National Estuarine Research Reserve System

2013 Southeast Tidal Creeks Summit
Wilmington, NC December 16th & 17th 2013

Expanding Living Shorelines Through Stakeholder-Driven Site Selections For Intertidal Oyster Reef Building In The ACE Basin NERR, South Carolina.

Benjamin W. Stone*, Peter R. Kingsley-Smith, Blaik Pulley Keppler, & John W. Leffler

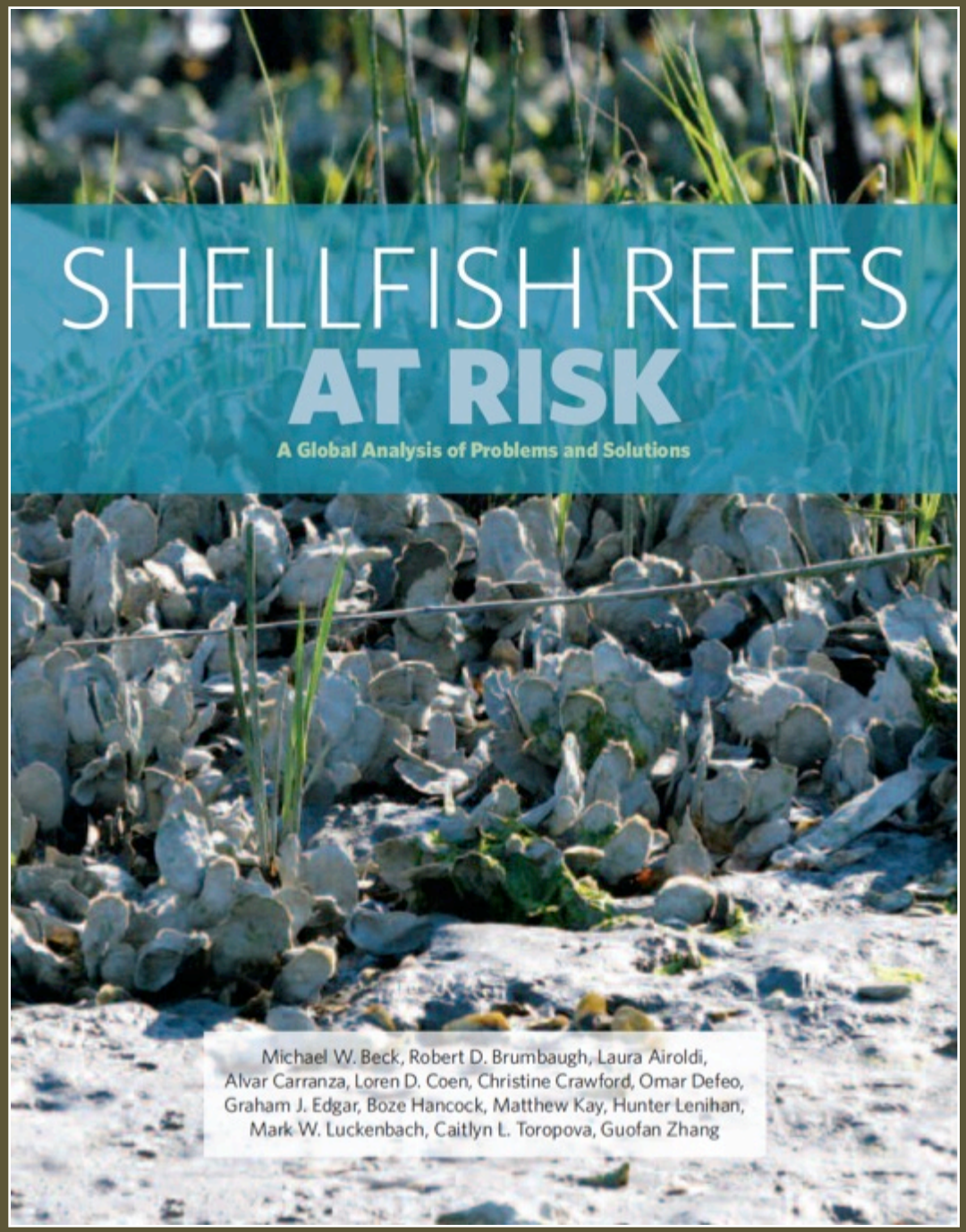
217 Fort Johnson Road, Charleston, SC 29412

stoneb@dnr.sc.gov

Coastal Training Program ACE Basin

South Carolina Department of Natural Resources

DNR



"Once dominant features in many temperate estuaries around the world, native oyster reefs are critically important ecologically and economically…"

