
St. Lucie County Artificial Reef Monitoring Program

FISHAMERICA FOUNDATION REEFS

DMC Barge/500 Ton Pile — 1st Annual Monitoring

1,000 Ton Pile — 1st Annual Monitoring



1,000 Ton Reef Pile – Quite a Prolific Reef Site

Prepared for:
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1st Annual Monitoring of the DMC Barge/500 Ton Pile Reef

DMC Barge – **Deployed 6/10/2009**
500 Ton Pile – **Deployed 6/11/2009**

1st Annual Monitoring of the 1,000 Ton Pile Reef

1,000 Ton Pile – **Deployed 8/31/2009**

1 Introduction

This report presents the first annual artificial reef monitoring surveys of the DMC Barge/500 Ton Pile and the 1,000 Ton Pile sites. Both sites are located within the FishAmerica Foundation Project area (FAF-8079).

The DMC Barge/500 Ton Pile reef was deployed June 10-11, 2009, and the 1,000 Ton Pile Reef deployed on August 31, 2009. Both of these artificial reefs are located 6 nautical miles offshore of St. Lucie County, Florida within the permitted ‘North County Nearshore Site.’

The deployment work was performed for St. Lucie County (SLC) with a donation from Fish America Foundation, grant funding from the Florida Fish and Wildlife Conservation Commission (FWC) and a donation from Bob Herbst Jr. The primary objectives of this project were to:

- Verify and document reef locations,
- Document biological activity (benthic organisms and coastal demersal finfish) and
- Evaluate material performance, (stability and condition of the reef materials, profile, scour and settlement, etc.).

The North County Nearshore Site area’s southwest boundary is located 5.6 miles NE of Ft. Pierce Inlet (Figure 2) with an average water depth of 54 feet. The bottom is a mix of coarse sand and shell fragments. To date there have been no natural reefs, or natural hard bottom areas located in this area.

2 Methodology

The field work surveys were performed by skilled divers using visual techniques and still underwater photography of the reef areas. Kerry Dillon (Sea Rover Services, Inc.) primarily performed the field work and report writing for this annual monitoring. Additional highly experienced scientific divers were employed to assist in the performance of field work, along with data analysis by a marine biologist. James Oppenborn, St. Lucie County Coastal Resources Supervisor, participated in monitoring survey dives, in addition to contributions of photographs and reef construction data. The field work is described as follows:

Physical reef structure – diver inspections and measurements were made to determine changes in the reef structure, including scour, settlement, horizontal extent, and movement of reef components. Reef structure depths were acquired by using dive computers for measurements of the bottom, along with the highest and average depths of the reef materials. The natural bottom depths away from the reefs were compared to the maximum depths adjacent to the reefs to assess scour. Over time, changes in the reef heights may be used to assess settlement of the materials. Distance measurements of the horizontal extent of the reefs were made using a tape measure.

Biological surveys – data collection methods included conducting the underwater ‘Roaming Diver’ visual assessment method.¹ This fish count technique assesses the relative fish species diversity and their quantities. Data were recorded on waterproof slates during the reef assessments. Dive data such as date and time, bottom time, depth, currents and water temperature were recorded. The relative abundance for each species was recorded based on the numbers observed, which can be described by the following categories:

- ‘S’ for a Single individual seen of that species
- ‘F’ for Few 2 - 10 individuals
- ‘M’ for Many 11 - 100 individuals
- ‘A’ for Abundant > 100 individuals

These categories are widely utilized by the REEF agency (Reef Environmental Education Foundation) and accepted by the scientific community for conducting underwater species surveys by divers on natural and artificial reefs worldwide.

All data taken during each dive was thoroughly reviewed on the boat following each dive before being transferred into field log books. These practices assure that correct and complete data were recorded and saved.

Photo-documentation – underwater digital still cameras were used to document the reefs’ condition and other observations that were made during the dives. These will be utilized in comparing reef structure and marine life in subsequent reef surveys. Representative photographs are included in this report.

3 Reef Locations

The GPS coordinates for the locations of the DMC Barge/500 Ton Pile and the 1,000 Ton Pile reefs are shown in Table 1. These artificial reefs were developed as follows:



Figure 1. Arrival of DMC Barge on Site Prior to Deployment

3.1 DMC Barge/500 Ton Pile Reef

The DMC Barge was deployed on June 10, 2009. On June 11, 2009, 500 tons of mixed secondary concrete materials were deployed on and next to the barge. McCulley Marine Services Inc. (MMS) provided materials delivery services.

