



South Carolina Coastal Management Program Section 309 Assessment and Strategy 2016-2020

Prepared by the South Carolina Department of Health and Environmental Control
Division of Ocean and Coastal Resource Management

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Introduction

The South Carolina Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management (DHEC-OCRM) is responsible for implementing the approved South Carolina Coastal Zone Management Program (SC CZMP) through the authorities specified in the Coastal Tidelands and Wetlands Act (SC Code ann. §48-39-110 *et. seq.*), the DHEC Coastal Division Regulations and the enforceable policies of the South Carolina Coastal Program Document. DHEC-OCRM has direct permitting authority for proposed activities within the critical areas of the coast, which are defined as coastal waters, tidelands, beach/dune systems and beaches (R. 30-1.D). DHEC-OCRM also has broader management authority over activities within the eight-county Coastal Zone through consistency certification of both federal and state permits, federal licenses, Outer Continental Shelf activities and requests for federal funding assistance.

In order to effectively implement the SC CZMP, DHEC-OCRM develops strategies and associated annual workplans under Section 309 of the Coastal Zone Management Act that will address priority issues within the coastal zone and result in positive changes to relevant program policies. The following is a summary of the current Section 309 strategy with anticipated outcomes and the development of the strategy for 2016-2020.

Summary of Current Section 309 Efforts

Coastal Hazards

The Blue Ribbon Committee on Shoreline Management

The Blue Ribbon Committee on Shoreline Management (BRC) was appointed in October 2010 by the DHEC Board to consider the recommendations of the Shoreline Change Advisory Committee and develop and prioritize recommendations for specific statutory, regulatory, and policy improvements for shoreline management. The BRC represented a broad range of stakeholder interests, including members of the General Assembly, state and local government representatives, academia and legal professionals, non-governmental organizations and private citizens. Over a two year period, the BRC met to discuss six main topic areas: beachfront “retreat” policy, the state beachfront jurisdictional area, the role of local governments in beachfront management, beachfront emergency orders and sandbag issues, and beach renourishment and groins.

The Committee’s final report outlines 16 regulatory and policy recommendations for enhanced beachfront management. The recommendations represent the majority opinion of members as expressed by committee vote, and minority opinions are provided for recommendations not receiving 2/3 majority. A copy of the final report can be viewed online at <http://www.scdhec.gov/library/CR-010631.pdf>.

DHEC-OCRM is currently working with members of the South Carolina General Assembly to introduce statutory and regulatory amendments that capture these recommendations. In concert with this effort, DHEC-OCRM is developing a framework for an updated South Carolina Beachfront Management Plan that will house non-regulatory information, such as shoreline

erosion rates, currently found in the Coastal Division regulations. DHEC-OCRM will also be convening an ad hoc technical committee on nearshore alterations and new technologies to develop guidelines for improved planning, siting, monitoring and evaluation.

Shoreline Web Applications

DHEC-OCRM has made a concerted effort to use technology and GIS applications to make coastal information more accessible to its stakeholders. As of the date of this Section 309 Assessment and Strategy, DHEC-OCRM has developed and released two applications.

In January 2014, DHEC released the Beachfront Jurisdiction and Adopted Erosion Rates Web Application on its website: <http://gis.dhec.sc.gov/shoreline/>.

The application is an interactive site that depicts state beachfront jurisdictional lines, beach zones and adopted erosion rates on a variety of base maps. Additionally, the application provides users with access to survey packets by specific beach area, which contain specific line coordinates, survey monument locations and additional background information. The launch of the application is complementary to a Blue Ribbon Committee and DHEC Board recommendation to make information more accessible to current and prospective property owners. Additionally, the application significantly reduces server file size by replacing large PDF documents, thus improving connection speed and public accessibility to the information. The application will continue to be expanded and augmented as additional data becomes available.

In December 2014, DHEC released the S.C. Public Beach Access Guide application. This web and mobile-compliant application provides users with selectable amenity features to over 600 public access sites along the beachfront, including state and municipal beach parks. DHEC-OCRM staff conducted detailed field reconnaissance of each point using a customized GPS interface and built the GIS application architecture to ensure compatibility across web-based and mobile device platforms.

South Carolina Guide to Beachfront Property

In August 2014, DHEC-OCRM released *The South Carolina Guide to Beachfront Property*. The publication reflects the contribution of content from numerous state and federal agencies regarding coastal dynamics, hazards and flooding. The document is available on the DHEC website:

<http://www.scdhec.gov/library/CR-003559.pdf>

Ocean Resources

South Carolina Ocean Action Plan

DHEC-OCRM is developing documents to guide the department's action on ocean-related activities within South Carolina. These Ocean Action Plans are designed to provide a greater understanding of, and identify DHEC's role in the key topic areas of regional sediment management (RSM) and offshore energy siting and development.

The action plan for RSM in South Carolina highlights the growing need to establish approaches for managing sand resources based on current and future demands for beach renourishment. This framework will provide a foundation for establishing guidelines and strategies by identifying data gaps and informational needs; establishing goals, objectives and challenges; identifying DHEC's role in developing and implementing a formal RSM Plan; and recommending stakeholder and partner agency roles, budget needs, and funding opportunities.

The action plan for Offshore Energy includes a detailed overview of the federal oil and gas and renewable energy programs, and the current status of leasing off of the South Carolina coast. It provides a broad understanding of state's role in federal OSC activities, and identifies opportunities where state agencies and stakeholders can provide input to potentially guide siting and/or recommend alternative actions. Specific DHEC staff actions are further detailed under an addendum to the plan.

