

# COASTAL RECREATIONAL FISHING LICENSE

## FINAL PERFORMANCE REPORT

Recipient: Riverworks at Sturgeon City

Grant Award #: 3140

Grant Title: New River and Adjacent Offshore Waters Artificial Reef Enhancement Project

Grant Award Period: June 15, 2010 through June 30, 2012

Performance Reporting Period: December 31, 2011 through June 01, 2012

Project Costs:

***Expenditures for the Period:***

<u>Category</u>	<u>Expenditures</u>
Personnel	17,717.58
Fringe	1,356.96
Travel	0.0
Equipment and Supplies	6,379.26
Construction	0.0
Contractual	277,471.30
Other	
Total Direct	10,850.00
Indirect	<u>0.0</u>
TOTAL	277,471.30

***Total Cumulative Expenditures:*** \$473,488.04

***Total Remaining Balance:*** \$ 89,851.96

Description of Work:

This artificial reef enhancement project will utilize bridge demolition material from the NC Route 17, Buddy Phillips Bridge in Jacksonville, North Carolina to build new reef structures in the New River. The proposed artificial reef structures are modeled after the NCDMF Resource Enhancement Section's coastal fish artificial reef program. This project provides the following advantages: adaptive reuse of the bridge material, bridge project cost savings for the NC Department of Transportation (NCDOT) increased habitat, increased fishing opportunities for sportsman, increased economic development related to tourism and a project that will serve to educate citizens about the value and function of habitat conservation restoration efforts and the impact to water quality in eastern North Carolina.

# COASTAL RECREATIONAL FISHING LICENSE

## FINAL PERFORMANCE REPORT

This project leveraged monies and resources by NCDOT, NCDMF, Riverworks at Sturgeon City, the City of Jacksonville, Jacksonville-Onslow Chamber of Commerce's Tourism Advisory Committee and Marine Corp Base Camp Lejeune.

Partners assisted in providing resources to identify river reef locations. NC DOT made reuse materials available as the Buddy Phillips Bridge was dismantled. All reuse materials were approved for use by NC Division of Coastal Management and NC DMF. Contractors prepared and moved the specified material to the barge loading site. The artificial reef building contractor loaded substrate material, delivered and deployed the material as specified protocols directed. Prior to bridge demolition all asphalt was removed from the roadbed surface. Once dismantling commenced the bridge demolition contractors delivered bridge components, i.e., spans, bent caps and pilings to a lay down yard at Riverworks at Sturgeon City. These material were processed buy breaking and grading to size specified by DMF and as approved by DCM. Steel and residual asphalt chunks were removed mechanically and by hand to the greatest reasonable extent possible. Deployment contractors transported the processed material to the barge loading site and loaded the barge directly. This material was then transported directly to the reef location and placed into water according to a prescribed and marked pattern specified protocols directed by NC DMF. Contracted services were supervised by Riverworks staff. Riverworks created scope of work, delivered bid oversight and engaged contracted services to include; artificial reef design, deployment protocol documentation material preparation, hauling to barge, loading dockside, barge transport services, material deployment services, gap process work coverage and contracts to fulfill all required federal, state and local permitting.

### Project Status/Work Accomplished:

#### Goal 1, Objective:

Coordination of activities included: Coordinating through NC DOT to secure demolition material. This process included coordinating the preparation, removal and initial transport of the material from the bridge to the processing site. Riverworks staff completed all preliminary reviews and investigations to identify potential reef sites. Site reviews and final artificial reef site selection and permitting process were coordinated with NC DMF assistance. This process included working with NC DMF staff to evaluate and qualify reef material, site, final site selection, the permitting process and documentation, reef design, deployment and construction supervision.

The construction of this reef creates physical habitat that provides hard substrate for sessile macro invertebrate attachment there by providing habitat for filter feeders supporting improved water quality. The substrate also provides additional habitat for finfishes and crustaceans. This artificial reef is closed a closed shellfish area. Only harvesting of finfish and potentially limited invertebrates will be allowed. This reef location is also in an area closed to shrimp trawling therefore impacts to existing uses were non-existent.

Monitoring activities during this grant period included side scanning sonar (SSS), bottom type mapping and shellfish sampling implementation to identify and evaluate

# COASTAL RECREATIONAL FISHING LICENSE

## FINAL PERFORMANCE REPORT

proposed reef sites. SSS was also used to confirm design implementation and the construction process. SSS confirmed structure placement, position, structure height and coverage. SSS and GPS collected information provides baseline data for all future monitoring and program research.