These deployments were:

- 6/10/2009 – DMC Barge, one 65' steel inland barge deployed
- 6/11/2009 – 500 Ton Pile, 500 tons of mixed secondary concrete materials deployed

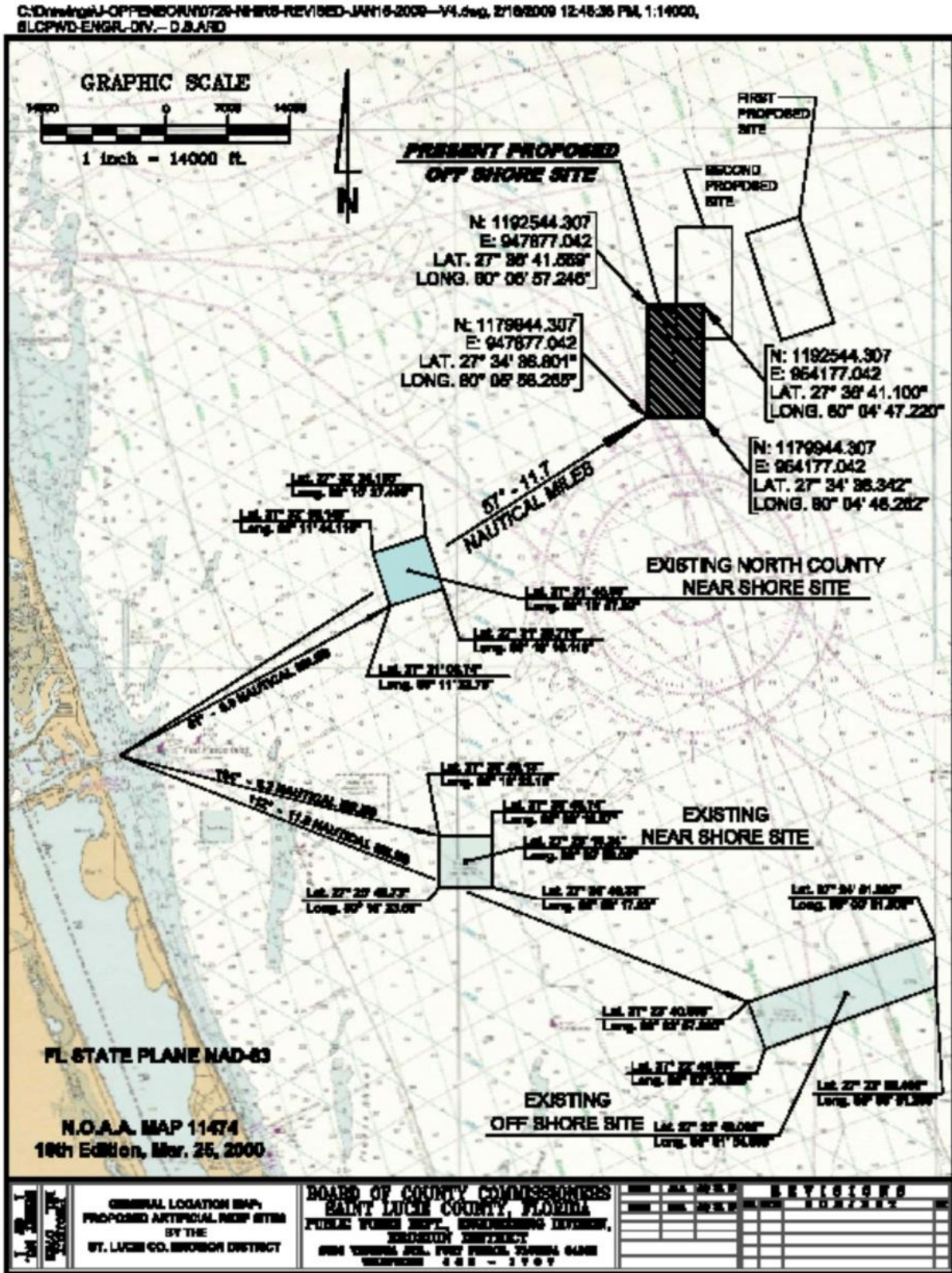


Figure 2. Permitted St. Lucie County Artificial Reef Sites

3.2 1,000 Ton Pile Reef

The 1,000 Ton Pile was created on August 31, 2009 by the deployment of one barge load of mixed secondary concrete materials. McCulley Marine Services, Inc. (MMS) provided materials delivery services.

