Interim and Final Report

South Carolina State Wildlife Grants Project

South Carolina Department of Natural Resources

October 1, 2007 – September 30, 2014

T-34-HM-1

Project Title: Community-based Habitat Restoration and Large-scale resource enhancement through SCORE (SC Oyster Restoration and Enhancement Program)

GOAL

Create intertidal oyster reefs and *Spartina* saltmarsh to provide essential fish habitat, protect shorelines from erosion, and provide forage for American Oystercatchers and other shorebirds, through a community-based restoration program.

PROJECT NARRATIVE

Need

Oyster reefs have been cited by The Nature Conservancy as the most endangered marine habitat on the planet (Beck et al. 2009). Oyster reefs are threatened by deteriorating water quality, sediment-loaded runoff, habitat destruction (e.g. by boat wakes), failure to replenish hard substrate at a rate equivalent to harvest, and coastal development in general (Rothschild et al. 1994; Kirby 2004; Wilberg et al. 2011; Beck et al. 2009, 2011). Oysters are a keystone species in SC estuaries, controlling water quality, mediating nutrient cycling, and providing habitat for more than 83 species of finfish and macro-invertebrates (Dame et al. 2001; Porter et al. 2004; Peterson et al. 2003; Plunket and Peyre 2005; Luckenbach et al. 2005). Oyster reefs and salt marsh are listed as Essential Fish Habitat by the ASMFC (ASMFC 2007). Species of commercial, recreational, and ecological concern that are associated with oyster habitat include species managed by ASMFC (American eel, Atlantic croaker, Atlantic menhaden, black sea bass, bluefish, coastal sharks, horseshoe crab, red drum, spanish mackerel, spot, spotted seatrout, striped bass, summer and winter flounder, and weakfish), members of the snapper-grouper complex (managed by SAFMC), blue crab and penaeid shrimp. In turn, these species provide prey for Spanish and king mackerel, cobia, and other species managed by the SAFMC, and for migratory species such as sharks and billfishes managed by NOAA Fisheries. Additionally, oyster reefs are critical foraging habitat for the American Oystercatcher (Highest Priority SWAP species; state Species of Concern) and other shorebirds such as egrets, herons, sandpipers, plovers, and godwits, all of which are listed in the SC Wildlife Action Plan as species of highest priority. Oyster reefs are nature's bulkheads to prevent erosion of saltmarsh, which also provides critical habitat for many birds, reptiles, fish and invertebrates and filters runoff to improve water quality (ASMFC 2010; Walker et al. 2011; Meyer et al. 1997; Piazza et al. 2005; Scyphers et al. 2011; NRC 2011; Shepard et al. 2011). Oyster reef sustainability has always depended on a continuing supply of hard substrate to support larval attachment, but substrate loss is currently outpacing replenishment. Substrate may be lost through many processes including burial (often

by upland-derived sediment), careless harvesting, and displacement by waves and boat wakes. Restoration of oyster reefs is accomplished by replenishing removed or lost substrate, usually oyster shells, a practice which dates back thousands of years. A community restoration program can accomplish restoration while providing increased public awareness and encouraging active environmental stewardship.

Objectives

1. Create and enhance oyster habitat with the assistance of community volunteers
   - Establish multiple oyster reefs along shorelines in coastal counties
   - Involve multiple K-12 classes in active stewardship
   - Involve the general public in active stewardship
2. Create and enhance saltmarsh through a K-12 school program
   - Work with schools to harvest, grow and transplant saltmarsh
3. Monitor reef and marsh development and continue to refine site selection criteria and success criteria

Accomplishments

Summary

During the life of this project, more than 15,000 volunteers including more than 35 K-12 schools, have participated in active stewardship, contributing more than 38,000 hours of volunteer time (Table 1). A total of 2.23 acres of oyster reefs have been constructed at 52 sites along 200 miles of SC coast, protecting more than 2 miles of shoreline (Table 2, Figure 1). These reefs were constructed with more than 36,000 bushels of recycled oyster shells weighing more than 990 tons. Approximately 5.4 acres of adjacent saltmarsh has been created and/or protected. Public awareness has been increased through 87 visits to schools and participation in events focused on K-12 education, 29 presentations at community meetings and events, 9 teacher workshops, and local and national press coverage. SCORE was featured in Southern Living Magazine, Spirit Magazine (Southwest Airlines), SC Wildlife Magazine (twice), and Coastal Heritage.

Table 1. Volunteer participation by year.

Grant Yr	Activities	Volunteers	Schools	Hours
2008	104	890	24	2,804
2009	131	945	21	2,643
2010	144	1,468	28	3,904
2011	182	2,900	23	7,328
2012	146	3,321	23	8,378
2013	126	2,755	33	6,589
2014	164	2,919	32	6,452

