
St. Lucie County Artificial Reef Monitoring Program

Civic Center Reef — **2nd Annual Monitoring**

Bob Herbst, Jr. Reef — **1st Annual Monitoring**



Photo of snook, baitfish, and structure of the Civic Center Reef

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**2nd Annual Monitoring of the Civic Center Reef
Deployed in Jan-Feb 2007**

&

**1st Annual Monitoring of the Bob Herbst, Jr. Reef
Deployed in August 2008**

1 Introduction

This report presents the second annual monitoring surveys of the Civic Center Reef deployed during January/February 2007 and the first annual monitoring surveys of the Bob Herbst, Jr. Reef deployed during August 2008. Both artificial reefs are located offshore in St. Lucie County within the permitted Reef Site #2. This work was performed for St. Lucie County (SLC), with funding support from the Florida Fish and Wildlife Conservation Commission (FWC), the St. Lucie County Board of County Commissioners (SLCBOCC), and the Boating Improvement Program Grant. The primary objectives of this project were to:

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

Figure 1 shows the locations of the three original artificial reef sites offshore of St. Lucie County. Both the Civic Center and Bob Herbst, Jr. Reefs were placed in Site #2, which is also known as the “Nearshore Site” and as the “Fishing Club” Site. This artificial reef area is a 1-mile square area located 6.3 miles SE of Ft. Pierce Inlet, with water depths ranging from 50 feet of water depth on the western boundary to 62 feet deep on the eastern boundary. The bottom is a mix of soft fine sand and coarse sand with shell fragments. To date there have been no natural reefs or natural hardbottom areas located in this area. Over the years the Fort Pierce Sportfishing Club, St. Lucie County, Florida FWC & FDOT, and others have utilized this site to deploy artificial reef materials and successfully create prolific artificial reef communities.

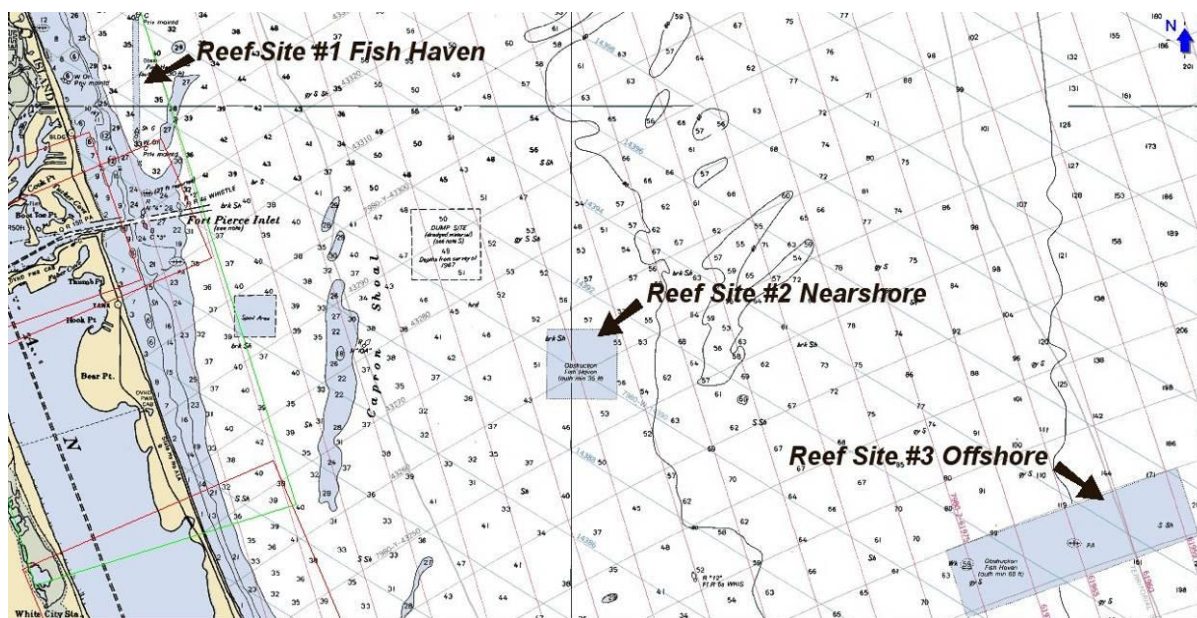


Figure 1. St. Lucie County original offshore Artificial Reef Sites

2 Methodology

The field work was performed by divers using visual techniques plus still and video underwater photography of the reef areas. Dr. Lee Harris in 2008 and Kerry Dillon 2008 & 2009 performed the field work and report writing for this report, with additional divers employed to assist with the field work. 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. This was accomplished by repeating survey measurements taken on past monitoring surveys. Reef structure depths were measured using dive computers for measurements of the bottom and both 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, and changes in the reef heights were 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 roaming diver fish counts to assess the relative fish species diversity and quantities. Fish census surveys were conducted using the Roving Diver underwater visual assessment method (Schmitt and Sullivan 1996). 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.

