

NERRS Science Collaborative Progress Report for the Period 03/01/13 through 08/30/13

Project Title: Expanding Living Shorelines within the ACE Basin NERR to Protect Habitat and to Reduce Climate Change Vulnerability through the Application of Collaborative Science-Based Habitat Restoration

Principal Investigator(s): John Leffler

Project start date: September 1, 2012

Report compiled by: John Leffler

Contributing team members and their role in the project:

Blaik Keppler – Collaboration Lead

Peter Kingsley-Smith – Applied Science Lead

Al Segars – field volunteer coordination

Susan Lovelace – facilitation advisor for intended user meetings

Michael Hodges – field logistics and volunteer coordination

Nancy Hadley – applied science consultant

Bruce Doneff – Project Advisory Committee

Clifford Campbell – Project Advisory Committee

Bud Skidmore – Project Advisory Committee

John Fisk – Project Advisory Committee

Queen Quet – Project Advisory Committee

Tony Mills – Project Advisory Committee

Amanda Flake – Project Advisory Committee

Denise Parsick – Project Advisory Committee

- A. Progress overview: State the overall goal of your project, and briefly summarize in one or two paragraphs, what you planned to accomplish during this period and your progress on tasks for this reporting period. This overview will be made public for all reports, including confidential submissions.

The overall goal for this project is to address three of the four ACE Basin NERR priority management issues, “Habitat Conservation”, “Water Quality”, and “Community Resilience”, by expanding living shorelines in the ACE Basin through a community-based, intended user-driven collaboration with SCDNR. Specifically, the project seeks to achieve the following goals:

- Create living shorelines that restore and conserve habitat by reducing erosion, improving water quality, and creating ever-growing breakwaters to protect shorelines in an era of climate change-driven sea level rise;
- Enhance communication and cooperation among local user groups;
- Establish habitat restoration lay advisors and monitors who will continue their activities beyond the scope and timeframe of this project; and
- Increase public commitment to stewardship.

During the second six months of this project we constructed reefs at the sites identified by the Project Advisory Committee in February. The Committee members had decided to install 2900 shoreline feet of loose shell, 550 feet of bagged shell, 550 feet of oyster castles, and 300 feet of concrete-coated crab traps at a total of 13 sites during Year 1. The assignment of reef-building method to each site was based upon the early site evaluations done by SCDNR staff accompanied by volunteers.

The staff biologists and volunteer coordinators began organizing the logistics of assembling materials and transportation, and working with the various intended user groups to organize volunteers to assist with reef construction. We ran into some unforeseen difficulties

because the regional office of the U.S. Army Corps of Engineers decided this year to revise their approach to issuing permits for oyster reef construction. This delayed the start of the loose shell and bagged shell reef construction several weeks and the construction of the crab trap and oyster castle reefs for approximately three months. Construction of oyster castle reefs was denied at three locations.

Despite these setbacks, by the end of August loose shell has been planted on 2,971 feet of shoreline at four locations. Bagged shell was installed along 560 feet of shoreline at nine locations. Oyster castles reefs have been built along 275 feet of shoreline at two locations. Three build dates are scheduled for mid-September to install 348 feet of concrete-coated crab traps. Of the 4,300 shoreline feet of reef building planned for Year 1 of this project, 4,154 feet of reef was successfully installed, the difference resulting from the permitting problems. A total of 289 volunteers have participated in the reef building days to date, representing 768.5 hours of volunteer labor. Table 1 summarizes the reef building effort to date.