Grand Total	997	15,198	184	38,098

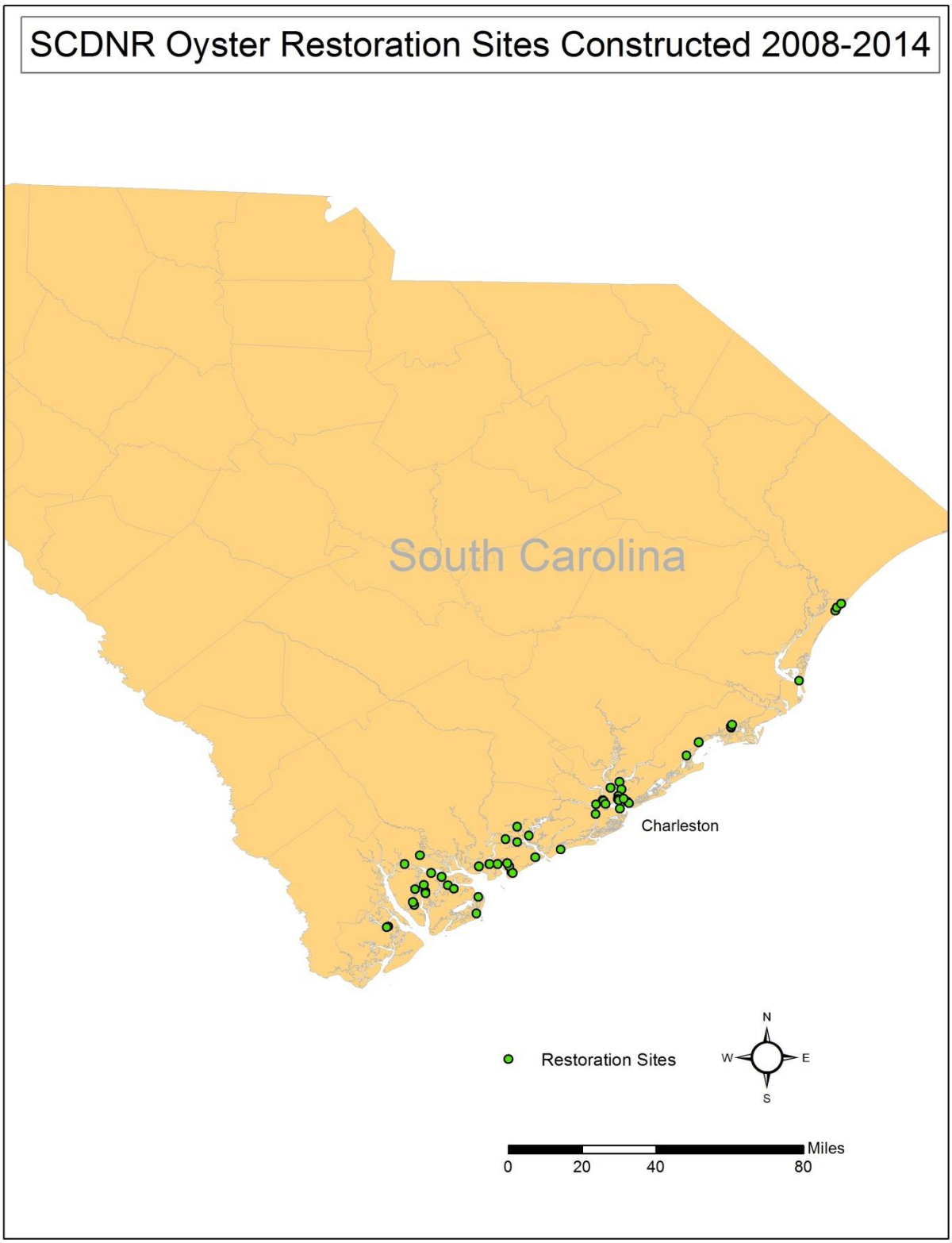

Figure 1. Map of restoration sites

Table 2. Restoration metrics for each year of the project. Total sites each year include ones which are expanded. New sites are indicated in parentheses.

Metric	2008	2009	2010	2011	2012	2013	2014	Total
# sites	7 (7)	8 (3)	6 (3)	12 (7)	14 (8)	24 (12)	30 (12)	101 (52)
# bags	3,124	3,690	6,554	6,915	9,610	10,603	13,939	54,435
# bushels	2,062	2,435	4,326	4,564	6,343	6,998	9,339	36,067
Feet of shoreline	620	733	1,302	1,373	1,909	2,115	2,755	10,807
Marsh acres	0.29	0.34	0.60	0.63	0.88	0.97	1.27	4.96
Reef acres	0.23	0.16	0.26	0.42	0.28	0.45	0.43	2.23

Objective 1. Create and enhance oyster habitat with the assistance of community volunteers

The community restoration program includes three main elements: shell recycling, shell bagging and reef building.

Shell recycling

Shell recycling has grown each year (Figure 2), with assistance from partners such as the Coastal Conservation Association (CCA). In 2014, CCA donated a dump truck to assist with shell recycling and assisted in the establishment of two shell drop-off sites in Columbia. This brings the total number of drop-off sites to thirty. Several press releases and radio spots each year remind the public to recycle shell. Each year, staff participate in multiple venues—such as the Carolina Green Fair—to disseminate information to the public.

Shell bagging

Over the life of the project 5,082 volunteers have donated almost 9,600 hours to fill 50,547 bags weighing 758 tons. Table 3 summarizes shell bagging for each year of the project. Interannual variation in recent years is largely due to the timing of our main bagging event, the Day of Caring sponsored by Trident United Way. In 2013 almost 5,000 bags were made at that one event. The 2014 event will not occur until November.

Table 3. Shell bagging by project year

Project Year	Events	Volunteers	Hours	Bags	Tons of shell
2008	12	259	547	2,487	37
2009	10	262	534	2,880	43
2010	37	728	1,536	9,734	146
2011	33	1,011	2,057	7,420	111
2012	25	755	1,334	7,444	112
2013	32	998	1,959	11,929	179
2014	36	1,069	1,627	8,653	130
Grand Total	185	5,082	9,593.5	50,547	758

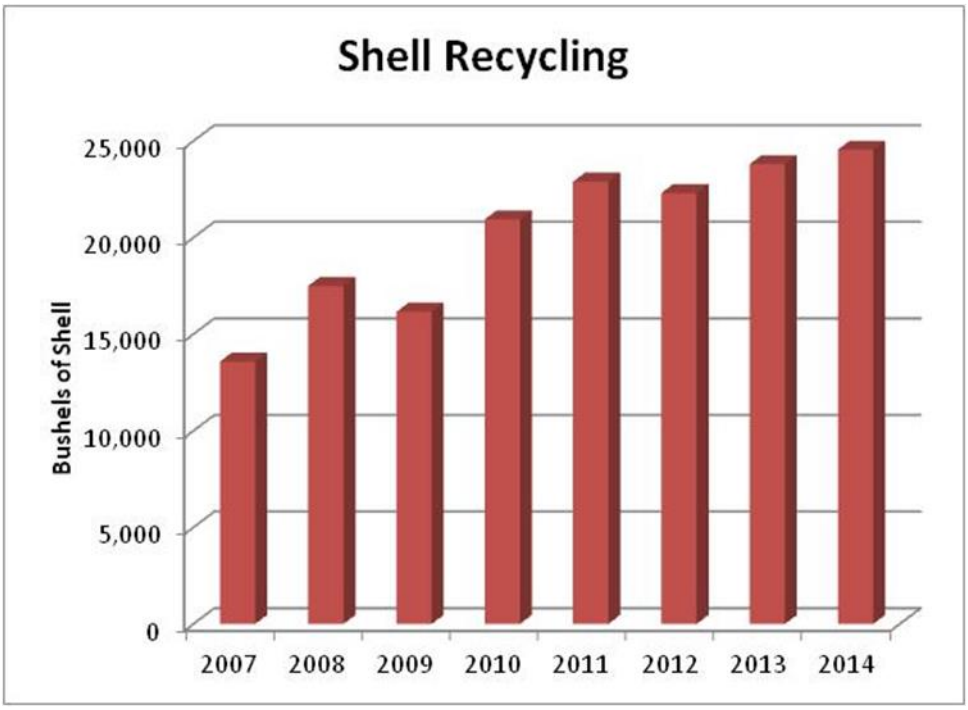

Figure 2. Shell generated through recycling program

Reef Construction

A total of 2.23 acres of oyster reefs have been constructed at 52 sites along 200 miles of SC coast, protecting more than 2 miles of shoreline (Table 2, Figure 1). These reefs were constructed with more than 36,000 bushels of recycled oyster shells weighing more than 990 tons. More than 1,300 volunteers participated in reef building activities in spring and summer 2014, donating 3,580 hours to construct oyster reefs at 28 sites along the SC coast. More than 13,700 bags weighing more than 200 tons were deployed, the most of any year since the project was initiated. Table 2 summarizes sites and acreage restored each year of this project.