Photo-documentation – underwater digital still and video cameras were used to document the reefs’ condition and observations made during the dives. These were used to compare with still and video photographs taken in prior reef surveys. Representative photographs are included in this report, with a copy of all photographs and video submitted on CD and/or DVD.

Post-deployment reports from prior years were reviewed prior to performing the field work, and slates were prepared in advance with sketches of the dive sites and tables for recording measurements and observations. All data taken during each dive was thoroughly reviewed on the boat following each dive, and data was transferred into field books to assure that correct and complete data were recorded and saved.

3 Reef Locations

The locations of the Civic Center and Bob Herbst, Jr. reefs are shown on the chart in Figure 4 and on the enlarged NW chart section of Figure 5. These artificial reefs were developed as follows:

Civic Center Reef The Sterling Barge was deployed in May 2006, and subsequently two barge loads of 500+ tons each of materials were deployed on top of the barge in January and February 2007. These consisted of (in chronological order of the deployments):

- 5/15/2006 – Sterling Barge, one steel barge 140’x40’ settled upside down
- 1/13/2007 – 555 tons of concrete materials (pilings and light poles)
- 2/07/2007 – 539 tons of concrete materials (largely culverts)

Bob Herbst, Jr. Reef Two barge loads of materials were deployed August 2008 in creating this reef.

- 8/27/2008 – 630 tons of mixed concrete materials
- 8/28/2008 – 461 tons of mixed concrete materials

Photo courtesy of Jim Oppenborn



Figure 2 Barge load of materials prior to deployment 8/27/08 – slabs, culverts and large chunks.

Photo courtesy of Jim Oppenborn



Figure 3 Barge load of materials prior to deployment 8/28/08 – piling cutoffs and RR ties).