"Globally, we estimate that 85% of oyster reefs have been lost – even greater than the losses reported for other important habitats, including coral reefs, mangroves, and seagrasses."

The Nature Conservancy
Shellfish Reefs at Risk (2009).

Causes of oyster declines

- Overharvesting and habitat degradation
- Endemic oyster diseases
  - *Perkinsus marinus* (cause of Dermo)
  - *Haplosporidium nelsoni* plasmodia (cause of MSX)
- Increasing coastal development
- Reductions in water quality e.g., algal blooms
- Erosion e.g., boat wakes
- Climate change (e.g., SLR, increased storminess, ocean acidification)

Importance of oyster reef habitat in SC:

- >95% intertidal (tidal creeks, reef flats)
- Improve water quality
- Wildlife habitat
- Support recreational and commercial fisheries
- Stabilize shorelines

NERRS Science Collaborative: Projects require significant balance between Applied Research & Collaboration between the Scientists and the Intended Users of the science.

Required Personnel:

- Project Coordinator/Fiscal Agent
- Collaboration Lead
- Applied Science Lead

Four reviewers of each proposal:

- 2 Applied Science Specialists
- 2 Collaboration Specialists

Equal weight given to Science and to Intended User Collaboration.

Project Goals

- **Problem:** Address the local management problem of the continued loss of shorelines through erosional processes that is likely to be increased under scenarios of future global climate change-driven sea level rise (SLR).
- **Solution:** Increase the potential resiliency of ecological communities in the ACE Basin to climate change-driven SLR.
  - Expand living shorelines (oyster reefs)
  - Engage community stakeholders in all stages of this project (site selection, monitoring, evaluation).

Stakeholders

SCDNR Colleagues:

MRRI Ace Basin Research Section
Dr. John Leffler
Blaik Pulley Keppler

McKenzie Field Station
Dr. Al Segars (DVM)

MRRI Shellfish Research Section
Katie Luciano
John Heinsohn
Christopher Simmons
Taylor Johnson

Shellfish Management Section
Nancy Hadley
Michael Hodges
Stephen Czwartacki
Jared Hulteen
Sarah Chabaane
Peter Bierce

Other Contributors

Coastal Carolina Association
(donation of vessels for fieldwork)