Internal Regulatory Guidance Document

DHEC-OCRM staff are finalizing an internal regulatory guidance document that provides instruction to staff regarding the process for offshore energy development on the Outer Continental Shelf. This document is an addendum to the broader Offshore Energy Action Plan and provides more detailed guidance related to the oil and gas and alternative energy processes to ensure DHEC-OCRM provides input during appropriate phases of the leasing process. Additional information regarding consistency reviews and policy analysis is also provided.

Development of the 2016-2020 Section 309 Assessment and Strategy

Public Input and Identification of Priority Areas

In fall 2014, DHEC-OCRM conducted a web-based survey of coastal management stakeholders to collect actionable feedback on priorities and specific needs for the nine enhancement areas identified by NOAA. The survey design received very positive feedback from participants, and over the course of two weeks, DHEC-OCRM collected 28 detailed responses. The survey questions and responses are included in Appendix A.

Stakeholders identified wetlands, coastal hazards and cumulative and secondary impacts as the top three priority areas for coastal management efforts. For the wetlands enhancement area, respondents indicated the need for improved coastal management of the resource through better assessment, monitoring and permitting oversight. Adaptation strategies for losses due to sea level rise and improved restoration efforts were also listed as emerging issues related to wetlands. Similarly, under coastal hazards, stakeholders identified assessment and monitoring, mapping efforts, and technical assistance and outreach as the top needs and/or data gaps. Several respondents ranked cumulative and secondary impacts as one of the top three priorities for the SC Coastal Program and recognized the need for better assessment of cumulative impacts, monitoring, mapping and data availability, and improved communication and outreach.

Based on this feedback and internal discussions among staff, DHEC-OCRM identified wetlands and coastal hazards as high priorities for the SC CZMP over the next five years. DHEC-OCRM has preliminarily identified two focus areas for 309 strategy development: the development of

regulatory and policy guidance for living shorelines/alternative shoreline stabilization and coastal hazard identification and mitigation/adaptive capacity development.

Phase I Assessment

Wetlands

Section 309 Enhancement Objective: Protection, restoration, or enhancement of the existing coastal wetlands base, or creation of new coastal wetlands. §309(a)(1)

Resource Characterization:

1. Summary of Wetland Change in South Carolina¹. The following map depicts net wetland change for both freshwater and saltwater wetlands.

Net Wetland Change by County 1996-2010

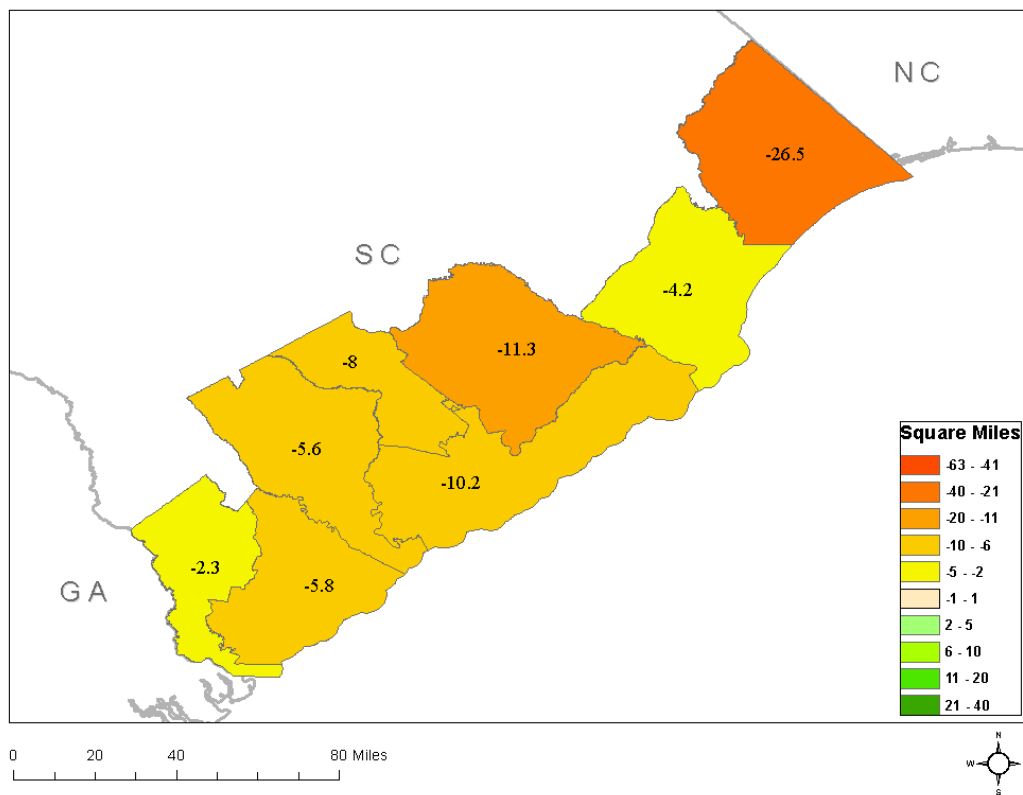


Figure 1. Net Wetland Change by County

¹ <http://www.csc.noaa.gov/ccapatlas/>. Derived from the Coastal Change Analysis Program (C-CAP) Data.

