

## 5.0 Results

The following sections summarize the monitoring results for each artificial reef monitored in 2010. A brief history and description of each artificial reef is followed by structural details and biological survey results along with selected photographs. Each of the following artificial reefs was monitored by the authors and support staff during 2010 and 2011.

### 5.1 Fogel Capital Management Artificial Reef

- Location: South County Reef
- Materials: Concrete – boxes, culverts, lamp posts, chunks, misc.
- Maximum Depth: 71 feet
- Reef High Point: 60 feet
- Year Created: 2007
- Monitoring Date: 9/10/2010
- Total Cost: \$14,601.50 (FWC 69% and Martin County 31%)

#### 5.1.1 History of the Fogel Capital Management Artificial Reef

In 2007 nearly 2,000 tons of large concrete and steel construction waste was delivered to Harbour Pointe Park in Ft. Pierce and stockpiled prior to deployment offshore of Martin County. In June 2008, the stockpiled material was shipped to the South County Artificial Reef area in three separate barge loads where one half of each barge load of material was deployed on each of the six South County Artificial Reef sites. A total of 245 tons of the material (½ barge load) were dropped in the southwest corner of the reef area from the anchored barge to form the Fogel Capital Management Reef. The material and deployment of the material used to create this reef was funded by the FWC and Martin County for the amount of \$14,601.50. Figure 7 shows a chart with the location of the Fogel Capital Management Reef within the South County Artificial Reef area shaded in light blue.

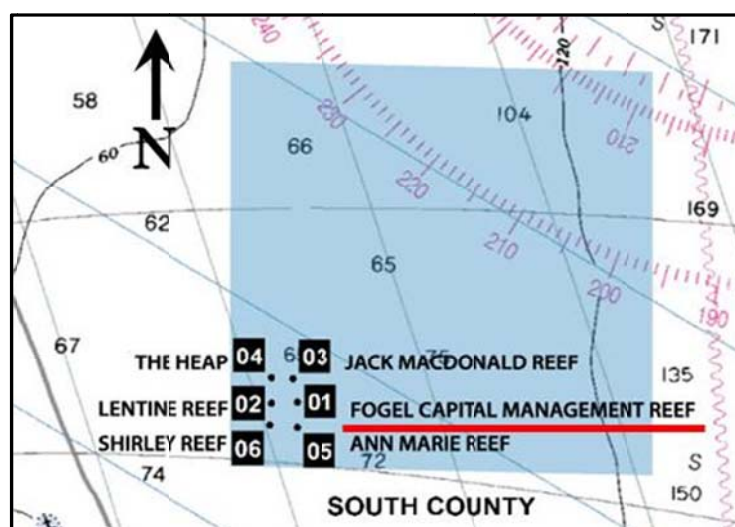


Figure 7. Chart view of the Fogel Capital Mgmt Reef in the S. County Artificial Reef area.

### 5.1.2 Structural Summary

The maximum depth at this artificial reef site is 71 feet with a maximum relief of about 11 feet. The footprint of the site is oval shaped with a southeast-to-northwest axis and occupies about 0.5 acres of seafloor. The deployment barge was securely moored at two points when the reef materials were dropped and the large concrete components settled in a single pile, although a few pieces settled to the bottom a short distance from the reef pile. Several large culvert sections provide cavernous recesses that are used extensively by large and small fish alike. Many culverts landed in a vertical position and have remained upright since their deployment. Some settling of the materials has occurred and minimal scouring has taken place. The photographs in Figure 8 are from the monitoring dive and show general conditions of the reef and some of the species observed during the dive.



Figure 8. Fogel Capital Management Artificial Reef 2010 photographs.

Identification of species in the photographs shown above in clockwise order from the upper-left photograph are (1) goliath grouper, (2) Sergeant Major & Fogel Capital Management Reef sign, (3) spanish hogfish & tomtates, and (4) various marine plants and algae, no fish.

