

Scaling up Sponge Community Restoration in South Florida: its Efficacy and Ecosystem Implications



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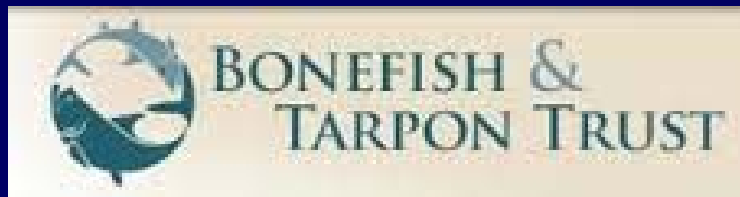
- FWC has been notified by the EPA that the agency will receive an award, but we have not received grant documents
- Collaboration with Old Dominion University & Florida Sea Grant
 - Project will provide the necessary underpinnings vital to a develop large-scale sponge restoration in the Florida Keys
 - Sponge restoration research/Sponge nursery
 - Incorporate community participation/outreach & education component
 - Estimate the costs to conduct large-scale sponge restoration



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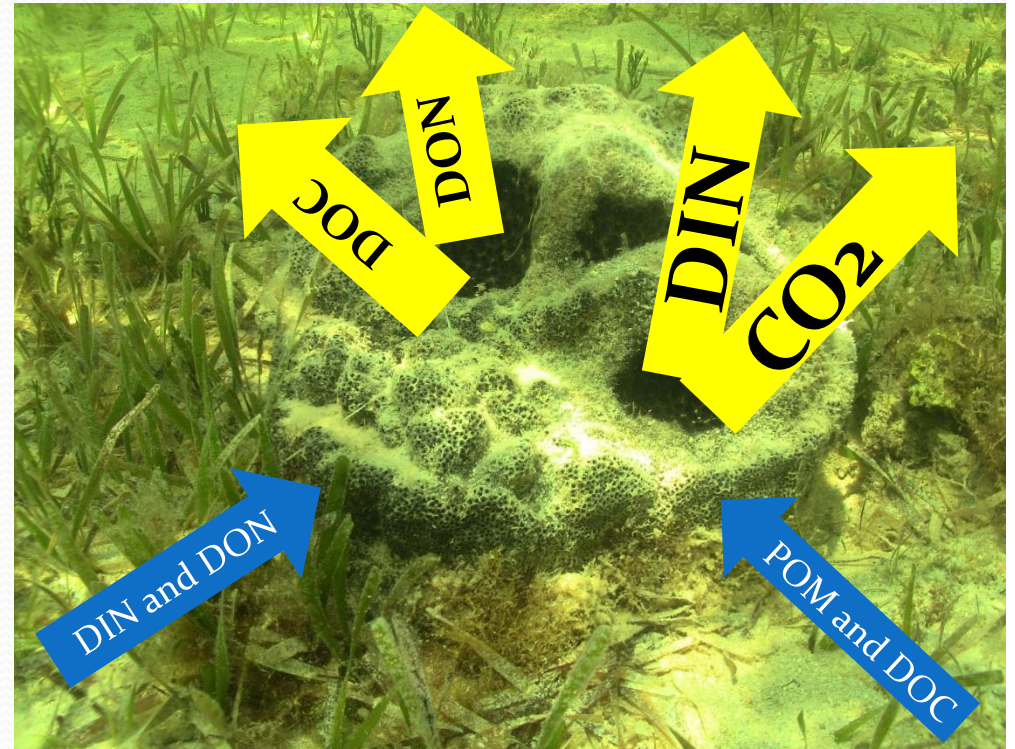
- Additional funding has been pledged by three NGOs – presently working on an MOU
- Establish additional *in situ* sponge nurseries
- Undertake a large-scale sponge restoration project in Florida Bay



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The Role of Sponges in Water Quality

- Sponges have associations with many microorganisms that produce chemical transformations in the water as it is pumped through their tissues



- These microbes transform nitrogen to forms that are more available for primary producers
 - Seagrasses
 - Algae (*e.g.*, *Laurencia* spp.)
 - Phytoplankton