Coastal Wetlands Status and Trends		
Current state of wetlands in 2011 (acres)	1982020.8 (37.7% of state)	
Net change in total wetlands (in acres)	from 1996-2011	from 2006-2011
	-51070.3	-10078.9
Net change in freshwater (palustrine wetlands) (gained or lost)	from 1996-2011	from 2006-2011
	-46915.8	-10404.1
Net change in saltwater (estuarine) wetlands (gained or lost)	from 1996-2011	from 2006-2011
	440.6	-862.2
Net change in Unconsolidated Shore wetlands (% gained or lost)	from 1996-2011	from 2006-2011
	-4595.1	-170.6

How Wetlands Are Changing		
Land Cover Type	Area of Wetlands Transformed to Another Type of Land Cover between 1996-2011 (Acres)	Area of Wetlands Transformed to Another Type of Land Cover between 2006-2011 (Acres)
Development	-23053.5	-7469.6
Agriculture	-3479.8	192.4
Barren Land	-4499.5	-2538.6
Water	-3825.2	-263.1

2. If available, briefly list and summarize the results of any additional state- or territory-specific data or reports on the status and trends of coastal wetlands since the last assessment to augment the national data sets.

As detailed under the Coastal Hazards enhancement area section, DHEC-OCRM has worked with Georgia Southern University through the Army Corps of Engineers Silver Jackets program to map and analyze shoreline change along estuarine coastlines throughout the South Carolina coastal zone. A comprehensive inventory of estuarine erosion control structures and information to guide future management options, such as living shorelines, will result from this effort. A link to the report for Phase I of this project is provided below.

[Mapping Coastal Erosion Hazards Along Sheltered Coastlines in South Carolina 1852 to 2006](http://www.scdhec.gov/HomeAndEnvironment/Docs/USACOE_Silver_Jackets_Shoreline_Report_2013.pdf)

http://www.scdhec.gov/HomeAndEnvironment/Docs/USACOE_Silver_Jackets_Shoreline_Report_2013.pdf

Management Characterization:

1. Indicate if there have been any significant changes at the state or territory level (positive or negative) that could impact the future protection, restoration, enhancement, or creation of coastal wetlands since the last assessment.

Management Category	Significant Changes Since Last Assessment (Y or N)
Statutes, regulations, policies, or case law interpreting these	Y-Case Law
Wetlands programs (e.g., regulatory, mitigation, restoration, acquisition)	N

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
 - a. Describe the significance of the changes;
 - b. Specify if they were 309 or other CZM-driven changes; and
 - c. Characterize the outcomes or likely future outcomes of the changes.

- a. In 2003, the Attorney General ("A.G.") issued an opinion in response to DHEC's question of whether it is legal to grant permits for bridges to islands that are presumed to be owned by the State, without a showing of a sovereign's grant. That A.G. opinion stated in accordance with [Coburg, Inc. v. Lesser, 309 S.C. 252, 422 S.E.2d 96 \(1992\) \(Coburg I\)](#) and [Coburg Dairy, Inc. v. Lesser, 318 S.C. 510, 458 S.E.2d 547 \(1995\) \(Coburg II\)](#) (collectively, *Coburg*), the State is the presumptive owner of all "marsh islands," and therefore, permit applicants must produce "an original grant from the State or predecessor sovereign" to demonstrate ownership.

Based on this opinion, DHEC adopted a policy that all applicants seeking permits to build structures on undeveloped islands must provide a sovereign's grant as proof of ownership.

Patricia Tenney applied for a dock permit to build a dock on her coastal island (Little Jack Rowe Island), but was only able to produce a chain of title to Little Jack Rowe dating back to 1865 when the United States government issued a Federal Tax Certificate as a measure to collect delinquent taxes from "insurrectionary districts within the United States." The A.G. said this was not sufficient proof of ownership, because Tenney could not produce a sovereign grant. Accordingly, DHEC would not process Tenney's dock permit application.

Tenney filed a Quiet Title Action and the Master-in-Equity issued an Order granting judgment for Tenney on the ground that Little Jack Rowe is not a marsh island under *Coburg*, and that Tenney was entitled to quieted title.

This Order was appealed and the Supreme Court heard the case. In 2011, the Supreme Court overruled the specific principle found in the *Coburg* cases that "ownership of

islands situate within marshland follows ownership of the marshland." [Coburg I, 309 S.C. at 253, 422 S.E.2d at 97](#). Specifically, the Supreme Court said that "the proposition that the State is the presumed owner of land that remains above the high water mark is at odds with coastal property jurisprudence that predated Coburg, and expands the public trust doctrine beyond its historic bounds."

- b. The activities of OCRM’s Legal Counsel are funded through Section 306 of the annual CZM awards.
- c. The practical impact of the Tenney case is that the Supreme Court removed the presumption of state ownership for marsh islands. As a result, DHEC-OCRM no longer requires a sovereign’s grant as proof of ownership for applicants seeking permits on marsh islands.

Enhancement Area Prioritization:

- 1. What level of priority is the enhancement area for the coastal management program?

High __X__
Medium _____
Low _____

- 2. Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

In 2010, DHEC-OCRM’s Shoreline Change Advisory Committee (SCAC) provided several recommendations to enhance the state’s ability to manage sheltered/estuarine coastlines. Of particular note is the need to promote alternatives to traditional erosion control devices, such as riprap and bulkheads.

DHEC-OCRM recognizes the need to expand the assessment and mapping of estuarine wetlands and management options for estuarine shorelines to include living shoreline alternatives that will protect upland property and provide shoreline stabilization while also restoring estuarine habitat. The shoreline change analysis effort underway with Georgia Southern University will provide valuable information on the suitability of sites for these types of alternative methods.

