Mitigation Reef B	Nearshore Artificial Reef Site	Deployed July-Sept 2000

Project Date: May ***26 & 30, 2004***
Subject: Annual monitoring report for the Nearshore Mitigation Reef B
Location: Nearshore permitted reefsite B, approximately 1000-ft. offshore of the Virginia Forest Beach (Tiger Shores) north***east*** of the Stuart Public Beach, Martin County, Florida
GPS Coordinates: N27 13.553 / W80 10.647 (center of the reefsite)
Crewmembers: ***5/26/30 – Dr. Lee Harris, Kerry Dillon, Mark Perry, Tony Cimagglio, Joe Morrow 5/30/04 – Capt. Leon Morrison, Scott Glover, Laura Herron***

The following field report documents the conditions on the artificial reef site known as nearshore mitigation reef "B" the middle of three such reefs in Martin County, Florida. This report addresses three types of data collected: Fish species identification, benthic species identification, and reef component stability.

HISTORY OF NEARSHORE REEF "B"

To offset predicted impacts from beach renourishment projects, Martin County has created three nearshore mitigation artificial reefsites. These reefs were constructed during the summer of 2000. Materials utilized were from dismantled concrete and steel components from the old Evans Crary Bridge. Larger sections were placed in the Ernst permitted offshore reefsite in 60 – 70 ft. of water while smaller sections were utilized for the shallower nearshore mitigation reefsites.

Nearshore reef B was constructed on 7/28, 8/2, 8/10, 8/28 & 9/5 2000 with five total bargeloads of the following materials:

- 115 concrete piles from 20 – 40 ft. long each
- 20 concrete pilecaps approx. 30 ft. x 4 ft. x 5 ft. each
- 15 steel/concrete roadway sections approx. 40 ft. x 5 ft. x 4 ft. each

These materials were deployed from an unanchored barge using several temporary surface buoys to mark the areas for material deployment. Nearshore reefsite B is approximately 1000 feet offshore of the beach, with water depths to natural bottom 16 – 24 ft. deep. The shallowest spot to the top of the reef components was measured as 7 feet, with the average water depth above reef components being 12 – 15 feet.

REEF COMPONENTS STABILITY:

It was observed that most all components are still close to the same position as when first deployed in the summer of 2000 and monitored in 2001**,** 2002, 2003 ***& 2004.*** This area is subject to seasonal and storm induced beach profile changes, with covering and uncovering of the nearshore natural and artificial reefs. There has been some settlement (and/or burial) and scour around the bridge pieces. The scour provides habitat similar to that provided by similar scour around nearshore natural reefs in the area.

The individual pilings that were placed horizontally on the flat sandy bottom have been partially buried into the sand, due to either sinking of the unit in the sand or sand accretion (or a combination of both). Many of the components that stacked on top of each other appear to be stable, and are providing many overhangs and crevices which provide excellent habitat for a variety of marine organisms.

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FISH SPECIES & ABUNDANCE FINDINGS:

Fish identification and abundance were determined utilizing the guidelines setup by the Reef Environmental Education Foundation, known as *REEF*. The roving diver method was used for a set time period of 30 minutes. The divers would roam around the reef structure and identify species and abundance and record data on underwater slates. Data would be double-checked once topside using field texts with color photographs and then transferred to the *REEF* data sheets to be added to their worldwide database. Underwater video and digital still photodocumentation were also utilized to accurately document fish species and abundance. Below are the results of those findings:

Marine species identified	Quantity observed	Juvenile or Adult
Porkfish	10's	***A & J***
Grey snapper	***10's***	***A & J***
Barracuda	***1***	***A***
Sheepshead	***4***	***A***
French Angelfish (Intermediate phase)	***1***	***J/A***
Common Snook	***!0's***	***A & J***
Atlantic Spadefish	***2***	A
Black Margate	***5***	***A***
Blue Runners	***100's***	***A***
Doctorfish	***10's***	***A***
Sailors Choice	***10's***	***A***
Lane Snapper	***1***	***A***
Southern Flounder	***1***	***A***
Porcupinefish	***1***	***A – 2 ft.***
Goliath Grouper	***1***	***J – 2.5 ft.***
Fry (unidentified species)	***100's***	***J – 3/8" long***
Spotted Moray Eel	***1***	***A***