Objective 2**.** Create and enhance saltmarsh through a K-12 school program

In 2011, SCDNR partnered with SC Seagrant, COSEE-SE, and Clemson Extension Service to start From Seeds to Shoreline, a program to involve K-12 students in marsh restoration. We have assisted schools in procuring, building, and outfitting greenhouses, collecting marsh grass seeds, germinating seeds, and planting seedlings behind oyster reefs. Since the Saltmarsh restoration project was initiated, we and our partners have collectively worked with 2,503 students at 22 schools and logged over 3,800 volunteer hours. We have conducted 7 workshops training 56 teachers from 52 schools. In addition to the seed propagation program, we have also engaged volunteers in rescuing saltmarsh which has calved off a bank and

relocating these clumps behind new oyster reefs. This is a very rapid way to establish a saltmarsh footprint and has a high success rate. Between the two methods, we have planted 1,571m^2 of saltmarsh at 16 sites.

Objective 3. Monitor reef and marsh development and continue to refine site selection criteria and success criteria

Recruitment and Reef Development

SCDNR monitors recruitment and growth of oysters annually by deploying standardized shell trays at multiple sites along the coast. Recruitment trays were deployed each spring to evaluate recruitment and early growth potential. Mean recruitment statewide from 2008-2013 was 4,930 oysters/m^2, which compares favorably with the long-term mean for South Carolina (4,645 oysters/m^2) (Figure 3). Inter-annual variation was substantial with annual means ranging from 3,063 oysters/m^2 in 2008 to 7,477 oysters/m^2 in 2011. This reflects the long-term trends in South Carolina (Figure 3). Some of the difference is due to sites used in individual years. For instance, in 2008 and 2009 many of the tray locations were chosen to coincide with SCECAP sampling sites while most years, the locations are chosen to coincide with oyster restoration sites. In 2011, several restoration projects were in progress in the ACE Basin and therefore an unsually large number of the locations were in that region, which is known for high recruitment.

Each year, new SCORE sites constructed the previous spring/summer were sampled to evaluate early reef development by taking replicate (n=3) bag samples from the reefs. One-year old oyster densities on SCORE sites constructed 2008-2013 ranged from 2,644 oysters/m^2 in

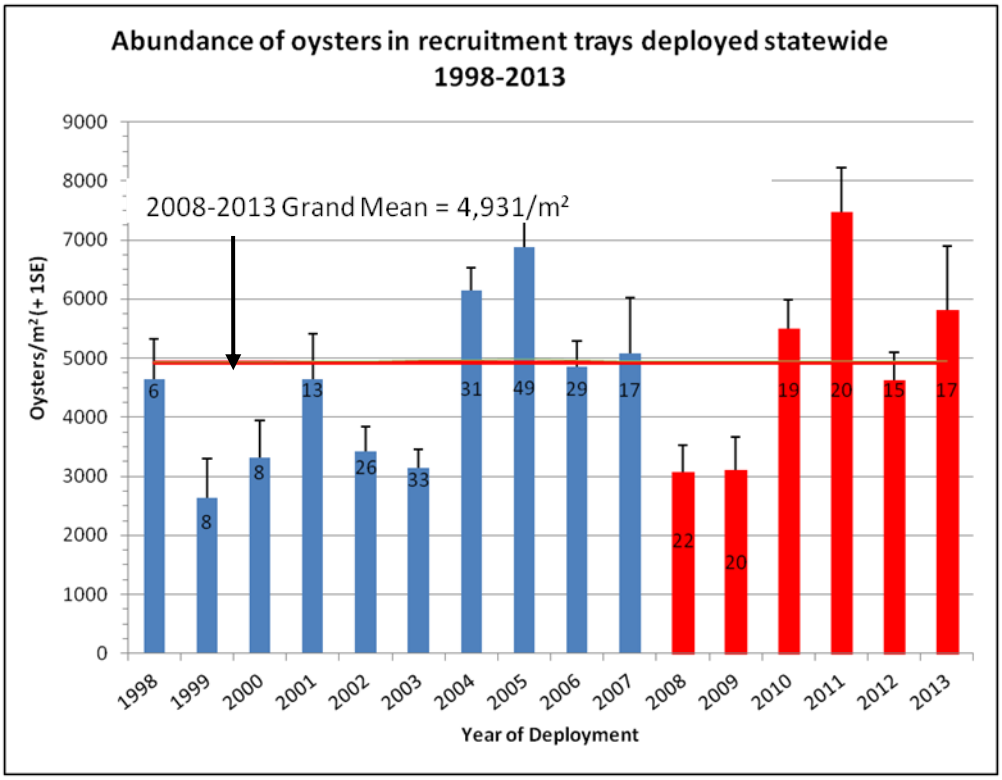

Figure 3. Annual recruitment in standardized shell trays deployed at multiple locations statewide (number of sites in column). Study years are red and horizontal line is the mean for study years.

2011 to 4,677 oysters/m^2 in 2013 with a mean recruitment of 3,244 oysters/m^2 (Figure 4). Density on SCORE reefs was lower than on shell trays, which we also find to be a general pattern in South Carolina. This is possibly attributable to the fact that the trays are deployed 1-3 months earlier than the reefs and therefore have longer to accumulate spat. We have observed that reefs often collect more sediment than trays which can affect survival.

Mean size of one year old oysters on SCORE reefs (24.7mm) is slightly higher than that of oysters in recruitment trays (19.8 mm) (Figure 5). Crowding on the trays could be depressing growth, or oysters on the reefs may be growing faster because of the sedimentation. It is not uncommon for oysters to grow faster in muddy environments (personal obs.)

In 2007, SCORE began experimenting with new reef designs to evaluate the effects on recruitment and reef development. These designs included adding spaces between rows (Figure 7) and elevating bags on wooden pallets (Figure 8). Adding space between rows increases the edges available for recruitment. Elevating the bags on pallets keeps the shell above the substrate so that shifting sand does not scour the spat and mud does not smother them. Density data suggest that recruitment to these alternate designs is enhanced relative to the standard SCORE

reef design, but the number of sites is limited, and not all treatments are available in each year (Figure 6).