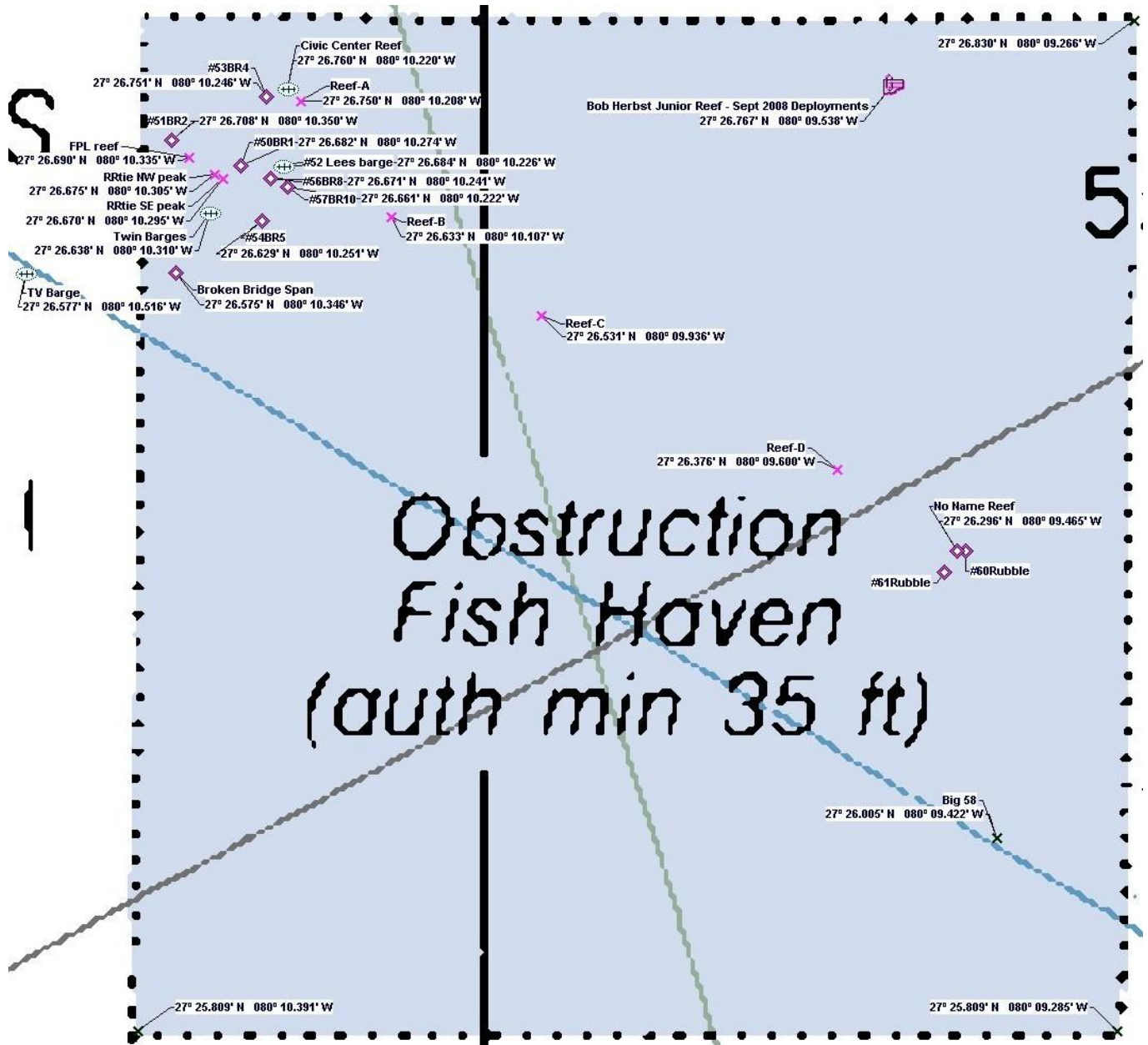


Table 1. Materials in St. Lucie County Artificial Reef Site #2

<i>Name</i>	<i>Latitude(N)</i>	<i>Longitude(W)</i>	<i>Water Depth</i>	<i>Top Depth</i>	<i>Deploy Date</i>	<i>Materials and Orientation</i>
Twin Barges – larger barge,	27° 26.651'	080° 10.312'	55'	49'	June 1995	steel barge, 100x40x8, lies E-W 100°
Twin Barges – smaller barge,	27° 26.638'	080° 10.310'	56'	49'	Jan. 1995	steel barge, 61x31x12, lies NW-SE 150°
#50BR1 - lies E-W	27° 26.682'	080° 10.274'	54'	50'	March 2001	concrete bridge span, lies E-W
#51BR2 -, top slopes down to W	27° 26.708'	080° 10.350'	54'	48'E, 50'W	March 2001	concrete bridge span, lies N-S
#52Lees barge – 90x34x8 lies N-S	27° 26.684'	080° 10.226'	56'	48'	unknown	steel barge lies N-S
#53BR4 northernmost span	27° 26.751'	080° 10.246'	53'	49'	Marc, 2001	concrete bridge span, lies SE-NW
#54BR5 - lies E-W	27° 26.629'	080° 10.251'	54'	50'	March 2001	concrete bridge span, lies E-W
#55BR7 - 2 PVC pipes inside	27° 26.672'	080° 10.235'	55'	50'	March 2001	concrete bridge span, lies E-W
#56BR8 - concrete slab inside	27° 26.671'	080° 10.241'	53'	47'	March 2001	concrete bridge span, lies N-S 190o
#57BR10, lies E-W (same as #55BR7)	27° 26.661'	080° 10.222'	55'	50'	March 2001	concrete bridge span, lies E-W
Broken Bridge Span, E end broken	27° 26.575'	080° 10.346'	54'	48'	March 2001	broken bridge span, lies E-W 80°
TV barge - steel barge remains	27° 26.577'	080° 10.512'	53'	46'	unknown	68'x44', lies N-S, tilted down to W
Sterling barge bow	27° 26.743'	080° 10.214'	56'	46'	May 2006	140' steel barge
Sterling barge stern	27° 26.777'	080° 10.229'	56'	46'	May 2006	140' steel barge
No Name Reef	27° 26.311'	080° 09.470'	58'	47'	mid 1990's	FPL mixed concrete and steel materials
RRtie NW peak	27° 26.675'	080° 10.305'	50	37	Aug-05	RRties
RRtie SE peak	27° 26.670'	080° 10.295'	50	39	Aug-05	RRties
FPL reef materials	27° 26.689'	080° 10.339'	55	35	Sep-05	480 tons concrete
Reef - A	27° 26.750'	080° 10.208'	52	46	May-06	523 tons mostly concrete culverts
Reef - B	27° 26.633'	080° 10.107'	55	44	May-06	572 tons mostly concrete dock piles
Reef - C	27° 26.531'	080° 09.936'	57	50	May-06	515 tons mostly concrete culverts
Reef - D	27° 26.402'	080° 09.601'	54	46	May-06	490 tons mostly concrete dock piles
Civic Center Reef (south end)	27° 26.743'	080° 10.214'	56'	35'	Jan 2007	555 tons concrete Civic Center materials
Civic Center Reef (north end)	27° 26.777'	080° 10.229'	56'	31'	Feb 2007	539 tons concrete culverts
Bob Herbst, Jr. Reef	27° 26.767'	080° 09.538'	59'	34'	Aug 2008	1,091 tons concrete culverts, pilings, and mixed materials

Table 1 summarizes all of the known artificial reef sites in the St. Lucie County Nearshore Reef Site #2. Figure 5 shows an enlarged chart of the NW corner of Site #2.



Figure 5 Chart of NW Portion of St. Lucie County Nearshore Artificial Reef Site #2

4 History of the Artificial Reefs

A. Civic Center Reef Deployments

The Sterling Barge was deployed beginning on May 10, 2006 (Figure 6) but ended up resting on her side. On May 15, 2006 she was righted, but ended up resting upside down on the bottom.



Figure 6 Sterling Barge Deployment

On January 31, 2007, 555 tons of concrete materials, including the remnants of the demolished Fort Pierce Civic Center, were deployed on top of the barge. On February 7, 2007 another 539 tons of mixed concrete materials, including a large number of concrete culverts, were added to the reef, which added considerable desired profile and complexity to the underwater site.