The Role of Sponges in Florida Bay

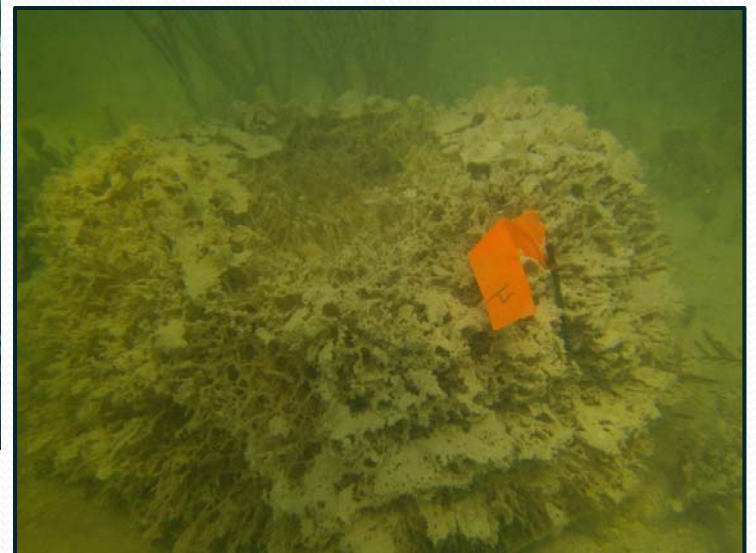
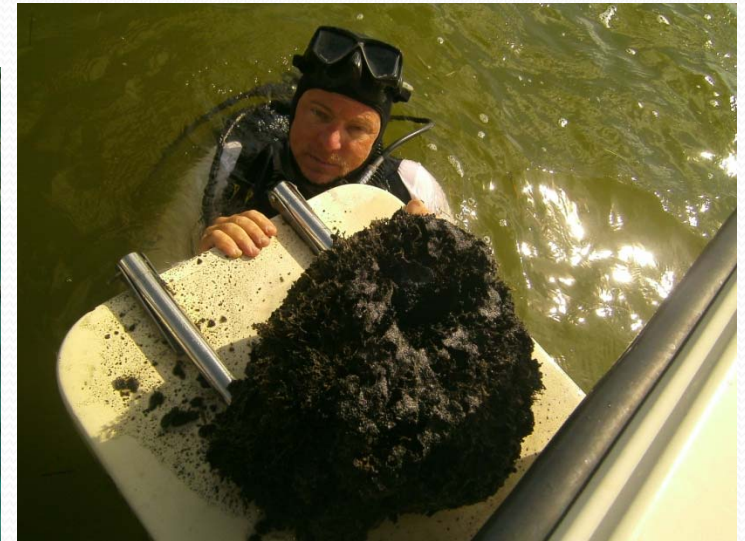
- Habitat for many commensal animals
 - Shrimps
 - Worms
 - Brittle stars
 - Fish
- Habitat for commercial species
 - Spiny lobsters
 - Stone crabs
- Primary forage for the endangered Hawksbill sea turtle



Florida Bay Algae Blooms and Sponge Die-Offs



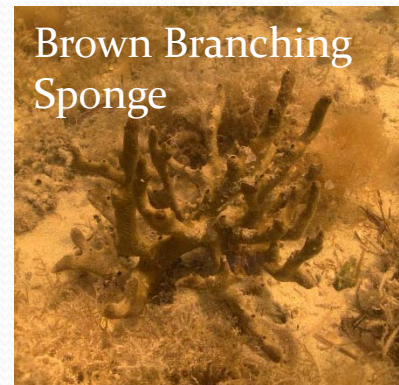
Florida Bay Cyanobacterial bloom 'Mystery Basin' -- Fall 2013



