



Invasive Cup Corals: What is the Risk to Florida's Coral Reef Ecosystem?



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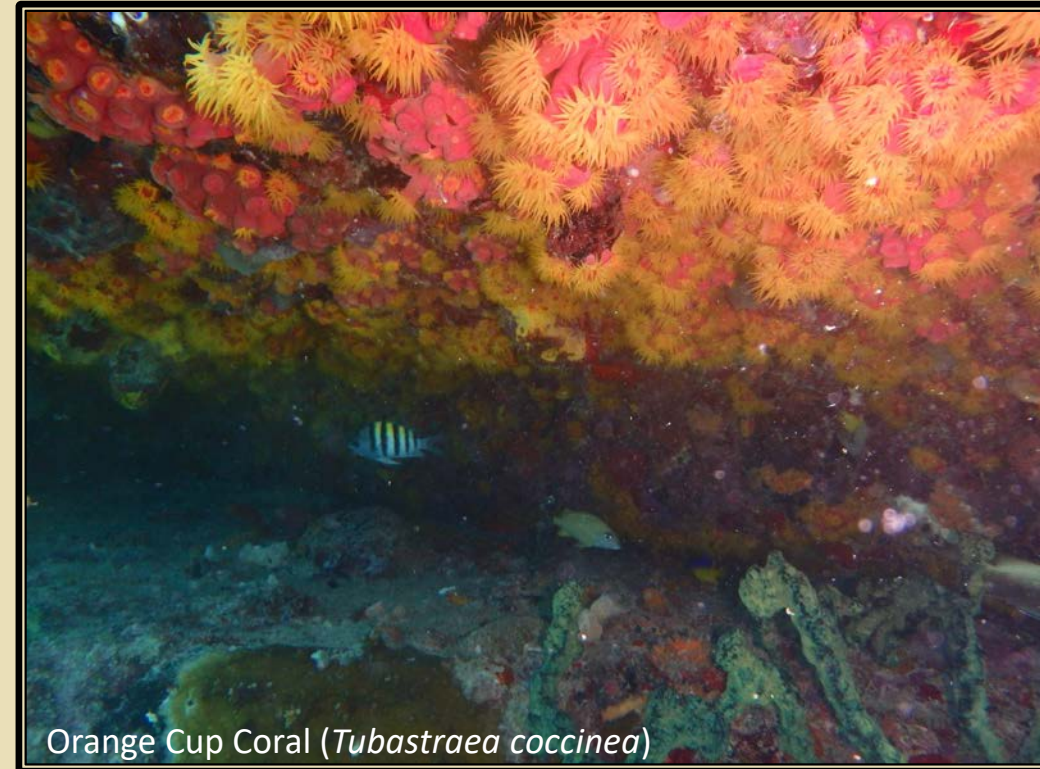
South Florida Regional Laboratory





What Are Cup Corals?

- Azoothanthellate
- Primarily Inhabits Darkened Recesses in Reefs
- Highly Fecund
- Aggressive Spatial Competitors
- Resilient to Environmental Stress



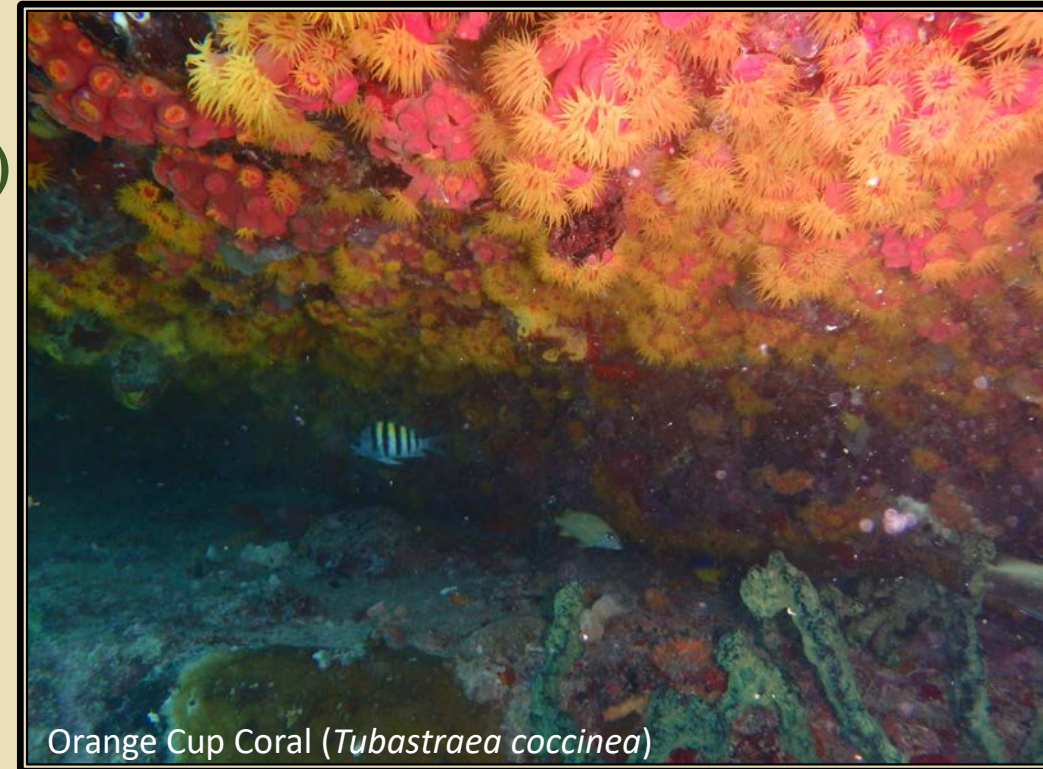
Orange Cup Coral (*Tubastraea coccinea*)