B. Bob Herbst, Jr. Reef Deployments

The Bob Herbst Jr. Reef was initialized when Bob Herbst Jr. was generous enough to give back to the marine environment that he loved so dearly. At one time he was an avid diver and angler enjoying the offshore environment whenever he could. As time passed by he was not as able to enjoy the ocean as much as he wished but gave back in the form of logistical & financial help with the Artificial Reef Program of St. Lucie County. He named one reef the Bob Herbst Sr. Reef as a living memorial to his father. The tug Leslie Lee Reef was named for his wife Leslie. The Herbst family has been a great supporter of the St. Lucie County Artificial Reef Program and the reefs with their names are great examples of the success of the beautiful living artificial reefs that lie beneath the ocean's surface just a short distance from St. Lucie County's coastline.

Construction of the reef was performed by McCulley Marine Services of Ft. Pierce Florida utilizing their tugboats, captains and crew and barges. Pre & post deployment survey dives and construction monitoring was performed by Sea Rover Services of Stuart, Florida.

On August 27, 2008, 630 tons of concrete materials were deployed in 55 ft. of water in the NE section of site #2 to begin the Bob Herbst Jr. Reef. This barge load consisted of mostly large slabs and culverts and can be seen on previous page number 6 of this report. The next day on August 28, 2008 another 461 tons of mixed concrete materials, including a large number of concrete pilings, and some railroad ties were added and placed directly on top of the previous deployment. This second barge load of materials can be seen in the photo on page 6 of this report.

5 Annual Monitoring

A. Civic Center - First Annual Monitoring

Post-deployment monitoring of the Civic Center Reef was performed during March 2007 with additional dives on the site during the summer of 2007. The first annual monitoring of the Civic Center Reef was performed on May 23, 2008, 15 months following the last deployment, with the conditions summarized below:

- Maximum water depth = 56 feet
- Reef crest depth = 37 feet
- Maximum reef relief = 19 feet
- Surface water temperature = 75° F
- Bottom water temperature = 72° F
- Thermocline depth = 22 feet
- Current = < 0.25 knots to the North
- Visibility = 30 feet

A detailed underwater survey of the Civic Center Reef was performed by divers, and the survey is shown in Figure 7. The barge lies in a NW-SE orientation, with the stern to the NW and bow to the SE. Both the barge bow and stern ends are raked, so that the reef surface slopes down to the bottom at each end of the barge. Concrete light poles are found predominantly at the NW area of the reef, with concrete culverts found at the SE end. Several of the culverts are standing upright, with the majority lying on their sides or at angles resting on other reef materials. A large field of material is located NE of the SE end of the reef. Reef-A, (constructed in May of 2006) which is nearby, located 140 feet to the SE (140 degrees) of the Civic Center Reef, and a concrete bridge span is located SW of the Civic Center Reef.