Comparison of Pre- and Post-Bloom Sponge Volume

Pre-Bloom Volume

3,995,890 Liters



Post-Bloom Volume

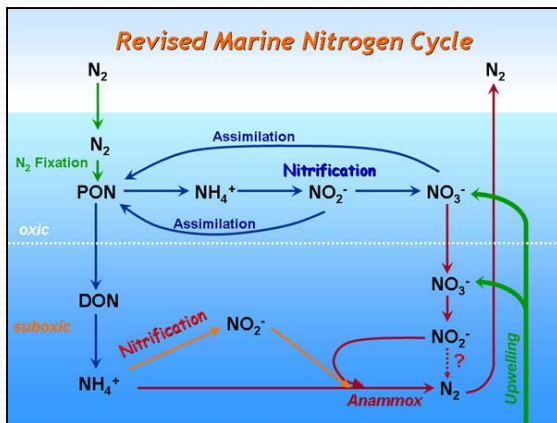
61,087 Liters



A 98 % Decline

Consequences of Sponge Die-off ?

- Loss of water column filtration
- Change in N-cycling
- Loss of habitat fishes, turtles, & invertebrates
- Damage to sponge & lobster fisheries
- Other?



Florida Bay Sponge Restoration

Testing the Efficacy of Sponge Restoration in Florida Bay...Laying the Groundwork

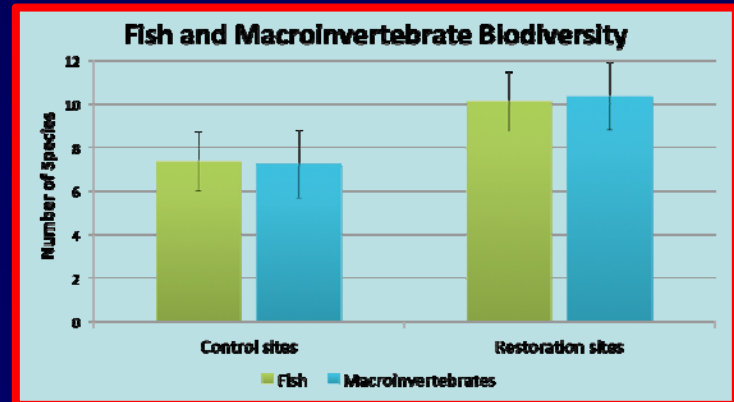


Sponge Filtration

New Vase sponge cuttings



Vase sponge cuttings 4 yrs later



Scaling-up Sponge Community Restoration

(1) Establish a network of sponge nurseries in Florida Bay

- Provide sponges for restoration activities
- Research to refine the husbandry process

(2) Test effect of sponge biodiversity on ecosystem services:

- planktonic communities
- water quality

(3) Test effect of sponge biodiversity on restoration success:

- recruitment of new sponges
- abundance of fish and macroinvertebrates

(4) Develop and incorporate community participation and a coordinated public outreach and education component.

(5) Undertake a large-scale sponge restoration effort

- ~ 30,000 nursery-propagated sponges

(6) Estimate the costs to conduct large-scale sponge restoration



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Scaling-up Sponge Community Restoration

Sponge Nurseries

- Test whether the establishment of sponge nurseries as donor sources is an efficient, effective, and environmentally sound method for use in the large-scale restoration of sponge communities in Florida Bay
- Permit Request to FKNMS



