Florida Bay Sponge Restoration

After widespread sponge die-offs, researchers are working to restore sponge habitats

Where have all the sponges gone? Healthy sponge populations are an important part of the Florida Keys ecosystem. But a series of harmful algal blooms has essentially eliminated once-thriving sponge communities over large areas of Florida Bay. Researchers from Old Dominion University and the Florida Fish and Wildlife Conservation Commission are now testing methods to restore sponge communities.

Who?

Researchers from the University of Florida and Old Dominion University (ODU) have been studying various aspects of sponge biology and ecology in the Florida Keys for many years. Several years ago, these researchers started studying sponge community restoration. Now, joined by researchers from the Florida Fish & Wildlife Conservation Commission (FWC), they are scaling-up their sponge restoration research efforts. This large-scale project also presents opportunities for community participation, inviting volunteers to work side by side with scientists to restore sponges in the Florida Keys.

What?

Sponges are animals that are among the most visible residents of the hard-bottom habitats typical of the Florida Keys and Florida Bay.

Sponges are essential to the healthy ecosystem functioning of the Florida Keys, because they continuously filter large volumes of water, removing particulate matter. Sponges also alter water chemistry by cycling nutrients and provide essential nursery habitat for important fisheries species such as spiny lobster, stone crab and bonefish.

The loss of such an important component of nearshore habitats has prompted calls for sponge restoration. Scientists are currently evaluating if sponge nurseries are an efficient means of producing a biologically diverse assemblage of sponges in order to restore Florida Bay sponge communities. By transplanting sponges onto experimental sites, researchers will evaluate how to ensure sponge transplants become self-sustaining and help restore the health of the Florida Bay ecosystem.

Why?

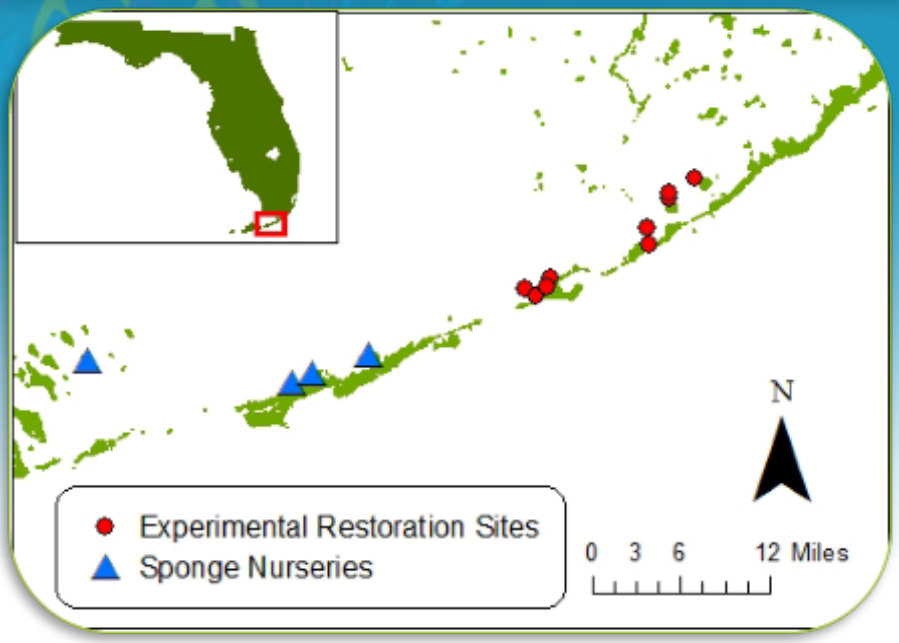
Phytoplankton blooms in the early 1990s, 2007, and 2013 caused mass sponge die-offs over wide areas of the Middle and Upper Florida Keys. Once such an extensive die-off occurs, the recovery of the sponge community can be lengthy due to their slow growth and limited larval dispersal.

Consequently, restoring sponge communities by transplanting cuttings of healthy sponges into areas where die-offs occurred can be an essential tool to jump-start natural sponge recruitment and re-establish vital ecosystem services that sponges provide. Preliminary sponge restoration research showed that cuttings of several sponge species can be successfully transplanted to produce new sponges. Current sponge restoration research will examine whether transplanted sponge cuttings can restore critical ecological functions that are provided by healthy sponge communities.

A healthy sponge community in Florida Bay

A loggerhead sponge after a die-off

Propogating new sponges using cuttings from a healthy sponge.



Locations of sponge nurseries and current experimental sites

When?

In 2015, ODU and FWC researchers began a series of research projects to develop large-scale sponge restoration in the Florida Keys, in partnership with the University of Florida (UF), The Nature Conservancy (TNC), Bonefish and Tarpon Trust (BTT) and the Florida Keys Environmental Fund (FKEF). Researchers are testing whether sponges can be propagated efficiently in large numbers and maintained within a network of sponge nurseries. In addition, they are transplanting sponges onto experimental restoration sites in the degraded areas of Florida Bay to evaluate their ability to become self-sustaining and restore the natural filtration effects on plankton and nutrient cycling.

In 2018, these scientists and partners from the UF, TNC, BTT and the FKEF will conduct large-scale sponge restoration in areas of Florida Bay with community participation.

Where?

Four sponge nurseries have been established that currently hold more than 4,000 sponges of 7 common shallow-water sponge species, with the goal of more than 15,000 sponges. There are 9 research sites spread over a 500 km2 area in the Middle Florida Keys.

Current objectives

- Test whether the establishment of sponge nurseries as donor sources is an efficient and environmentally sound method for large-scale sponge restoration Florida Bay
- Test whether sponge restoration can restore natural sponge filtration effects on planktonic communities and key water quality parameters
- Test whether aggregation of adjacent restoration sites improves sponge reproductive success and recruitment, and effectiveness of restoration sites as essential fish habitat
- Develop and incorporate community participation in the project and a coordinated public outreach and education component
- Estimate costs to conduct large-scale sponge restoration

Various sponge propogation methods being tested in a nursery

After cutting, the remaining base of a loggerhead sponge (left) is monitored for recovery next to an uncut sponge (right).

Additional Reading

"Florida's Marine Sponges: Exploring the Potential and Protecting the Resource." John Stevely and Don Sweat. Florida Sea Grant College Program. SGEF 169, December 2008. http://nsgl.gso.uri.edu/flsgp/flsgpg08001.pdf

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