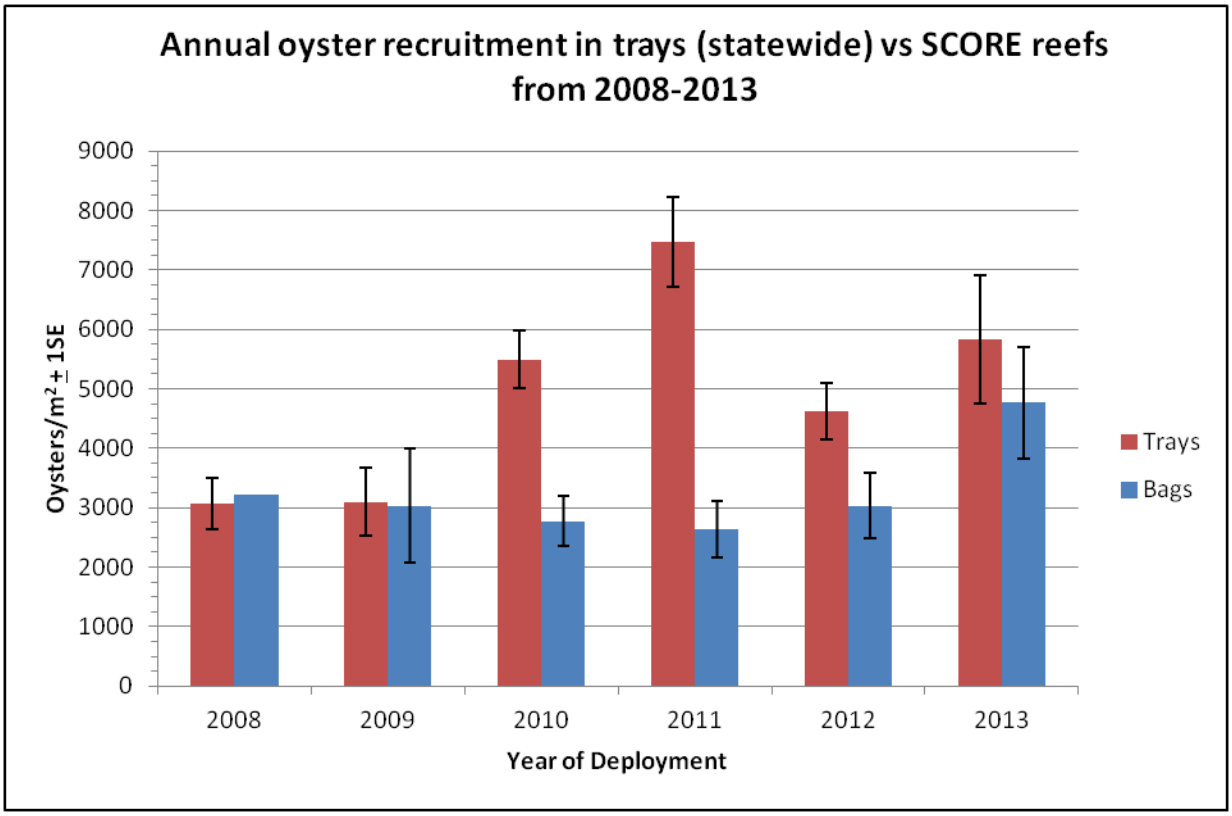

Figure 4. Annual oyster recruitment in standardized shell trays deployed statewide and in individual bags sampled from SCORE reefs at one year of age.

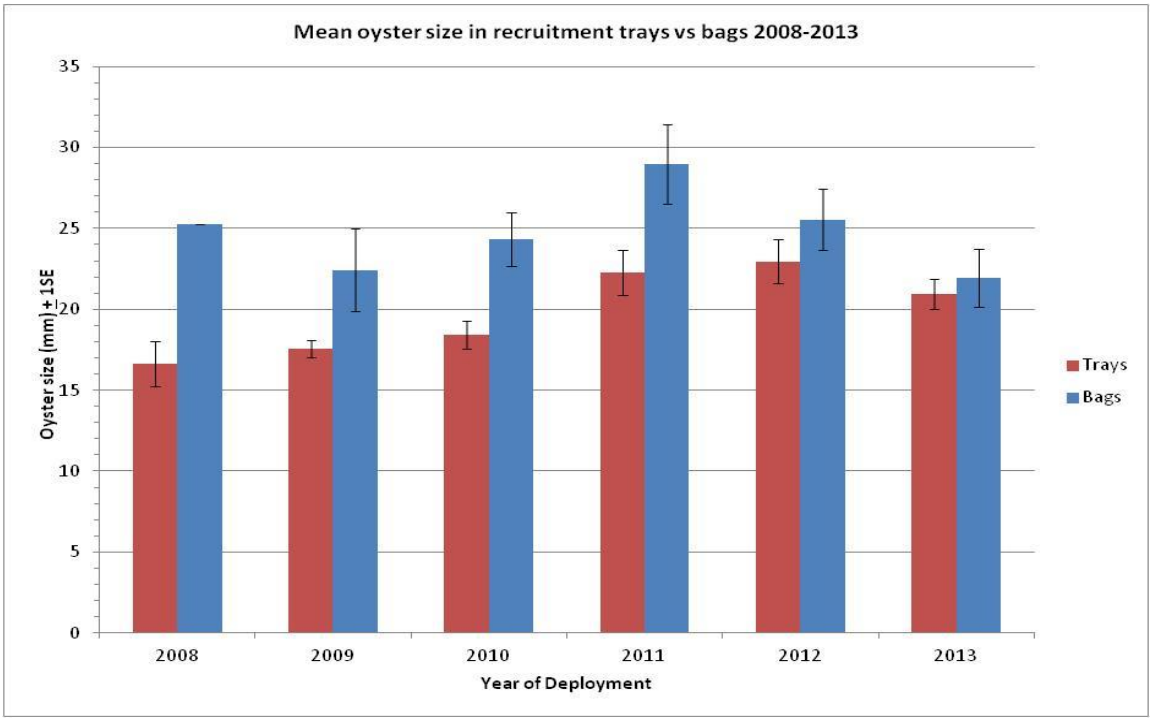

Figure 5. Mean size of one year old oysters recruited to shell trays and on SCORE reefs.