Nursery Species



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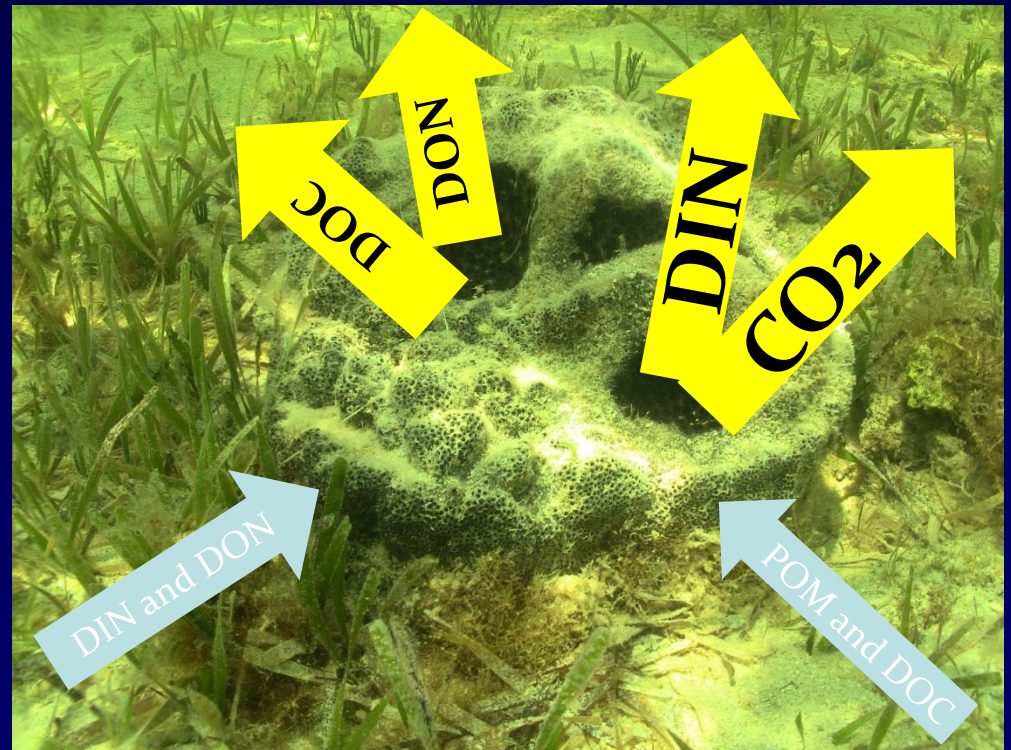
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Scaling-up Sponge Restoration

Test effect of sponge biodiversity on ecosystem services

- Test in a field experiment whether sponge restoration can restore natural sponge filtration effects on planktonic communities and key water quality parameters
- Intend to take first steps during October 2015 if the award has been received



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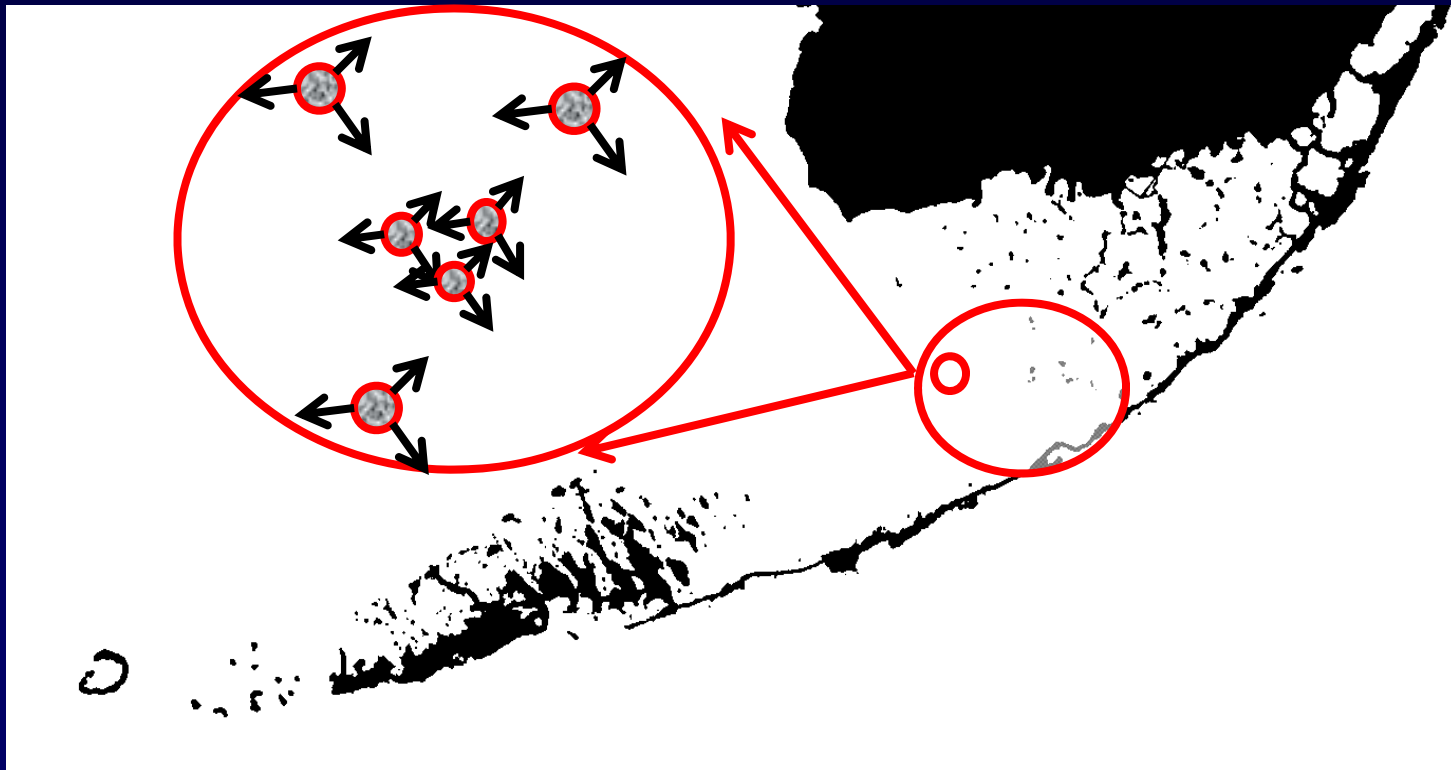
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Scaling-up Sponge Community Restoration