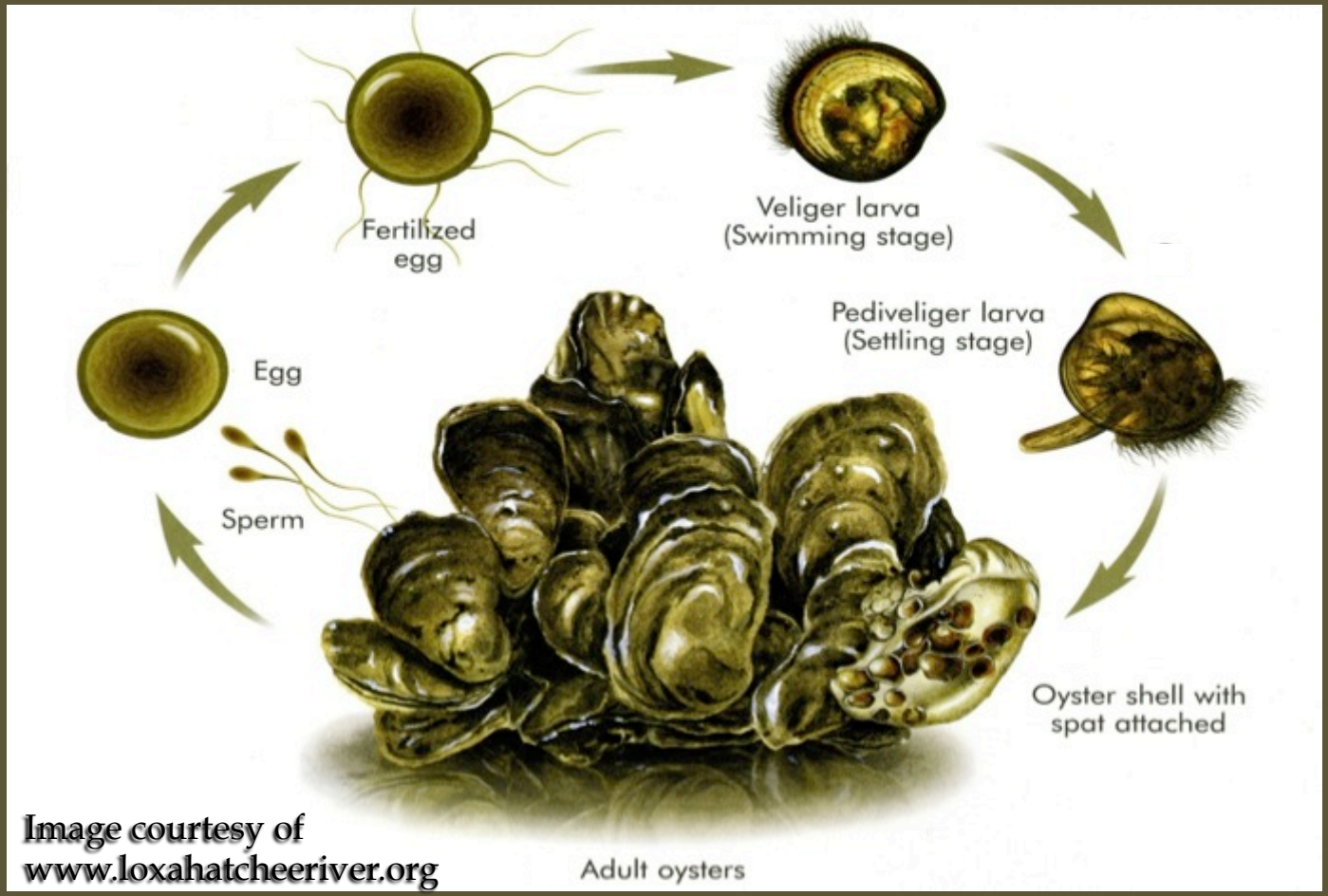
Note: Project Advisory Committee (PAC) Members are highlighted in green

Stakeholders and volunteer group leaders:

Amanda Flake	Beaufort County
Bess Kellett	SCDNR Botany Bay Volunteer Coordinator
Bob Sandifer	FRESPACE
Bruce Doneff	Friends of Hunting Island State Park
Denise Parsick	Beaufort Soil & Water Conservation District
Dick Yetter	SCNRCS
E.M ."Bud" Skidmore	Edisto Island Preservation Alliance
E.V. Bell	South Carolina Sea Grant Consortium
Frank Gibson	Beaufort Sportfishing & Diving Club
Frank Roberts	Lady's Island Oyster Company
Fred Kinard	SC Wildlife Foundation
Helga Crandall	Beaufort High School CREATE Club
Howard Schnabolk	NOAA Restoration Center
James M. Brailsford, III	Edisto Island Preservation Alliance
James Rader	Ducks Unlimited
James S. Rosen	Beaufort Sail and Power Squadron
Janie LackmanFripp Island Turtle Program	
Jenks Mikell	EIOLT / Marine Advisory Program
John R. Fisk	Lowcountry Master Naturalists
Joy Brown	The Nature Conservancy (South Carolina Chapter)
Laura Reasonover	Colleton County Middle School
Mark Purcell	ACE Basin National Wildlife Refuge
Nicole Barnes	Colleton Preparatory Academy
Patty Kennedy	Beaufort Open Land Trust
Phil Young	Sea Island Fly Fishers
Queen Quet	Gullah / Geechee Sea Island Coalition
Rebekah Crandall	Beaufort High School CREATE Club
Reed Armstrong	Coastal Conservation League
Teri Metalak	St Helena Elementary – Beaufort County Schools
Tony Mills	Lowcountry Institute
Tracy Sanders	Army Corps of Engineers
Walter "Tripp" Boltin	US Fish and Wildlife Service
Will Doar	SCDNR Coastal Geologist