### 5.1.3 Biological Survey Results

Fish surveys indicate a diverse assemblage of fishes. In 2009 the first year of monitoring occurred and 19 fish species were observed. Seabass, snappers and grunts represented the most numerous species of fishes during that survey. In the 2010 monitoring survey 26 fish species were observed. Of these fish species observed 5 species were in the South Atlantic Grouper/Snapper complex, and one species (snook) is considered an important sport/food fish in Florida waters. Schools of baitfish and predator species were observed in the upper water column above the reef materials, while the demersal species showed an affinity for the reef itself and the numerous crevices and refugia. Plants and invertebrates observed on the artificial reef included red, brown and green algae, sargassum algae, hydroids, sea anemones, sea urchins, barnacles, sea cucumbers, arrow crabs, hermit crabs and encrusting sponges. Table 6 presents the fish species observed during 2010 and Table 7 presents the benthic species observed.

**Table 6. Fogel Capital Management Artificial Reef fish species census.**

Family/Common Name	Species	2010	
		Abundance	Size
<b>Acanthuridae</b>			
Blue Tang	<i>Acanthurus coeruleus</i>	F	A
<b>Carangidae</b>			
Amberjack	<i>Seriola dumerili</i>	M	J
Blue Runner	<i>Caranx crysos</i>	A	A
Round scad	<i>Decapterus punctatus</i>	F	J & A
<b>Centropomidae</b>			
Common snook	<i>Centropomus undecimalis</i>	F	A
<b>Chaetodontidae</b>			
Reef butterflyfish	<i>Chaetodon sedentarius</i>	F	A
<b>Grammatidae</b>			
Whitespotted soapfish	<i>Rypticus maculatus</i>	F	J & A
<b>Haemulidae</b>			
Porkfish	<i>Anisotremus virginicus</i>	M	A
Tomtate	<i>Haemulon aurolineatum</i>	A	J & A
White margate	<i>Haemulon album</i>	F	A
<b>Labridae</b>			
Slippery dick	<i>Halichoeres bivittatus</i>	M	J & A
Spanish hogfish	<i>Bodianus rufus</i>	S	A
<b>Lutjanidae</b>			
Gray snapper	<i>Lutjanus griseus</i>	M	J & A
Yellowtail snapper	<i>Ocyurus chrysurus</i>	F	J & A
<b>Pomacanthidae</b>			
Blue angelfish	<i>Holocanthus bermudensis</i>	F	A
Queen angelfish	<i>Holocanthus ciliaris</i>	S	J
<b>Pomacentridae</b>			
Beaugregory	<i>Pomacentrus leucostictus</i>	F	A
Sergeant major	<i>Abudefduf saxatilis</i>	F	A
Yellowtail reeffish	<i>Chromis enchrysurus</i>	M	J & A
<b>Serranidae</b>			

Family/Common Name	Species	2010	
		Abundance	Size
Belted sandfish	<i>Serranus subligarius</i>	M	A
Goliath grouper	<i>Epinephelus itajara</i>	F (8)	A
Scamp	<i>Mycteroperca phenax</i>	F	J
Gag grouper	<i>Mycteroperca microlepis</i>	F	J
<b>Sparidae</b>			
Sheepshead	<i>Archosargus probatocephalus</i>	F	A
Sheepshead porgy	<i>Calamus penna</i>	F	A
<b>Tetraodontidae</b>			
Sharpnose puffer	<i>Canthigaster rostrata</i>	S	J
	<b>Total</b>	<b>26</b>	

Abundance Key: S=single, F=few (2-10), M=many (11-100), A=abundant (>100)

Size Key: A=adult, J=juvenile, A/J=intermediate

**Table 7. Fogel Capital Management Artificial Reef benthic species census.**

	Common Name	Scientific Name
<b>Echinoderms</b>	Common arbacia sea urchin	<i>Arbacia punctulata</i>
	Sea Cucumber	Unidentified species
<b>Cnidarians</b>	Algae Hydroid	<i>Thyroscyphus ramosus</i>
	Hydroids	Unidentified species
	Unidentified solitary octocoral	<i>Octocoralia</i>
	Sea Anemones	Unidentified species
<b>Ascidians</b>	Overgrowing Tunicates	<i>Didemnidae</i>
	Mottled Encrusting Tunicate	<i>Distaplia bermudensis</i>
<b>Poriferans</b>	Encrusting Sponge	Unidentified species
<b>Crustaceans</b>	Yellowline Arrow Crab	<i>Stenorhynchus seticornis</i>
	Hermit Crab	Unidentified species
	Sessile barnacles	<i>Balanus trigonus</i>
<b>Other</b>	Red, Brown & Green Algae	Unidentified species
	Sargassum Algae	Unidentified species