

## 7 Railroad Tie Stack Reef

Monitoring Date: June 8, 2005

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

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This is the 2nd of a 5-year annual monitoring effort at this site. This report addresses four types of collected data: dive data, reef component stability, fish species & abundance, and benthic species identifications.

### 7.1 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 & 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, & June 23, 2003.

### 7.2 Dive Data

Max. Depth at bottom = 91 ft. Min. depth at top center of summit = 73 ft.

Size of structure = 120 ft. long by 50 ft. wide by 18 ft. high

Underwater visibility this day = 50 ft.

Bottom water temperature = 69° F

Surface water temperature = 80° F

Current direction & speed < ½ knot to the north

Divers breathing mode & gases = open circuit scuba with nitrox 36 & 35%

### 7.3 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 Sept. 2004, Frances Cat. 2 and Jeanne Cat 3. These storms had little effect on the two concrete railroad tie reefs in Martin County. When viewed in 2005 the overall shape of the pile seemed exactly 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 73 feet (in 2004 it was measured as 69 feet), and the maximum bottom depth measured in 2005 was 91 feet (in 2004 it was 93 feet).

### 7.4 Fish Species & Abundance Findings:

Fish identification and abundance were determined utilizing the guidelines setup by The Reef Environmental Education, as described previously. The fish species census is shown in Table 12.

**Table 12. Railroad Tie Stack Reef Fish Census**

<i>Marine Species Identified</i>	<i>Quantity observed</i>	<i>Juvenile or Adult</i>
Tomtate	100's	A
Spotfin butterfly fish	2	A
Sheepshead	10's	A
Sheepshead Porgy	7	A
Vermilion Snapper	5	A
Gray Snapper	10's	A
Porcupine fish	1	A
Gray Triggerfish	2	A
Beau Gregory	4	J
Porkfish	5	A
Lane Snapper	10's	A
*Scrawled Cowfish	1	A
*Black Seabass	3	A
*Highhat	3	J
*Greater Amberjack	10s in feeding school	A
*Atlantic spadefish	10's	A

\* - These species were not seen during 2004 monitoring

### 7.5 Benthic Species Identification

Benthic species listed in Table 13 were identified using the roving diver technique.

**Table 13. Railroad Stack Reef Benthic Species Census**

<i>Benthic Species Identified</i>	<i>Abundance</i>	<i>Comments</i>
<b>Green Algae</b>		
<i>Codium</i> spp.	>100 Small individuals	(thallus < 6 cm high)
<i>Caulerpa brachypus</i> (attached)	1 rhizome with four blades	on east side of stack
<b>Brown Algae</b>		
<i>Spatoglossum</i> spp.	11-100	Thalli up to 0.33 m long
<b>Red Algae</b>		
<i>Rhodymenia</i> spp.	11-100	
<b>Sponges</b>		
White encrusting sponge		
Orange encrusting sponge		
<b>Cnidarians</b>		
Unidentified anemone	11-100	
<b>Crustaceans</b>		
Deep-water limpets	>100	Extremely abundant
Arrow crab ( <i>Stenorhynchus seticornis</i> )	1	
<b>Gastropods</b>		
Unidentified spp. # 1	2-10	
Unidentified spp. # 2	2-10	
<b>Bryozoans</b>		
<i>Yellow bryozoan</i>	2-10	
<b>Urchins</b>		
<i>Arbacia punctulata</i>	11-100	

The benthic growth rate on the concrete surfaces of each railroad tie has been quite rapid since immersion in 2003. Compared to steel surfaces on the nearby FPL reef in the same depth of water, the growth rate is quicker on the concrete materials. Also the upper portions of the pile as have much more benthic growth compared to the lower areas. This is probably due to more sunlight and warmer surface waters flowing through the shallower depths.

### **7.6 Railroad Tie Stack Reef Summary**

The overall size, density, complexity, and profile of this site are providing an excellent artificial reef habitat to enhance the offshore marine environment and benefit marine resource users. The stability of the structure appears to be very good, especially in surviving relatively intact after two direct passes of major hurricanes. In the 2005 fish census, the total species identified is down slightly to 16 from 20 identified at this site in 2004. The most significant sport/food fish missing were Gag Grouper, Yellowtail Snapper, Almaco Jack, Snowy Grouper, and Common Snook, all of which are migratory species common in these waters. Five new species to this site in 2005 were identified. Two of those 5 are considered food & sportfish important species (Black Seabass & Greater Amberjack).