

## 5 Railroad Tie Stack Reef

This reef is now four years old, so that this is the fourth year of monitoring for this reef site.

Construction date: March 13, May 9, June 23, 2003

Monitoring Date: June 25, 2007

Location: Approximately 7 miles offshore St. Lucie Inlet - Martin County, Florida

GPS coordinates: N27° 12.201 / W80° 02.310 at the summit of the reef site

### 5.1 History of the Railroad Tie Stack Artificial Reef:

This is the first artificial reef site to be built in Martin County from donated concrete railroad ties. As part of a grant from the Florida Fish and Wildlife Commission (FWC Grant #02108 for \$25,000) and with additional funding from Martin County, the Railroad Tie Stack Reef was constructed in March, May and June 2003. This reef was built utilizing discarded concrete railroad ties donated by the Florida East Coast Railroad Company. Each railroad tie is approximately 11' x 14" x 10" and weighs 600 to 700 lbs. each. Approximately 1500 tons of concrete railroad ties were placed in three deployments from an anchored barge in 93 feet of ocean water. Deployment dates were March 13, May 9, and June 23, 2003. Underwater photographs taken on June 25, 2007 are shown in Figure 12.



Figure 12. RRtie Stack Reef Photographs

## 5.2 Reef Components Stability

The railroad ties that comprise this reef are interlocked with each other at numerous contact points. The reef structure is quite complex with many interstitial voids in which marine life can hide from predators. Even on bright sunny days with good visibility, many dark recesses were observed which required use of a light just to peer into the areas.

Martin County was the recipient of two hurricanes in September 2004, and another one in October 2005. These storms had little effect on the two concrete railroad tie reefs in Martin County. When viewed in 2005 and 2006 the overall shape of the pile seemed the same as it was each year since construction, a cone shaped mountain of concrete railroad ties. The local nickname of this site is "The Matterhorn". The only measurable change was that the depth of the uppermost summit is now 72 feet (in 2004 prior to the hurricanes it was measured as 69 feet).

## 5.3 Fish Species and Abundance Findings:

The fish species census is shown in Table 6. In the 2007 fish census, the total species identified is up to 30 from 19 identified at this site in 2006 and 16 identified in 2005.

**Table 6. Railroad Tie Stack Reef Fish Census**

Common	Scientific	Adult or Juvenile	2007	2006	2005
Atlantic Spadefish	<i>Chaetodipterus faber</i>	A		F	M
Baitfish	<i>Decapterus punctatus</i>	J&A	A		
Banded Sandfish	<i>Malacanthus plumieri</i>	J&A			
Bandtail Puffer	<i>Sphoeroides spengleri</i>	J&A	F		
Bank Seabass	<i>Centropristis ocyurus</i>	A	F		
Baracuda	<i>Sphyaena barracuda</i>	A			
Batfish	<i>Dibranchus atlanticus</i>	A		S	
Beau Gregory	<i>Stegastes leucostictus</i>	J&A	F	F	F
Belted Sandfish	<i>Serranus subligarius</i>	A	M	F	
Bicolor Damselfish	<i>Stegastes partitus</i>	J&A	M		
Black Seabass	<i>Centropristis striata</i>	A		F	F
Blue Angelfish	<i>Holacanthus bermudensis</i>	A	F		
Blue Runner	<i>Caranx crysos</i>	A	M		
Burrfish	<i>Chilomycterus antennatus</i>	A		S	
Common Snook	<i>Centropomus undecimalis</i>	A	F	F	
Cubbyu	<i>Pareques umbrosus</i>	J&A	M		
Gag Grouper	<i>Mycteroperca microlepis</i>	A		F	
Gray Angelfish	<i>Pomacanthus arcuatus</i>	J&A	S		
Gray Snapper	<i>Lutjanus griseus</i>	A	F	F	M
Gray Triggerfish	<i>Balistes capriscus</i>	A		S	F
Greater Amberjack	<i>Seriola dumerili</i>	A	M	M	M
Highhat	<i>Equetus acuminatus</i>	J&A			F
King Mackerel	<i>Scomberomorus cavalla</i>	A	F		
Lane Snapper	<i>Lutjanus synagris</i>	J&A	M		M
Ocean Triggerfish	<i>Canthidermis sufflamen</i>	A			

