

## The Keys to the Keys

Due to widespread sponge die-offs, researchers and volunteers are working to restore lost 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 and the Keys. Can this critical habitat recover? With Florida Sea Grant funding, researchers are now testing transplant techniques to see if they can accelerate the restoration process. Initial results are promising.**

### Who?

Our team of researchers has been studying various aspects of sponge biology and ecology in the Florida Keys for many years and a few years ago began research on sponge restoration to determine the feasibility of a large-scale program to restore these crucial communities. Nearly 40 volunteers from six states and three countries have joined our research team in the Florida Keys to assist us with this project.

### What?

A diverse sponge community, some of commercial value, covers large areas of the shallow, hard-bottom seafloor surrounding the Florida Keys.

The initial results of restoration work are promising. Cuttings of several sponge species have been successfully transplanted and

produced new sponges. This is important because some sponges have weak larval dispersal and are slow growing. Past research has documented that natural recovery of sponge populations can be a decades-long process. Now, additional funding and volunteer labor are needed to determine whether transplanted sponge cuttings can indeed restore the variety of critical ecological functions that are provided by thriving sponge populations.

### When?

Harmful phytoplankton blooms in the early 1990s, 2007, and 2013 have caused mass sponge die-offs over wide areas of the Middle and Upper Keys. We will test the survival and growth of additional sponge species over these sites in 2014. Also, a shallow-water sponge forum is planned in the Keys to provide citizens with more information about the ways they can participate in restoration and research opportunities.

### Where?

The existing sponge restoration sites are spread over a roughly 500 km<sup>2</sup> area of the seafloor north of the central Florida Keys.

### Why?

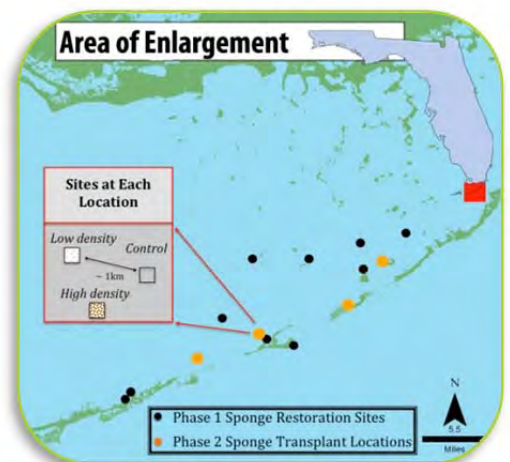
Because of their abundance and size, sponges play an important part in naturally functioning ecosystems. As the dominant filter feeding organism in these habitats, they play a critical role in cycling food resources. They also alter water chemistry by cycling nutrients, and provide essential nursery habitat for important commercial fishery species like spiny lobsters and stone crabs.



*A healthy loggerhead sponge.*

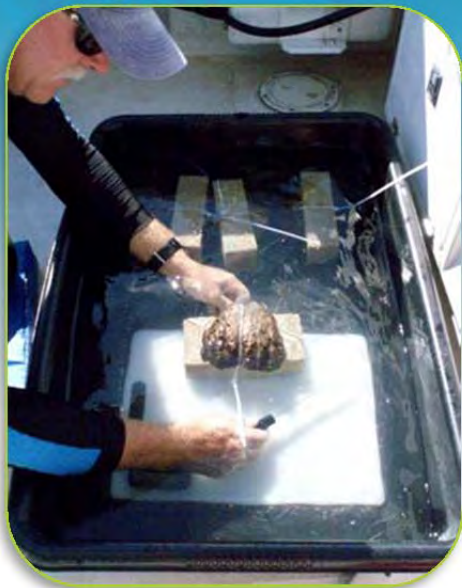


*A loggerhead sponge after a die-off.*



*These are current sponge restoration sites in the Florida Keys.*

# Restoration and How You Can Help



At left, preparing sponge transplants. At right, sponge cuttings healing before transplantation. Below, a healthy vase sponge.

Sponges are animals that are among the most visible residents of the hard-bottom habitats typical of the Florida Keys and Florida Bay. Some sponge species, like the vase and loggerhead, can grow to over 1 meter in diameter and live for decades if not longer.

Many sponges are found on hard bottom where there is not enough sediment cover for plants like seagrasses to take root. Sponges readily colonize these areas because the hard surface provides a holdfast for attachment. Because of their structure, a complicated maze of canals and chambers within their body, they provide shelter for a wide variety of shrimplike, crablike and wormlike creatures. In a way, you can think of them as apartments or condos for these creatures. It's also vital habitat for juvenile lobsters.

Just as importantly, they pump and filter large quantities of water and hence serve as a part of the food web by cycling nutrients and altering water chemistry.

Although we know that sponges are central to the ecosystem, we are just now beginning to more fully understand some of the complex roles they may play. A new line of research suggests that sponge communities can be surprisingly noisy. Many of the ani-



mals dwelling within or around sponges, like snapping shrimp, generate noise, creating loud sounds that are thought to attract still more young fish, crabs, and shrimp in search of habitat.

When a sponge die-off occurs, the process of establishing abundant large sponges can be lengthy due to slow growth and weak larval dispersal. For many sponge species, the larval stage can last just a matter of hours or days, so larvae do not travel far from the parent sponge. Contrast this with the larval stage of spiny lobsters which can last for many months!

Restoration can be an essential tool to jump-start natural recruitment. This involves transplanting cuttings of parent sponges from donor sites into areas that have experienced die-offs. Thus far, we have successfully transplanted four sponge species, and will test if other species are likewise amenable.

How can you help? Restoration work is just in the initial phase and more needs to be learned. Citizens and organizations can volunteer their labor or provide needed matching funds to continue this work. Contact one of the individuals below for more information.

## 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.

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