B. Working with Intended Users:

- Describe the progress on tasks related to the integration of intended users into the project for this reporting period.
- The selection of specific reef building sites as well as the allocation of resources to each location was decided by the intended users who participated in the December workshop and who served on the Project Advisory Committee (PAC) that met in February. During this reporting period we worked with a variety of intended user groups including schools, fishing and environmental clubs, and individuals. A total of 289 volunteers were involved with the construction of the reefs summarized in Table 1. We have been in communication with the PAC regarding the structure and date of the next comprehensive workshop, which the committee scheduled for September 10th. Besides planning next year's priorities, that workshop will also organize the volunteer program to monitor the reefs constructed during Year 1.
- What did you learn? Have there been any unanticipated challenges or opportunities?
 - We have been somewhat surprised by how well the work with the intended users has gone to date. They are extremely enthusiastic and invested in this work.
- Who has been involved?
 - During this reporting period in addition to consulting with the PAC regarding volunteers and the future workshop, we have worked with 289 volunteers who were out in the mud building reefs.
- Has interaction with intended users brought about any changes to your methods for integration of intended users, the intended users involved, or your project objectives?
 - No. The plan for interaction with the intended users, and who is involved, has gone very well.
- How do you anticipate working with intended users in the next six months?
 - A day-long workshop is scheduled for September 10th (we are much earlier this year to allow for extra time to obtain the US Army Corp of Engineers permits). This will involve representatives from many different organizations as well as deeply interested individuals. The invitations that have gone out include everyone who was invited or who attended (34) the workshop last December. During this workshop we will review all the projects completed this year. The intended users will then discuss the experience, revisit/revise the priorities for site selection they developed last year,

and nominate new sites for Year 2 reef construction. At this meeting we will also help those interested in monitoring the success of the Year 1 reefs, to organize a monitoring program consisting of two levels. The first level is entirely done by volunteers on their own time while the second level will be volunteers joining SCDNR staff to make rigorous measurements on each of the new reefs during the spring of 2014. Following the September workshop, SCDNR staff accompanied by volunteers from that workshop will visit and evaluate each of the nominated sites. Another workshop is planned with the PAC members for November so that the committee can consider the evaluation data, make decisions on which specific sites will be developed, and allocate the available methodological resources to those sites as it did last February.

C. Progress on project objectives for this reporting period:

- Describe progress on tasks related to project objectives for this reporting period.

The specific collaborative objectives are to

1. Conduct a facilitated process with intended users to prioritize restoration sites;
 - The major effort during this period was the field construction of the sites which had been prioritized by the intended users during the previous period.
2. Establish a Project Advisory Committee (PAC) to organize and coordinate the volunteer efforts and to provide advice on all facets of the project;
 - The PAC was organized during the previous period and its members assisted throughout the spring to coordinate volunteers and boats for the reef building days.
3. Recruit and coordinate an extensive volunteer program necessary for the success of this program;
 - To date 34 intended users were involved with the workshops, a number of others with the field evaluations, and 289 volunteered for the actual construction of the reefs.
4. Establish and train a team of lay monitors who will act as stewards of the restored sites and report observations to the SCDNR during and beyond the termination of this grant;
 - This objective will be addressed at the September 10th workshop.
5. Improve communication and coordination among all the groups involved with the project and develop a mechanism for continuing feedback to the SCDNR and the ACE Basin NERR staff regarding the management of the Reserve's resources.
 - This process has begun well and we hope to establish a continuing network of involved intended users through the success they experience with this project.

The applied science objectives for this project are to

1. Utilize state-of-the-art GIS techniques and on-the-ground site evaluations to provide information and expertise to the intended users' group on the distribution of habitat suitable for living shoreline restoration and enhancement;
 - SCDNR's Shellfish Section GIS specialist constructed a variety of maps that were used by the workshop and PAC participants in making their decisions. SCDNR staff, accompanied by volunteers, assessed all the sites for characteristics such as wave energy, surface firmness, shoreline elevation, and linear feet in need of reef

construction. Recommendations were developed regarding the most effective reef construction methodologies to apply at each location.

