific field site.

Current and future work

- Project is in its second year of sampling, long-term collection of data will establish important baseline and allow for identification of runoff events
 - Differentiation between runoff vs. resuspension events
- Mineralogical analyses seeks to confirm composition of other/terrigenous component
 - May allow for identification of mineralogical tracers of Guanica Watershed sediments
- General characterization of coral community to identify trends that may be consistent with trends in sedimentation

Current and future work

- Turbidity is likely just as (if not more) important as sedimentation and needs to be assessed



QUESTIONS?

Manta Ray in Guanica Bay 11 February 2010