Pigfish	<i>Orthopristis chrysoptera</i>	A	A		
Porcupinefish	<i>Diodon hystrix</i>	A			S
Porkfish	<i>Anisotremus virginicus</i>	J&A	M		F
Red Snapper	<i>Lutjanus campechanus</i>	J&A		F	
Reef Butterflyfish	<i>Chaetodon sedentarius</i>	J&A	F	F	
Round Scad (Cigar Minnows)	<i>Decapterus punctatus</i>	J&A	A		
Sargent Major	<i>Abudefduf saxatilis</i>	A	F		
Scorpionfish	<i>Scorpaena grandicornis</i>	A		S	
Scrawled Cowfish	<i>Acanthostracion quadricornis</i>	A			S
Sergeant Major	<i>Abudefduf saxatilis</i>	A	F		
Sheepshead	<i>Archosargus probatocephalus</i>	A	F	F	M
Sheepshead Porgy	<i>Calamus penna</i>	A	M	F	F
Slippery Dick	<i>Halichoeres bivittatus</i>	A	M		
Snowy Grouper	<i>Epinephelus niveatus</i>	J&A			
Southern Stingray	<i>Dasyatis americana</i>	A		F	
Spanish Hogfish	<i>Bodianus rufus</i>	J&A	F		
Spiny Lobster	<i>Panulirus argus</i>	A		S	
Spotfin Butterflyfish	<i>Chaetodon ocellatus</i>	A	S		F
Spotted Soapfish	<i>Rypticus subbifrenatus</i>	A	F		
Tomtate	<i>Haemulon aurolineatum</i>	A	A	M	A
Vermilion Snapper	<i>Rhomboplites aurorubens</i>	J&A			F
Whitespotted Soapfish	<i>Rypticus maculatus</i>	A	F		
Yellowtail Snapper	<i>Ocyurus chrysurus</i>	A			
	<b>Total Number of Species:</b>		30	19	16

## 5.4 Benthic Species Identification

Benthic species listed in Table 7 were identified using the roving diver technique. Species and abundance were similar to that observed in 2005 and 2006, except for the lack of the green algae *Caulerpa brachypus* in 2006. In 2006 and 2007 a small colony of hard stony white coral, *Oculina diffusa*, was observed, which had not been recorded at this site in previous years.

**Table 7. Railroad Stack Reef Benthic Species Census**

<i>Benthic Species Identified</i>	<i>2007 Abundance</i>	<i>2006 Abundance</i>	<i>Comments</i>
<b>Green Algae</b>			
<i>Codium spp.</i>	>100 Small individuals	>100 Small individuals	(thallus < 6 cm high)
<i>Caulerpa brachypus</i>	none	none	
<b>Brown Algae</b>			
<i>Spatoglossum spp.</i>	11-100	11-100	Thalli up to 0.33 m long
<b>Red Algae</b>			
<i>Rhodomenia spp.</i>	11-100	11-100	
<b>Sponges</b>			
White encrusting sponge			
Orange encrusting sponge			

<b>Cnidarians</b>			
Unidentified anemone	11-100	11-100	
<b>Crustaceans</b>			
Spiny Lobster ( <i>Panulirus argus</i> )	2	0	
Deep-water limpets	>100	>100	Extremely abundant
Arrow crab ( <i>Stenorhynchus seticornis</i> )	2-10	1	
<b>Gastropods</b>			
Unidentified spp. # 1	2-10	2-10	
Unidentified spp. # 2	2-10	2-10	
<b>Bryozoans</b>			
Yellow bryozoan	2-10	2-10	
<b>Urchins</b>			
<i>Arbacia punctulata</i>	11-100	11-100	
<b>Coral</b>			
<i>Oculina diffusa</i>	1	1	

The benthic growth rate on the concrete surfaces of each railroad tie has been quite rapid since immersion in 2003. The upper portions of the pile continue to exhibit much more benthic growth compared to the lower areas. This may be due to more sunlight and warmer surface waters flowing at the shallower depths.