DHEC-OCRM distributed an online survey to over 400 external stakeholders, including local governments, other state agency partners, non-governmental organizations, and interested parties. Of the responses received, wetlands ranked as one of the top three highest priorities for 81% of the respondents.

Coastal Hazards

Section 309 Enhancement Objective: Prevent or significantly reduce threats to life and property by eliminating development and redevelopment in high-hazard areas, managing development in other hazard areas, and anticipating and managing the effects of potential sea level rise and Great Lakes level change. §309(a)(2)

Resource Characterization:

1. **Flooding:** Data on the number of people in the coastal floodplain of South Carolina was derived from *NOAA's State of the Coast* "Population in the Floodplain" viewer². Data on the population of South Carolina's coastal counties was taken from the U.S. Census Bureau's 2000 and 2010 census³.

Population in the Coastal Floodplain			
	2000	2010	Percent Change from 2000-2010
No. of people in coastal floodplain	322,666	404,562	25%
No. of people in coastal counties	981,338	1,219,958	24%
Percentage of people in coastal counties in coastal floodplain	33%	33%	-----

2. **Shoreline Erosion** (for all states other than Great Lakes and islands; for Great Lakes and islands, see Question 5): The vulnerability of SC's shoreline to erosion was determined using data from *NOAA's State of the Coast* "Coastal Vulnerability Index."⁴

Vulnerability to Shoreline Erosion		
Vulnerability Ranking	Miles of Shoreline Vulnerable	Percent of Coastline
Very low (>2.0m/yr) accretion	83.28	10%
Low (1.0-2.0 m/yr) accretion	17.58	2%
Moderate (-1.0 to 1.0 m/yr) stable	268.42	32%
High (-1.1 to -2.0 m/yr) erosion	124.91	15%
Very high (<-2.0 m/yr) erosion	357.63	42%

3. **Sea Level Rise** (for all states other than Great Lakes and islands; for Great Lakes and islands, see Question 5): The vulnerability of SC's shoreline to sea level rise was determined using data from *NOAA's State of the Coast* "Coastal Vulnerability Index"⁵.

² <http://stateofthecoast.noaa.gov/pop100yr/welcome.html>. Note FEMA is in the process of updating the floodplain data. This viewer reflects floodplains as of 2010.

³ <http://quickfacts.census.gov/qfd/index.html#>

⁴ <http://stateofthecoast.noaa.gov/vulnerability/welcome.html> (see specifically "Erosion Rate" drop-down on map). The State of the Coast visually displays the data from USGS's Coastal Vulnerability Index.

Coastal Vulnerability to Historic Sea Level Rise		
Vulnerability Ranking	Miles of Shoreline Vulnerable	Percent of Coastline
Very low	0	N/A
Low	0	N/A
Moderate	540.13	63%
High	311.69	37%
Very high	0	N/A

4. **Other Coastal Hazards:** The table below provides a summary of the general level of risk in the SC coastal zone for each of the coastal hazards.

Type of Hazard	General Level of Risk (H, M, L)
Flooding (riverine, stormwater)	H
Coastal storms (including storm surge)	H
Geological hazards (e.g., tsunamis, earthquakes)	H
Shoreline erosion	H
Sea level rise	M
Great Lake level change	N/A
Land subsidence	M
Saltwater intrusion	M
Other (please specify)	

5. If available, briefly list and summarize the results of any additional data or reports on the level of risk and vulnerability to coastal hazards within your state since the last assessment. The state’s multi-hazard mitigation plan or climate change risk assessment or plan may be a good resource to help respond to this question.

Beachfront Vulnerability Index:

South Carolina’s NOAA Fellow developed a Beachfront Vulnerability Index (BVI) to assess community exposure and susceptibility to losses from storm surge and erosion. The BVI identifies vulnerability at the parcel level from coastal hazards under present-day conditions using historical data instead of predictive models. Created in conjunction with the South Carolina Coastal Program, the BVI combines data on elevation (LIDAR), long-term erosion rates (DHEC), number of dunes present (DHEC), wave height (NOAA), tidal range (NOAA), a habitable structure’s proximity to an inlet (DHEC), and a habitable structure’s distance from the DHEC-OCRM lines of jurisdiction (setback line and baseline). These data were edited, reclassified, and standardized using ArcGIS. The standardized variables were then analyzed using the ArcGIS Weighted Overlay tool to establish a vulnerability score for each parcel along the South Carolina beachfront. The Weighted Overlay tool assesses all variables together, and allows each variable to be weighted equally or according to the variable’s perceived influence. A representative image of the BVI can be viewed on the Digital Coast website at <http://www.csc.noaa.gov/digitalcoast/stories/vulnerability-index>.

⁵ <http://stateofthecoast.noaa.gov/vulnerability/welcome.html> (see “Vulnerability Index Rating” drop-down on map). The State of the Coast visually displays the data from USGS’s Coastal Vulnerability Index.

South Carolina MyCoast/King Tides Initiative:



MyCoast is a web and mobile-device enabled site that allows users to upload photographs and characterize environmental conditions associated with coastal events. MyCoast houses two discrete, though functionally similar programs: SC King Tides and Storm Witness. SC King Tides allows users to easily submit photographs of tidal impacts along beaches, tidal creeks and low-lying areas. The application geolocates the photographer's position and the time that the photo was taken based on metadata included in the picture file. The application then appends useful information to the report, including weather conditions, tidal stage and proximity to the nearest tidal gauge. Individual reports, along with photographs, are displayed via a map interface on the MyCoast website. The operational definition of a King Tide is any predicted tide equal to or greater than 6.6 ft MLLW in Charleston Harbor. DHEC identified 28 King Tide events, occurring mostly in the late summer and early fall of 2014, and incorporated an icon on its annual Tide Chart to assist in raising public awareness of the event and program.