**St. Lucie County Artificial Reef Program
Civic Center Reef Survey May 23, 2008**

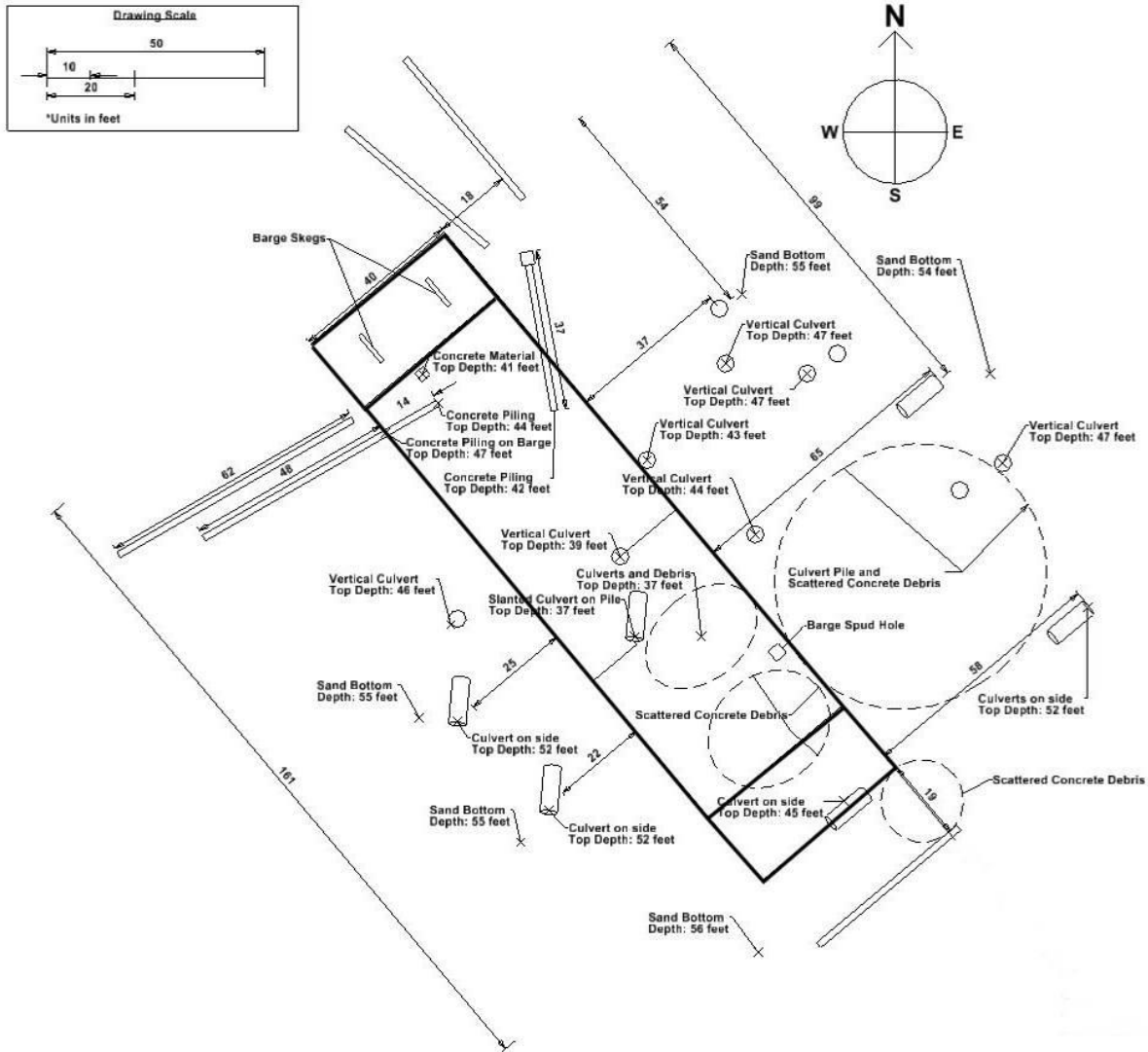


Figure 7 Layout of the Civic Center Reef

Fish census data for the first and second annual monitoring, 2008/2009 are presented in Table 2. The Roving Diver method was used, with numbers of species positively identified recorded. Thirty-two species of fish were identified during the fish count in 2008 & twenty-two species identified in 2009. A school of large sea nettles (stinging jellyfish) numbering in the 100's were present and possibly could have been the cause for less fish species documented in 2009. In addition, on this same day the residents of the Civic Center Reef had a feeding frenzy while the divers were monitoring. A fury of activity lasted for over 20 minutes that could have forced some species to temporarily leave the site, and not be counted.

B. Civic Center - Second Annual Monitoring Conditions

The second annual monitoring was performed on Sept. 19, 2009, 2 ½ years following the last deployment of materials and 3 years and 4 months after the original Sterling Barge deployment, with the documented conditions & data summarized below:

- Maximum water depth = 54 feet
- Reef crest depth = 36 feet
- Maximum reef relief = 18 feet
- Surface water temperature = 85 °F
- Bottom water temperature = 81 °F
- Thermocline depth = 25 feet
- Current = < 1/2 knot to the north
- Visibility = 30 feet

Table 2 Coastal Demersal Fish Census for Civic Center Reef for 2008 and 2009

Family/ Common Name	Species	19-Sep-09		23-May-08	
		Abundance	Size	Abundance	Size
Elasmobranchs					
Southern stingray	<i>Dasyatis americana</i>	S	A	S	A
Centropomidae					
Common snook	<i>Centropomus undecimalis</i>	F	A	M	A
Serranidae					
Belted sandfish	<i>Serranus subligarius</i>			M	A
Black seabass	<i>Centropristis striata</i>			M	A
Goliath grouper	<i>Epinephelus itajara</i>	M 15+	A	F (2)	A
Yellowmouth grouper	<i>Mycteroperca interstitialis</i>			F (2)	J 10" long
Grammatidae					
Spotted soapfish	<i>Rypticus subbifrenatus</i>			F	A
Apogonidae					
Twospot cardinalfish	<i>Apogon pseudomaculatus</i>	F	A	F	A
Carangidae					
Amberjack	<i>Seriola dumerili</i>			M	A
Blue runner	<i>Caranx chrysos</i>	A	A	M	A
Permit	<i>Trachinotus falcatus</i>	F	A		
Rainbow runner	<i>Elagatis bipinnulata</i>	F	A		

