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Date: October 29, 2002

Subject: 2002 Monitoring Report for Evans Crary Bridgepile

Location: Ernst artificial reef permitted area. GPS coordinates **N27 09.360 / W80 03.355** at the center of the reefsite at the high section of the material pile.

Crewmembers: Project Director Lee Harris, Ph.D., Boat operator Capt. Rich Gurleck, Lead diver Kerry Dillon, guest biologist & diver Mike McGarry

Project Date: August 2, 2002

INTRODUCTION

The following is a field report to document as found conditions on a component of the Ernst permitted reefsite known as the Evans Crary Bridgepile. The report will address three types of data collected: (1) fishlife species identification and quantity, (2) benthic species identification, and (3) reef components and stability. Underwater still photographs and video were taken during the monitoring work, and provide additional documentation of the conditions.

HISTORY OF EVANS CRARY BRIDGEPILE

As part of the contract to construct the new Evans Crary Bridge in Stuart, Florida the contractor was required to dismantle and dispose of the old bridge components. After researching options it was determined to be economically feasible and environmentally acceptable to use these old steel and concrete components to construct an artificial reef. The smaller components were used to create three shallow water mitigation reefs close to the Stuart and Jensen Beach shorelines, while larger sections were deployed in the Ernst permitted offshore reefsite in depths of 60 – 70 feet of ocean water.

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

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

These materials were deployed from one of two temporary mooring buoys placed approximately 100 – 200 yards west of three sunken barges previously sunk for artificial reef development in the Ernst Reef Area (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 measures 280 feet long by 80 feet wide by 30 feet high, and lies in an east/west orientation. Underwater still and video documentation has been done since the deployments to capture the immensity and biological development of this artificial reef site.

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The pile has become a thriving reef community of pelagic tropical fishlife and abundant amounts of benthic species attached to almost every available surface. Probably because of the substantial profile, baitfish by the thousands are always observed at this site. In a matter of two years it has become one of the most (if not the most) visited artificial reefsites in Martin County for saltwater anglers, charter sportfishing boats and recreational divers.

FISH SPECIES & ABUNDANCE FINDINGS:

Fish identification and abundance was 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 and record 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 still photographs were taken for documentation and were utilized to accurately determine fish species and abundance. Below are the results of those findings:

<u>Marine species identified</u>	<u>Quantity observed</u>	<u>Juvenile or Adult</u>
Goliath Grouper	2	A (> 100 lbs.)
Porkfish	> 20	mixed
Grey snapper	> 10	A
Sheepshead	4	A
Beaugregory	2	J
Tomtate	100's	A
Common Snook	>10	A
Atlantic Spadefish	> 20	A
Sergeant Major	1	A
Doctorfish	4	A
Barracuda (4-5 ft.)	>10	A
Spanish hogfish	4	2-J & 2-A
Queen Angelfish	3	A
Reef Butterflyfish	3	A
Belted Sandfish	5	A
Baitfish with yellow tail	100's	?
Blue Angelfish	1	A
Bluehead wrasse	1	A

BENTHIC SPECIES IDENTIFICATION:

The roving diver method was also used for benthic species identification. The divers would roam around the reef structure and identify benthic species and record data on underwater slates. Data was also double-checked once topside using field texts with color photographs. Underwater video and still photographs were taken for documentation and were utilized to accurately document benthic species.

Below are the results of the benthic survey:

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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 *Clairapa*, an non-native exotic species
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 what aquaculturists use to provide surface area for farm raised oysters. This colonization was noticed within months of deployment of the sections.

It is estimated that the above list of benthic species represents only 25% of the benthic organisms that are living on the Evans Crary bridgepile. Identification of all the species will take more time and require collection of samples with laboratory work to more accurately identify benthic growth development at this site.

REEF COMPONENTS AND STABILITY:

The deployment of such a large quantity and diverse array of sizes and shapes has created a very complex reef structure. This includes crevices, overhangs, long tunnels, caverns, scoured areas, upright protrusions, small cracks, lattice type areas, well shaded areas, and wide open flat expanses at this site.

When first deployed in summer of 2000 some divers 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, no significant movement has occurred since that time. It appears that the mix of materials has created a stable interlocking matrix with little chance of further movement, except for an extremely severe storm event such as a major hurricane.

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About six months after the pile was constructed divers began noticing old truck tires being partially uncovered within the bridgepile reef area and adjacent sand/shell bottom. This was a result of scour around the newly placed artificial reef materials, that actually has exposed some previously placed tire artificial reef materials that have been buried under the sand. The original Martin County artificial reef builders were known as “reeftires” and were headed by Bill Donaldson. Mr. Donaldson with other retirees and local fishing enthusiasts began the artificial reef building efforts by sinking thousands of truck and car tires on the Ernst permitted site in the 1970’s.

As can be expected anytime a structure is placed on the bottom, some scouring takes place around the perimeter of that object. In this case the Evans Crary bridge pile has caused enough localized scouring to take place to expose some of the old tires. Since that time the tires have begun to support a base on which benthic growth has occurred and small fish are hiding inside the tires. Most likely these tires have not been exposed since sometime in the 1970’s, but now seem to be providing additional habitat for marine life to thrive in the year 2002. Most of the now exposed tires are underneath and trapped by the larger concrete pieces, which provides stability for the tires (similarly the nearby barges in the Ernst artificial reef site are filled with tires).

CONCLUSIONS:

The Evans Crary bridgepile artificial reef site has become an active living artificial reef community for both fish and benthic organisms. Its success can be linked to the proper planning and execution of the deployments. In the past, many artificial reef projects have been haphazard attempts at deploying materials in a targeted area with limited success. This was because the contractors were allowed to perform “drive by” deployments. This would only result in a scattering of material across wide areas of ocean floor with very little profile. The contractual requirement of mooring the barge each time a deployment is made provides larger underwater relief to be achieved, and should be considered for future artificial reef development efforts.

CERTIFICATION:

This written field report narrative of the underwater inspection of the Evans Crary Bridgepile in the Ernst artificial reef site is true and accurate to the best of my knowledge and belief

Date: October 29, 2002

Lee E. Harris, Ph.D., P.E., On-site Observer
Consulting Engineer, FL PE # 26252