### Goal 3, Objective:

A thirty-one acre artificial fishing reef site has been permitted and established. Nine patch reefs have been built on this artificial reef site. All material originated from the Buddy Phillips Bridge during this grant period. The thirty-one acre site was designed to include all of the Buddy Phillips Bridge material in nine patch reefs. By targeting a minimum of nine patch reef with overage allowances for four additional patch reefs, any residual unused area was planned for limestone marl material. However this project was so successful that should the opportunity present itself more processed concrete may be used. Two of the fifteen patch reefs of the reef's design were planned Reef Balls® and concrete pipe. Future reef substrate comparison studies and additional space within the reef permit allowed for reef complexity and future research opportunities; an example would include an opportunity to test performance of companion materials.

### Specific Program Goal, Objective:

After reviewing preliminary multiple sites a single primary reef site was identified and permitted. Many potential reef sites were investigated, most were found to be problematic due to unsuitable bottom types. One hundred percent of the bridge material was removed during this grant period. Bridge material provided substrate material to build 1639 mounds two feet high, eight feet in diameter, at 1.85 cu. Yards per mound. A total of 5,609 tons were utilized to construct the nine patch reefs. 2,092 tons of byproduct of sand/fines and 57 stone were utilized by the City of Jacksonville NC for access roads at their Land Application Wastewater Plant on Fire Tower Road. Approximately 350 tons of steel rebar and pre-cast wire were recycled. The construction of nine patch reefs was completed during the grant period. The initial estimate of 7900 total tons versus actual tonnage yielded of 8051 tons. Factors that contributed to an increased amount of total tonnage (151 tons) is as follows: Larger amounts of steel were found in the concrete road deck material than previously estimated and material processing effected usable material yield. In addition, a small amount of concrete footers from demolition of a building on the work site was used, less than 50 cu. Yards (this amount is not considered significant). Though this higher than expected bridge total tonnage occurred it did not translate into a larger amount of processed materials because the additional steel was not usable for reef construction and displaced the concrete components.

### Deviations:

Deviations include lower yield of bridge material resulting in less reef material available than projected in initial estimates. Fifteen to twenty percent (15- 20%) loss

# COASTAL RECREATIONAL FISHING LICENSE

## FINAL PERFORMANCE REPORT

during processing was projected, actual loss was twenty nine percent (29 %). Total build out of the patch reefs produced 1639 mounds verses the 2065 mounds that were projected and proposed in the permit document.

- Material yield of usable bridge substrate material was over estimated
- Processing methodology changed from phase I to phase II, to further diminishing yield. A close monitoring to avoid over processing is noted.
- To ameliorate the decrease in yield of substrate and maintain project goals the number of mounds per quad were decreased. However, the decrease in total mound surface area is not expected to affect the desired habitat and the edge effect was not diminished

### Additional Guidance:

The controlling factor of bridge demolition has dictated a two phase (multi-year funding) approach. Forty percent of the bridge has been demolished in phase I (grant year one) and sixty percent of the bridge is to be dismantled in phase II (grant year two). This phasing was identified prior to award of grant year one. The initial award letter addressed multi-year awards; if phase I was successful completed subsequent years would be considered. In the award of this project the projected cost (project budget) was divided equally between year one and year two. The bridge is being demolished on a forty/sixty percentage. The awarded funding was split fifty percent, fifty percent. I am requesting that the unused balance from funding year one be carried over to funding year two. This would allow the unused balance of funds to complete the construction schedule balance of demolition carried over from funding year one to funding year two.

Processing methodology changed from phase I to phase II, to further diminish usable material yield. A close monitoring to avoid over processing is noted. The tendency of equipment operators is to over process or break up the material to a uniform size, this is not necessary and will lower material yield. When processing the material to remove pre-cast concrete wire and cut in place rebar the material is broken down as far as it needs to be. Even some material being larger than basketball size rubble is acceptable. The amount of this size rubble will not be considerable enough to affect transportation of the reef building material. Smaller reef building material will help bed it for transport. Having some larger material will help in the reef building process. Future reef design and constrictions of water depth would allow for different sized material to be process.