2. Evaluate sites identified and prioritized as being of critical concern to intended users and select appropriate best management practices (BMPs) for each site;
 - Site evaluations by SCDNR staff and volunteers were made during the last reporting period. Best management practice reef construction methodologies were recommended at the Project Advisory Committee meeting in February.
 3. Implement the most effective habitat restoration and enhancement techniques (outlined below) for the selected sites based on the expertise and previous experiences of the applied science team;
 - This work has largely been accomplished between April and August. Some site development was delayed due to the permitting problem. Three build days for installation of the concrete-coated crab trap reefs are scheduled for mid-September and this will complete all construction for Year 1.
 4. Allocate specified acreage, linear extent, or numerical goals for each shoreline habitat restoration technique by working with intended users to coordinate volunteers in restoration efforts;
 - At the Project Advisory Committee meeting in February the committee members allocated all of the available Year 1 resources to the sites that they prioritized. The actual construction efforts are almost completed for all sites (Table 1).
 5. Coordinate post-construction reef monitoring with intended users (lay monitors) and provide feedback on the effectiveness of the habitat restoration efforts.
 - Lay monitoring training will begin in September 2013 and reports will be made to the Project Advisory Committee in November.
- What data did you collect?
 - The following data were collected during the last reporting period by the staff/volunteer evaluation teams for each of 26 sites identified at the workshop. This process will be repeated during the next reporting period for new sites prioritized during the September workshop.
- Site name
Date assessed
County
Latitude
Longitude
Viable restoration strategies
Creek width (m)
Slope measurements (average of 3 measurements at each site)
Distance from MLW to edge of marsh
Distance from marsh to back edge of future restoration reef
Sediment type (e.g., mud, mud/clay, shell, etc.)
Sinkability (cm) Shell matrix depth (beneath sediment surface, cm)
Nearby oyster abundance (1-5, where 1=no oysters nearby)
Distance to nearest oysters (m)
Potential length of available substrate (m)
Potential width of available substrate (m)

Potential area of available substrate (length x width, m2)

Creek form (straight vs. curved) shoreline site occurs on when looking downstream (left vs. right)

Nearby structures (check all that apply, e.g., docks, houses, boat landing, marina)

Distance to nearest access point

SCDNR Management Status (e.g., State Shellfish Ground, Undesignated, Culture Permit)

SCDHEC Status (e.g., Prohibited, Restricted)

- Has your progress in this period brought about any changes to your methods, the integration of intended users, the intended users involved or the project objectives?
 - No. The plan for interaction with the intended users, and who is involved, has gone very well. We are moving up the workshop and PAC meeting during Year 2 to allow more time for obtaining the US Army Corps of Engineers permits under its new permitting system.
 - Have there been any unanticipated challenges, opportunities, or lessons learned?
 - The change in the Corps of Engineers' permitting system presented an unanticipated challenge, and we are adjusting to allow more time for obtaining Year 2's permits.
 - What are your plans for meeting project objectives for the next six months?
 - The Year 2 large workshop is scheduled for September. The volunteer monitoring program will be started at that time as well. Intended users and SCDNR staff will evaluate newly identified sites during the fall. The PAC will meet in November to make the final decisions of the reefs to be constructed in the spring. Permits will be applied for immediately after that meeting.
- D. Benefit to NERRS and NOAA: List any project-related products, accomplishments, or discoveries that may be of interest to scientists or managers working on similar issues, your peers in the NERRS, or to NOAA. These may include, but are not limited to, workshops, trainings, or webinars; expert speakers; new publications; and new partnerships or key findings related to collaboration or applied science.
- A description of this project, emphasizing the intended user-driven nature of the work, was presented at
 - the Beaufort (SC) Sportfishing and Diving Club on January 10, 2013. (Keppler & Leffler)
 - the joint meeting of the World Aquaculture Society and the National Shellfisheries Association in Nashville, TN on February 24, 2013. (Kingsley-Smith)
 - the Lowcountry Master Naturalists Association on April 2, 2013 (Kingsley-Smith)
 - the Beaufort Senior Leadership Workshop on March 21, 2013 (Kingsley-Smith)
- Dr. Peter Kingsley-Smith is scheduled to present a nationally broadcasted webinar about our project through the restoration webinar series that an inter-agency/organization group (including NOAA, USFWS, ACOE, TNC) is sponsoring this fall and winter.
- E. Describe any activities, products, accomplishments, or obstacles not addressed in other sections of this report that you feel are important for the Science Collaborative to know.
- None

Table 1. Summary of the reef building activities accomplished during the second six month period of Year 1.