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Marine species identified	Quantity observed	Juvenile or Adult
Spotail Pinfish	*10's*	*A*
Stripped Croaker (Fed. species of concern)	*10's*	*A*
Gray Triggerfish	*7*	*A*

In the 2004 monitoring 20 fish species were identified as compared to 8 for 2003. Also a federal species of concern (Striped Croaker) was identified at this site. This species is of special concern because of its limited habitat Florida range. The only known breeding population in North America is in Brevard, Indian River, & St. Lucie counties. (Gilmore 1992). This species is dependent on the nearshore rock alga reefs for most of its lifespan. **In future monitoring this species will continue to be of special concern.**

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BENTHIC SPECIES IDENTIFICATION:

Survey Date: 30 May 2004 - Benthic species listed below were identified using the roving diver technique. Professionally trained divers spent 20 minutes hovering over Mitigation Reef B looking specifically for benthic invertebrates and macroalgae. All species were documented (to lowest recognizable taxon) on an underwater slate and verified at the surface using reference guides. Some of the most relevant guides for the Martin County area include: 1) Littler and Littler's Caribbean Reef Plants: An Identification Guide to the Reef Plants of the Caribbean, Bahamas, Florida and Gulf of Mexico, 2) Hendler, Miller, Pawson and Kier's Echinoderms of Florida and the Caribbean: Sea Stars, Sea Urchins, and Allies, and 3) Paul Humann's Reef Creature Identification: Florida Caribbean and Bahamas. For further analysis, underwater video and digital still photo documentation were also performed onsite. Individuals observed were also placed in one of the following abundance classifications for long-term analysis: 1, 2-10, 11-100 or >100.

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Benthic Species Identified	Abundance	Comments
Green Algae		
Codium spp.	11-100	
Caulerpa brachypus (attached & drift*)	Abundant	Low relative density all over reef.
Caulerpa prolifera	1	One rhizome with 5 young blades.
Caulerpa racemosa	11-100	
Caulerpa mexicana	2-10	
Halimeda tuna	11-100	
Brown Algae		
Sargassum hystrix var. *buxifolium*	2-10	
Unidentified *Dictyota* spp.	2-10	
Padina spp.	11-100	
Stypopodium spp.	1	
Red Algae		
Botryocladia spp.	11-100	
Gracilaria spp.	2-10	
Liagora spp.	11-100	
Chondria spp.	2-10	
Red turf algae	>100	
Sponges		
Orange encrusting sponge	2-10	
Unidentified encrusting sponges	11-100	
Cnidarians		
Unidentified hydroids	11-100	
Feather hydroids	11-100	
Regal sea fan (*Leptogorgia hebes*)	11-100	
Yellow sea whip	2-10	
Tunicates		
Clavelina spp.	11-100	
Polyandrocarpa spp.	11-100	
Black solitary tunicate	11-100	

Additional Benthic organisms

Sabellariid worm rock
Branching soft coral (orange & yellow)
Barnacles
Hermit crabs

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CONCLUSIONS:

Site B is the middle of the nearshore reef sites, and is located just north of Site C. Site B had the same number of bargeloads of materials as Site C, and almost as much material placed as Site C back in construction year of 2000.

In contrast to findings at sites B & C in 2003 where less numbers of fish species were observed at Site B than at site C; in 2004 the same total number of species were documented at both sites. The total benthic coverage has increased between 2003 and 2004 as can be seen on the digital videodocumentation images. One substantial change in the bethic species diversification at this site has occurred. The invasive exotic green algae species Caulerpa Brachypus was seen drifting and attached to the substrate adjacent to reefsite materials. This species has created much concern in the counties further south along Florida's East Coast and is now confirmed to be as far north as Martin County.