The educational component has included the following during this grant period: 30 public programs, thirty to sixty minutes in length, describing the building of the artificial

# COASTAL RECREATIONAL FISHING LICENSE

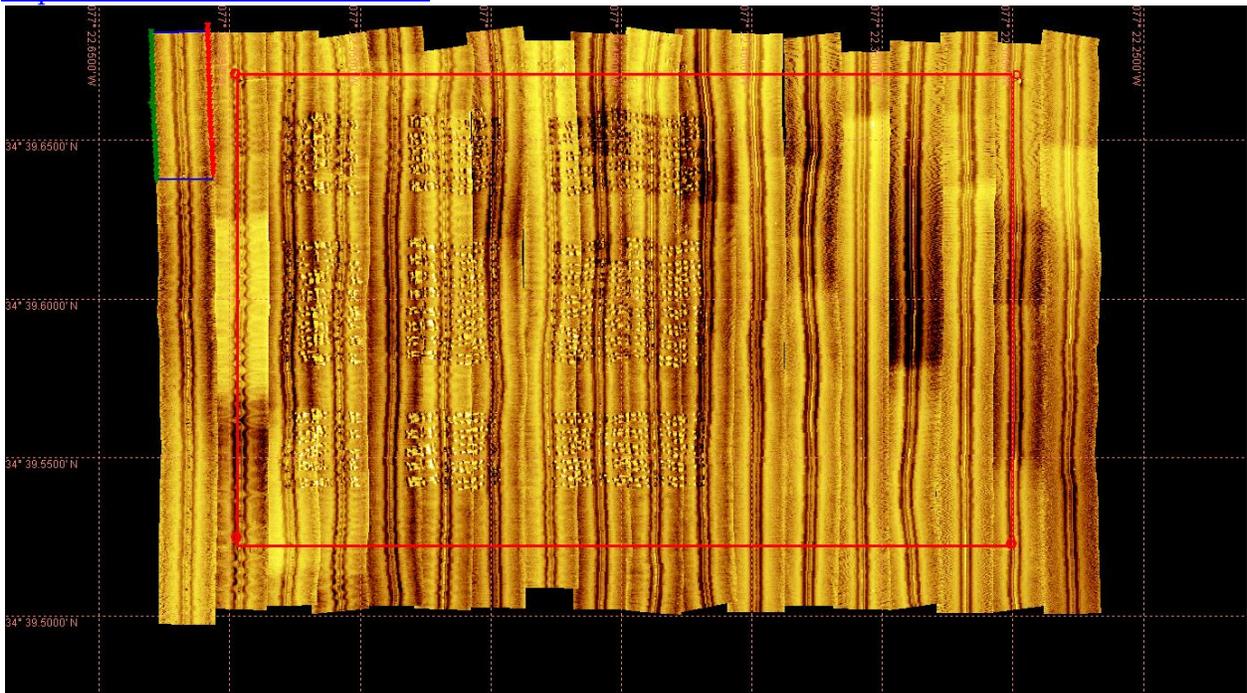
## FINAL PERFORMANCE REPORT

fishing reef to a total of 840 adults. Three Radio talk shows, two television productions and four television spotlights on the reef project have been created and broadcasted on GTV10, Time Warner Cable market, in the Jacksonville NC. Channels TV 14 and FOX News spotlighted the program on 3 news broadcasts. The online links to these video's are below.