- 8/31/2009 – 1,000 tons of mixed secondary concrete materials

Table 1. St. Lucie County Artificial Reef Deployments, 2005-2009

ST. LUCIE COUNTY ARTIFICIAL REEF DEPLOYMENTS							
Deployment Date	Latitude	Longitude	Zmax	Zmin	Profile	Materials	Name
8/17/2005	27*26.675'N	80*10.305'W	55	43	12	440 tons FEC railroad ties	
	27*26.670'N	80*10.295'W	55	43	12	FEC railroad ties	
9/30/2005	27*26.687'N	80*10.333'W	55	35	20	340 tons FPL materials	
5/4/2006	27*26.402'N	80*09.601'W	54	43	11	490 tons dock piles	
5/6/2006	27*26.633'N	80*10.107'W	54	44	10	572 tons dock piles	
5/9/2006	27*26.531'N	80*09.936'W	53	45	8	515 tons mixed concrete materials	
5/11/2006	27*26.750'N	80*10.208'W	54	44	10	523 tons mixed concrete materials	SKA Reef
5/15/2006	27*26.743'N 27*26.777'N	80*10.214'W 80*10.229'W	56 56	46 46	19	140' Sterling Barge - Bow 140' Sterling Barge - Stern	Civic Center Reef
1/31/2007	27*26.743'N 27*26.777'N	80*10.214'W 80*10.229'W	56	35		555 tons Civic Center materials	Civic Center Reef
2/7/2007	27*26.777'N	80*10.229'W	56	37		539 tons mixed concrete materials (Civic Center and culverts)	Civic Center Reef
6/4/2007	27*23.168'N	80*03.704'W	95	84	11	526 tons mixed concrete materials	Midway Reef
6/6/2007	27*23.596'N	80*03.668'W	91	73	21	485 tons mixed concrete materials	N Reef
6/8/2007	27*23.465'N	80*03.707'W	89	76	12	473 tons mixed concrete materials	SW Reef
6/9/2007	27*23.464'N	80*03.619'W	92	74	18	526 tons mixed concrete materials	SE Reef
12/6/2007	27*24.048'N	80*02.206'W	122	103	19	500 tons mixed concrete materials + 500 tons concrete RR ties	120-ft. Reef
12/8/2007							
2/16/2008	27*24.103'N	80*01.577'W	140	122	18	500 tons mixed concrete materials + 500 tons FEC railroad ties	140-ft. Reef
2/24/2008							
8/25/2008	27*22.990'N	80*03.699'W	93	76	17	526 tons mixed concrete materials +	Bob Herbst Sr. Reef
8/26/2008						481 tons mixed concrete materials	
8/27/2008	27*26.767'N	80*09.538'W	55	34	21	630 tons mixed concrete materials +	Bob Herbst Jr. Reef
8/28/2008						461 tons mixed concrete materials	
9/17/2008	27*24.132'N	80*01.114'W	152	133	19	Tug Lee (50' tug)	Tug Lesley Lee Reef
6/10/2009	27*31.213'N	80*11.158'W	53	48	5	DMC Barge (65" inland barge)	DMC Barge, FAF Reef
6/11/2009	27*31.214'N	80*11.169'W	64	50	14	500 tons mixed concrete materials	500 Ton Pile, FAF Reef
8/31/2009	27*31.279'N	80*11.103'W	53			500 tons mixed concrete materials	FAF Reef
8/31/2009	27*31.187'N	80*11.107'W	54	27	27	1,000 tons mixed concrete materials	1000 Ton Pile, FAF Reef

4 History of the Artificial Reefs

4.1 DMC Barge/500 Ton Pile Reef Deployments

On June 4, 2009, pre-deployment survey dives were conducted by Kenny Smith and James Oppenborn. The DMC Barge was deployed on June 10, 2009 and settled in an up-right position. Deployment of the barge was performed by McCulley Marine Services of Ft. Pierce, Florida utilizing their tugboats, captains, crew and barges.

An initial post-deployment survey dive was performed on November 1, 2009, by Sea Rover Services of Stuart, Florida and Jim Oppenborn of SLC.



Photo courtesy of Jim Oppenborn

Figure 3. 500 Tons of Secondary Concrete Leaving Fort Pierce Inlet

4.2 1,000 Ton Pile Reef Deployments

On August 31, 2009, a volunteer diver conducts a sweep of the deployment area using her boat's depth finder. No anomalous readings were found.



Photo courtesy of Jim Oppenbom

Figure 4. Secondary Concrete Leaving Fort Pierce Inlet before Deployment

Deployment of the barge was performed by McCulley Marine Services of Ft. Pierce, Florida utilizing their tugboats, captains, crew and barges.

5 Annual Monitoring

5.1 DMC Barge/500 Ton Pile Reef - First Annual Monitoring



Figure 6. DMC Barge/500 Ton Pile – Prolific Reef as Seen During 1st Annual Monitoring



Figure 5. Stacking of bridge post and rail on DMC Barge/500 Ton Pile reef

On October 13, 2010, the first annual monitoring was performed with the following data collected:

• DMC Barge, Maximum water depth	=	64 feet
• DMC Barge, Vessel deck depth	=	57 feet
• DMC Barge, Reef crest depth	=	50 feet
• DMC Barge, Maximum reef relief	=	14 feet
• DMC Barge, Vessel bow orientation	=	220°
• 500 Ton Pile, Maximum water depth	=	65 feet
• 500 Ton Pile, Reef crest depth	=	48 feet
• 500 Ton Pile, Maximum reef relief	=	17 feet
• Surface water temperature	=	80° F
• Bottom water temperature	=	80° F
• Thermocline depth	=	None
• Current at Surface	=	1/4 knot to the North
• Current at Bottom	=	1/8 knot to the North
• Visibility Near Surface	=	60 feet
• Visibility at Bottom	=	80 feet

A detailed underwater survey of the DMC Barge/500 Ton Pile Reef was performed by a team of divers. The barge lies in a NE-SW orientation, with the stern to the NE and the bow to the SW. Concrete materials are stacked on the deck of the barge and alongside the vessel.

Fish census data for the first annual monitoring of 2010, is presented in Table 2. Species were positively identified and their quantities were listed utilizing the Roving Diver method. Twenty-eight species of fish were identified during this survey.