ACE Basin
National Estuarine Research Reserve

- The **ACE Basin National Estuarine Research Reserve (NERR)** was designated in 1992.
- Named for the convergence of the **Ashepoo**, **Combahee** and **Edisto** rivers into St. Helena Sound.
- At 99,308 acres, the reserve protects one of the largest relatively undisturbed estuaries on the East Coast.



- 'Broodstock limited' (e.g., VA/MD)
  - Low numbers of adults (broodstock); few larvae produced; few larvae available to settle on substrate
  - Restoration solution = increase the number of adults in population
- 'Substrate limited' (e.g., South Carolina)
  - Sufficient broodstock; lack of appropriate substrate for settlement
  - Restoration solution = provide suitable substrate (e.g., oyster shell)


Crab traps


Loose oyster shell


Bagged oyster shell


Oyster castles

Stakeholder Workshops

- December 2012 and September 2013
- Problem definition

Establish stakeholder criteria and concerns

- Erosion
- Public access
- Visibility
- Habitat
- Water quality

Evaluation of sites

- Sites chosen by stakeholders
- Sites evaluated by SCDNR staff and stakeholders.
- Sediment type
- Sinkability
- Bank slope
- Nearby oysters
- Development
- Viewscape

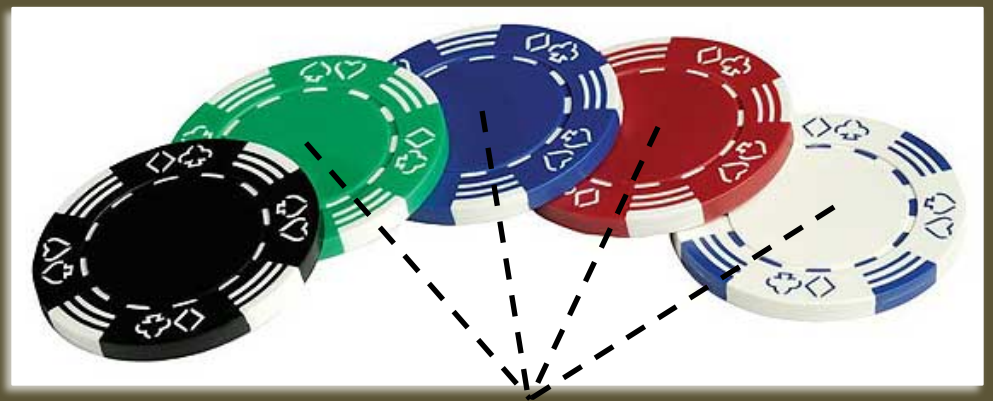
Project Advisory Committee

An exercise in resource allocation for the project stakeholders…

Step 1: Site prioritization

Stakeholders individually allocated black chips to priority sites.

Step 2: Allocation of resources



Collectively, the stakeholders allocated restoration resources among their priority sites, based on limits provided.

Restoration Type	Annual Goals	Year 1 Restoration	Year 2 Targets
Loose Shell	2,900 ft	2,971 ft	2,900 ft
Oyster Castles*	550 ft	275 ft	850 ft
Bagged Shell	550 ft	560 ft	750 ft
Crab Traps*	300 ft	348 ft	350 ft

