6 Railroad Tie Patches (Five Peaks) Reef

This reef is now three years old, so that this is the third year of monitoring for this reef site.
Construction date: June 22, 28, 29, 2004
Monitoring date: July 10, 2007
Location: Sirotkin permitted artificial reef site
GPS coordinates: 27° 11.701 North / 80° 02.140 West (summit of yellow patch).

6.1 History of the Railroad Tie Patches Artificial Reef:

As part of a Florida Fish and Wildlife Conservation Commission construction grant, (FWC Grant #03048 for $52,500) and with additional funding from Martin County, a 5 component patch reef utilizing donated concrete railroad ties was constructed in June of 2004. The materials deployed were donated by the Florida East Coast Railroad Company. Each railroad tie is approximately 11' x 14" x 10" and weighs approximately 600 – 700 lbs. each. On the East Coast of Florida similar successful artificial reefs have been built using concrete railroad ties in St. Lucie and Indian River Counties.

In Martin County this reef is the fourth in a series of four that were built in 90 to 100-foot water depths for the purpose of comparing different materials and arrangements on the seafloor. The five peaks reef was built in 2004 approximately 3/4 mile south of an existing concrete railroad tie stack reef constructed in 2003. One half mile north of the RR tie stack reef is a patch reef built of concrete tetrahedrons built in 2002, and ½ mile north of that is a tetrahedron stack reef constructed in 2001. Each of these 4 reefs consists of a similar total tonnage of concrete (1500 tons) and is located in similar water depth and distance offshore of the Martin County shoreline (6.5 miles).

The 5 peaks railroad tie patch reef was built on June 2, 28, and 29, 2004 utilizing a full barge load of concrete railroad ties for each deployment. Approximately 1500 railroad ties (500 tons) were placed from an anchored barge for each of the three deployments. There are five patches or "peaks" on the reef; each separated by a natural sand/shell seafloor. Distances vary between the peaks and are an average of 120 feet from centers of each cluster. Color-coded tie wraps have been added to each of the patch areas to aid future monitoring efforts.

6.2 Railroad Tie Patches Orientation:

Figure 13 shows the detailed chart of the concrete railroad tie five-patch reefs (Five Peaks Reef). The distances and bearings between the five peaks are shown, based on the GPS coordinates and diver observations.

Underwater photographs taken on July 10, 2007 are shown in Figure 14. Reef components, baitfish, benthic growth, divers and other fish are shown in the photographs.