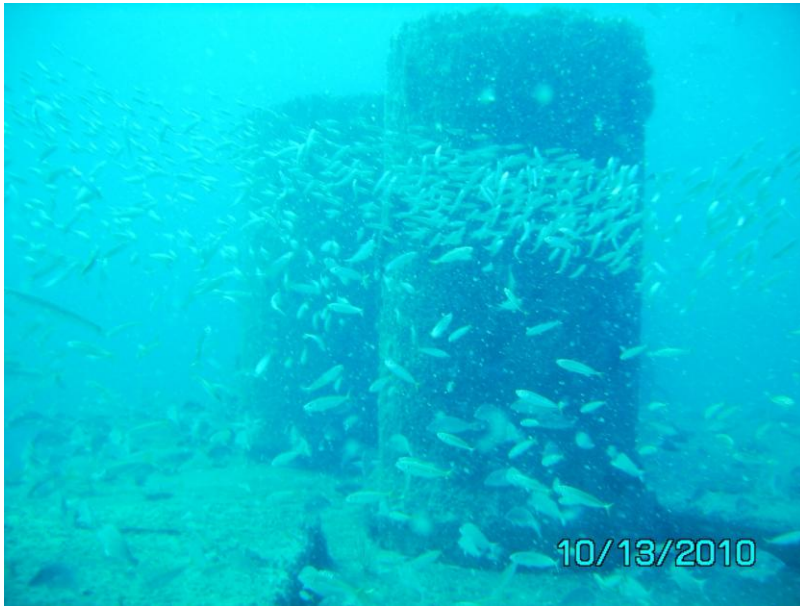


Figure 7. Culverts upright on barge deck provide desirable vertical profile

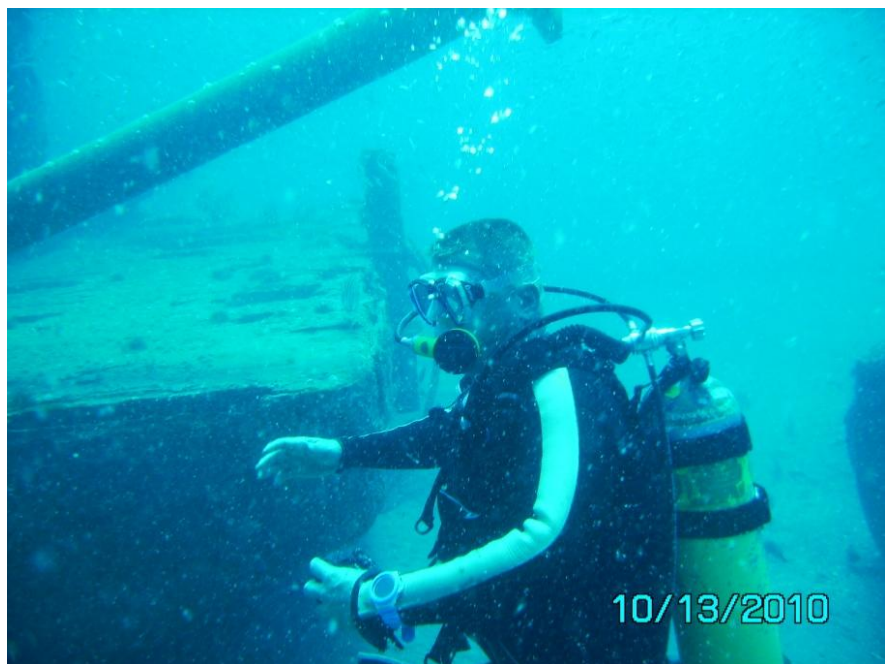


Figure 8. Jim Oppenborn, SLC Coastal Resources Supervisor, observes structure & marine life

