

The Guardian Reef

The Guardian Artificial Reef was created through a series of material deployments from April 1992 thru May 1993. This material consisted almost entirely of concrete culverts and collection boxes ranging in size from 1 to 10 feet. The deployment also included two steel Fuel tanks, (10,000 and 30,000 gallon) and 24 steel Rinker/concrete mixer barrels. This Reef is now 12-13 years old.

The Guardian Reef is inside the Donaldson Permitted Area and measures approximately 1300' x 1300'. If a person were to swim out from center mass, they would find that the largest portion of the material extends out to about 300' in all directions. Outside of this radius the material becomes scattered out along a barren sand and shell bottom.

This Artificial Reef site was so named because of a large concrete statue of a Viking warrior standing inside a boat. The statue was named "The Guardian" and up until a few years ago, it was easy to recognize as a Viking statue. Once the saltwater corroded the iron rebar skeleton, the statue crumbled and is mostly unrecognizable due to encrustation.

As part of the matching funds segment of the Monitoring Grant, The F.O.S. Dive Team installed 3 Benchmarks on 3 different material structures at this site. They are as follows:

Benchmark #1

Installed on a concrete culvert next to other culverts and collection boxes. All are completely intact and heavily encrusted. These 2 to 5 foot diameter structures provide cave like swim throughs that are very popular with the local fish population. Goliath Grouper can often be seen using these structures as their own private lair.

We are of the opinion that concrete is a superior material for use as an Artificial Reef.

Benchmark #2

Installed on a cluster of approximately 4-6 steel Rinker Barrels. These particular barrels are intact with a slightly lesser amount of encrustation than the nearby culverts. Like the culverts, large grouper are attracted to and take refuge inside the cave like barrels.

Benchmark #3

Installed on the smaller of the two large steel fuel tanks that lie in close proximity to each other. Both structures are mostly intact and heavily encrusted. There are some large holes in the tanks but these are access hatches that were cut prior to deployment and not from corrosion.

These structures seem to attract mostly smaller Fish probably due to the lack of large corridors or interstitial spaces. There are 2 green morays that at times can be seen under or around the small Fuel tank.

Florida Oceanographic Society Research Dive Team
Florida Fish & Wildlife Conservation Commission Monitoring Grant

"Artificial Reef Stability Assessment Survey"
Martin County Florida

"Guardian Reef" Benchmark 1

Date of Survey: August 21, 2004

Research Divers: Laura Herren, Kerry Dillon, Doug Raynor, Frank Evans.

| |
|---|
| Reef Material: Concrete Culverts |
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| Orientation: Variable. Benchmark is on upright culvert. |
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| Bottom Composition: Sand and Shell |
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| General Condition of Material: Very Good. |
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| Collapse: Not applicable |
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| Scattering: None noticed. Culverts appear to have settled and are not moving. |
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| Disintegration: Concrete culverts are intact. |
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| Additional Observations: The concrete culverts are heavily encrusted with Benthic organisms and are very stable. |
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Florida Oceanographic Society Research Dive Team
Florida Fish & Wildlife Conservation Commission Monitoring Grant

"Artificial Reef Stability Assessment Survey"
Martin County Florida

"Guardian Reef" Benchmark 2

Date of Survey: August 21, 2004

Research Divers: Laura Herren, Kerry Dillon, Doug Raynor, Frank Evans.

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| Reef Material: Steel Rinker Barrels |
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| Orientation: Variable. Stacked around each other. |
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| Bottom Composition: Sand and Shell |
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| General Condition of Material: Good. |
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| Collapse: None noticed. |
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| Scattering: These barrels have settled and have not moved as of this date. |
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| Disintegration: Small areas on a few of the barrels are showing some signs of desintegration. |
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| Additional Observations: These Rinker barrels are in good condition at this time but are showing signs that this is not likely to be case in the future. Some but not much Benthic growth. |
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Florida Oceanographic Society Research Dive Team
Florida Fish & Wildlife Conservation Commission Monitoring Grant

"Artificial Reef Stability Assessment Survey"
Martin County Florida

"Guardian Reef" Benchmark 3

Date of Survey: August 21, 2004

Research Divers: Laura Herren, Kerry Dillon, Doug Raynor, Frank Evans.

