

**Project Date:** May 6, 2003

**Subject:** Annual monitoring report for the Evans Crary Bridge Reef

**Location:** Ernst permitted reefsite, approximately 6 miles offshore Martin County, Florida

**GPS Coordinates:** N27 09.360 / W80 03.355 (center of the reef at the high section of the reef materials)

**Crewmembers:** Lee Harris, Kerry Dillon, Nicky Samuleson & David Samuleson

The following field report documents the conditions on the artificial reef known as the “Evans Crary Bridge Pile” located in the Ernst permitted reefsite offshore Martin County, Florida. The report addresses three types of data collected: Fish species identification, benthic species identification, and reef component stability.

### **HISTORY OF EVANS CRARY BRIDGE PILE:**

As part of the contract with the Florida Department of Transportation to construct the new Evans Crary Bridge in Stuart, Florida the contractor was required to dismantle and dispose of the old bridge components. The contractor was required to transport the steel and concrete bridge components offshore to construct an artificial reef. Some of the smaller bridge components were used to create three shallow water mitigation reefs close to the Stuart and Jensen Beach shorelines in water depths of 10-20 feet, while the larger bridge sections and the majority of the materials were deployed in the Ernst permitted reefsite in water depths of 60-70 feet.

In the summer of 2000 approximately 24 barge loads of old bridge components were deployed at the Ernst offshore site, these deployments consisted of the following:

- concrete piles from 20 – 40 ft. long each
- concrete pilecaps approx. 30 ft.x 4 ft. x 5 ft. each
- steel/concrete roadway sections approx. 40 ft. x 5 ft. x 4 ft. each
- pieces of the bascule piers various sizes up to 10 ft.x 8 ft. x 4 ft.
- sections of the steel drawbridge leafs up to 30 ft. x 12 ft. x 10 ft.
- large steel gears from the drawbridge lifting mechanisms
- cast iron & PVC water main piping
- steel & Aluminum electrical conduit
- concrete handrail & sidewalk sections

Each barge load of these materials were deployed from one of two temporary mooring buoys placed approximately 100 – 200 yards west of three sunken barges previous sunk for artificial reef development in 1972. Because the contractor moored the barge each time to the same buoys, the materials settled on the bottom in a tightly grouped pile. This pile is roughly elliptical and measures approximately 280 feet long x 80 feet wide x 30 feet high, with the major axis in an east/west orientation.

The Evans Crary Bridge pile has become a thriving reef community with substantial populations of pelagic and benthic species. At the surface above the reef, baitfish by the 1000's are often seen at this site. In three years this artificial reef site has become one of if not the most visited artificial reefsite in Martin County for saltwater anglers, charter sportfishing boats, and recreational divers.

Evans Crary Bridge Reef	Ernst Artificial Reef Site	Deployed Summer 2000
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**REEF COMPONENTS STABILITY:**

The deployment of such a large quantity of material with a diverse array of sizes and shapes has created a very complex reef structure. The pile has within its boundaries many kinds of underwater habitats: crevices, overhangs, long tunnels, caverns, scoured areas, upright protrusions, small cracks, lattice type areas, well shaded areas, and wide open flat expanses exist at this site.

When first deployed in the summer of 2000 some were concerned that the materials would shift in heavy swells and possibly cause a hazard to divers. Although the pile did settle somewhat in the first few months following deployment, no significant movement has occurred since that time. It appears that the mix of materials has created a stable interlocking matrix that will resist movement.

An unusual phenomenon has been noticed at this site. Unknown to anyone involved with this project, the Evans Crary Bridge pile was apparently built adjacent to and perhaps on top of an old artificial reef made from tires, which had become completely buried beneath the sand. About six months after the pile was constructed divers began noticing old truck tires being partially uncovered in the adjacent sand/shell bottom, due to scour around material at the base of the pile. The Evans Crary Bridge pile has caused enough localized scouring to take place to expose many of the old tires.

The original Martin County artificial reef builders were known as “reef-tirees” and were headed by Bill Donaldson. Mr. Donaldson and other retirees and local fishing enthusiasts began the artificial reef building efforts by sinking 1000’s of truck and car tires on the Ernst permitted site in the 1970’s. Most likely these tires that have now become exposed have been buried under the sand for many years, but now are providing additional habitat for marine life. From observations in 2003, more tires appear to be exposed than in 2002. Most of the tires are only partially exposed and appear well seated and stable in the shell/sand substrate or beneath the concrete bridge components.

**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, recording 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. One interesting note at this site during 2003 was the observation of a small school of full grown Cubera snappers that were observed over several weeks in the dark recesses of the structure. Below are the fish species observed during monitoring on May 6, 2003:

<b>Evans Crary Bridge Reef</b>	<b>Ernst Artificial Reef Site</b>	<b>Deployed Summer 2000</b>
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<u>Marine species identified</u>	<u>Quantity observed</u>	<u>Juvenile or Adult</u>
Spotted Eagle Ray	2	A
Goliath Grouper	6	A (>100 lbs.)
Porkfish	> 50	mixed
Grey snapper	> 5	A
Sheepshead	2	A
Tomtate	100's	A
Common Snook	1	A
Flounder	1	A
Cocoa Damsel fish	1	A
Doctorfish	2	A
Barracuda (4-5 ft.)	4	A
Spanish hogfish	2	A
Belted Sandfish	2	A
Mackerel scad	100's	N/A
Blue Angelfish	1	A
Bluehead wrasse	1	A
Yellowtail snapper	>10	J & A mixed
Greater Amberjack	5	A
Blue Runner	>7	A
Scorpianfsh	2	A
Barracuda	4	A
Loggerhead Turtle	1	A

**BENTHIC SPECIES IDENTIFICATION:**

The roving diver method was also used for benthic species identification. The divers swim around the reef structure and identify benthic species and record data on underwater slates. Data would also be double-checked once topside using field texts with color photographs. Underwater video and digital still photodocumentation were also utilized to accurately document benthic species. Below are the results of the benthic survey:

**Marine benthic species identified:**

White telesto, branching soft coral

Orange telesto, branching soft coral

Deepwater octocorals, a member of the gorgonian family

Black tunicates

Bell tunicates

Several species of sponges

Branching coral (orange & yellow)

Ameracupa, hard cup corals

Compound tunicates, sea-pork

Several species of hydroids

Several species of green marine algae

Several species of red marine algae

Green fleshy algae

Red leafy algae

Oysters

Barnacles

One interesting finding is the amount of oyster growth on the steel roadway grating of the drawbridge leafs. These leafs are now almost completely covered with colonies of oysters. The gratings are similar to those used by aquaculturists to provide surface area for farm-raised oysters. This colonization was noticed within months of deployment of the sections.

<b>Evans Crary Bridge Reef</b>	<b>Ernst Artificial Reef Site</b>	<b>Deployed Summer 2000</b>
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**CONCLUSIONS:**

The main difference in the 2003 monitoring observations is the continued increase in total benthic coverage. Almost every surface has some type of marine life attached and growing on it. The rapid growth has been most likely caused by a combination of factors: the height of the reef profile allowing sunlight to promote photosynthesis in the upper structure, currents providing flow of nutrient rich water from the nearby western edge of the Gulf Stream, the complexity of the surface areas allowing many benthic species to pick their optimum attachment point, and possibly the proximity to the St. Lucie Inlet (6 miles) providing a source of nutrient rich waters from land runoff from Lake Okeechobee and the connecting Okeechobee waterway.