Table 2. DMC Barge/500 Ton Pile Fish Census, 10/13/2010

FAMILY	COMMON NAME	SPECIES	2010	
			Abundance	Size
Acanthuridae	Doctorfish	<i>Acanthurus chirurgus</i>	F	A
Atherinidae	Silversides	<i>Unidentified specie</i>	A (1,000'S)	J & A
Balistidae	Gray trigger	<i>Balistes caprisucus</i>	M	A
Carangidae	Amberjack	<i>Seriola dumerili</i>	M	J & A
	Atlantic bumper	<i>Chloroscombus chrysurus</i>	A	A
	Blue runner	<i>Caranx chrysos</i>	A	A
	Round scad	<i>Decapterus punctatus</i>	A	A
Centropomidae	Common snook	<i>Centropomus undecimalis</i>	M (20)	A
Elasmobranchs	Southern stingray	<i>Dasyatis americana</i>	S	A
Ephippidae	Atlantic spadefish	<i>Chaetodipterus faber</i>	A	A
Haemulidae	Black margate	<i>Anisotremus surinamensis</i>	F	A
	Pigfish	<i>Orthopristis chrysoptera</i>	A	A
	Porkfish	<i>Anisotremus virginicus</i>	M	J & A
	Tomtate	<i>Haemulon aurolineatum</i>	A	J & A
Lutjanidae	Gray snapper	<i>Lutjanus griseus</i>	F	J & A
	Lane snapper	<i>Lutjanus synagris</i>	M	J/A & A
	Yellowtail snapper	<i>Ocyurus chrysurus</i>	F	A
Pomacanthidae	Blue angelfish	<i>Holocanthus bermudensis</i>	F	J & A
	Beaugregory	<i>Stegastes leucostictus</i>	F	J & A
Rachycentridae	Cobia	<i>Rachycentron canadum</i>	S	A
Sciaenidae	Cubbyu	<i>Pareques umbrosus</i>	F	J & A
Scorpaenidae	Red Lionfish	<i>Pterois volitans</i>	S	J
Serranidae	Black sea bass	<i>Centropristis striata</i>	A	J & A
Sparidae	Sheepshead	<i>Archosargus probatocephalus</i>	M	A
	Sheepshead pogy	<i>Calamus penna</i>	F	A
Sphyraenidae	Great barracuda	<i>Sphyraena barracuda</i>	F	A
	Guaguanche	<i>Sphyraena quachancho</i>	M	J/A
Tetraodontidae	Bandail puffer	<i>Sphoeroides spengleri</i>	F	J
Total Species			28	



Figure 9. DMC Barge/ 500
Ton Pile 1st annual monitoring
underwater photographs

The DMC Barge/500 Ton Pile is clearly a very successful artificial reef habitat. The visibility was very good (80 feet) providing excellent monitoring conditions. However, the abundance of thick schools of baitfish often temporarily obscured visibility. Photographs clearly show the reef structure with benthic and demersal marine life.

Benthic organism census data for this reef site's first annual monitoring in 2010 is presented in Table 3. The specific species positively identified was recorded while utilizing the Roving Diver method. Eleven species of benthics were identified during this survey

Table 3. DMC Barge/500 Ton Pile Benthic Census, 10/13/2010

	Common Name	Scientific Name
Echinoderms	Rock Boring Urchin	<i>Echinometra lucunter luctunter</i>
	Arabacia Urchin	<i>Arabacia punctulata</i>
Cnidarians	Encrusting Gorgonian	<i>Erythropodium caribaeorum</i>
	Yellow Sea Whip	<i>Pterogorgia citrina</i>
	Colorful Sea Whip	<i>Leptogorgia virgulata</i>
	Coral Recruits	<i>Oculina diffusa</i>
Ascidians	Giant Tunicates	<i>Polycarpa spongiabilis</i>
	Mottled Encrusting Tunicate	<i>Distaplia bermudensis</i>
Poriferans	Brown Clustered Tube Sponge	<i>Agelas wiedenmyeri</i>
	Brown Variable Sponge	<i>Anthosigmella varians</i>
	White Lumpy Sponge	<i>Ptilocaulis sp.</i>

5.2 1,000 Ton Pile Reef - First Annual Monitoring Conditions

The preliminary post-deployment monitoring dive of the DMC Barge/500 Ton Pile Reef was performed in November 2009. On October 13, 2010, the first annual monitoring was performed with the following data collected.

- 1,000 Ton Pile, Maximum water depth = 64 feet
- 1,000 Ton Pile, Reef crest depth = 34 feet
- 1,000 Ton Pile, Maximum reef relief = 30 feet
- Surface water temperature = 82° F
- Bottom water temperature = 82° F
- Thermocline depth = None
- Current at Surface = 1/4 knot to the North
- Current at Bottom = 1/8 knot to the North
- Visibility Near Surface = 60 feet
- Visibility at Bottom = 80 feet