Family/ Common Name	Species	19-Sep-09		23-May-08	
		Abundance	Size	Abundance	Size
Lutjanidae					
Gray snapper	<i>Lutjanus griseus</i>	M	A	M	A
Lane snapper	<i>Lutjanus synagris</i>			F	A
Haemulidae					
Black margate	<i>Anisotremus surinamensis</i>	F	A	M	A
Pigfish	<i>Orthopristis chrysoptera</i>	A	A	M	A
Porkfish	<i>Anisotremus virginicus</i>	M	J & A	M	J & A
Tomtate	<i>Haemulon aurolineatum</i>	A	J & A	A	A
White margate	<i>Haemulon album</i>	F	A		
Sparidae					
Sheepshead	<i>Archosargus probatocephalus</i>	F	J & A	F	A
Sheepshead porgy	<i>Calamus penna</i>			M	A
Spottail pinfish	<i>Diplodus holbrookii</i>			F	2" long
Sciaenidae					
Cubbyu	<i>Pareques umbrosus</i>	M	J & A	M	A
Highhat	<i>Pareques acuminatus</i>	F	J		
Ephippidae					
Atlantic spadefish	<i>Chaetodipterus faber</i>			A	A
Pomacanthidae					
Gray angelfish	<i>Pomacanthus arcuatus</i>			S	A
Pomacentridae					
Beaugregory	<i>Stegastes leucostictus</i>	F	J & A	M	J & A
Sergeant major	<i>Abudefduf saxatilis</i>	F	A	F	A
Labridae					
Slippery dick	<i>Halichoeres bivittatus</i>			F	A
Sphyraenidae					
Great barracuda	<i>Sphyraena barracuda</i>	F	A	A	A
Acanthuridae					
Doctorfish	<i>Acanthurus chirurgus</i>	F	A	M	A
Tetraodontidae					
Bandtail puffer	<i>Sphoeroides spengleri</i>	F	A	M	J & A
Bothidae					
Southern flounder	<i>Paralichthys lethostigma</i>			S	A
Fry					
2 Species observed	<i>Species not confirmed</i>			A 1000's	J 1" & 3/8" long
Atherinidae					
Atlantic silverside	<i>Menidia menidia</i>	A 1000's	A		

Family/ Common Name	Species	19-Sep-09		23-May-08	
		Abundance	Size	Abundance	Size
Labrisomidae					
Hairy blenny	<i>Labrisomus nuchipinnis</i>			M	A
Scaridae					
Parrotfish	<i>Specie unconfirmed</i>			S	A
Scyphozoa					
Sea nettle	<i>Chrysaora quinquecirrha</i>	A	A		
	Total Number of Species	23		32	

Representative underwater photographs of the civic Center Reef taken on May 23, 2008 are shown in Figure 8. The visibility was fair (30 feet) and the abundance of thick schools of baitfish often limited visibility. Additional photographs of the reef taken during the summer of 2007 are also available to provide other views of the reef during unusually good visibility (60 feet), so that the summer 2007 photographs clearly show the reef structure with benthic and demersal marine life.

Table 3 Benthic Census for Civic Center Reef for 2009

Phylum	Common Name	Species
Echinoderms	Rock Boring Urchin	<i>Echinometra lucunter</i>
	Common Arbacia Urchin	<i>Arbacia punctulata</i>
	3 Rowed Sea Cucumber	<i>Isostichopus badionotus</i>
Cnidarians	Sea Anemones	Unidentified species
	Colorful Sea Whip	<i>Leptogorgia virgulata</i>
	Hydroids	Unidentified species
Ascidians	Button Tunicates	<i>Distaplia corolla</i>
	Bulb Tunicates	<i>Clavelina sp.</i>
	White Condominium Tunicates	<i>Eudistoma sp.</i>
	Black Condominium Tunicates	<i>Eudistoma obscuratum</i>
	Giant Tunicates	<i>Polycarpa spongiabilis</i>
Crustaceans	Sessile Barnacles	Thoracica
	Red Netted Barnacles	<i>Megabalanus sp.</i>
	Yellowline Arrow Crab	<i>Stenorhynchus seticornis</i>
	Ciliated False Squilla	<i>Pseudosquilla ciliate</i>
Ectoprocta	Encrusting Bryozoans	Unidentified species
Mollusca	Florida Horse Conch	<i>Pleuroploca gigantea</i>
Annelida	Variiegated Feather Duster	<i>Bispira variegata</i>
Gorgonian	White Telesto	<i>Carijoa riisei</i>

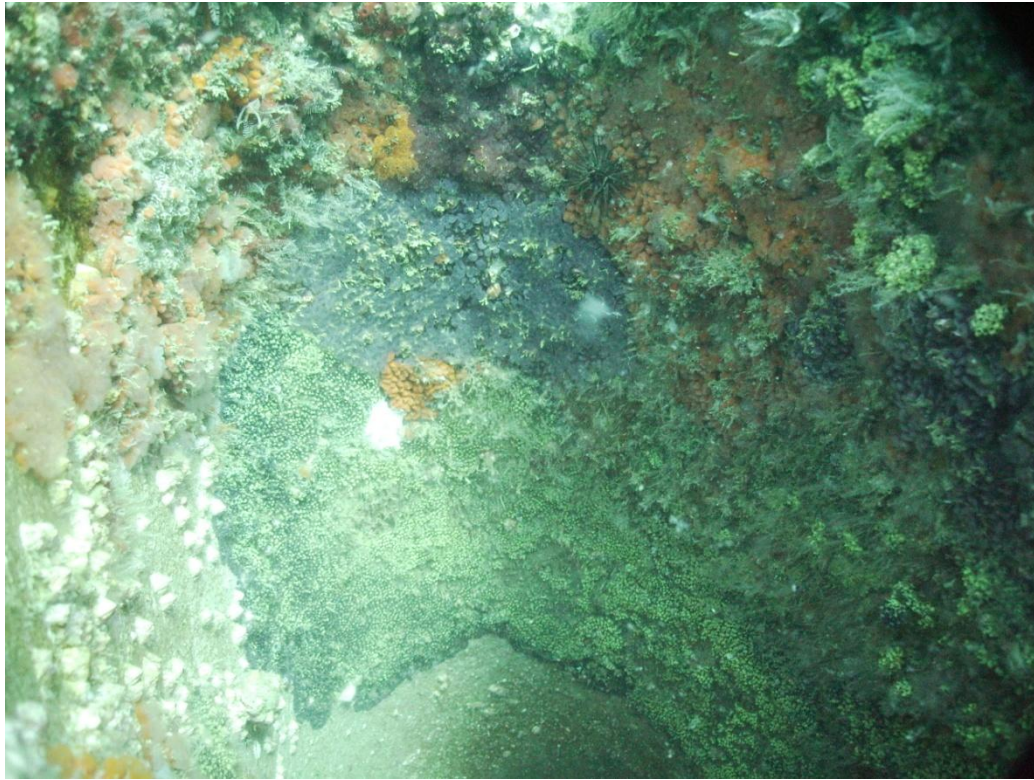
Figure 8 Underwater Photographs of the Civic Center Reef