Storm Witness functions similarly to King Tides, but focuses on the collection of storm-related impacts to coastal structures and beach erosion. In addition to submitting photos, participants of Storm Witness are also prompted to characterize impacts to specific types of structures. The information collected through Storm Witness will enable DHEC to more efficiently coordinate with state and local governmental entities and prioritize storm response activities.

DHEC successfully Beta-tested MyCoast:South Carolina in early 2014 during a King Tide event and a final version of the site was launched in spring 2014 (www.MyCoast.org/SC).

Hazard Vulnerability Assessment (HVA) Tool:

DHEC-OCRM participated in the development and demonstration of a new coastal hazard assessment tool called the Hazard Vulnerability Assessment (HVA). The goal of the HVA is to provide a geospatial tool that can be used by federal, state, and local coastal managers and scientists to improve comprehensive and hazard mitigation planning, post-disaster redevelopment, as well as determine areas best suited for restoration and mitigation. This tool was created through a collaborative effort of the Governor's South Atlantic Alliance (GSAA), which is a regional partnership among four states (NC, SC, GA, and FL) focused on shared ocean and coastal challenges and opportunities, promoting environmental sustainability, disaster preparedness, and strong economies. Federal partners of the GSAA include NOAA, EPA, and the DOI.

The HVA is an analysis tool that evaluates coastal hazard vulnerability from four hazards: storm surge, shoreline change rate (erosion or accretion), flooding, and social/economic vulnerability (SoVI®). The final product is a vulnerability index on a scale of 1 to 5 (1 being the least risk, 5 being the most risk). In addition to this composite product, HVA also produces products for Inundation (surge + flooding), Inundation + SoVI®, and Shoreline Change (rate, plus temporal and spatial variations). Users can examine each hazard component to see which has the most impact in any given area.

The tool is open source and available free to any user. In addition to building this tool, the GSAA has tested it in pilot areas in each of the four states. In SC, the SCDNR Geological Survey ran the tool for a portion of Edisto and Wadmalaw Islands, located in southern Charleston County. The results from this pilot area are available on the GSAA portal. To expand the use of this tool to other areas in SC or other states, some GIS skills and datasets are required. For GIS users, DHEC-OCRM, SCDNR- Geological Survey, and GSAA HVA tool builders will provide technical assistance. For non-GIS users, DHEC-OCRM, in collaboration with other agency partners will be running this tool, and rolling out final results for all SC coastal counties by the fall 2015.

Shoreline Change Analysis:

Since 2012, DHEC-OCRM has been working with the Charleston District U.S. Army Corps of Engineers through the Silver Jackets Program, to assess estuarine shoreline positions and erosion rates to help coastal planners, managers, and communities develop and prioritize responses to shoreline change projections. Through this Silver Jackets work, Phases I and II of estuarine shoreline mapping were completed, which included all estuarine areas from the SC/GA border to Edisto and then Edisto to Capers Inlet, respectively. For each of these phases, three shorelines were digitized (1800’s, 1930’s, and 2000’s), including all anthropogenic shoreline features (i.e. docks, bulkheads). These shorelines were analyzed using the AMBUR (Analyzing Moving Boundaries Using R) tool, and shoreline change rates were calculated for the entire study area. Finally, factors that were likely driving shoreline erosion, such as fetch, boat activity, armoring, and dredging, were also identified.

DHEC-OCRM is currently funding Phase III of this effort under the FY14 CZM award. Phase III includes continued mapping of the estuarine shoreline from Capers Inlet to the SC/NC border, mapping of all beachfront shorelines, and analyzing these datasets using AMBUR to calculate shoreline change rates. Finally, all of the datasets from Phase I, II, and III will be merged into a single cohesive state-wide dataset. This effort will result in three digitized shorelines for the entire SC coast, which will be utilized to produce a cohesive statewide beachfront and estuarine shoreline change analysis. DHEC-OCRM will provide NOAA with a report summarizing the Phase III products and analysis.

Management Characterization:

1. Indicate if the approach is employed by the state or territory and if significant state- or territory-level changes (positive or negative) have occurred that could impact the CMP’s ability to prevent or significantly reduce coastal hazards risk since the last assessment.

Management Category	Employed by State or Territory (Y or N)	CMP Provides Assistance to Locals that Employ (Y or N)	Significant Changes Since Last Assessment (Y or N)
Statutes, regulations, policies, or case law interpreting these that address:			
<i>elimination of development/redevelopment in high-hazard areas</i>	Y	Y	Y

<i>management of development/redevelopment in other hazard areas</i>	Y	Y	N
<i>climate change impacts, including sea level rise or Great Lake level change</i>	N	Y	N
Hazards planning programs or initiatives that address:			
<i>hazard mitigation</i>	Y	Y	Y
<i>climate change impacts, including sea level rise or Great Lake level change</i>	Y	Y	N
Hazards mapping or modeling programs or initiatives for:			
<i>sea level rise or Great Lake level change</i>	N	N	N
<i>other hazards</i>	Y	N	N

2. Briefly state how “high-hazard areas” are defined in your coastal zone.

Although the South Carolina Coastal Program does not specifically define high-hazard areas, the Coastal Division Regulations (R. 30-1.et.seq.) define the Coastal Zone as “all coastal waters and submerged lands seaward to the State's jurisdictional limits and all lands and waters in the counties of the State which contain any one or more of the critical areas. These counties are Beaufort, Berkeley, Charleston, Colleton, Dorchester, Horry, Jasper, and Georgetown.” Critical Areas are defined as “any of the following: (1) coastal waters, (2) tidelands, (3) beach/dune systems and (4) beaches.” The Coastal Program has direct permitting authority for activities within the critical areas of the coastal zone and broader management authority for activities within the eight-county coastal zone outside of the critical area.

