

**Octocoral Harvest
Live Rock Aquaculture
Offshore Coral Nursery and
Restoration Program**

By Ken Nedimyer Coral AP Member,

Octocoral Management Plan History

- 1990 Amendment 1 to the 1982 FMP for Corals and Coral Reefs allowed the annual harvest of 50,000 colonies from Federal waters of the South Atlantic and Gulf of Mexico
- 1994 amendment 2 defined allowable substrate on the octocoral holdfast and prohibited the harvest of non-erect species of octocoral
- 1995 amendment 3 prohibited the harvest of Octocorals north of Canaveral in the South Atlantic EEZ

Octocoral Harvest from State vs Federal Waters by Gulf vs Atlantic
2007-2008

Atlantic

		Regulatory Waters								
		Federal Waters			State Waters			Total		
		Units	Trips	Value(\$)	Units	Trips	Value(\$)	Units	Trips	Value(\$)
Year	Month									
2007	1	1,306	20	4,934	3,917	66	11,543	5,223	86	16,477
	2	1,271	9	4,497	2,120	54	7,785	3,391	63	12,281
	3	1,014	29	3,293	2,562	43	7,914	3,576	72	11,207
	4	1,220	21	4,163	2,916	52	10,690	4,136	73	14,852
	5	548	16	1,698	1,774	41	6,237	2,322	57	7,934
	6	575	20	1,902	3,526	47	10,511	4,095	67	12,413
	7	1,129	32	3,747	2,774	42	9,213	3,903	74	12,960
	8	590	17	1,924	1,546	35	6,028	2,136	52	7,952
	9	605	22	1,907	1,628	40	5,482	2,233	62	7,390
	10	767	22	2,562	2,265	24	8,000	3,032	46	10,562
	11	981	24	3,702	3,596	45	12,489	4,577	69	16,191
	12	757	20	2,477	1,773	17	6,146	2,530	37	8,625
Total		10,763	252	36,804	30,393	506	102,041	41,156	758	138,045
2008	1	704	17	2,416	2,193	36	8,433	2,897	53	10,849
	2	1,039	26	3,853	2,889	42	9,529	3,928	68	13,382
	3	867	20	3,359	1,350	38	5,351	2,217	58	8,710
	4	573	15	2,221	3,895	51	12,697	4,468	66	14,919
	5	814	23	3,273	1,905	41	6,100	2,719	64	9,373
	6	1,166	26	3,983	2,028	33	7,927	3,194	59	11,911
	7	1,044	24	4,062	1,407	33	6,227	2,452	57	10,289
	8	699	17	2,480	1,845	24	6,421	2,544	41	8,901
	9	706	15	2,357	2,176	43	7,122	2,882	58	9,479
	10	348	13	1,101	3,290	37	13,067	3,638	50	14,168
	11	195	6	195	427	11	1,090	622	17	1,275
	Total	8,155	202	29,300	23,405	389	83,956	31,560	591	113,256

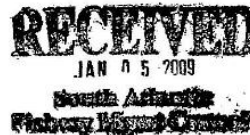
2007
Raw
FWRI
Data
(Atlantic)

Octocoral Harvest from State vs Federal Waters by Gulf vs Atlantic
2007-2008

Gulf

		Regulatory Waters								
		Federal Waters			State Waters			Total		
		Units	Trips	Value(\$)	Units	Trips	Value(\$)	Units	Trips	Value(\$)
Year	Month									
2007	1	100	2	221	434	10	928	534	12	1,149
	2	88	3	198	148	6	287	236	9	485
	3	46	1	104	205	5	535	252	6	639
	4	0	0	0	405	10	814	405	10	814
	5	0	0	0	184	7	400	184	7	400
	6	0	0	0	317	9	542	317	9	542
	7	0	0	0	160	8	308	160	8	308
	8	0	0	0	274	6	535	274	6	535
	9	0	0	0	184	6	467	184	6	467
	10	0	0	0	138	4	366	138	4	366
	11	0	0	0	129	6	311	129	6	311
	12	0	0	0	129	5	252	129	5	252
	Total	234	6	523	2,708	82	5,745	2,942	88	6,267
2008	Month									
	1	0	0	0	292	6	556	292	6	556
	2	0	0	0	381	9	795	381	9	795
	3	71	1	144	332	11	807	403	12	950
	4	0	0	0	401	11	966	401	11	966
	5	74	2	213	311	9	1,024	385	11	1,237
	6	0	0	0	128	4	272	128	4	272
	7	0	0	0	313	6	536	313	6	536
	8	0	0	0	30	4	57	30	4	57
	10	6	1	18	881	5	3,356	887	6	3,374
	11	0	0	0	3	1	5	3	1	5
	Total	151	4	375	3,072	68	8,372	3,223	72	8,747