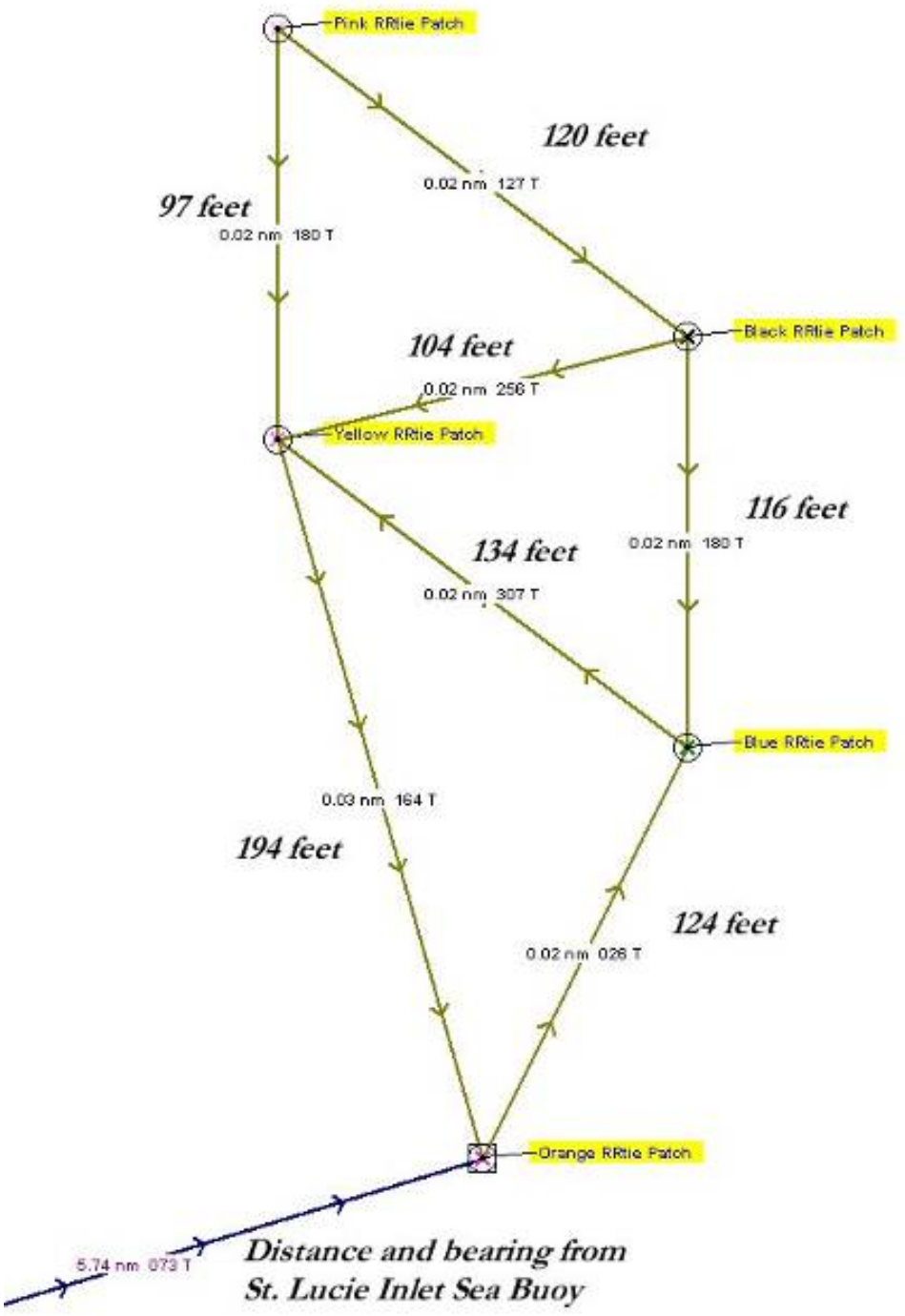

Figure 13. Chart of the Five Concrete Railroad Tie Patch Reefs

Also known as Five Peaks Reef, with the locations, distances and bearings between the five summits of this reef shown in the above diagram.

Figure 14. RRtie Patch Reef Photographs

6.3 Reef Components Stability

The concrete railroad ties weigh between 600 to 700 lbs. each in air. They are approximately 11 feet long x 14" x 10" and as they are deployed they wedge into spaces between adjacent ties. There were about 920 ties for each peak, forming an interlocking matrix of 300 tons of concrete in five cone-shaped piles. The average profile for each of the 5 peaks is 7.5 feet; with a roughly circular shape and approximately 50-feet diameter.

6.4 Fish Species and Abundance Findings:

Fish census data from July 10, 2007, May 27, 2006 and June 8, 2005 are shown in Table 8.

Table 8. Railroad Tie Patches Reef Fish Census

Common Name	Scientific Name	Adult or Juvenile	2007	2006	2005
Atlantic Spadefish	*Chaetodipterus faber*	A			M
Baitfish	*Decapterus punctatus*	A	A		
Bandtail Puffer	*Sphoeroides spengleri*	J&A	F	F	
Beau Gregory	*Stegastes leucostictus*	A		S	
Black Margate	*Anisotremus surinamensis*	J&A	F		
Black Seabass	*Centropristis striata*	J&A	M	F	M
Blue Angelfish	*Holacanthus bermudensis*	A	F		S
Blue Runner	*Caranx crysos*	A	M		
Bonito (Little Tunny)	*Euthynnus alletteratus*	J	F		
Cobia	*Rachycentron canadum*	A	S		
Cubbyu	*Pareques umbrosus*	J&A	M	F	
Gag Grouper	*Mycteroperca microlepis*	A	S	F	F
Gray Angelfish	*Pomacanthus arcuatus*	A			S
Gray Snapper	*Lutjanus griseus*	A	F	F	F
Gray Triggerfish	*Balistes capriscus*	J&A	F	F	M
Greater Amberjack	*Seriola dumerili*	A	F	S	F
Lane Snapper	*Lutjanus synagris*	A	F		F
Porkfish	*Anisotremus virginicus*	J&A	M		F
Puddingwife	*Halichoeres radiatus*	A		F	S
Red Snapper	*Lutjanus campechanus*	J&A	M	F	M
Reef Butterflyfish	*Chaetodon sedentarius*	A		F	F
Sailors Choice	*Haemulon parra*	A			M
Sargent Major	*Abudefduf saxatilis*	A	F	S	
Scamp	*Mycteroperca phenax*	A	F		F
Scrawled Cowfish	*Acanthostracion quadricornis*	A			F
Sheepshead	*Archosargus probatocephalus*	A	M	F	F
Sheepshead Porgy	*Calamus penna*	A	F		F
Silversides (Baitfish)	*Atherinidae*	2-3 in.	A		
Smooth Trunkfish	*Lactophrys triqueter*	A			F
Southern Flounder	*Paralichthys lethostigma*	A			S
Southern Stingray	*Dasyatis americana*	A	S		
Spotfin Butterflyfish	*Chaetodon ocellatus*	A	F	F	F
Spotfin Hogfish	*Bodianus rufus*	J&A	M	S	S
Spottail Pinfish	*Diplodus holbrookii*	A	F	F	
Spotted Moray Eel	*Gymnothorax moringa*	A	S		
Spotted Scorpionfish	*Scorpaena plumieri*	A		S	S
Spotted Soapfish	*Rypticus subbifrenatus*	A	F		
Tomtate	*Haemulon aurolineatum*	J&A		M	M
Unidentified Baitfish		A			A
Vermilion Snapper	*Rhomboplites aurorubens*	A			F
Whitespotted Soapfish	*Rypticus maculatus*	A			S
	Total Number of Species:		27	19	27