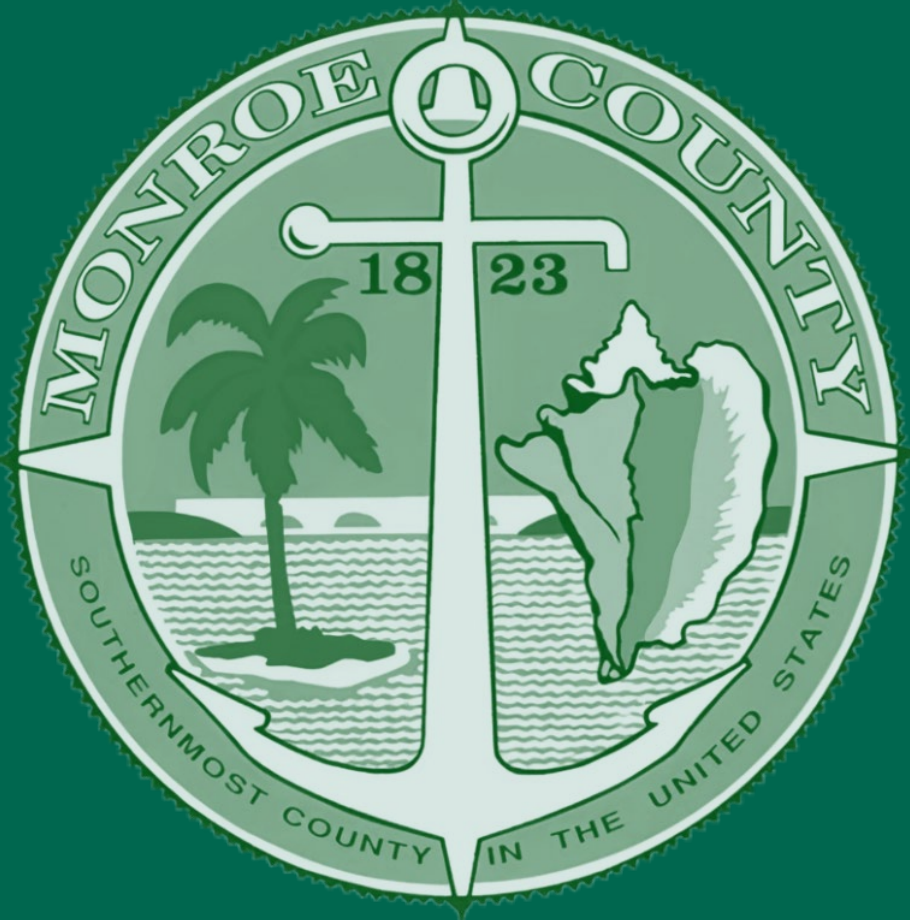




Using Habitat Support Structures (HSS) to Address Habitat Deficits within Bayside Nearshore Hardbottom of the FKNMS



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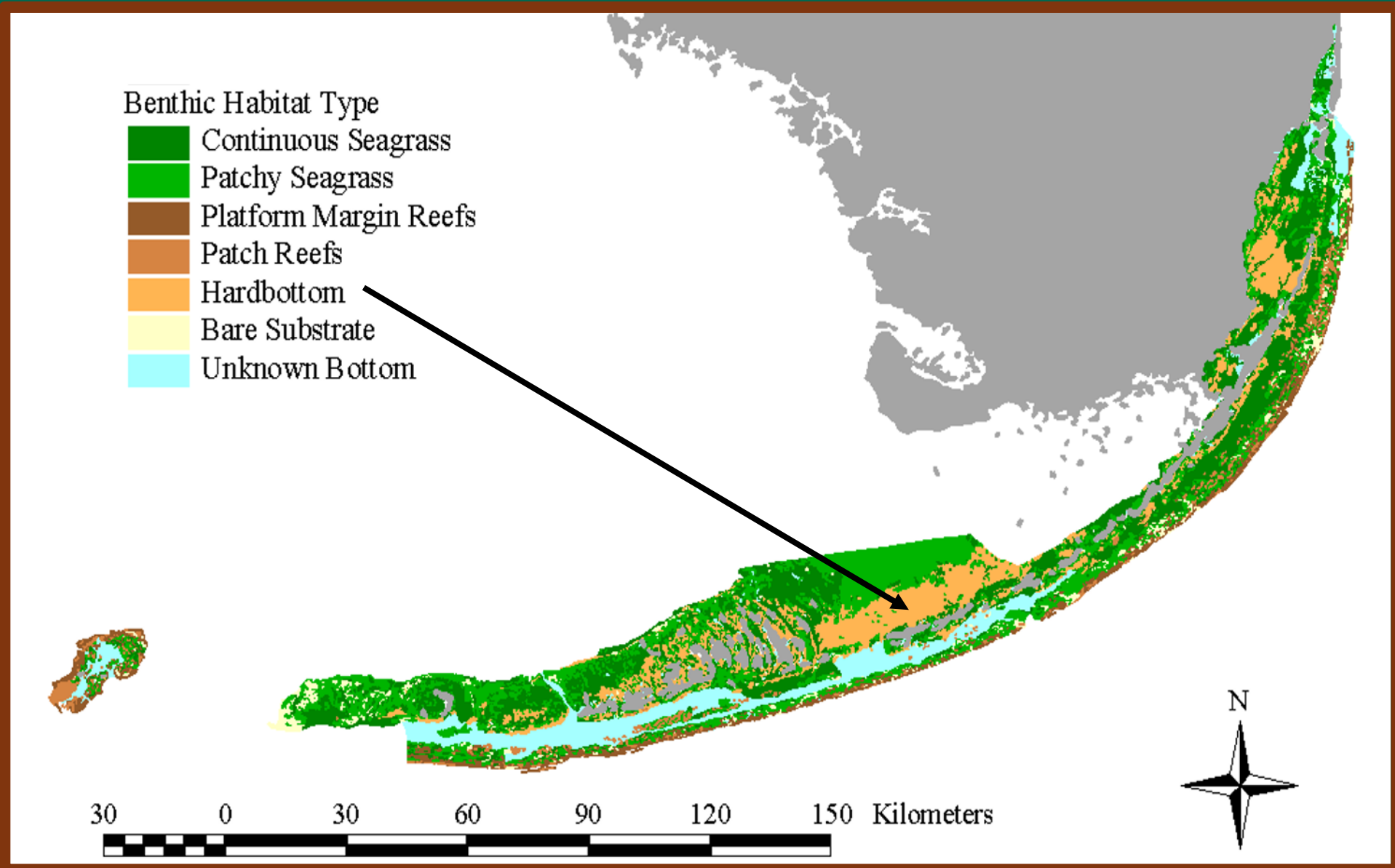
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><{{{°}}> Nearshore Hardbottom is Essential Habitat in Decline <°}}}><