### Video Links:

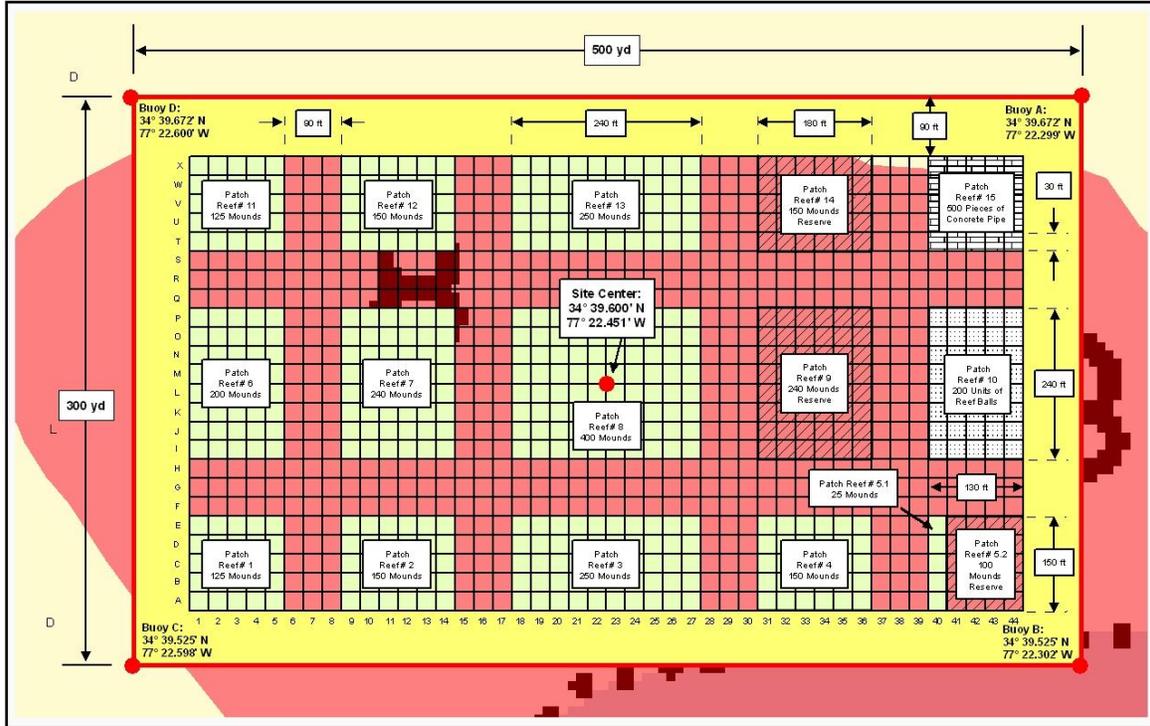
<http://www.vimeo.com/15370260>

<http://www.vimeo.com/13828515>

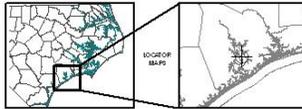


# COASTAL RECREATIONAL FISHING LICENSE

## FINAL PERFORMANCE REPORT



**Chart 3**  
**New River Reef, AR-398**  
**Mound Quadrates Layout With Patch Reef**  
**Dimensions and