2007-
2008
Raw
FWRI
Data,
(Gulf)



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
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St. Petersburg, Florida 33701-5505
(727) 824-5305; FAX (727) 824-5308
<http://sero.nmfs.noaa.gov>

DEC 29 2008

F/SER2:CB

MEMORANDUM FOR: Robert Mahood, Executive Director
South Atlantic Fishery Management Council

FROM: Roy E. Crabtree, Ph.D.
Regional Administrator

James E. Weaver

SUBJECT: Preliminary 2007-2008 Commercial Landings

The Southeast Fisheries Science Center has provided the following preliminary landings estimates for species in the South Atlantic Fishery Management Council's area of jurisdiction subject to quota management through December 15, 2008.

Species	Fishing Year	Current Landings (lb)	Quota (lb)	Quota (%)
Atlantic Group king mackerel	03/01/08 - 02/28/09	2,593,471 ^a	3,710,000	69.90
Atlantic Group Spanish mackerel	03/01/08 - 02/28/09	887,175 ^a	3,870,000	24.51 ^b
Gulf king mackerel - Eastern Zone-East Coast subzone	11/01/08 - 03/31/09	135,801 ^c	1,040,625	13.05 ^c
Snowy grouper	01/01/08 - 12/31/08	49,943	84,000	59.46
Golden tilefish	01/01/08 - 12/31/08	290,815 ^d	295,000	98.58
Greater amberjack	05/01/08 - 04/30/09	364,662	1,169,931	31.17
Black sea bass	06/01/08 - 05/31/09	110,676	309,000	35.82
Vermilion snapper	01/01/08 - 12/31/08	942,117	1,100,000	85.65
Red porgy	01/01/08 - 12/31/08	110,938	127,000	87.35
Wreckfish	04/16/07 - 04/15/08	^e	2,000,000	^e
Dolphin	01/01/08 - 12/31/08	598,604	1,500,000	39.91
Octocoral	01/01/07 - 12/31/07	Atlantic: 40,782 Gulf: 2,912	50,000 ^g	87.39

a. Atlantic king and Spanish mackerel data includes preliminary landings through December 15, 2008.

b. Atlantic Spanish mackerel Quota (%) is based on the adjusted quota of 3,620,000.

c. Gulf king mackerel - East Coast subzone closed on February 21, 2008. Reported landings for 11/01/07 - 03/31/08 were 1,028,925 lbs and 98.90% of the quota was met.

d. Golden tilefish closed on August 17, 2008.

e. Confidential landings

f. The Dolphin Wahoo Fishery Management Plan established a 1.5 million pound cap for the dolphin commercial fishery. Data includes preliminary landings during January 1, 2008, through August 31, 2008.

g. Octocoral landings are reported twice a year with final landings reported by May of the next year; therefore, these are the total landings for both Atlantic (750 trips) and Gulf (87 trips) in federal waters for 2007, reported in number of colonies.



NMFS Reported 2008 Landings

2007 and 2008 Octocoral Landing Summary

	South Atlantic EEZ	Gulf of Mexico EEZ	Total Federal	State Waters	Total Harvest
2007	10,763	234	10,997	33,101	44,098
2008 (Thru Dec)	8,155	3,072	11,227	26,477	37,704

Octocoral Fishery Characteristics

- All products are landed Live
- Demand dictates harvest levels
- Harvest is done underwater by hand
- Specimens are selected by size, shape, health, color
- Average specimen is 2-5 years old
- Harvest levels are a tiny fraction of standing stock
- Limited entry fishery, less than 150 ML holders
- There are many areas already closed to harvest in State and Federal waters

Future Management Options

- No Change In Management Plan
- Improve Reporting System
- Pruning Vs Whole Colony Harvest
- Maximum Upper Size Limits
- Aquaculture Lease Options

What is Live Rock?

“Living Marine organisms or an assemblage thereof attached to a hard substrate (including dead coral or rock). For example, such marine organisms associated with hard bottoms, banks, reefs, and liverock may include, but are not limited to: Sea Anemones, Sponges, Tube Worms, Bryozoans, Sea Squirts, Marine Algae.” Amendment 2 to the Coral FMP



Wild Harvest to Aquaculture

State Closure in 1989, Fishery moved to Federal Waters

April 1990 State marine life reporting system implemented

June 1990 SAFMC begins discussions on liverock, defers action to the State of Florida.