What Are Cup Corals?

- Native to the tropical Indo-Pacific
- Orange Cup Coral (*Tubastraea coccinea*)
 - Introduced into the Caribbean in the 1940's
 - Now almost circumtropical
 - Gulf of Mexico
 - Caribbean Sea
 - Brazilian coast

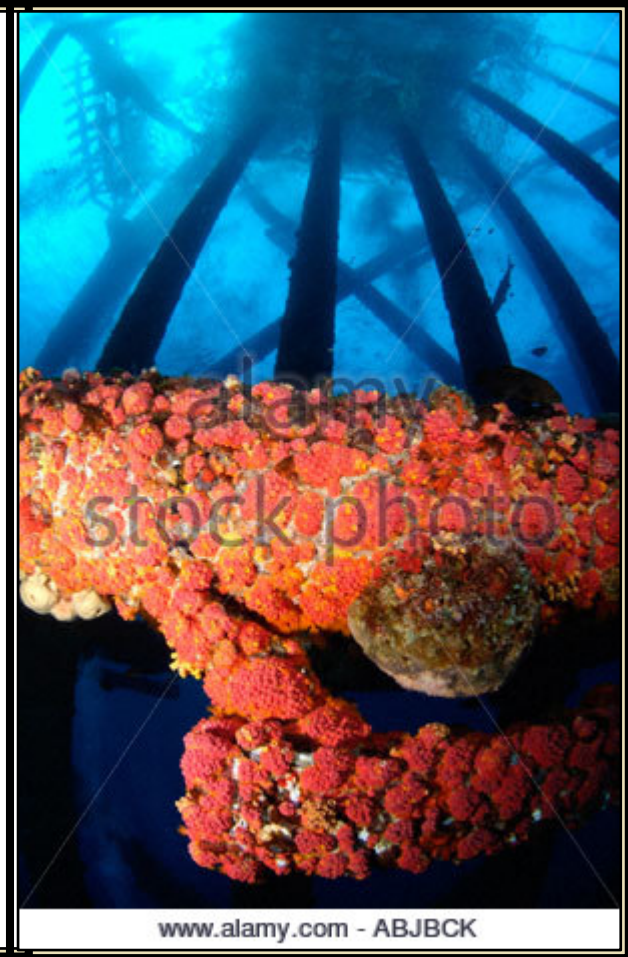
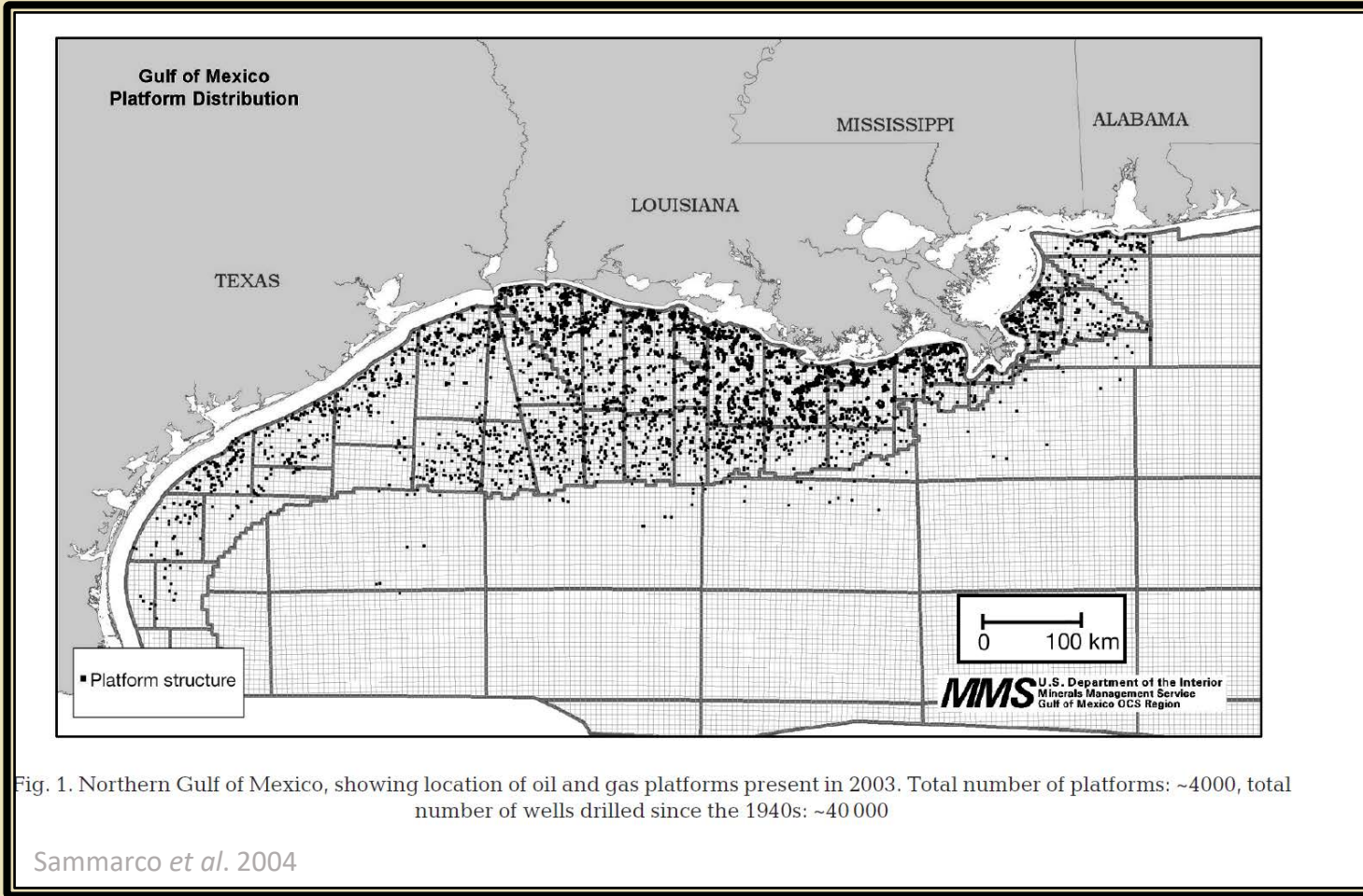