Figure 10. 1,000 Ton Pile 1st annual monitoring underwater photographs

Table 4 1,000 Ton Pile Fish Census, 10/13/2010

FAMILY	COMMON NAME	SPECIES	2010		COMMENTS
			Abundance	Size	
Acanthuridae	Doctorfish	<i>Acanthurus chirurgus</i>	F	A	
Atherinidae	Silversides	<i>Unidentified specie</i>	A	A	
Carangidae	Blue runner	<i>Caranx chrysos</i>	M	A	
	Round scad	<i>Decapterus punctatus</i>	A	J & A	
Centropomidae	Common snook	<i>Centropomus undecimalis</i>	M	A	
Elasmobranchs	Nurse shark	<i>Ginglymostoma cirratum</i>	S	A	
Ephippidae	Atlantic spadefish	<i>Chaetodipterus faber</i>	M	A	
Haemulidae	Black margate	<i>Anisotremus surinamensis</i>	F	A	
	Pigfish	<i>Orthopristis chrysoptera</i>	A	A	
	Porkfish	<i>Anisotremus virginicus</i>	F	J & A	
	Tomtate	<i>Haemulon aurolineatum</i>	A	J & A	
Labridae	Slippery dick	<i>Halichoeres bivittatus</i>	F	A	
Labrisomidae	Hairy blenny	<i>Labrisomus nuchipinnis</i>	F	J & A	
Lutjanidae	Gray snapper	<i>Lutjanus griseus</i>	M	J & A	
	Lane snapper	<i>Lutjanus synagris</i>	M	J & A	
	Yellowtail snapper	<i>Ocyurus chrysurus</i>	F	A	
Pomacanthidae	French angelfish	<i>Pomacanthus paru</i>	S	J	1/2" long
	Sergeant major	<i>Abudefduf saxatilis</i>	F	A	
Sciaenidae	Cubbyu	<i>Pareques umbrosus</i>	M	J & A	
	Belted sandfish	<i>Serranus subligarius</i>	F	J & A	
	Black sea bass	<i>Centropristis striata</i>	A	J & A	
	Gag grouper	<i>Mycteroperca microlepis</i>	S	A	
	Goliath grouper	<i>Epinephelus itajara</i>	M	J & A	12
Sparidae	Sheepshead	<i>Archosargus probatocephalus</i>	M	A	
	Sheepshead porgy	<i>Calamus penna</i>	F	A	
	Spottail pinfish	<i>Diplodus holbrookii</i>	F	A	
Sphyraenidae	Great barracuda	<i>Sphyraena barracuda</i>	M	A	
	Guaguanche	<i>Sphyraena guachancho</i>	F	A	
Tetraodontidae	Bandtail puffer	<i>Sphoeroides spengleri</i>	F	A	
Unidentified Family	Fry	Unidentified species	M	J	1/2" long
Total Number of Species			30		

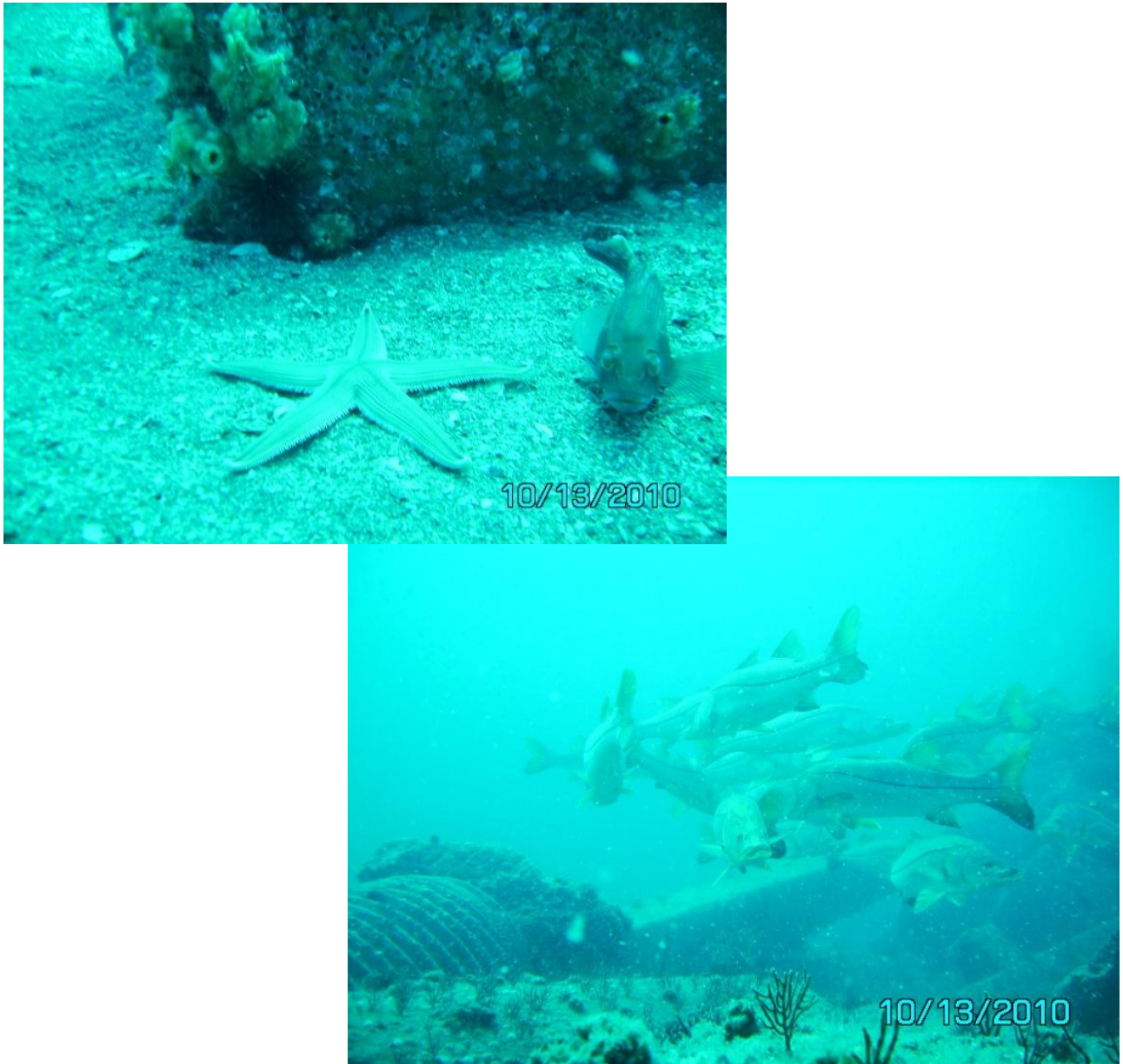


Figure 11. 1,000 Ton Pile 1st annual monitoring underwater photographs

Benthic organism census data for the first annual monitoring in 2010 is presented in Table 5. The specific species positively identified was recorded while utilizing the Roving Diver method. Fourteen species of benthics were identified during this survey