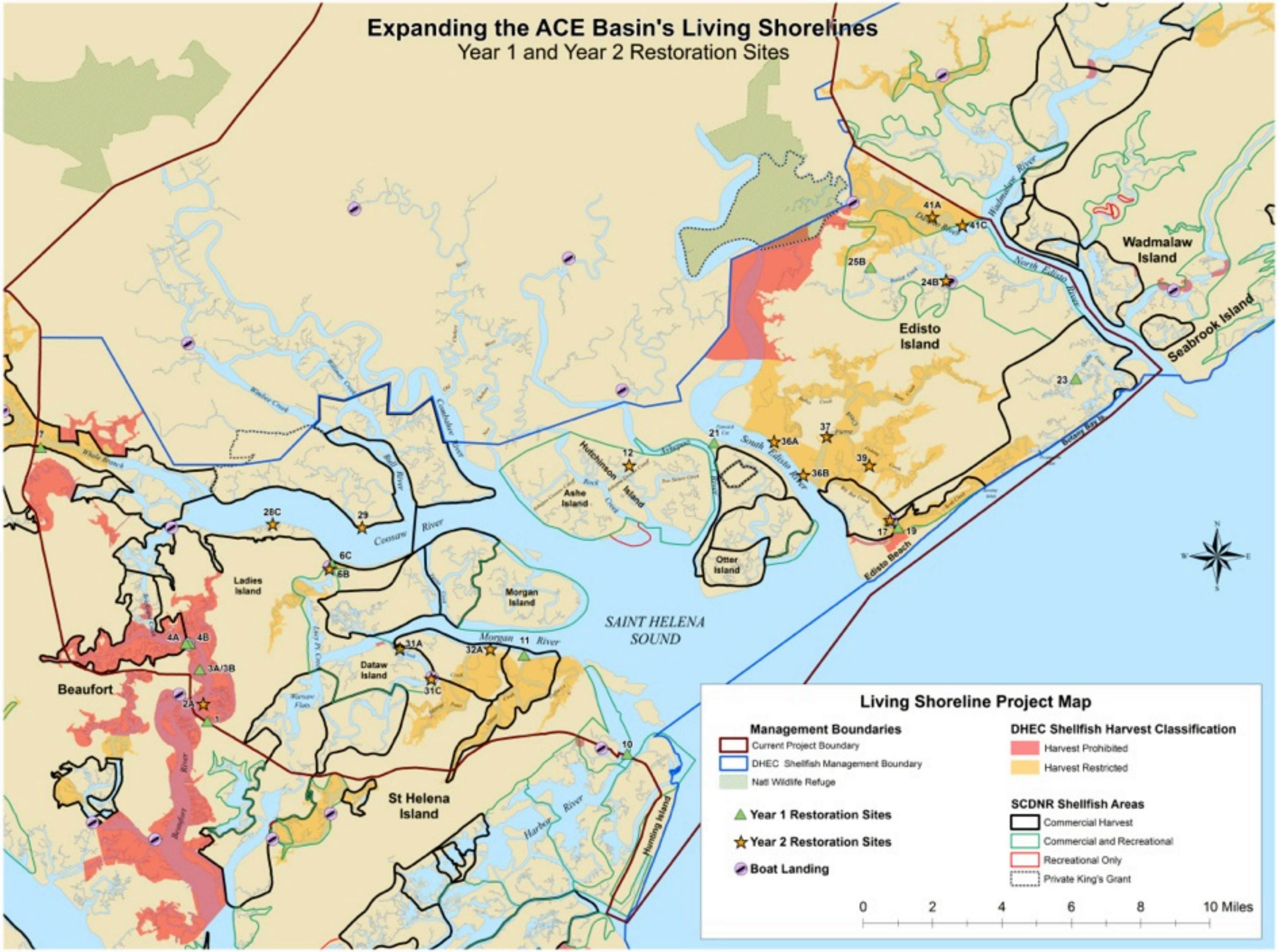
Future Work

- Year 2 construction in Spring/Summer 2014
- Graduate student to evaluate collaborative/social science components
- Volunteer & scientific monitoring of reef sites

*Requires new permits and signage

Expanding the ACE Basin's Living Shorelines

Year 1 and Year 2 Restoration Sites



THANK YOU TO THE VOLUNTEERS!
(280+ volunteers; 750 hrs)


Thank You