Orange Cup Coral (*Tubastraea coccinea*)



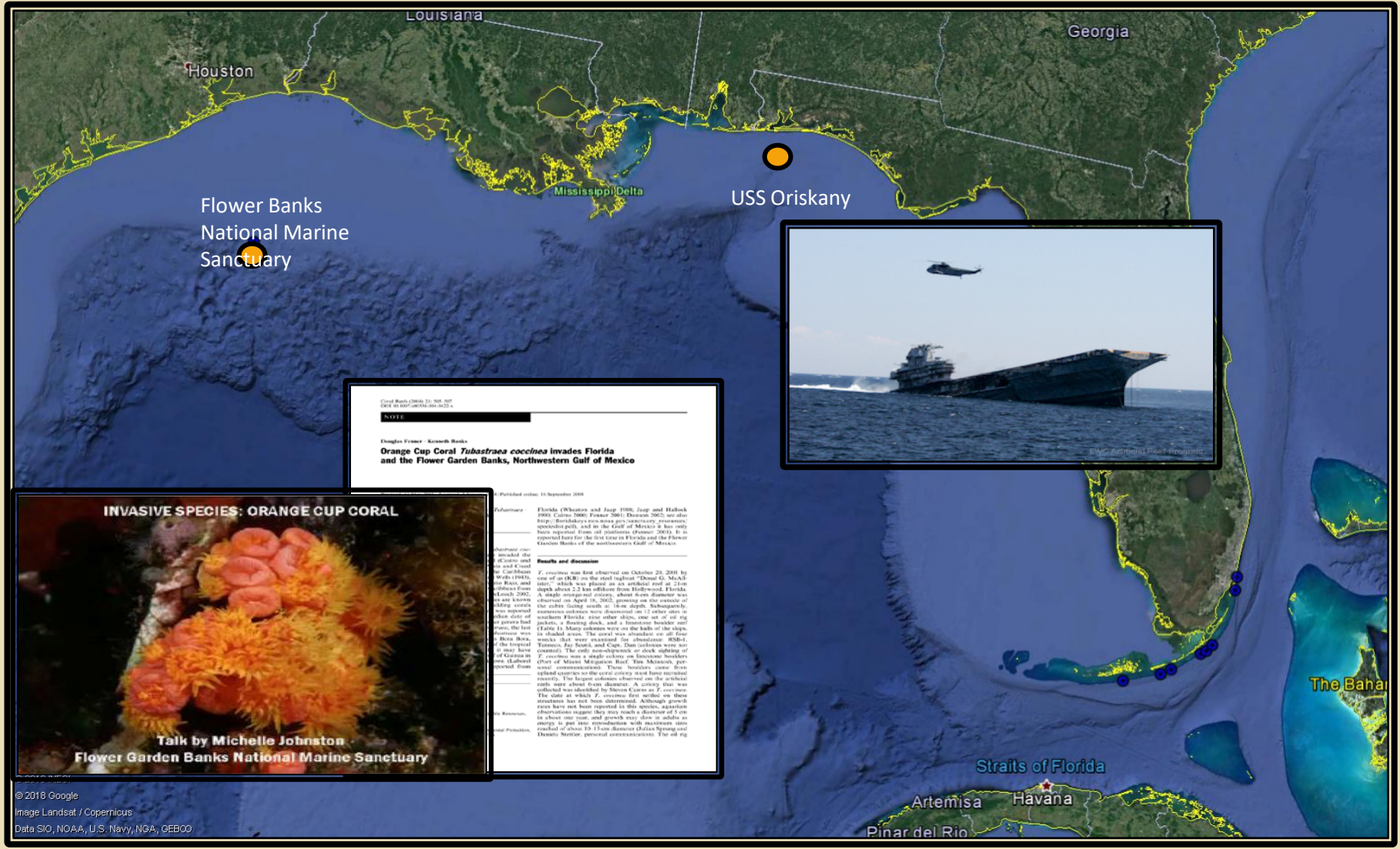


Orange Cup Coral in the Gulf of Mexico & Florida





Orange Cup Coral in the Gulf of Mexico & Florida



Coral Banks (2004) 21: 948-107
 DOI: 10.1007/s12237-004-0021-x

NOTE

Douglas Fraser Kenneth Banks
Orange Cup Coral *Tubastraea coccinea* Invades Florida and the Flower Garden Banks, Northwestern Gulf of Mexico



Published online: 10 September 2008

Abstract Florida (Whitson and Jaap 1998, Jaap and Hallock 2003, Carter 2006, Fraser 2007, Dawson 2007) was also the first introduction site from the Caribbean, southern Florida, and the Gulf of Mexico. It has only been reported from the northwestern Gulf of Mexico (Fraser 2007). It is reported here for the first time in Florida and the Flower Garden Banks of the northwestern Gulf of Mexico.

Results and discussion *T. coccinea* was first observed on October 23, 2008 by one of us (DFB) on the steel tugboat "Donald G. McCallister," which was placed on an artificial reef at 2.1m depth about 2.2 km offshore from Hollywood, Florida. A single orange cup coral, about 10 cm diameter, was observed on April 18, 2007, growing on the outside of the cabin during a dive to 10 m depth. Subsequently, numerous colonies were discovered on 12 other sites in southern Florida: nine other ships, one set of oil rig jacks, a floating dock, and a limestone boulder reef (Table 1). Many colonies were on the hulls of the ships, in shaded areas. The coral was abundant on all four weeks that were examined for abundance. *T. coccinea* was a single colony on limestone boulders (Site of Miami Mitigation Reef, Fort Monro, personal communication). These boulders were then placed on the coral colony and have recruited recently. The largest colonies observed on the artificial reef were about 10 cm diameter. A colony that was collected was identified by Steven Carter as *T. coccinea*. The date at which *T. coccinea* first settled on these structures has not been determined. Although growth rates have not been reported in this species, expansion characteristics suggest they may reach a diameter of 1 cm in about one year, and growth may take a month or more in past sea temperature with maximum recorded of about 19 °C in Miami (Data from National Oceanic and Atmospheric Administration). The oil rig





Orange Cup Coral in SE Florida

www.scubadiving.com

- Port of Miami Mitigation Reef
- C-One Wreck
- Spiegel Grove
- Duane/Bibb
- Aquarius Underwater Habitat
- Long Key Artificial Reef
- Adolphus Busch
- Thunderbolt

Google earth
Image Landsat / Copernicus
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

© Roy F. Evans, Miami, FL

The main image is a satellite map of the southeastern Florida coastline, showing the Atlantic Ocean to the east and the Florida peninsula to the west. Several locations are marked with yellow dots and labeled. Two inset photographs show orange cup coral in detail. The top-left inset shows a close-up of the coral's surface. The middle-left inset shows a diver swimming near a large structure covered in orange cup coral. The bottom-right inset shows a circular opening in a coral structure with people's faces visible through it.