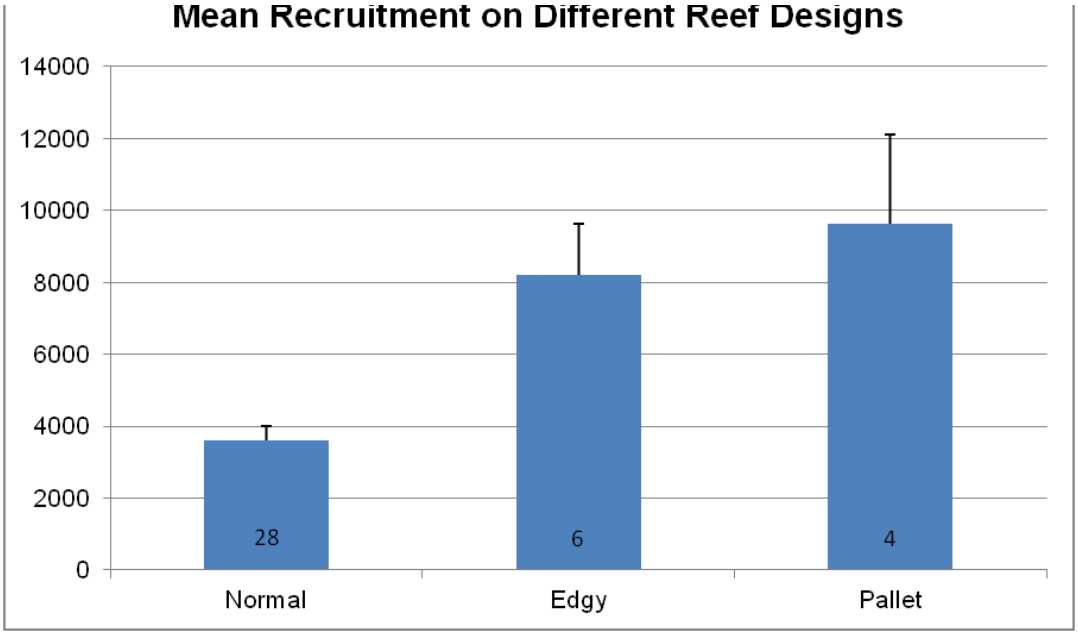

Figure 6. Mean density of oysters on different reef designs one year after construction. Data represents 2008-2014 but not all treatment types are represented in each year. Number of sites shown within column.

Figure 7. Alternative reef designs: maximizing edge.

Figure 8. Alternative reef design: elevating bags on wooden pallets.

Sediment Composition and Saltmarsh Expansion

The SCORE Program monitors changes in sediment composition behind reefs by analyzing sediment cores collected before and after reef construction. Sediment composition often shifts from a hardened, sand-based sediment to one that contains a higher percentage of fine (silt/clay) sediments (Figures 9). These sediments can accumulate as water slows when passing over the reef, causing sediment to settle out of the water column. Sediment can also become trapped behind the reef as water washes out of the marsh on outgoing tides, carrying fine surface sediments (Figure 10, top).

In 2012, the SCORE program began measuring marsh edges behind reefs shortly after reef construction with a Trimble sub-meter GPS purchased by this grant. These measurements will allow us to track *Spartina* marsh erosion or seaward expansion over time at restoration sites. We have measured seaward expansion of marsh at a subset of sites post reef construction (Figure 10, bottom). We are also measuring the areas of marsh that we transplant behind reefs to track how these areas progress over time.

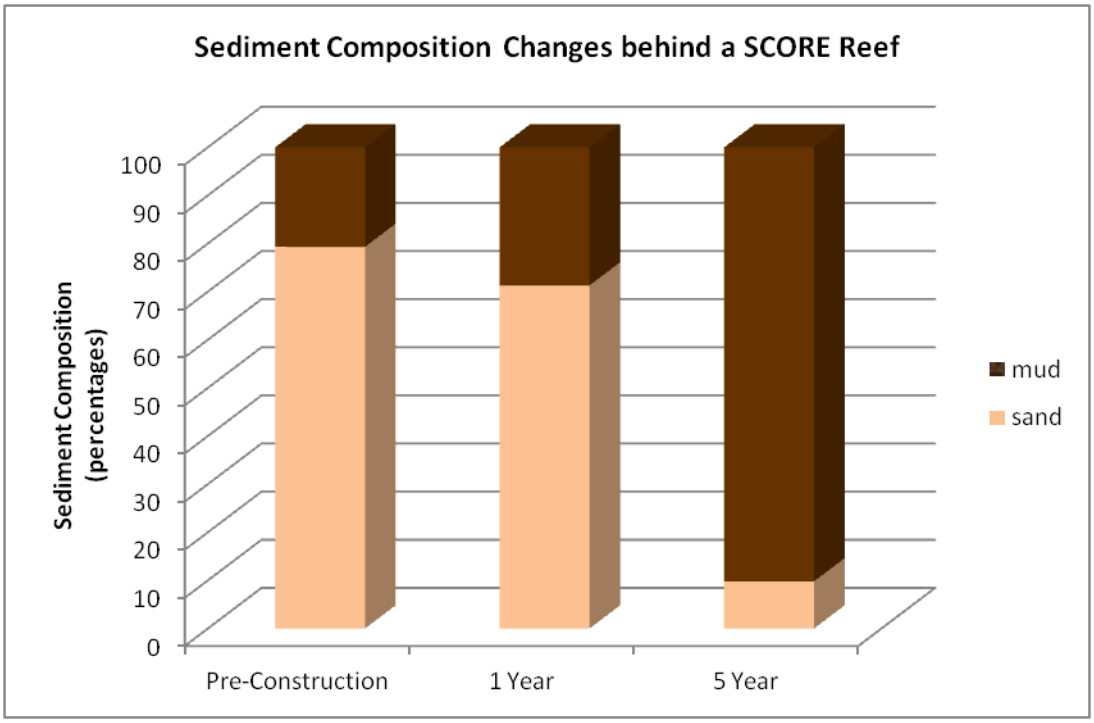

Figure 9. Changes in sediment composition behind the SCORE reef at Coosaw Cut on the AICW. Sediment composition has shifted over a 5 year period from 80% sand to 90% mud.

Figure 10. SCORE reefs along the Atlantic Intracoastal Waterway in Coosaw Cut.

Top: soft sediment accumulation behind the reef allows marsh grass to expand seaward. This picture was taken in 2011.

Bottom, aerial view with footprints of oyster reefs constructed 2007, 2009 and 2012, showing the marsh grass expansion behind the older reefs..

Fish Sampling

In 2009, the SCORE Program developed volunteer-friendly fish sampling methods as a way to introduce volunteers to the motile organisms that utilize oyster reefs. Methods included gill nets, seine nets, fyke nets, Breder traps, and lift nets. Gill nets (Figure 12) and seine nets (Figure 13) proved to be the easiest methods to utilize with volunteers. Since 2009, 239 volunteers from 10 organizations (including several local schools) have participated in 13 fish sampling events, logging more than 714 volunteer hours. A total of 2,399 individual organisms representing 64 different species have been cataloged through this effort (Table 4,5).