Strategy	Site No.	Site Name	Stakeholder Interest	Stakeholder allocations (shoreline ft)	Realized build (shoreline ft)	Status	Construction dates	Total available shoreline (ft)	Available shoreline remaining (ft)	Number of volunteers	Volunteer hrs
<i>Bagged shell</i>	1	Factory Creek	5	100	100	Complete	4/26/2013	98	-2	58	153
<i>Bagged shell</i>	21	Fenwick Cut	5	90	87	Complete	5/7/2013	492	405	16	40
<i>Bagged shell</i>	4A	Beaufort River	3	50	54	Complete	5/8/2013	272	3	29	58
<i>Bagged shell</i>	7	Whale Branch Middle	6	40	35	Complete	5/17/2013	39	4	54	108
<i>Bagged shell</i>	17	Big Bay Creek	1	50	52	Complete	5/21/2013	295	129	54	162
<i>Bagged shell</i>	23	Ocella Creek	1	50	56	Complete	5/23/2013	148	92	22	66
<i>Bagged shell</i>	19	Scott Creek	1	50	58	Complete	6/4/2013	161	-17	8	24
<i>Bagged shell</i>	6C	Lucy Point Creek	1	70	70	Complete	6/19/2013	131	1	4	8
<i>Bagged shell</i>	10	Harbor River	1	50	48	Complete	6/24/2013	262	-26	12	69.5
			Yr 1 Totals	550	560				total	257	688.5
			Yr 2 Target	540							
Strategy	Site No.	Site Name	Stakeholder Interest	Stakeholder allocations (shoreline ft)	Realized build (shoreline ft)	Status	Construction dates	Total available shoreline (ft)	Available shoreline remaining (ft)	Number of volunteers	Volunteer hrs
<i>Loose shell</i>	4B	Beaufort River	2	400	419	Complete	5/14/2013	394	-25	2	6
<i>Loose shell</i>	10	Harbor River	1	200	240	Complete	5/23/2013	262	-26		
<i>Loose shell</i>	11	Morgan River	1	1150	1104	Complete	5/31/2013	1115	11		
<i>Loose shell</i>	3A/3B	Beaufort River	0	1150	1208	Complete	5/17/2013 & 5/22/2013	1148	-60	2	6
			Yr 1 Totals	2900	2971				total	4	12
			Yr 2 Target	2829							
Strategy	Site No.	Site Name	Stakeholder Interest	Stakeholder allocations (shoreline ft)	Target build (shoreline ft)	Status	Construction dates	Total available shoreline (ft)	Available shoreline remaining (ft)	Number of volunteers	Volunteer hrs
<i>Oyster castles</i>	6C	Lucy Point Creek	1	60	60	Complete	7/18/2013	131	1	4	8
<i>Oyster castles</i>	4A	Beaufort River	3	170	215	Partially complete	7/23, 8/15-8/22	272	3	24	60
<i>Oyster castles</i>	19	Scott Creek	1	50	0	Cancelled	Too soft; moved to site 4A	161	-17		
<i>Oyster castles</i>	23	Ocella Creek	1	60	0	Cancelled	Not approved by USACE	148	92		
<i>Oyster castles</i>	21	Fenwick Cut	5	210	0	Cancelled	Not approved by USACE	492	405		
			Yr 1 Totals	550	275				total	28	68
			Yr 2 Target	825							
Strategy	Site No.	Site Name	Stakeholder Interest	Stakeholder allocations (shoreline ft)	Target build (shoreline ft)	Status	Construction dates	Total available shoreline (ft)	Available shoreline remaining (ft)	Number of volunteers	Volunteer hrs
<i>Crab traps</i>	19	Scott Creek	1	60	120	Pending	9/17	161	-17		
<i>Crab traps</i>	17	Big Bay Creek	1	120	114	Pending	9/18	295	129		
<i>Crab traps</i>	25B	Russell Creek	1	70	114	Pending	9/19	69	-45		
<i>Crab traps</i>	23	Ocella Creek	1	50	0	Cancelled	Not approved by USACE	148	92		
			Yr 1 Totals	300	348				total	0	0
			Yr 2 Target	252							

Figure 1. Intended users participating in bagging shell and constructing oyster reefs between April and August 2013. Middle school students grew *Spartina* in their greenhouse and planted it behind the newly constructed bagged shell oyster reef.



Figure 2. Intended user volunteers working with SCDNR staff to construct a reef of oyster castles, suitable for areas of high wave energy and firm substrates.



Figure 3. Map indicating the sites that were evaluated and the sites selected on which living shoreline oyster reefs were constructed during Year 1.