Orange Cup Coral --The Issue

- Prized by Marine Aquarists
- Marine Life Collectors have asked FWC's fisheries managers to consider allowing collection





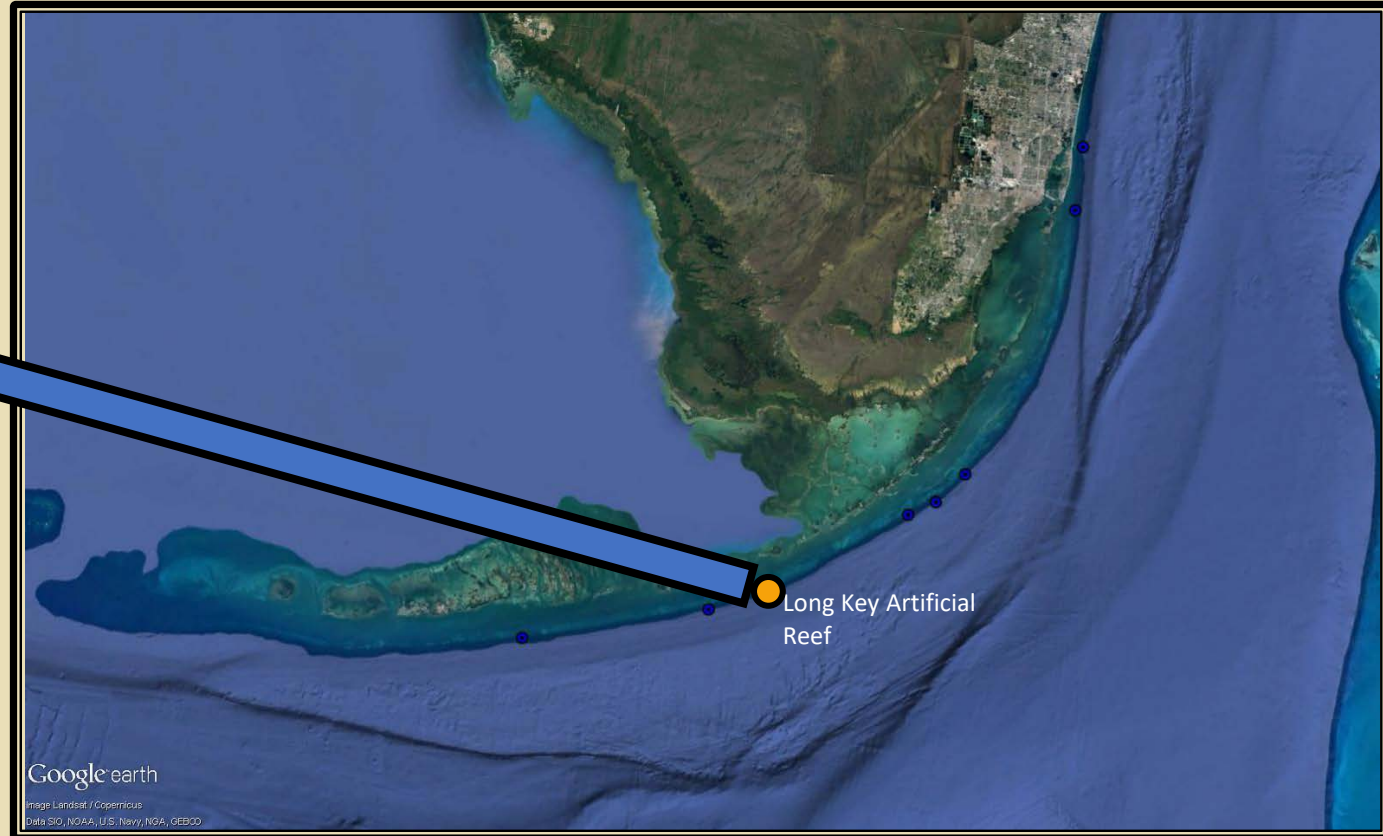
So...What Is The Risk of Collecting?

- Our managers asked if collecting would cause the spread of orange cup coral at existing locations and to new locations?