Within the beach/dune system, the Department classifies beaches as either standard or inlet erosion zones, based on the following definitions:

Standard Erosion Zone - a segment of shoreline which is subject to essentially the same set of coastal processes, has a fairly constant range of profiles and sediment characteristics, and is not directly influenced by tidal inlets or associated inlet shoals.

Inlet Erosion Zone - a segment of shoreline along or adjacent to tidal inlets which is directly influenced by the inlet and its associated shoals.

(a) Unstabilized Inlets - inlets that have not been stabilized by jetties, terminal groins, or other structures.

(b) Stabilized Inlets - inlets which are stabilized by jetties, terminal groins, or other structures.

3. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:

- a. Describe the significance of the changes;
- b. Specify if they were 309 or other CZM-driven changes; and
- c. Characterize the outcomes or likely future outcomes of the changes.

The following legislative changes occurred during the 2014 legislative session and took effect on July 1, 2014. Acts 147 and 219 and the Provisos were not CZM-driven. Acts 184 and 188, although not formal recommendations of the Blue Ribbon Committee on Shoreline Management, were supported and sponsored by members of the Committee.

Elimination of development/redevelopment in high-hazard areas:

Protection of certain golf courses seaward of the baseline

Act 147 of 2014 allows sand scraping or sandbagging as temporary protection for golf courses seaward of the baseline that existed prior to May 24, 1991 under an emergency orders issued or approved by the Department.

Authorization to allow use of pilot projects to address beach and dune erosion

Act 219 of 2014 allows the Department use in a pilot project of any technology, methodology or structure to address beach or dune erosion if anticipated to be successful; and to allow the continued use if success is demonstrated.

Under the 2014-2015 Appropriations Bill

Act 286 of 2014 allows for the following activities to occur for the period of July 1, 2014 through June 30, 2015:

Wave Dissipation Device

Proviso 34.51 allows the initiation of a Wave Dissipation Device pilot program conducted by the Citadel or a research university, defines a "qualified wave dissipation device"; exempt the pilot program from a permit but establishes a department fee for deployment or expansion; and describes the conditions under which the Department can order removal of the device.

DeBordieu Seawall Reconstruction / Repair

Proviso 34.55 allows the Department to issue a special permit for the reconstruction or repair of the existing erosion control device located at DeBordieu using like material within two feet of the original footprint.

Initiatives to address hazard mitigation:

Accommodations tax revenue used for beach renourishment

Act 184 of 2014 allows local accommodation tax revenue to be used for beach renourishment, and allow a local government to hold this revenue for more than two years if it is designated for control and repair of waterfront erosion.

Beach Preservation Act

Act 188 of 2014 allows a coastal municipality, after approval by referendum, to impose an additional 1% "beach preservation fee" on accommodations to be used for renourishment, erosion mitigation, monitoring, and other defined measures to preserve dune systems and maintain public beach access.

Enhancement Area Prioritization:

1. What level of priority is the enhancement area for the coastal management program?

High __X__
Medium _____
Low _____

2. Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

Efforts to address coastal hazards continue to be a priority for the SC Coastal Program under the current Section 309 strategy and as evidenced by the task outcomes funded under Section 306 and matching state fiscal resources. Improved mapping, assessment and accessibility to information through online web applications are key ongoing efforts as described above. In addition, the online survey of external stakeholders emphasized the importance of coastal hazards, with 69% of the respondents ranking this enhancement area among the top three priority areas needing additional resources over the next five year period.

Public Access

Section 309 Enhancement Objective: Attain increased opportunities for public access, taking into account current and future public access needs, to coastal areas of recreational, historical, aesthetic, ecological, or cultural value. §309(a)(3)

Resource Characterization:

1. Use the table below to provide data on public access availability within the coastal zone.

Public Access Status and Trends			
Type of Access	Current number	Changes or Trends Since Last Assessment (↑, ↓, -, unkwn)	Cite data source
Beach access sites	620	No Change-Although this number is lower than last reported, this is the most accurate inventory of beach access locations	DHEC-OCRM Beachfront Public Access Inventory Completed in 2014
Shoreline (other than beach) access sites	Covered by Recreational Boating Access		
Recreational boat (power or nonmotorized) access sites	165 state/county/ locally maintained boat ramps	Increase	SC Department of Natural Resources: https://www.dnr.sc.gov/mlands/boatramp/ ; County Government Websites
Number of designated scenic vistas or overlook points	3 Designated Scenic Rivers	No Change-Includes portions of the Ashley River (Charleston County), the Great Pee Dee River (Georgetown County) and the Little Pee Dee River (Horry County)	https://www.dnr.sc.gov/mlands/manage?p_type=13
Number of fishing access points (i.e. piers, jetties)	36	No Change	http://saltwaterfishing.sc.gov/piersbridges.html ; County Government Websites
Coastal trails/ boardwalks	No. of Trails/ boardwalks 103 Miles of Trails/boardwalks 865.26	No Change	SC Trails Program http://www.sctrails.net/trails/
Number of acres parkland/open space	Total sites 9 State Parks within the coastal zone (11,353 acres)/41 SC DNR Managed Lands (393,646 acres)/County, Regional and Community Parks	No Change	South Carolina State Parks http://www.southcarolinaparks.com/ SCDNR Managed Lands: https://www.dnr.sc.g

	totaling over 4630 acres		ov/mlands/propertys_earch?p_flag=1#coa
	Sites per miles of shoreline		
Other (please specify)			

- Briefly characterize the demand for coastal public access and the process for periodically assessing demand. Include a statement on the projected population increase for your coastal counties.