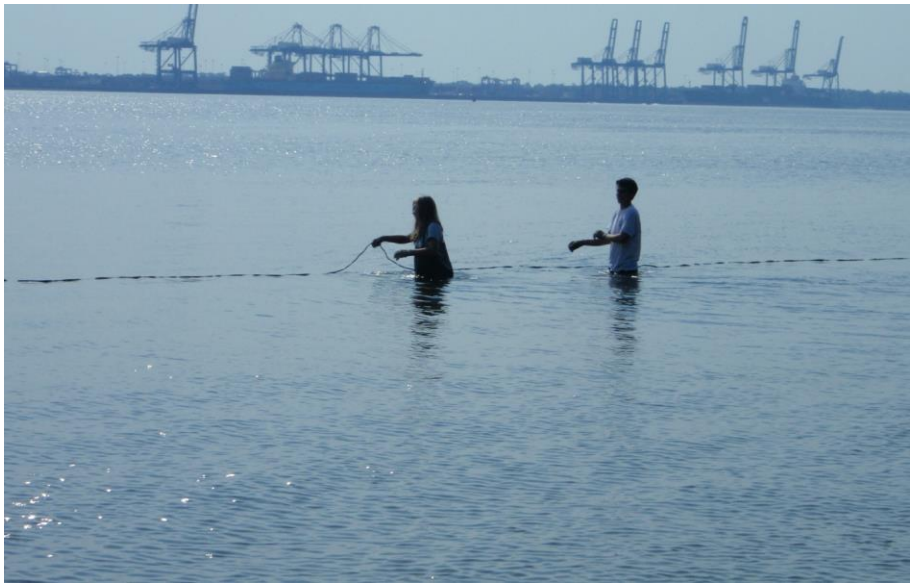

Figure 12. Students fishing with an experimental gill net.

Figure 13. Students fish sampling with a seine net.

Table 4. Finfish and elasmobranchs reported from intertidal oyster reefs in South Carolina. (adapted from ASMFC 2007 and updated with SCDNR unpublished data). [1] = managed by ASMFC; [2]=FAC priority list; [3]=managed by SAFMC. Highlighted species caught at volunteer fish sampling events.

Resident fishes
Feather blenny (Hypsoblennius hentz)
Naked goby (Gobiosoma bosc)
Oyster blenny (Hypleurochilus aequipinnis)
Oyster toadfish (*Opsanus tau*)
Striped blenny (Chasmodes bosquianus)

Facultative resident fishes
Atlantic spadefish (*Chaetodipterus faber*)[3]
Darter goby (Ctenogobius boleosoma)
Northern pipefish (*Syngnathus fuscus*)

Transient fishes
American eel (*Anguilla rostrata*)[1, 2]
Anchovy
Bay anchovy (Anchoa mitchilli)
Striped anchovy (*Anchoa hepsetus*)
Atlantic bumper (Chloroscombrus chrysurus)
Atlantic croaker (Micropogonias undulatus) [1]
Atlantic menhaden (*Brevoortia tyrannus*) [1,2]
Atlantic needlefish (*Strongylura marina*)
Atlantic sharpnose shark Rhizoprionodon terraenoval
Atlantic silverside (*Menidia menidia*)
Atlantic stingray (*Dasyatis sabina*)
Atlantic thread herring (*Opisthonema oglinum*)
Atlantic tripletail (Lobotes surnamensis)
Bandtail puffer (Sphoeroides spengleri)
Bay whiff (Citharicthys spilopterus)
Bighead searobin (*Prionotus tribulus*)
Black drum (Pogonias cromis)[2]
Blackcheek tonguefish (*Symphurus plagiusa*)
Bluefish (Pomatomus saltatrix) [1]
Bonnethead shark (*Sphyrna tiburo)*
Butterfish (Peprilus triacanthus)
Chain pipefish (Syngnathus louisianae)
Cobia (Rachycentron canadum)[2,3]
Cownose ray (Rhinoptera bonasus)
Crested blenny (Hypleurochilus geminatus)
Crevalle jack (*Caranx hippos*)
Dusky pipefish (Syngnathus floridae)
Florida pompano (Trachinotus carolinus)
Fringed flounder (*Etropus crossotus*)
Gag grouper (Mycteroptera microlepis) [3]
Gizzard shad (Dorosoma cepedianum
Gray/mangrove snapper (*Lutjanus griseus)*[3]
Gulf killifish (*Fundulus grandis*)
Harvestfish (Peprilus paru)
Highfin goby (Gobionellus oceanicus)
Hogchoker (Trinectes maculatus)
Horse-eye jack (*Caranx latus*)
Inland silverside *(Menidia beryllina*)
Inshore lizardfish (*Synodus foetens*)
Ladyfish (Elops saurus)
Lane snapper (Lutjanus synagris)[3]
Leatherjacket Oligoplites saurus
Lookdown (*Selene vomer*)
Mahogany snapper (*Lutjanus mahogoni*)[3]
Mummichog (Fundulus heteroclitus)
Northern puffer (Sphoeroides maculatus)
Northern stargazer (*Astroscopus guttatus*
Ocellated flounder (Ancylopsetta quadrocellata)
Orange filefish (*Aluterus schoepfii*)
Oyster blenny
Permit (Trachinotus falcatus)
Pigfish (Orthopristis chrysoptera)
Pinfish (Lagodon rhomboides)
Planehead filefish (Stephanolepis hispidus)
Red drum (Sciaenops ocellatus)[1,2]
Sailfin molly (Poecilia latipinna)
Sheepshead (Archosargus probatocephalus) [3]
Sheepshead minnow (Cyprinodon variegatus)
Silver perch (Bairdiella chrysoura)
Smooth butterfly ray (*Gymnura micrura)*
Southern flounder (Paralichthys lethostigma)
Southern kingfish (Menticirrhus americanus)
Southern stingray (*Dasyatis americana*)
Spanish mackerel (Scomberomorus maculatus)[1,2,3]
Speckled worm eel (*Myrophis punctatus*)
Spot (Leiostomus xanthurus) [1]
Spotfin mojarra (Eucinostomus argenteus)
Spotted seatrout (Cynoscion nebulosus) [1,2]
Striped burrfish (Chilomycterus schoepfii)
Striped killifish (*Fundulus majalis*)
Striped mullet (*Mugil cephalus)*
Summer flounder (*Paralichthys dentatus*) [1,2]
Threadfin shad (Dorosoma petenense)
White mullet (*Mugil curema*)
Weakfish (Cynoscion regalis) [1,2]
Western mosquitofish (*Gambusia affinis*)

Table 5. A partial list of invertebrates found in association with intertidal oyster reefs in South Carolina. (adapted from ASMFC 2007 and updated with SCDNR unpublished data). [1] = managed by ASMFC; [2]=FAC priority list; [3]=managed by SAFMC. Highlighted species caught at volunteer fish sampling events.