Studies At The Long Key Artificial Reef





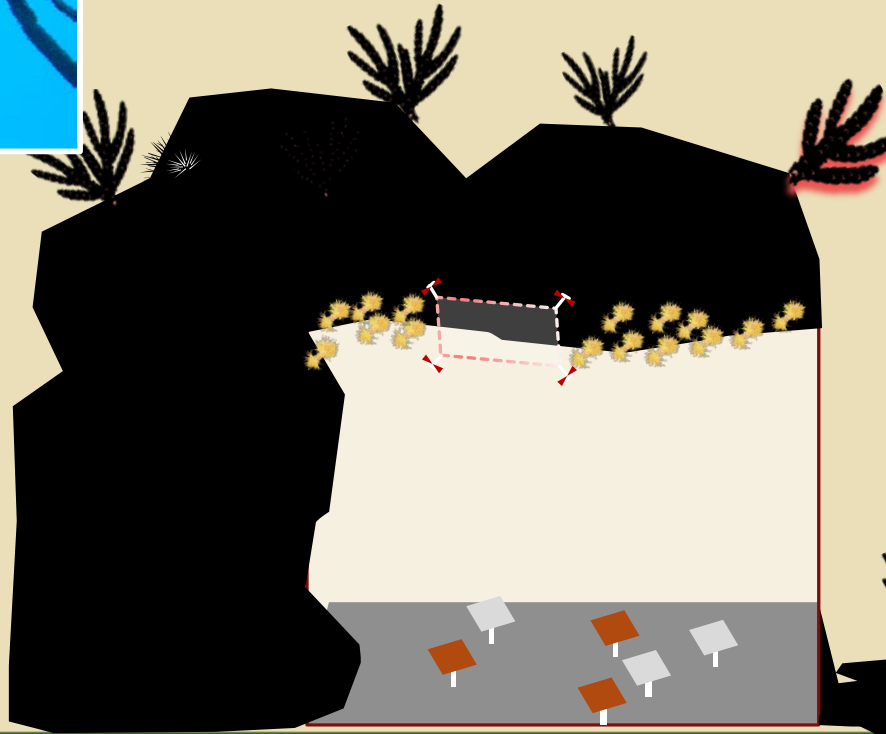
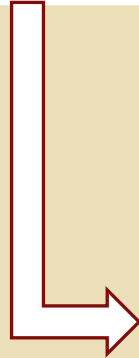
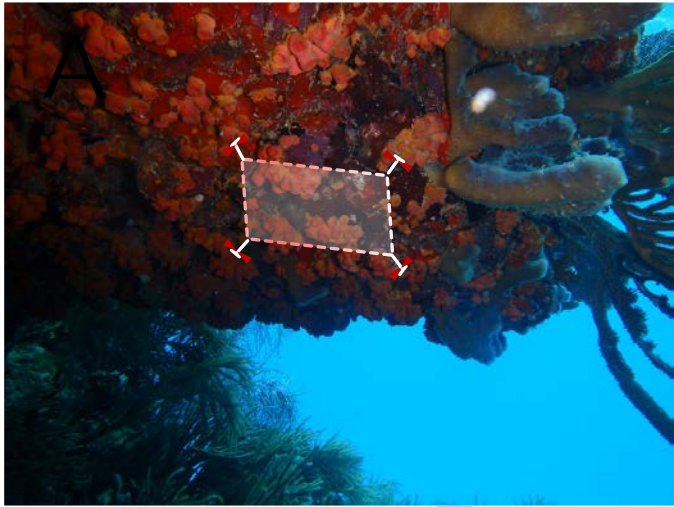
Studies At The Long Key Artificial Reef




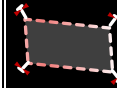
- Assess the effects of the removal of orange cup coral (*Tubastrea coccinea*) from the artificial reefs within the FKNMS – Can we detect enhanced recruitment?
- Direct manipulations to assess competition between OCC and native benthic organisms, esp. corals