View from overhang shadowed area with at least five distinct species of fish utilizing shelter.



View from inside culvert showing $\frac{3}{4}$ " long fry of an unidentified species.



View of the inside of a vertical culvert showing an array of attached benthic organisms.



View of the inside of a horizontal culvert with attached soft coral White Telesto,

Carijoa riisei, surrounded by 100's of unidentified species of fry 3/8" long.



Angelfish taking refuge inside hollow concrete footer.



This photograph shows the tears in the steel hull, that provide access for water flow and transit of marine life. These tears were probably initiated by the impact of the concrete materials deployed on top of the barge, and have increased slowly in their numbers and sizes since the summer 2007 inspections.



Underwater photographs taken in June 2007, have better visibility than during the 2008 or 2009 monitoring.

Fast swimming school of baitfish during a feeding frenzy.

The subsurface buoy located at the southeast end of the Civic Center reef often attracts many different fish species. In this photo a Goliath Grouper and a school of baitfish hover above the active reef.



Snook position themselves around abundant baitfish during a feeding frenzy.



A school of Round Scad baitfish are fast swimming and often ball up with excited predators on the feed.



A school of Snook hovering over a pile of concrete culverts.

Five Goliath Grouper surrounded by fast swimming school of baitfish, Round Scad.



Bob Herbst, Jr. - First Annual Monitoring Conditions

Post-deployment survey dives of the Bob Herbst Jr. Reef were performed on October 10, 2008. A fish census was performed as well although not an official annual monitoring event. It is interesting to note that only 6 weeks after deployments were complete, 23 finfish species were documented. Of these 23 species, 12 were on the 'South Atlantic Snapper Grouper Complex' list. The first annual monitoring was performed on Sept. 19, 2009, 12 ½ months following the last deployment, with the documented conditions and data summarized below:

- Maximum water depth = 58 feet
- Reef crest depth = 30 feet
- Maximum reef profile = 28 feet
- Surface water temperature = 84 °F
- Bottom water temperature = 81 °F
- Thermocline depth = 27 feet
- Current = < 1/2 knot to the north
- Underwater Visibility = 25 feet
- Seafloor substrate type = Coarse sand & shell hash

Table 4 Demersal Fish Census for Bob Herbst, Jr. Reef 2009

Family/ Common Name	Species	2009	
		Abundance	Size
Elasmobranchs			
Southern stingray	<i>Dasyatis americana</i>	S	A
Muraenidae			
Spotted moray	<i>Gymnothorax moringas</i>	S	A
Centropomidae			
Common snook	<i>Centropomus undecimalis</i>	M	J & A
Serranidae			
Belted sandfish	<i>Serranus subligarius</i>	M	J & A
Black seabass	<i>Centropristis striata</i>	M	J & A
Goliath grouper	<i>Epinephelus itajara</i>	F	A
Grammatidae			
Whitespotted soapfish	<i>Rypticus maculatus</i>	S	A
Apogonidae			