Designations**

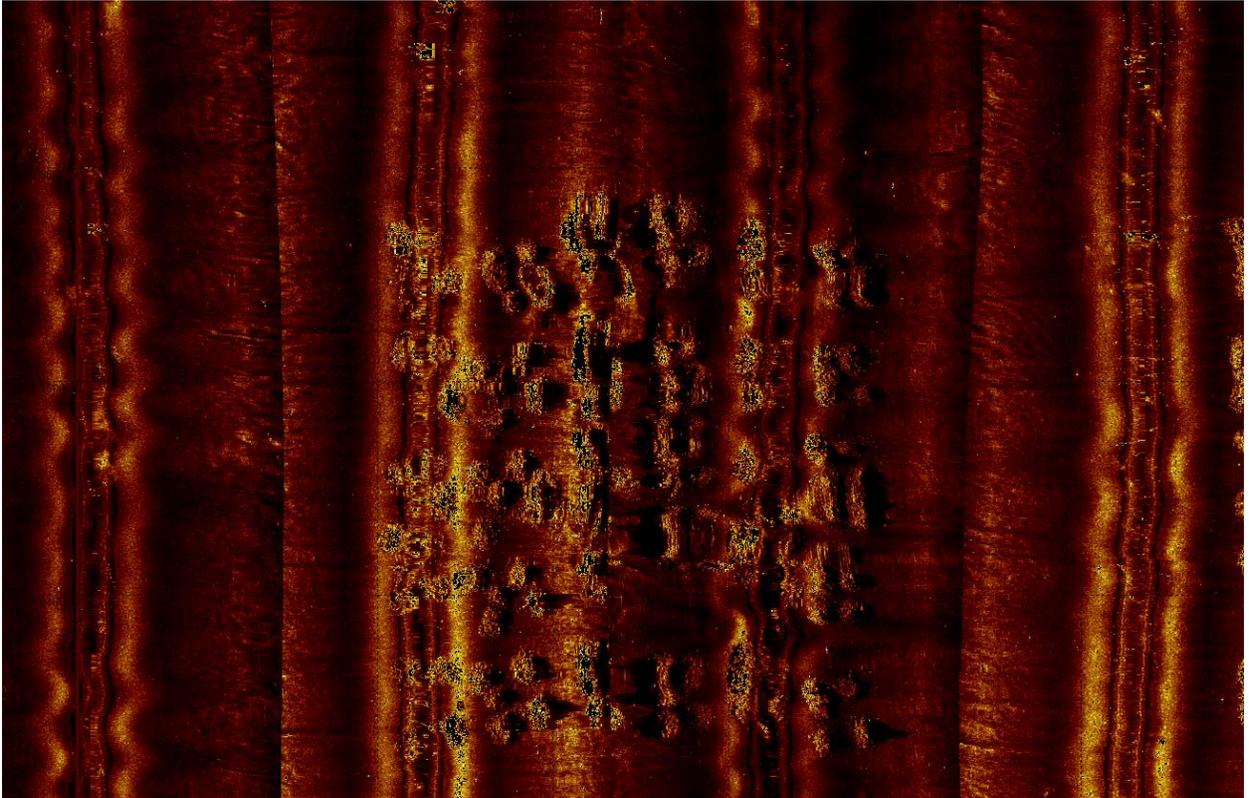


Scale: 1:24,000  
 Date: 11/03  
 Project: NC State Park  
 Applicant: FISH  
 11/20/2010



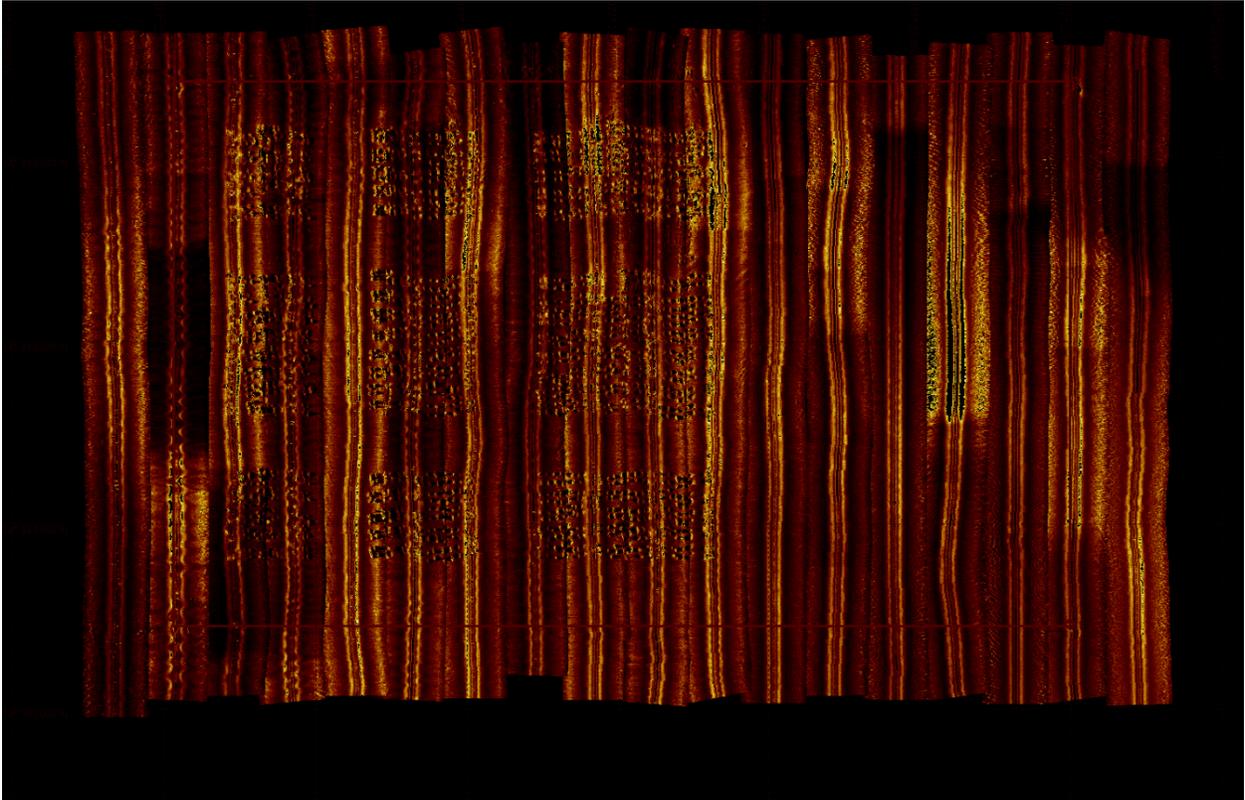
# COASTAL RECREATIONAL FISHING LICENSE

## FINAL PERFORMANCE REPORT



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## FINAL PERFORMANCE REPORT