June 1992 Florida Governor and Cabinet approve The FMFC rule to phase out the harvest of live rock in EEZ over a 3 year period

March 1993, US District Court Judge issued a preliminary injunction to prevent enforcement of the state's quota system

April 1993 SAFMC adds liverock to the Coral FMP and begins development of a FMP for live rock

Amendment 2 to Coral FMP

July 1994

- Defined Live Rock
- Defined Allowable Octocoral Harvest to exclude non erect, encrusting octocorals
- Prohibited liverock harvest north of Dade County Florida
- Established a 485,000 annual harvest for two years
- Closed all harvest in the South Atlantic after 1996
- Prohibited Chipping of live rock in the South Atlantic
- Allowed for the harvest of aquacultured liverock by permit only

Amendment 3 to the Coral FMP

July 1995

Established a permit system for liverock aquaculture in the South Atlantic EEZ

Prohibited the harvest of Octocorals north of Cape Canaveral

Prohibited Anchoring in the Oculina Bank off Ft Pierce FL.

Administration of the permitting system was transferred to NOAA Fisheries, SE Region, and applications were not accepted until March 1996.

Permits as of 2007

- 11 active permits in the South Atlantic issued to 11 different entities
- All 11 sites are in the Florida Keys
- There are 6 inactive permits in the Keys issued to 6 different entities
- There are 15 active permits in the Gulf of Mexico issued to 7 different entities
- There are 9 inactive permits in the GOM issued to 2 different entities

South Atlantic Landings

<u>Year</u>	<u>Pounds landed</u>	
2002	733,732	Hurricanes Charley, Frances, Ivan, & Jean
2003	982,592	
2004	1,033,726	
2005	373,711	Hurricanes Dennis, Katrina, Rita, & Wilma
2006	13,058	

6 Months



One Year



18 Months



2 Years



Live Rock Farms act as Fish Nurseries



Corals on the Live Rock



Coral Nursery and Reef Restoration Update

Ken Nedimyer

Staghorn Coral on a live rock in 2000



Cutting Small Pieces of Coral In 2000



Mounting the corals (2000)



Freshly mounted Frags



One Year old coral (2001)



Mounting corals at the Reef (2003)



October 2003



July 2007



August 2007



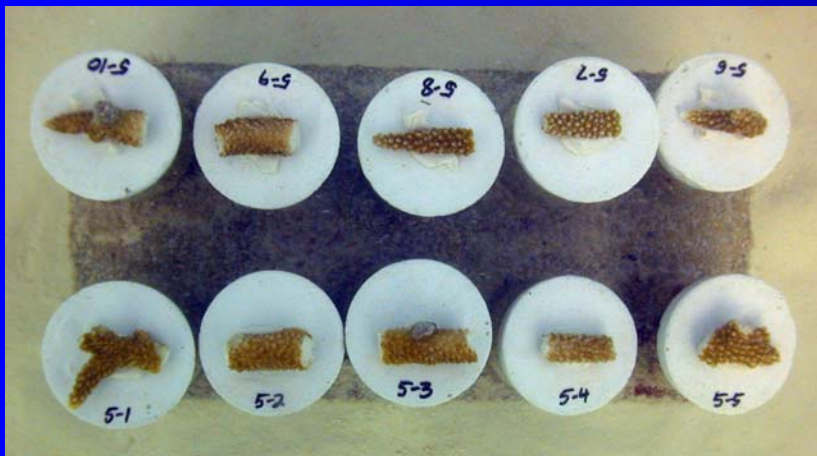
Early Research projects with TNC

- To look for genotypes of staghorn coral that may be more resistant to disease or bleaching.
- To look for habitat types that might provide a more favorable environment for growth, disease resistance, and bleaching resistance among a variety of different genotypes.

Early Results

Growth Rate Differences

January 2006



June 2006



Growth Rate Differences

January 2006



June 2006



Growth Rate Differences

January 2006



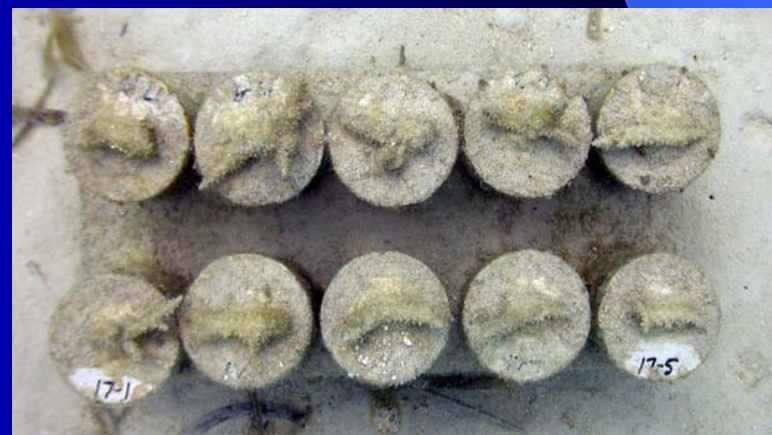
June 2006



Early Results

Survival Rate Differences

From 100% on 3 genotypes to 0% on one genotype.