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|---|
| Reef Material: Steel Fuel Tanks |
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| Orientation: |
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| Bottom Composition: Sand and Shell |
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| General Condition of Material: Fair. |
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| Collapse: No signs of collapse. |
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| Scattering: None noticed. |
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| Disintegration: There are areas of desintegration. None of them appear to threaten the structural integrity of the steel tanks at this time. |
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| Additional Observations: Both steel fuel tanks are heavily encrusted with Benthic organisms and appear stable at this time. |
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Guardian

Survey Date: 21 August 2004

Benthic species listed below were identified using the roving diver technique. Professionally trained divers spent 30 minutes hovering over the three Guardian benchmarks 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 Martin County's reefs 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. Documented organisms were also placed in one of the following abundance classifications for long-term analysis: Single (1), Few (2-10), Many (11-100) or Abundant (>100).

| <u>Benthic Species Identified</u> | <u>Abundance</u> | <u>Comments</u> |
|--|------------------|--|
| Green Algae | | |
| <i>Codium</i> sp. | Many | |
| <i>Caulerpa brachypus</i> (attached) | Abundant | Low relative density. |
| <i>Caulerpa racemosa</i> | Many | |
| Red Algae | | |
| <i>Halymenia</i> sp. | Few | |
| <i>Rhodymenia</i> sp. | Many | |
| <i>Laurencia poiteaui</i> | Few | |
| <i>Asparagopsis</i> sp. | Few | Scarlet red tufts of algae approximately 2 cm tall. |
| Sponges | | |
| <i>Ircinia felix</i> | Few | |
| <i>Ircinia campana</i> | Many | |
| Encrusting sponges | Many | |
| Cnidarians | | |
| <i>Leptogorgia</i> sp. | Single | Bright yellow sea whip (maybe <i>L. virgulata</i>). |
| Regal sea fan (<i>Leptogorgia hebes</i>) | Many | |
| Branching hydroids | Abundant | |
| <i>Oculina</i> sp. | Few | |
| Nudibranchs | | |
| Regal sea goddess (<i>Hypselodoris edenticulata</i>) | Single | |
| Bryozoans | | |
| Yellow calcified bryozoan | Many | |
| Tunicates | | |
| Bulb tunicate (<i>Clavelina</i> sp.) | Many | |
| Black solitary tunicate (<i>Acidia niger</i>) | Single | |
| Compound tunicates (<i>Eudistoma</i> spp.) | Few | |
| Solitary tunicate | Few | Looks similar to <i>Styela</i> spp. |

Florida Oceanographic Society Research Dive Team

FPL Artificial Reef Fish Census Database

| Species | Species Abund | Species Number | Species Method | Species Area | Species Size | Date | County | Latitude | Longitude | (F) Temp | (Ft) Depth | # Of Dive | Participating Divers | Bot Time Min | (Ft) Vis | Photo | Video | Reef Name | Reef Materials | Years Reef Age | Reef Tons | Reef Ft Prt Sq Ft | Reef Relief (Ft) | Deploy Date |
|------------------------|---------------|----------------|----------------|--------------|--------------|-----------|--------|----------|-----------|----------|------------|-----------|----------------------|--------------|----------|-------|-------|-----------|----------------|----------------|-----------|-------------------|------------------|-------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| Angelfish, Blue | F | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Angelfish, Gray | S | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Barracuda, great | F | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Blenny, Seaweed | M | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Blenny, Hairy | S | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Butterflyfish, Reef | F | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Butterflyfish, Spotfin | F | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Chromis, Deep water | M | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Chromis, Yellowtail | M | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Damselfish, Yellowtail | F | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Damselfish, Dusky | F | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Goby, Bridled | F | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Grouper, Gag | S | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Grunt, Tomlate | A | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Grunt, White | F | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Hogfish, Spanish | M | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Amberjack, | F | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Snapper, Gray | F | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Snapper, Lane | F | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Porgy, Saucereye | M | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Porgy, Sheepshead | M | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Porkfish, spp | M | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Puddingwife | S | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Puffer | S | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Ray, Spotted Eagle | S | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Scorpionfish | S | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Snapper, Gray | S | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Snook, spp | F | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Spadefish, Atlantic | F | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Triggerfish, Gray | F | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Triggerfish, Ocean | F | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Wrasse, hogfish | F | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Wrasse, Clown | F | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Sandfish, Belted | F | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.913 | 8006.750 | 62 | 50 | 1 | FOS-Ih | 60 | 25 | yes | yes | Guardian1 | Concrete | 11 | | | varies | 1993 |
| Angelfish, Blue | F | N/A | RD | N/A | N/A | 8/21/2004 | Martin | 2712.895 | 8006.748 | 62 | 50 | 1 | FOS-Ih | 15 | 25 | yes | yes | Guardian2 | Steel Barrel | 11 | | | varies | 1993 |