Nearshore Hardbottom Communities occur in shallow (<3m) coastal (bayside and oceanside) waters within ~2km of shore on top of consolidated limestone substrate covered by a thin veneer of sand; they cover ~30% of the nearshore habitat in the Florida Keys marine ecosystem.



Historically, habitat/structural complexity in these areas was characterized by a complex assemblage of **low-relief organisms** including sessile benthic invertebrates(sponges and octocorals), macroalgae, and solution holes.



Sponges support infaunal populations of snapping shrimp whose acoustic signal serves as important settlement **cues**. Newly settled & juvenile fishes account for >80% of fishes found in these SE FL habitats.

Repeated cyanobacterial blooms in Florida Bay

↓
Mass mortality of sessile benthic invertebrates (especially sponges)

↓
Substantial changes in habitat landscape, structural complexity, community composition, & ecology



><{{{°}}> Can HSS Mitigate the Loss of Habitat? <°}}}><

Study Sites

Middle Keys Bayside
3 study sites
6-8' deep

Burnt Point (P01)
Burnt Point (E01)

Long Key (J01)

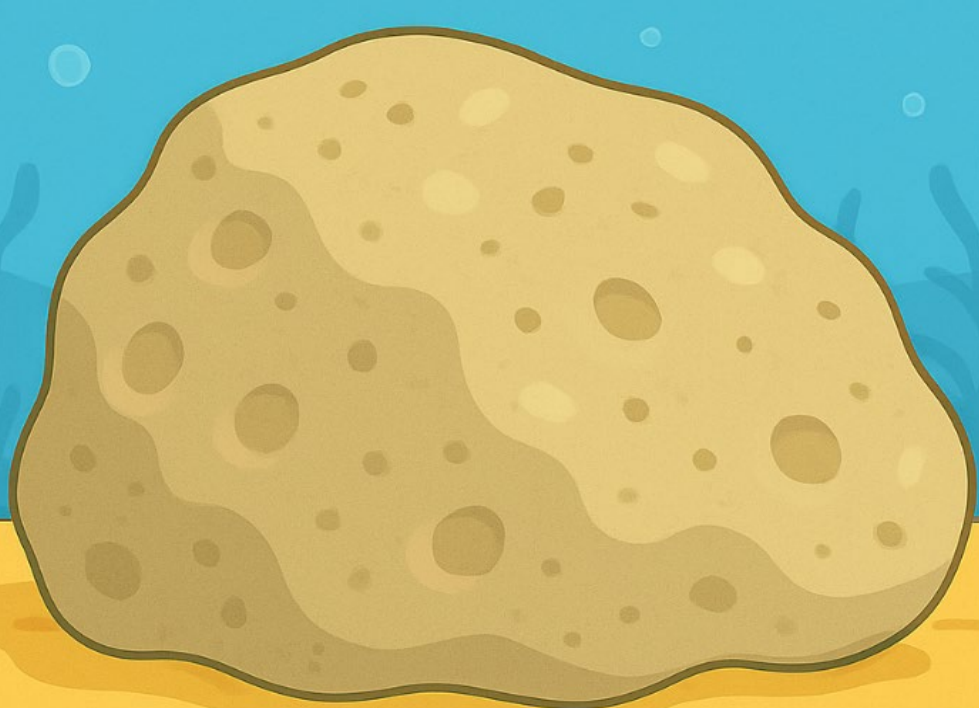
2 plots/site
6 replicates/treatment
1 treatment/3,700m²
Randomized block design

Questions

- Which treatment has the greatest net positive **ecological outcome**?
- How does **biodiversity** compare over time?
- Can we restore **nursery habitat**?
- How are trends impacted **post-disturbance**?
- Are **hydrodynamics** altered in a way to positively impact nearby solution holes, or in a way to increase availability of suitable settlement substrate surrounding structures?
- What does successful **sponge restoration** look like?

Treatments

Basic Physical Structure



Limestone Boulder

Complex Physical Structure



3DP Concrete

Physical + Biological Structure



~6-species sponge community

Biological Structure



6-species sponge community

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+ No Structure Controls

+ Scale Treatment: 1-, 4-, 9-, 18-units

All Low Relief: 1.5' H x 3' W x 3' L