The population within South Carolina’s coastal shoreline counties is projected to increase by 23 percent between 2010 and 2020⁶. The following figure shows the change in population from 2000 to 2010 according to the U.S. Census Bureau.

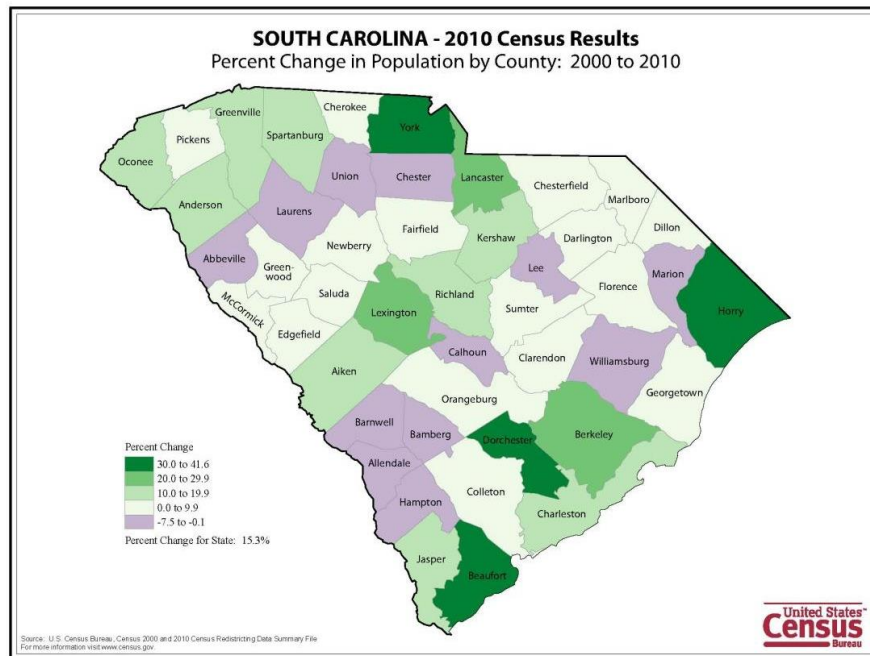


Figure 2. Percent Change in Population by SC County

The most recent assessment of public access demand was conducted by South Carolina Parks, Recreation and Tourism (SCPRT) to determine the demand for public access to outdoor recreation facilities and to prioritize state resources-both in-state and out-of-state users⁷. The 2008 South Carolina Outdoor Recreation Plan (SCORP) was based on a survey that analyzed overall participation trends and also analyzed individual factors, such as type of activity, age group, gender, family income and race. The survey evaluated the use of public facilities based on their location, including those within a user’s home district, those within a home district that require a certain resource or facility, and those outside of the

⁶ See NOAA’s Coastal Population Report: 1970-2020 (Table 5, pg. 9): <http://stateofthecoast.noaa.gov/coastal-population-report.pdf>

⁷ <http://www.scpert.com/tourism-business/outdoorrecreationplan.aspx>

district (usually occurring because the activity requires a certain geographic region, such as saltwater fishing). The survey found that the percentage of South Carolinians who feel the State has adequate outdoor recreation or leisure-time facilities and activities was 59.7% in 1984, 60.4% in 1990, 59.8% in 1994, 61.3% in 1999, and 63.5% in 2005. South Carolina residents expressed a need for a wide range of facilities and activities; however, parks were most frequently identified as a recreational need. Overall, South Carolina is seeing a continued rise in nature-based tourism and cultural/heritage tourism and visiting public beaches, lakes and streams continues to be a top priority.

In addition, the SCORP survey found that respondents with a health condition or disability identified the need for better access to facilities, including wheelchair access, inclined ramps, and more shaded areas/shelters. Based on the 2010 Census, 13.8% of South Carolinians were classified as having disability status, and a recent DHEC-OCRM inventory of beachfront access sites found that of the 620 access sites, 83 (13.4%) provided access for individuals with disabilities.

Several of the top issues in the 2008 SCORP included:

- Provide or improve outdoor recreation facilities to enable greater accessibility and use by multiple age groups and persons with disabilities.
- Minimize conflicts between outdoor recreational activities that are not compatible through education, regulation, and careful planning of new or expanded facilities and programs.
- Provide and properly maintain adequate facilities for and access to a diverse range of outdoor recreation activities, from traditionally popular activities such as boating and hunting to emerging activities such as rowing, rock climbing, disc golf, and dog parks.
- Require and/or encourage the provision of connectivity between trails, outdoor recreation facilities, open space and residential development on all levels – local, regional and statewide.

3. If available, briefly list and summarize the results of any additional data or reports on the status or trends for coastal public access since the last assessment.

