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

April 26, 2017

FWC Restoration Ecology Staff

Florida Fish & Wildlife Conservation Commission
Fish & Wildlife Research Institute
South Florida Regional Laboratory
Scaling-up Sponge Community Restoration in South Florida: its Efficacy and Ecosystem Implications

- FWC has received funding from the EPA for 2015-2018
- Collaboration with Old Dominion University & Florida Sea Grant
  - Project will provide the necessary underpinnings vital to develop large-scale sponge restoration in the Florida Keys
- Additional funding has been pledged by three NGOs
  - Establish additional sponge nurseries & undertake a large-scale sponge restoration project in Florida Bay
Scaling-up Sponge Community Restoration

1. Test whether sponge nurseries as donor sources are an efficient, and environmentally sound method for large-scale sponge restoration Florida Bay

2. Test in a field experiment whether sponge restoration can restore natural sponge filtration

3. Test whether aggregation of restoration sites nearby one another improves sponge reproductive success and recruitment, as well as the effectiveness of restoration sites as essential fish habitat

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

5. Undertake a large-scale sponge restoration effort

6. Estimate the cost to conduct large-scale sponge restoration
Establishing & Evaluating Sponge Nurseries

- Four Nurseries Established
- Propagation Methods Being Evaluated
- Propagated > 6,000 Sponge Cuttings of Seven Species
- “Volunteer Week” May 1
Scaling-up Sponge Community Restoration

1. Test whether sponge nurseries as donor sources is an efficient, and environmentally sound method for large-scale sponge restoration Florida Bay.

2. Test in a field experiment whether sponge restoration can restore natural sponge filtration.

3. Test whether aggregation of restoration sites nearby one another improves sponge reproductive success and recruitment, as well as the effectiveness of restoration sites as essential fish habitat.

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

5. Undertake a large-scale sponge restoration effort.

6. Estimate the cost to conduct large-scale sponge restoration.
Sponge Filtration Study

- Use in situ fluorometers “upstream” and “downstream of small experimental sponge outplant sites
  - Measure phytoplankton pigments
- “Bench tests” conducted this winter/spring
- Field Testing began Summer 2016
- Refinements underway

Benchtop fluorometer prototype testing of LED emitter with light spectra output to computer

Experimental pigment extract dilution series and pigment extract benchtop test apparatus.
Sponge Recruitment Study

• How does restoration site proximity affect sponge fertilization success?

• Outplant sponges at three inter-site distances

• Sites established Summer/Fall 2016

• Preliminary faunal surveys completed
Sponge Die-Off Sandfly Key Nursery Region

- Early December 2016 – Observed mortality of Vase, Brown Branching, Glove, Yellow, & Sheepswool sponges

Vase Sponge

Glove Sponge

Yellow Sponge

Brown Branching Sponge
Sponge Die-Off Sandfly Key Nursery Region

December 2016

Marathon Nurseries Not Affected!
Satellite detection of cyanobacteria blooms in Florida Bay

MODIS-Aqua Enhanced Red-Green-Blue (ERGB) composite image from normalized water-leaving radiance at 547 nm (R), 488 nm (G), and 443 nm (B).

Blue-shaded areas indicate a cyanobacteria bloom according to a modified-CI_{MODIS} technique (Wynne et al., 2010) [pers. comm. Jennifer Cannizzaro, University of South Florida].

Nov. 5, 2016
Die-off had abated by January 2017
Approx. 20% of sponges in Sandfly Key nursery lost
Marathon nurseries not impacted
Propagation at all nurseries has resumed
Affected propagation experiments re-established
Scaling-up Sponge Community Restoration

1. Test whether sponge nurseries as donor sources is an efficient, and environmentally sound method for large-scale sponge restoration Florida Bay

2. Test in a field experiment whether sponge restoration can restore natural sponge filtration

3. Test whether aggregation of restoration sites nearby one another improves sponge reproductive success and recruitment, as well as the effectiveness of restoration sites as essential fish habitat

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

5. Undertake a large-scale sponge restoration effort

6. Estimate the cost to conduct large-scale sponge restoration
Scaling-up Sponge Community Restoration

- Updated Fact Sheet on Sponge Restoration Research
- Poster Presentation – December 2016 at Restore America’s Estuaries Conference in New Orleans
- Sponge Forum Held March 2017
- Volunteer Sponge Week at Nurseries
Scaling-up Sponge Community Restoration
Stay Tuned...

Questions?