Resident Invertebrates

Antillean sphenia (*Sphenia antillensis*)
Atlantic mud crab (*Panopeus herbstii*)
Atlantic sand fiddler (*Uca pugilator*)
Bigclaw snapping shrimp (*Alpheus heterochaelis*)
Boring sponge (*Cliona celata*)
Brown bryozoans (*Bugula neritina*)
Clam worm (Nereis succinea)
Crested oyster (Ostreola equestris)
Flatback mud crab (Eurypanopeus depressus)
Green oyster worm (*Nereiphylla fragilis*)
Green porcelain crab (*Petrolisthes armatus*)
Honeysuckle tunicate (*Perophora viridis*)
Hooked mussel (Ischadium recurvum)
Impressed odostome (*Boonea impressa*)
Lunar dovesnail (*Astyris lunata*)
Mud snail (Nassarius obsoletus)
Northern quahog (Mercenaria mercenaria)
Oyster pea crab (*Zapos ostreum*)
Oyster springtail (*Anurida maritima*)
Polychaete worm (Dipolydora socialis)
Pseudoscorpion
Ribbed mussel (Geukensia demissa)
Rockworm (Marphysa sanguine)
Scaleworm (Lepidonotus sublevis)
Scorched mussel (Brachidontes exustus)
Spaghetti worm (*Amphitrite ornata*)
Squareback marsh crab (*Armases cinereum*)
Starlet sea anemone (*Nematostella vectensis*)
Tanaid crustacean (*Hargeria rapax*)

Transient Invertebrates

Atlantic brief squid (*Lolliguncula brevis*)
Atlantic oyster drill (*Urosalpinx cinerea*)
Banded Tulip (Fasciolaria hunteria)
Blue crab (Callinectes sapidus)
Channel Whelk Busycotypus canaliculatus
Lesser blue crab (*Callinectes similis*)
Brown shrimp (Farfantepenaeus aztecus) [3]
Daggerblade grass shrimp (*Palaemonetes pugio*)
Florida stone crab (*Menippe mercenaria*)
Horseshoe crab (Limulus polyphemus)
Knobbed Whelk (*Busycon carica*)
Lemon drop nudibranch (*Doriopsilla pharpa*)
Marsh grass shrimp (*Palaemonetes vulgaris*)

Pink shrimp (Farfantepenaeus duorarum) [3]
Thick-lipped oyster drill (*Eupleura caudata*)
White shrimp (Litopenaeus setiferus)[3]

Public Awareness and Outreach; Awards and Recognition

From 2007 to 2014, 102 hands-on classroom lessons were presented to 4,644 schoolchildren. 45 field trips introduced K-12 students to field sampling. 8 teacher workshops trained 64 teachers to incorporate oyster and saltmarsh lessons into their curriculum. 28 presentations at community meetings and public events reached more than 800 participants. SCORE has been featured in numerous newspaper articles and local television spots (Table 6). Additionally, SCORE was featured in Southern Living Magazine, Spirit Magazine (onboard magazine for Southwest Airlines), SC Wildlife Magazine (twice) and Coastal Heritage (SC Sea Grant magazine). SCORE receives frequent local press coverage (Table 6) including several feature articles on specific volunteers or volunteer groups. Two student-created murals highlighting oyster reef biodiversity were installed at area environmental centers where they are seen by thousands of visitors annually. Interpretive signage was installed at 3 state parks.

The SCORE Program received one of ten Captain Pride awards from Charleston County's Community Pride, INC. This award is given to the top 10 individuals, businesses, governments, or civic organizations that have undertaken tasks that have significantly improved the environment. The SCORE Program was also recognized by the Ashley Cooper Stormwater Education Consortium for our important role in waterway protection education in the community.

Table 6. Press Coverage for South Carolina Oyster Restoration and Enhancement Program October 2007– September 2014

Year	Newspaper	TV	Online	Magazine	Newsletter
2008	11		11	2	1
2009	7			1	
2010	3	1			
2011	3	1	1	1	
2012	6	2	6	3	2
2013	3	1	6	2	3
2014	4	5	2		1
Total	7	10	16	9	7

Project Partners

Project partners (Table 7) have been instrumental in the success of this project. Partners provide monetary support, logistical support, expertise, and access to volunteer pools. Partners are particularly important in publicizing volunteer events and acknowledging local volunteer efforts.

Table 7. SCORE Partners and Participating Schools

Academic Magnet School
ACE Basin NERR
ACE Basin NWR
Americorps, NCCC Southeast Region
AMI-Kids Beaufort
AMI-kids Georgetown
Archibald Rutledge Academy
Ashley Cooper Stormwater Education Consortium
Ashley Hall School
Ashley Ridge High School
Baldwin Wallace University
Bears Bluff National Fish Hatchery
Beaufort Academy
Beaufort Conservation District
Beaufort Fly Fishing Club
Beaufort Highschool Create Club
Beaufort Sail and Power Squadron
Beaufort Sportfishing &Diving Club
Beaufort Yacht Club
Benefit Focus
Bishop Gadsden Retirement Community
Blackbaud Co.
Boeing Charleston
Bohicket Marina
Bowens Island Seafood
Boy Scouts/Cub Scouts Troops 11,12,20,44,63, 64,332,396,413,475
Bubba Gump Shrimp Co
Buist Academy
Burke Middle School
Cainhoy Boys and Girls Club
Cainhoy Elementary School
Camp Sewee
Cape Romain Environm. Educ. Charter School
Cape Romain National Wildlife Refuge
Cario Middle School
Caw-Caw Interpretive Center
Charleston City Marina
Charleston Collegiate School
Charleston County Parks & Recreation Comm.
Charleston Day School
Charleston Dive Club
Charleston Explorers
Charleston Outdoor Catering
Charleston River Dogs
Charleston School of the Arts
Charleston Soil & Water Conservation District
Charleston Water Keeper
Christ Our King-Stella Maris School
City of Charleston Parks & Recreation Dept
Clemson University Cooperative Extension
Coastal Conservation Association- SC
Coastal Discovery Museum
Coastal Expeditions
College of Charleston:
Biology Club
Center for Civic Engagement
Enactus
Geology Club
Grice Marine Lab
MES Student Assoc
Students in Free Enterprise
Volunteers Corps
Colleton Middle School
Colleton Preparatory Academy
Cooper River Marina
Cottage Plantation Community/HOA
Crowfield JCLDS
Daniel Island Fly Fishing Club
Daniel Island POA
Dataw Island POA
DePaul University
Dolphin Cove Marina
Disney Give a Day Get a Day
Dunes West
East Carolina University
East Cooper Marina
East Cooper Montessori School
East Cooper Outboard Motor Club
Edisto Beach State Park
Edisto Island Community Association
Edisto Island Open Land Trust
Edisto Island Preservation Alliance
Environmental Action Volunteers