Manipulative Experiments



-  *T. coccinea* Polyps
-  Metal Plates
-  Terracotta Plates
-  Removal Area



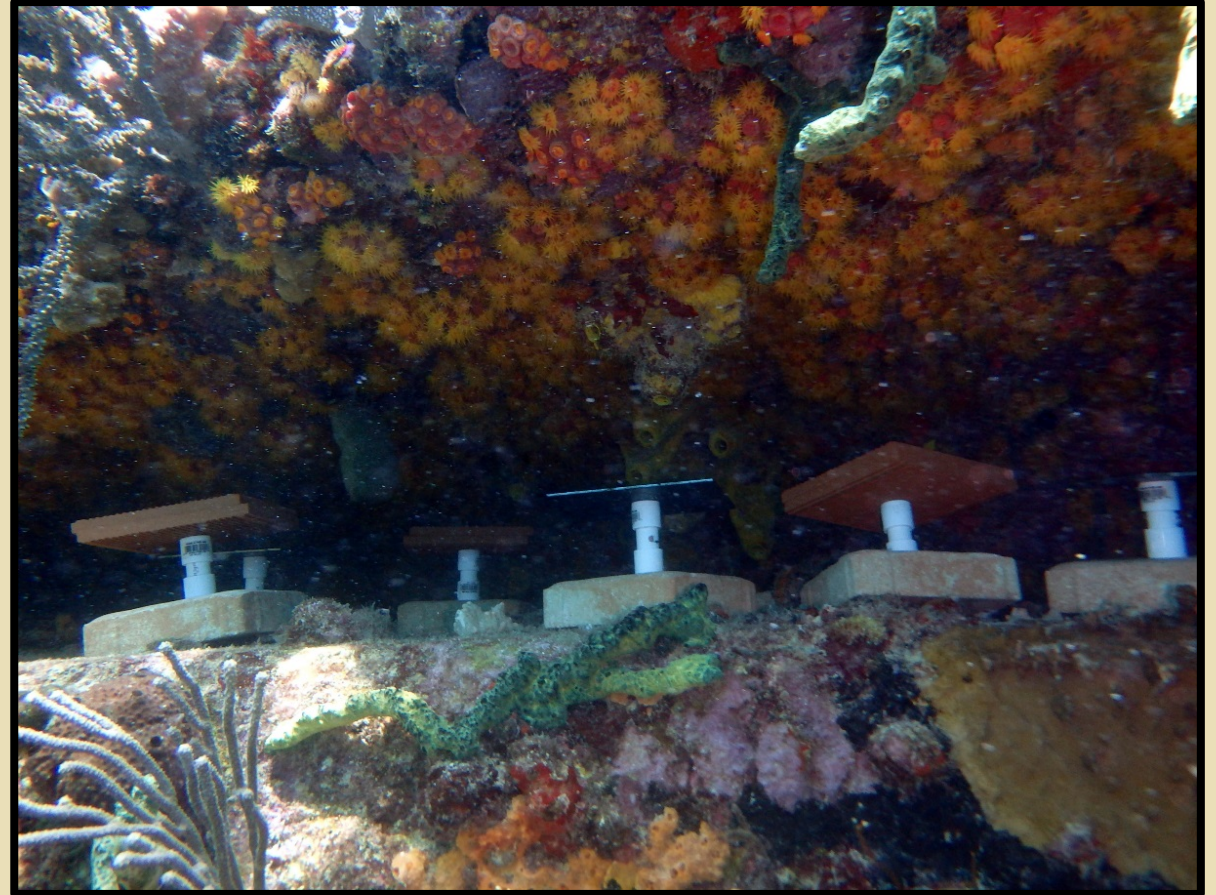


Manipulative Experiments





Manipulative Experiments





Setbacks





So...What Is The Ecological Risk?

- What is the potential for *Tubastraea* to outcompete native species in the shallow water natural coral reef environment





So What Have We Found?...

- Morphologically distinct polyps at the Long Key Artificial Reef





Other Cup Coral Species in the Atlantic



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Aquatic Invasions Records

Expansion of the invasive corals *Tubastraea coccinea* and *Tubastraea tagusensis* into the Tamoios Ecological Station Marine Protected Area, Brazil

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■ Brazil – *Tubastraea taguensis*



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Research article

A new coral species introduced into the Atlantic Ocean - *Tubastraea micranthus* (Ehrenberg 1834) (Cnidaria, Anthozoa, Scleractinia): An invasive threat?

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■ GOM – *Tubastraea micranthus*





So What Have We Found...

- Genetic evidence suggest that there multiple species invading Florida water
- Two of the species invading Florida water also invading Brazilian waters
 - Genetically they are either the same or very similar