Summary of Outplanting Results

- Some genotypes grew faster than others in all zones
- Growth rates varied from zone to zone
- Inshore zone experienced bleaching, but only in some genotypes
- Disease incidence varied greatly from zone to zone
- More work needs to be done

By spring of 2007 we had over 1000 corals
By spring of 2008 we had over 2000 corals
By spring of 2009 we will have over 4500 corals

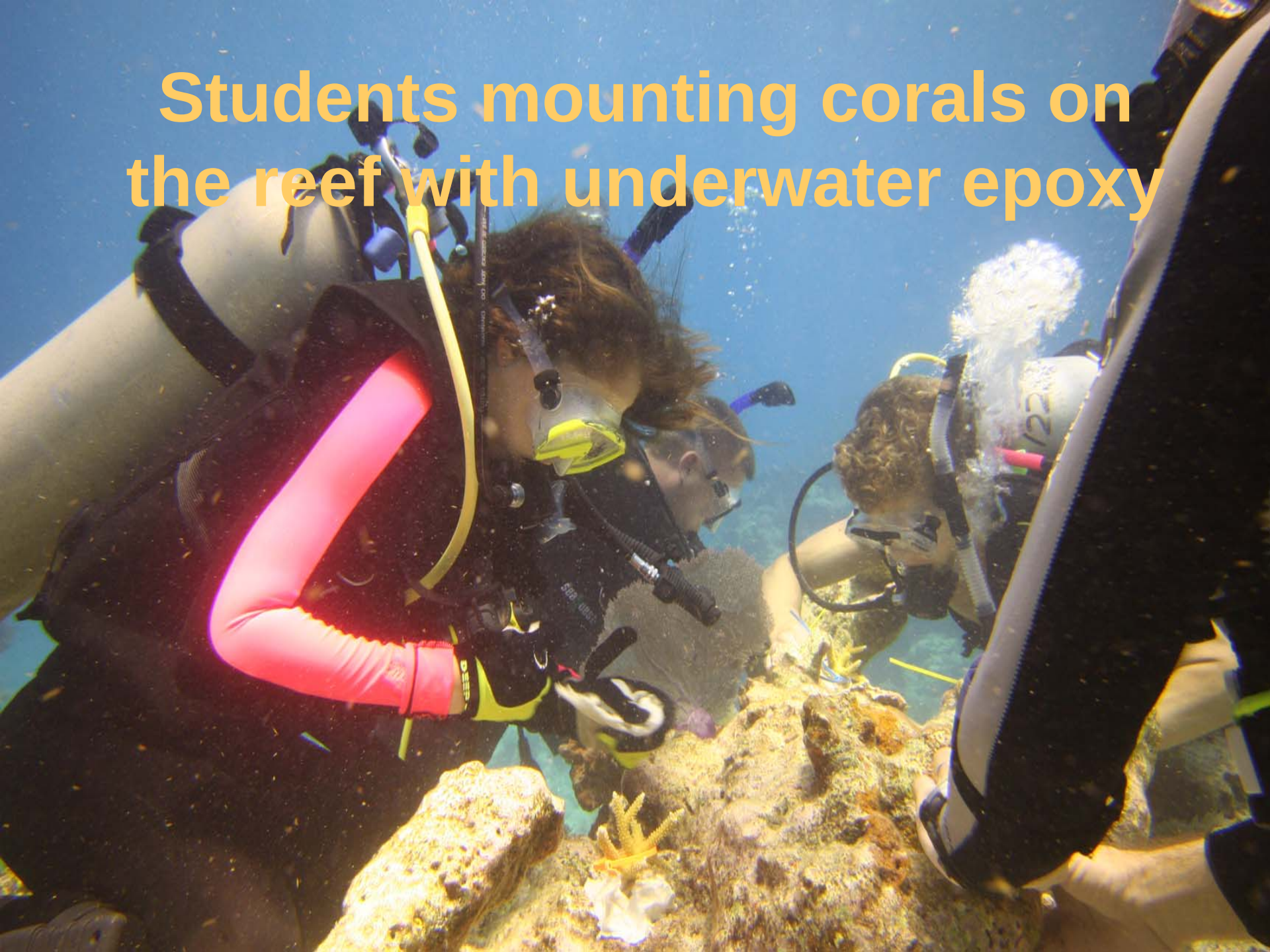
“What are we going to do with them?”