Family/ Common Name	Species	2009	
		Abundance	Size
Twospot cardinalfish	<i>Apogon pseudomaculatus</i>	F	A
Carangidae			
Blue runner	<i>Caranx crysos</i>	M	A
Round scad	<i>Decapterus punctatus</i>	A	A
Lutjanidae			
Gray snapper	<i>Lutjanus griseus</i>	M	J & A
Lane snapper	<i>Lutjanus synagris</i>	F	J & A
Haemulidae			
Black margate	<i>Anisotremus surinamensis</i>	F	J & A
Pigfish	<i>Orthopristis chrysoptera</i>	M	A
Porkfish	<i>Anisotremus virginicus</i>	M	J & A
Tomtate	<i>Haemulon aurolineatum</i>	A	J & A
White grunt	<i>Haemulon plumieri</i>	F	A
Sparidae			
Sheepshead	<i>Archosargus probatocephalus</i>	F	A
Sheepshead porgy	<i>Calamus penna</i>	M	A
Sciaenidae			
Cubbyu	<i>Pareques umbrosus</i>	F	J & A
Ephippidae			
Atlantic spadefish	<i>Chaetodipterus faber</i>	F	A
Chaetodontidae			
Reef butterflyfish	<i>Chaetodon sedentarius</i>	F	A
Pomacentridae			
Beaugregory	<i>Pomacentrus leucostictus</i>	F	A
Yellowtail reeffish	<i>Chromis enchrysurus</i>	M	J & A
Acanthuridae			
Doctorfish	<i>Acanthurus chirurgus</i>	F	A
Tetraodontidae			
Bandtail puffer	<i>Sphoeroides spengleri</i>	F	J & A
Atherinidae			
Atlantic silverside	<i>Menidia menidia</i>	A	A
Scyphozoa			
Sea nettle	<i>Chrysaora quinquecirrha</i>	A	A
Fry			
1 Species observed	<i>Species not confirmed</i>	A 1000's	J 3/8" long
	Total Number of Species	29	

Table 5 Benthic Census for Bob Herbst, Jr. Reef, 9/19/2009

Phylum	Common Name	Species
Echinoderms	Rock Boring Urchin Common Arbacia Urchin 3 Rowed Sea Cucumber	<i>Echinometra lucunter luctunter</i> <i>Arbacia punctulata</i> <i>Isostichopus badiionotus</i>
Cnidarians	Sea Anemones Colorful Sea Whip Hydroids	Unidentified species <i>Leptogorgia virgulata</i> Unidentified species
Ascidians	Button Tunicates White Condominium Tunicates Black Condominium Tunicates Giant Tunicates	<i>Distaplia corolla</i> <i>Eudistoma sp.</i> <i>Eudistoma obscuratum</i> <i>Polycarpa spongiabilis</i>
Crustaceans	Sessile Barnacles Red Netted Barnacles	Thoracica <i>Megabalanus sp.</i>
Crustaceans	Yellowline Arrow Crab	<i>Stenorhynchus seticornis</i>
Ectoprocta	Encrusting Bryozoans	

Figure 9 Underwater Photographs of Bob Herbst, Jr. Reef



Sea urchins, barnacles, Tomtates juv. on concrete surfaces of Bob Herbst, Jr. reef.



One of 100's of the jellyfish encountered on the Bob Herbst, Jr. reef. Sea Nettles - *Chrysaora quinquecirrha* . Many were seen feeding on baitfish.

6 Summaries

The Civic Center Reef is one of the best shallow water artificial reefs in St. Lucie County for large populations of individual species and diversity of marine life. The large footprint (almost 200'x 200') and large vertical profile (almost 20 feet) make this reef an attraction for marine life, divers and salt water anglers.

The Sterling Barge assisted in creating the high vertical relief of this reef, and the barge's rectangular shape and raked ends provide good navigation references for divers and underwater surveys. The concrete materials placed on top of and alongside of the barge provide an abundance of habitat both within and between the materials.

In addition to the 23 fish species identified during this monitoring study, other species have been observed by divers and caught by anglers on this reef. These include gag grouper, several species of snapper, snook, and other important sport fishes on the '**South Atlantic Snapper Grouper Complex**' List. During the 2009 monitoring the incredible sight of a full-fledged feeding frenzy was witnessed by the monitoring divers. It lasted about 20 minutes and it seemed every fish was in a panic of rapid swimming and darting about either feeding or being fed upon. During the frenzy there were bits of fish everywhere. Smaller baitfish were coming out of the culverts in what could be described as a tornadic swirl of activity and at velocities that were blinding for the divers. Some of these fish were actually hitting divers as they raced away from the bigger predators for their lives.

I have only witnessed this activity a few times in my 35 years of diving and am always amazed to experience this most primal event of nature. The Civic Center Reef 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. It is surely to continue as an active successful artificial reef in St. Lucie County for decades into the future.

The Bob Herbst Jr. Reef is another example of a well planned and constructed artificial reef. It is believed it has the second highest profile (28 ft.) of any of the St. Lucie County Artificial Reefs other than the large shipwrecks. This was created by carefully placing the second deployment of materials directly on top of the first deployment. This has allowed for an intricate complex assembly of concrete shapes and sizes to stack on top of each other. This creates much sought after shelter for many fish species. All kinds of nooks and crannies exist at this site. Even in bright daylight there are many dark crevices that a diver needs a light to peer into to reveal the many species that exist. The high profile is also a great attractant to large schools of baitfish that use the eddies of disrupted current to rest while searching the water column for bits of food drifting in the currents. During the first annual monitoring 29 coastal demersal finfish were identified and a wide array of attached benthic organisms as well. This attached marine life is the basis of the food chain and is thriving at the Bob Herbst Jr. Reef. It is expected that even more species of marine life will be documented and photographed during the 2010 second annual monitoring at this site.