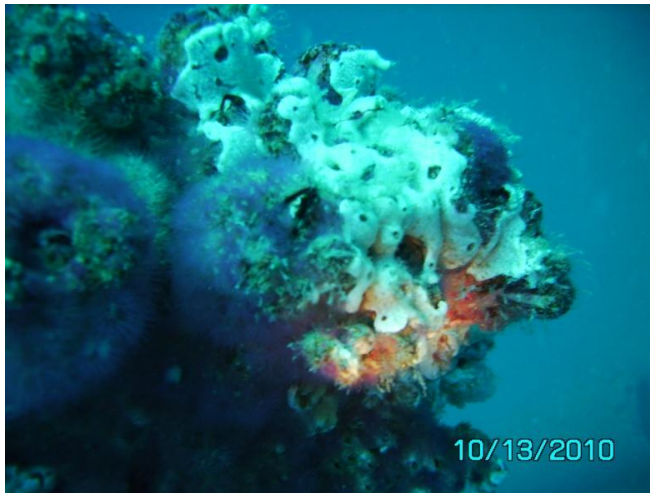


Figure 12. Colonies of benthic organisms, 1000 Ton Pile

Table 5. 1,000 Ton Pile, Benthic Census, 10/13/2010

	Common Name	Scientific Name
Echinoderms	Rock Boring Urchin	<i>Echinometra lucunter lucunter</i>
	Arabacia Urchin	<i>Arabacia punctulata</i>
	Variegated Urchin	<i>Lytechinus variegatus</i>
	Striped Sea Star	<i>Luidia clathrata</i>
Cnidarians	Encrusting Gorgonian	<i>Erythropodium caribaeorum</i>
	Yellow Sea Whip	<i>Pterogorgia citrina</i>
	Colorful Sea Whip	<i>Leptogorgia virgulata</i>
	Coral Recruits	<i>Oculina diffusa</i>
	Glass Anemone	<i>Aptasia spp.</i>
	Moon Jellyfish	<i>Aurelia aurita</i>
Ascidians	Giant Tunicate	<i>Polycarpa spongiabilis</i>
	Mottled Encrusting Tunicate	<i>Distaplia bermudensis</i>
Poriferans	Brown Variable Sponge	<i>Anthosigmella varians</i>
	White Lumpy Sponge	<i>Ptilocaulis sp.</i>

6 Summaries

6.1 DMC Barge/500 Ton Pile Reef

The DMC Barge/500 Ton Pile reef is another example of a well designed and constructed shallow water artificial reef offshore of St. Lucie County. This is the second such reef here that utilized an obsolete barge as a foundation with secondary concrete materials to augment the overall profile and complexity. I have dove and monitored dozens of sunken barges in many locations and can confidently attest to the comparisons. The barges deployed without additional materials are very limited in useable space for marine life to forage and take shelter. Over time most barges steel side plates break apart and fall to the seafloor. This usually takes many years to occur. Once this occurs much more useable space becomes available and the total bio-load increases. The reefs, such as the DMC Barge/500 Ton Pile, with the additional concrete materials provide immediate shelter for varying sizes and species of marine life. This site has many different types of niche habitats including (though not limited to) overhangs, flat wide surfaces, small crevices and large voids. These steel and concrete materials are vital at providing shelter for species from minute fry to large predators. The artificial reef structures' cryptic habitats and high profile appendages shelter all sizes of marine life. These spaces provide habitat for benthic invertebrate settlement and maturation while also providing habitat for demersal fish colonization. In addition, in one year's time small outcrops of *Oculina diffusa* hard stony corals have begun to grow and were documented in October 2010.

This reef site has truly become a superior example of what an artificial reef program can achieve when the proper funding, construction techniques, government, private/public support and management oversight is in place. The second annual monitoring will be conducted in the fall of 2011 to document this artificial reef's continued development.

6.2 1,000 Ton Pile Reef

The 1,000 Ton Pile Reef is also an excellent example of a well planned and well constructed artificial reef. With the exception of the large offshore shipwrecks, it has the highest profile – at 30ft.– of all the St. Lucie County Artificial Reefs. This was accomplished by a properly anchored barge which ensured careful stacking of the deployed materials. This generated an intricate assembly of concrete shapes and sizes stacked and interlocked with each another. An impressive superstructure was created for many fish species and attached benthic organisms to thrive. All types of cryptic spaces exist at this site. It seems as though each one is filled with some type of living creature. Even in bright daylight many of the crevices and caverns require a light to reveal the individual species that exist therein.