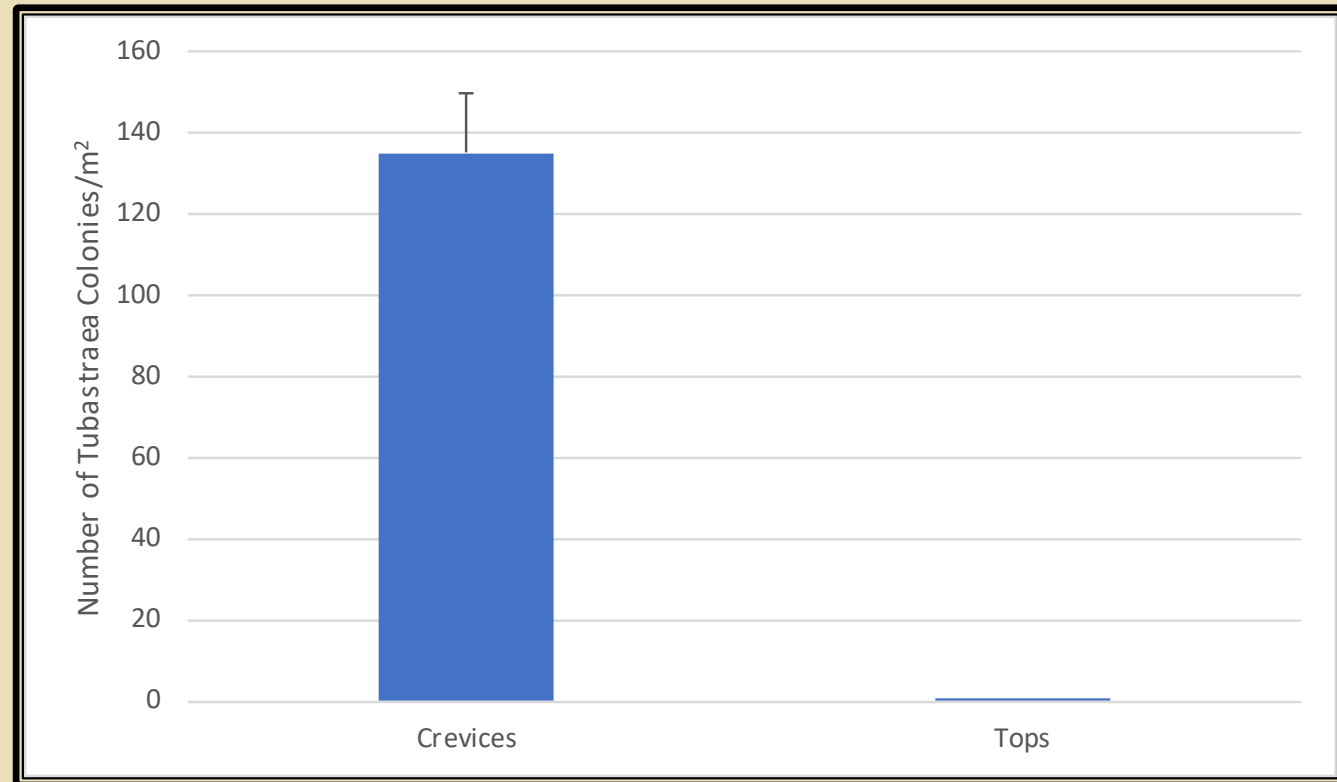




So What Have We Found...



- *Tubastraea* confined to darkened crevices?





Risk to The Coral Reef Ecosystem

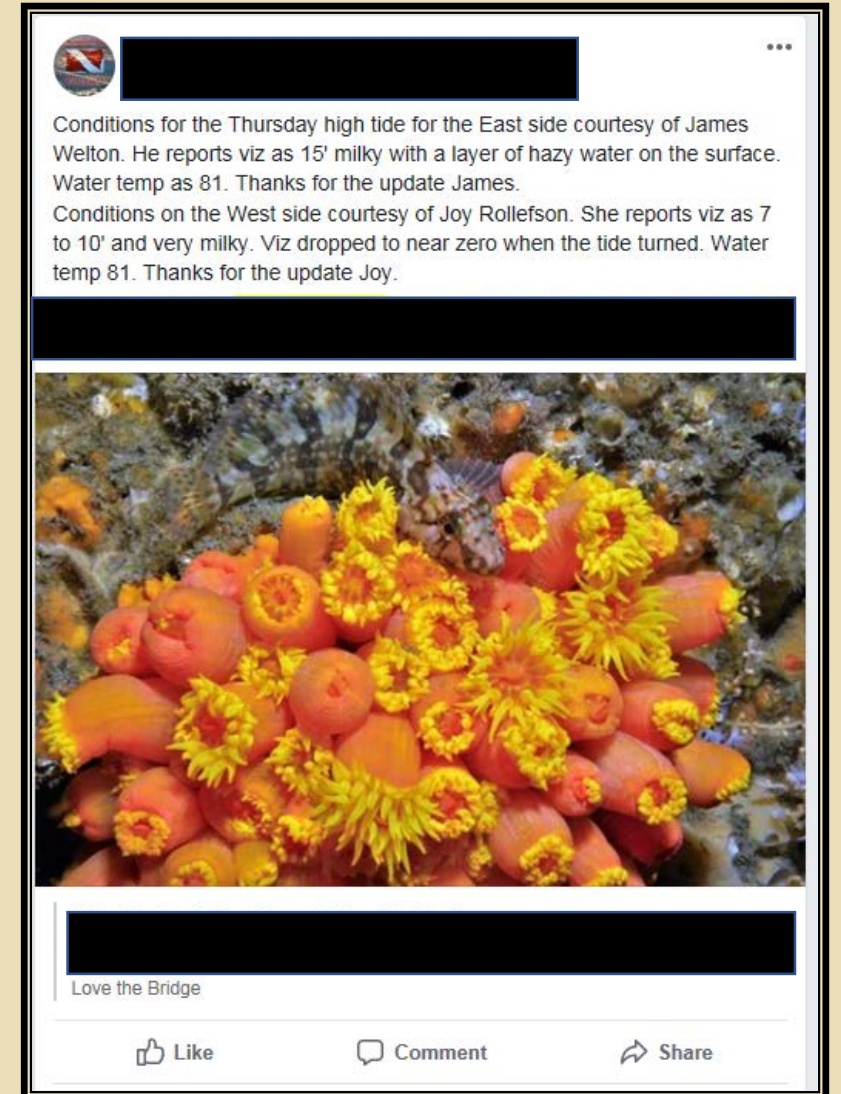
- Largely confined artificial structures; darkened crevices in shallow water
- Has it successfully colonized the darkened recesses of natural reefs?
 - Much of the hard surface area of reefs lies within crevices, caves, and other cavities





Parting Comment

- Be on the lookout for cup corals...we welcome reports!!





ECISMA Partners