Environmental Media

Table 7 continued. SCORE Partners and Participating Schools

Fort Dorchester High School
Fort Johnson Middle School
FReSPACE
Friends of Botany Bay
Friends of Edisto State Park and ACE Basin
Friends of Hunting Island State Park
Friends of Huntington Beach State Park
Friends of the Rivers
Girl Scout Troops 599, 650, 449, 618
Governors School of Math and Science
Grove High School
Gullah/Geechee Coalition
Hands on Charleston
Hanahan Middle/High School
Hilton Head Middle School
Hilton Head Preparatory School
Hobcaw Yacht club
Hunting Island State Park
Huntington Beach State Park
James Edwards Elementary
James Island Charter High School
James Island Yacht Club
James Island Middle School
Lutheran Church of the Redeemer
Kiawah Isl. Comm. Assoc
Kiawah Island Resort
James Island County Park
James Simons Elementary School
Jeannie Moore Elementary School
Joint Base Charleston
Kalmia Gardens
Ladys Island Middle School
Ladys Island Oyster Co
Laing Middle School
Lake Marion High School
Lake Norman Charter High
Lambs Elementary School
LevelWing Media
Lincoln Middle School
Love God Serve Charleston
Lowcountry Earth Force
Lowcountry Estuarium
Lowcountry Institute at Spring Island
Lowcountry Outward Bound
Lowcountry SCUBA
Mason Preparatory School
Master Naturalists – Coastal Chapter
Master Naturalists- Lowcountry Chapter
McClellanville Middle School
McCracken Middle School
Medical Univ. of SC
Minorities in Marine Education program
Montessori Community School
Montessori Day School
Moultrie Middle School
Murray Lasaine Elementary School
Murrells Inlet 2020
Murrells Inlet Rotary Club
Nativity School
Navy Nuclear Power Training Command
NFWF
NOAA Coastal Services Center
North Charleston Elementary
North Charleston Middle School
North Inlet-Winyah Bay NERR
Northside Christian Church
Northwood Academy
Oakwood School
Palmetto Islands County Park
Patriots Point Marina
Patriots Point Maritime Museum
Peer Express Service Camp
Pfeiffer University
Porter Gaud School
Ripley's Marina
River Smart
Rotary Club of Beaufort
Roswell Presbyterian Church
Rowland Hall Elementary School
Seabrook Island Natural History Group
Sea Island Fly Fishers
Sea Scouts Ship 510
Secular Humanists of Charleston
Sewee Environmental Education Center
Sewee to Santee Economic Foundation
South Carolina Aquarium
SC Coastal Conservation League
SC Sea Grant Consortium

Table 7 continued. SCORE Partners and Participating Schools

SC State Ports Authority
SC State University
Southeast Aquatic Resources Partnership
Stiles Point Elementary
St. Johns High School
Students Today Leaders Forever
Summerville High School
Summerville YMCA
Summerville Salt Water Anglers
The Citadel
The Nature Conservancy – SC Chapter
Town of Bluffton
Town of Hilton Head
Town of Mount Pleasant
Trident Tech
Trident United Way
Trinity Montessori School
UNC-Greenville
University of Georgia
USC Belle Baruch Institute
USFWS
Virginia Military Institute – Engineers without Borders
Wando Angling Club
Wando High School
Wells Fargo
Wellspring Academy
West Ashley Middle School
West Ashley High School
West Carrolton High
Western Carolina University
Whale Branch Middle School
Wild Dunes Resort
William Reeves Elementary
Wonder Voyage
Zucker Middle School

BUDGET

See SF-425 under separate cover.

$404,567 federal funds

$274,691 state match

$679,258 total

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Appendix A. Photos

Students from Moultrie Middle formed a human chain to pass shell bags to the shoreline to build oyster reefs at Pitt St. Bridge site on Charleston Harbor.

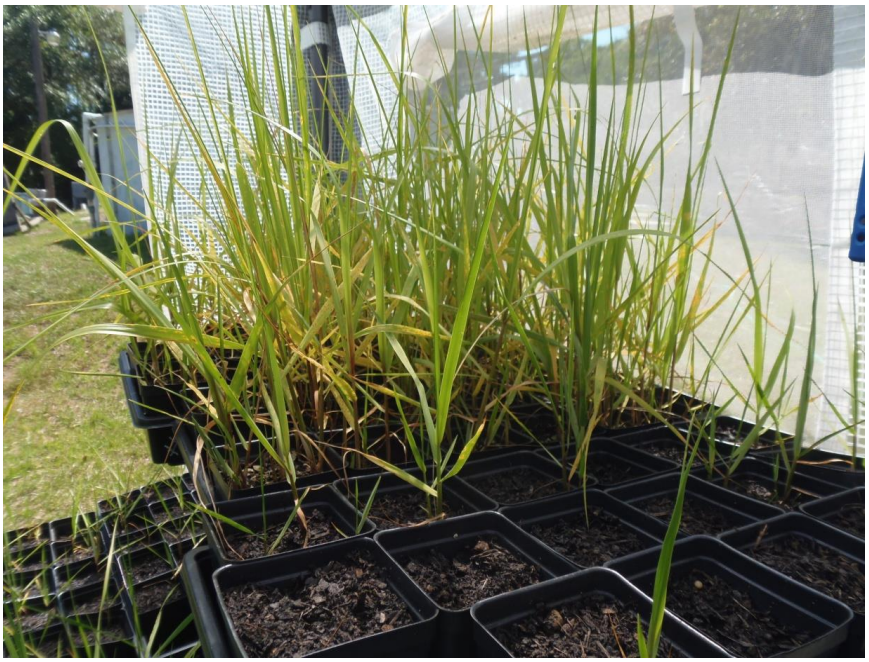
Students from Moultrie Middle planted *Spartina* seedlings on the shoreline at Pitt St. Bridge site on Charleston Harbor.

Engineering students from VMI participated in a week of service under the sponsorship of the Sewee to Santee Economic Foundation. Reefs were constructed at Graham Creek and Five Fathom Creek in Cape Romain NWR.

Attendees at teacher workshop at Fort Johnson constructed a greenhouse and planted marsh grass.

Transplanting large clumps of mature Spartina to Fort Johnson shoreline. Students from Pfeiffer University assisted with this effort.

Spartina seeds were collected from nearby shorelines in the fall, germinated in the laboratory or classroom, and grown out in greenhouses at Fort Johnson and school campuses.



Spartina plants grown from germinated seeds that were planted spring 2014.

Students from area schools bagged shell for this project.