Large schools of baitfish are attracted by the high profile of the 1,000-ton reef; fishes rest in the eddies down current from this reef while foraging. During the 1st Annual Monitoring, 30 finfish were identified, as well as a wide array of attached benthic organisms. The attached marine life is the basis of the food chain, which is thriving here. It is expected that even more species of marine life will be documented and photographed during the 2011, 2nd Annual Monitoring at this site.

REFERENCES

1. 'Roaming Diver' visual assessment method, Schmitt and Sullivan, 1996.

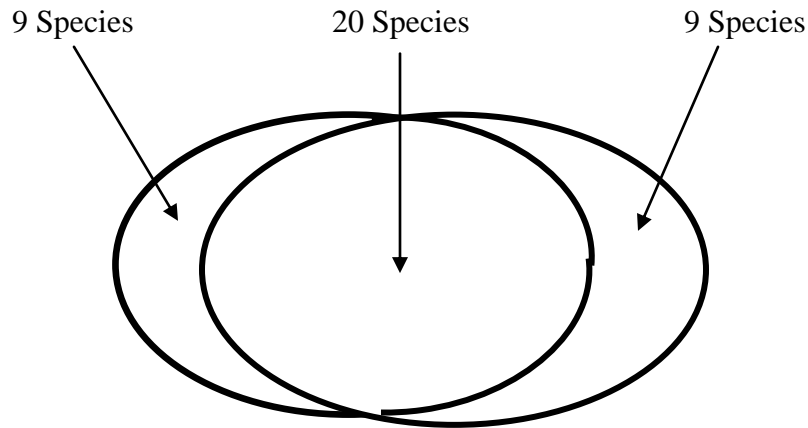
FishAmerica Foundation Reef Fish Species Data Comparison

Prepared by James B. Oppenborn

St. Lucie County Coastal Resources Supervisor

TOTAL SPECIES ON THE FISHAMERICA FOUNDATION REEFS

1,000-TON REEF BOTH REEFS 500-TON/DMC BARGE



- | | | |
|---------------------|-------------------------|-------------------------|
| 1. Belted sandfish | 1. Atlantic spadefish | 1. Amberjack |
| 2. French angelfish | 2. Atlantic Silversides | 2. Atlantic Bumper |
| 3. Gag grouper | 3. Bandtail puffer | 3. Beaugregory |
| 4. Goliath grouper | 4. Barracuda | 4. Blue Angelfish |
| 5. Hairy blenny | 5. Black margate | 5. Cobia |
| 6. Nurse shark | 6. Black seabass | 6. Gray triggerfish |
| 7. Sergeant major | 7. Blue runner | 7. Red Lionfish |
| 8. Slippery dick | 8. Cigar minnow | 8. Southern stingray |
| 9. Spottail pinfish | 9. Common snook | 9. Unidentified species |
| | 10. Cubbyu | |
| | 11. Doctorfish | |
| | 12. Guaguanche | |
| | 13. Gray snapper | |
| | 14. Lane snapper | |
| | 15. Pigfish | |
| | 16. Porkfish | |
| | 17. Tomtate | |
| | 18. Sheepshead | |
| | 19. Sheepshead porgy | |
| | 20. Yellowtail snapper | |

Figure 13

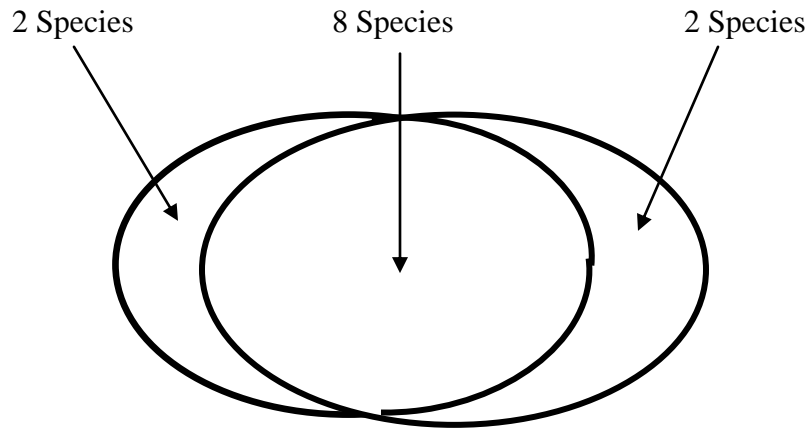
FishAmerica Foundation Reef
Snapper-Grouper Complex Data Comparison

Prepared by James B. Oppenborn

St. Lucie County Coastal Resources Supervisor

SNAPPER-GROUPER COMPLEX SPECIES ON THE FISHAMERICA FOUNDATION REEFS

1,000-TON REEF BOTH REEFS 500-TON/DMC BARGE



- 1. Gag grouper
- 2. Goliath grouper

- 1. Atlantic spadefish
- 2. Black margate
- 3. Black seabass
- 4. Gray snapper
- 5. Lane snapper
- 6. Tomtate
- 7. Sheepshead
- 8. Yellowtail snapper

- 1. Amberjack
- 2. Gray triggerfish

Figure. 14