- Test whether aggregation of restoration sites nearby one another improves sponge reproductive success and recruitment



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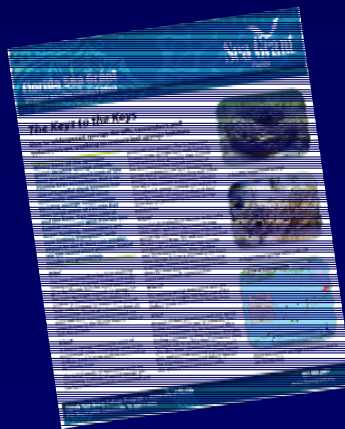


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Scaling-up Sponge Community Restoration

- **Develop and incorporate community participation**
 - Coordinated by Shelly Krueger, Florida Sea Grant agent at the Monroe County Extension Service (University of Florida Institute of Food and Agricultural Sciences)
 - Will develop a multimedia campaign
 - four newspaper articles
 - six radio spots
 - one fact sheet
 - Will coordinate with the P.I.s to provide volunteers to assist with sponge propagation and nursery development activities



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(3) Test effect of sponge biodiversity on restoration success:

- recruitment of new sponges
- underwater soundscapes & fish/invertebrate recruits
- abundance of fish and macroinvertebrates

(4) Develop and incorporate community participation and a coordinated public outreach and education component

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- minimum 15,000 nursery-propagated sponges

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Scaling-up Sponge Community Restoration

- **FWC will outplant a minimum of 15,000 nursery-propagated sponges in the region of Florida Bay that was most highly impacted by the recent cyanobacterial blooms**



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BONEFISH &
TARPON TRUST

The Nature
Conservancy



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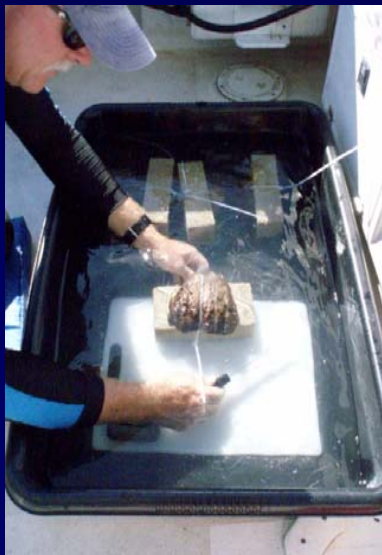
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Scaling-up Sponge Community Restoration



- We will evaluate the project's manpower costs
 - Staff and volunteer time involved in sponge propagation, nursery development and maintenance, sponge out-planting, and associated administrative functions
 - Associated materials, vessel use, fuel costs, etc.
 - We will use these estimates to provide the estimated costs of future sponge restoration efforts



Scaling-up Sponge Community Restoration

Stay Tuned...

Questions?



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