What to Do with All the Corals

- Research projects:
 - 2005 TNC Reef Resiliency Work
 - 2008 Aquarius Reef Base Mission
 - Ongoing Growth and Survival Comparison Study with The Florida Aquarium
- Restoration Projects
 - One Project in 2007
 - 6 projects in 2008
 - 10 projects in 2009
 - ??? Projects in 2010 and beyond

Students mounting corals on the reef with underwater epoxy



Finished Product

December 2007

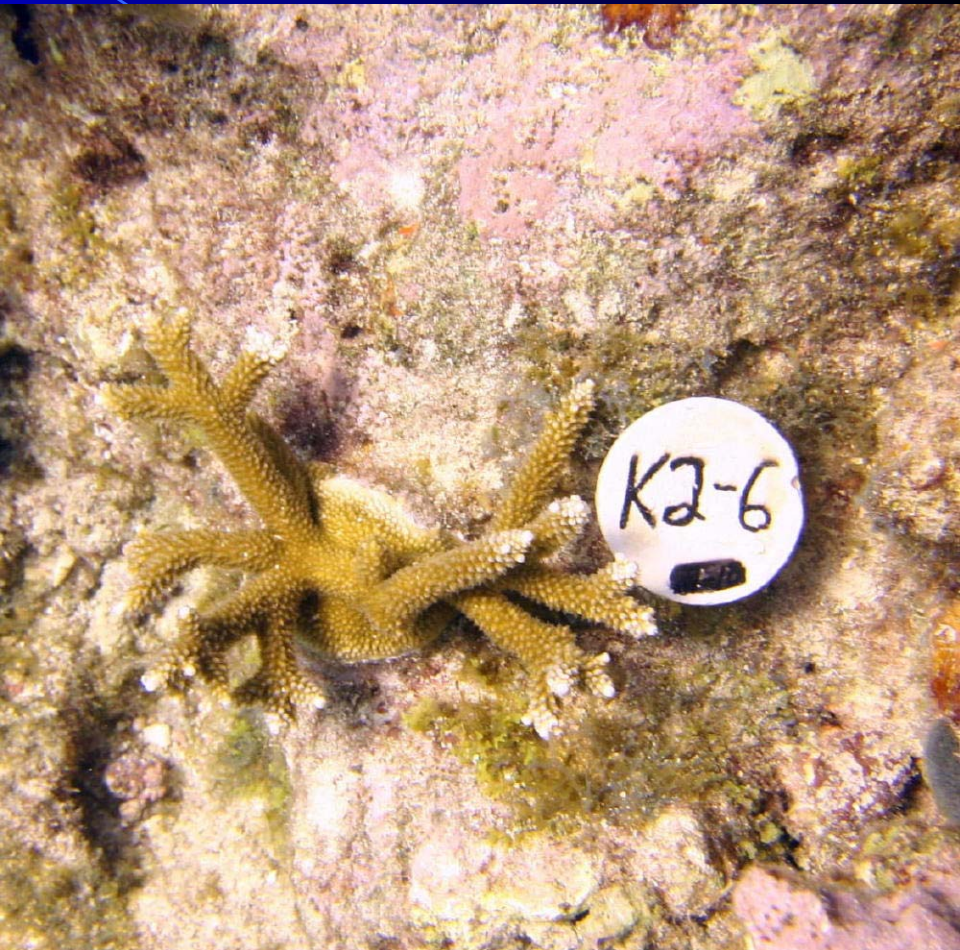
July 2008

January 2009

Six Months Growth



July 26, 2007



January 25, 2008

One Year's Growth



July 26, 2007



July 12, 2008

18 months of growth



July 26, 2007



January 9th, 2009

Future Vision,... Restored Thickets of Staghorn Corals



Future Vision,... Restored Elkhorn fore reefs



Supporters

- Sanctuary Friends Foundation
- Islamorada Charter Boat Association
- Monroe County Commercial Fishermen's Assn
- The Nature Conservancy
- Disney Wildlife Conservation Fund
- Volunteer Divers
- NOAA Fisheries
- National Undersea Research Center (NURC)

Partners

- Fl Keys National Marine Sanctuary
- Florida's FWC
- Coral Shores High School
- Island Christian School
- Florida Keys Dive Center
- Amoray Dive Resort
- REEF

The Coral Restoration Foundation, Inc

www.coralrestoration.org

- Tavernier based Non-Profit, 501c(3)
- Focused on developing practical solutions for restoring coral reefs using corals grown in offshore nurseries.
- Volunteer based
- Citizen Science