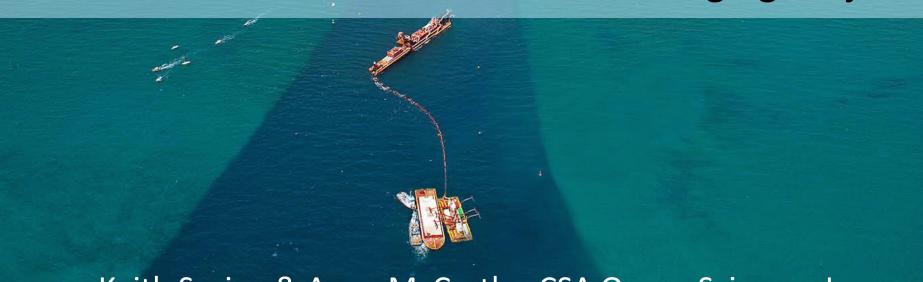
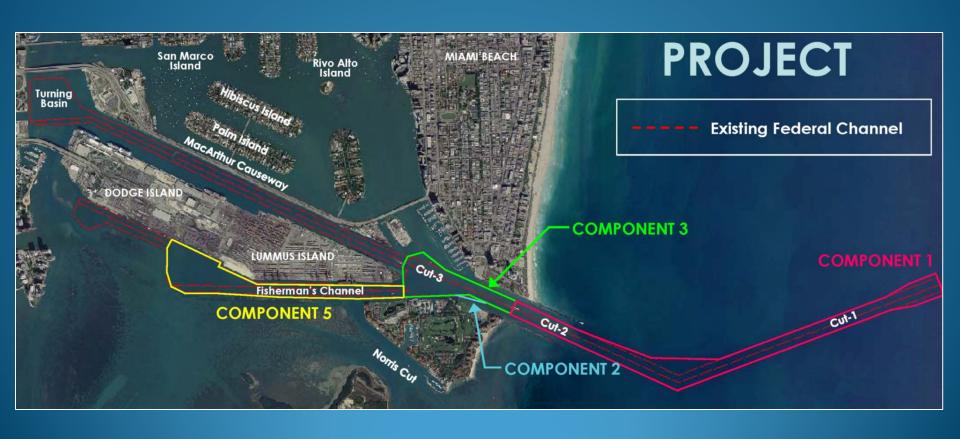


Relocation of *Acropora cervicornis* and *Xestospongia muta* (Giant Barrel Sponge) Associated with the Port of Miami Dredging Project



Keith Spring & Anne McCarthy, CSA Ocean Sciences Inc.

Miami Harbor Phase III Dredging Project













PORT//I/A//II

Focused Relocation Efforts

Acropora cervicornis (required by permit)

 2011 NMFS B.O. called for 1) relocation from channel edges and 2) collection of fragments for genetic preservation

Xestospongia muta (supplemental preservation)

- Advanced Compensatory Mitigation; reduce function loss time lag; potential mitigation responsibilities
- Long-lived sponge species

Acropora cervicornis Survey

2010: 31 colonies on 2nd reef track (DCA) using NMFS 2-tiered protocol for >0.1 hectare



2010 Acropora locations



CSA Task: Relocate all 31 colonies and note any new specimens not previously documented

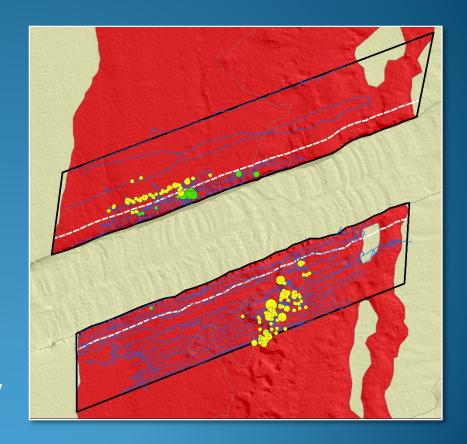
Acropora cervicornis Survey

- CSA conducted intensive survey (10 m line spacing)
- Located 243 colonies along
 22 of 32 transects

2010: 31 colonies

• 2013: 243 colonies

Projected densities>10 times than 2010 survey



2013 Acropora locations

Acropora cervicornis Relocation

- Subsequent discussion with agencies
- 38 colonies (8 cm to 1 m) tagged for relocation within 100 ft of channel edge





Acropora cervicornis Relocation

- Pre-removal
 - Size, health, photographs
 - Fragmentation (~5 cm)
- Transport
 - Ambient conditions
 - Chain of custody (RSMAS)
- Reattachment (December 2013)
 - 2 sites north and south
 - Naturally occurring colonies
 - Epoxy



Monitoring Results

- 40 days post-relocation (CSA)
 - 100% survivorship
 - Fragmentation at 39%
 - Growth over epoxy base
- 6 months post-relocation (CSI)
 - 100% survivorship
 - Fragmentation at 37%
 - Growth 14-239% by volume



Monitoring Results

- ~10 months post-relocation
- Healthy, showing significant growth (visual, CSA)



Advanced Compensatory Mitigation

- Proactive mitigation by GLDD to provide added preservation of reef biota along channel
- Relocation of stony corals (250), octocorals (100), and sponges
 (50) not required by FDEP Permit







ACM: Relocated Barrel Sponges Xestospongia muta

- Barrel sponges are "redwoods" of the reef community
- 50 sponges were relocated in May 2014 from channel flares to three sites (two north and one south) of the channel







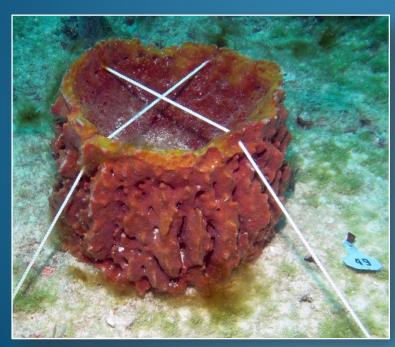
ACM: Relocated Barrel Sponges Xestospongia muta

Video of Xestospongia muta relocation

ACM: Relocated Barrel Sponges

30 barrel sponges visited ~6 months following relocation

- 27 attached and healthy
- 2 not attached
- 1 partially dead



Sponge 49 — May 1, 2014



Sponge 49 — October 22, 2014

ACM: Totals Relocated

500 stony corals (382 to AR, 118 to Museum of Science)

144 gorgonians50 barrel sponges

= 694 organisms



Beach Restoration in SE Florida

- Potential impact to threatened *Acropora* spp.
- *Acropora* survey method dependent on size of project area
- Relocation as potential mitigation (if avoidance is not an option)

• Relocation of barrel sponges as additional mitigation

option