During this assessment period, DHEC-OCRM provided two grant opportunities for coastal access improvement funding for local governments. As a result of the state funding and local match, these projects resulted in the renovation or enhancement of 30 public access sites along South Carolina's coast.

As part of the current 309 strategy, DHEC-OCRM recently completed a comprehensive inventory of public beach access sites along the coast. This information was used to create the South Carolina Public Beach Access web application. With detailed information on parking, handicapped-accessibility and other amenities, the web- and mobile-device enabled application seeks to promote the responsible use of public resources through a user-friendly tool. The application is available publicly online:
<http://gis.dhec.sc.gov/beachguide/>

Keep off the Dunes Cost Share Program

During this assessment period, DHEC-OCRM implemented a beach access and sand dune preservation cost-share program with beachfront municipalities. In exchange for bi-annual reports of local efforts to improve/enhance beach access and the beach-dune system, DHEC provides the community with “Please Keep Off The Dunes” signs at a discounted cost. The signs are highway grade, UV treated aluminum and incorporate the municipality’s logo to publicize the joint effort in promoting and protecting shared coastal resources.



Current local partners include the Towns of Edisto Beach, Kiawah Island, Pawleys Island, Seabrook Island, Surfside Beach, Sullivan’s Island and Horry County.

Management Characterization:

1. Indicate if the approach is employed by the state or territory and if there have been any significant state- or territory-level management changes (positive or negative) that could impact the future provision of public access to coastal areas of recreational, historical, aesthetic, ecological, or cultural value.

Management Category	Employed by State or Territory (Y or N)	CMP Provides Assistance to Locals that Employ (Y or N)	Significant Changes Since Last Assessment (Y or N)
Statutes, regulations, policies, or case law interpreting these	Y	Y	N
Operation/maintenance of existing facilities	Y	Y	N
Acquisition/enhancement programs	Y	Y	N

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
 - a. Describe the significance of the changes;
 - b. Specify if they were 309 or other CZM-driven changes; and
 - c. Characterize the outcomes or likely future outcomes of the changes.
3. Indicate if your state or territory has a publically available public access guide. How current is the publication and how frequently it is updated?

Public Access Guide	Printed	Online	Mobile App
State or territory has? (Y or N)	Yes-Pamphlet	Y	Y
Web address	N/A		

(if applicable)			
Date of last update	2000	2014	2014
Frequency of update	N/A	Continuous	Continuous

Enhancement Area Prioritization:

1. What level of priority is the enhancement area for the coastal management program?

High _____
Medium X
Low _____

2. Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

One of the key policies of the South Carolina Beachfront Management Act is the preservation and enhancement of public access to coastal resources for the citizens of the state. DHEC-OCRM works continuously with local governments to improve coastal access through the Local Comprehensive Beach Management Plan process, the state-funded Coastal Access Improvement Program, the Keep off the Dunes cost share program and through the funding of state-approved renourishment efforts when state appropriations are made available.

The respondents to the external survey did not rank public access among the highest priorities; however, DHEC-OCRM will continue to emphasize the importance of public access through ongoing programmatic efforts under Section 306.

Marine Debris

Section 309 Enhancement Objective: Reducing marine debris entering the nation’s coastal and ocean environment by managing uses and activities that contribute to the entry of such debris. §309(a)(4)

Resource Characterization:

1. In the table below, characterize the existing status and trends of marine debris in the state’s coastal zone based on the best available data.

Source of Marine Debris	Existing Status and Trends of Marine Debris in Coastal Zone			Source
	Significance of Source (H, M, L, unknwn)	Type of Impact (aesthetic, resource damage, user conflicts, other)	Change Since Last Assessment (↑, ↓, -, unknwn)	
<i>Land-based</i>				
Beach/shore litter	Medium/High	All of the above	↓	DHEC-OCRM, Keep Charleston Beautiful, and Sea Grant
Dumping	Unknown	All of the above	Unknown	Keep Charleston Beautiful
Storm drains and runoff	High	All of the above	Unknown	Carolina Clear and Keep Charleston Beautiful
Fishing (e.g., fishing line, gear)	High	All of the above	Unknown	Department of Natural Resources
Other (please specify)				
<i>Ocean or Great Lake-based</i>				
Fishing (e.g., derelict fishing gear)	High	All of the above	Unknown	Department of Natural Resources
Derelict vessels	High	All of the above	—	DHEC-OCRM, Department of Natural Resources
Vessel-based (e.g., cruise ship, cargo ship, general vessel)	Low	All of the above	Unknown	DHEC-OCRM
Hurricane/Storm	Low	All of the above	—	DHEC-OCRM
Tsunami	Low	All of the above	—	DHEC-OCRM, Department of Natural Resources

				Resources
Other (please specify)				

- If available, briefly list and summarize the results of any additional state- or territory-specific data or reports on the status and trends or potential impacts from marine debris in the coastal zone since the last assessment.

Abandoned Vessel Removal

DHEC-OCRM is updating the inventory of abandoned vessels within the coastal zone in an effort to prioritize future removal efforts. Figure 3 below shows the vessel locations and a summary of the types of vessels by county. DHEC-OCRM recently partnered with SC Sea Grant Consortium and SC Department of Natural Resources on a grant proposal with NOAA’s Office of Response and Restoration. This proposal was selected for funding and DHEC-OCRM will receive a sub-award from SC Sea Grant to conduct targeted abandoned vessel removal efforts in the Charleston Harbor area in conjunction with the City of Charleston and Charleston City Marina.

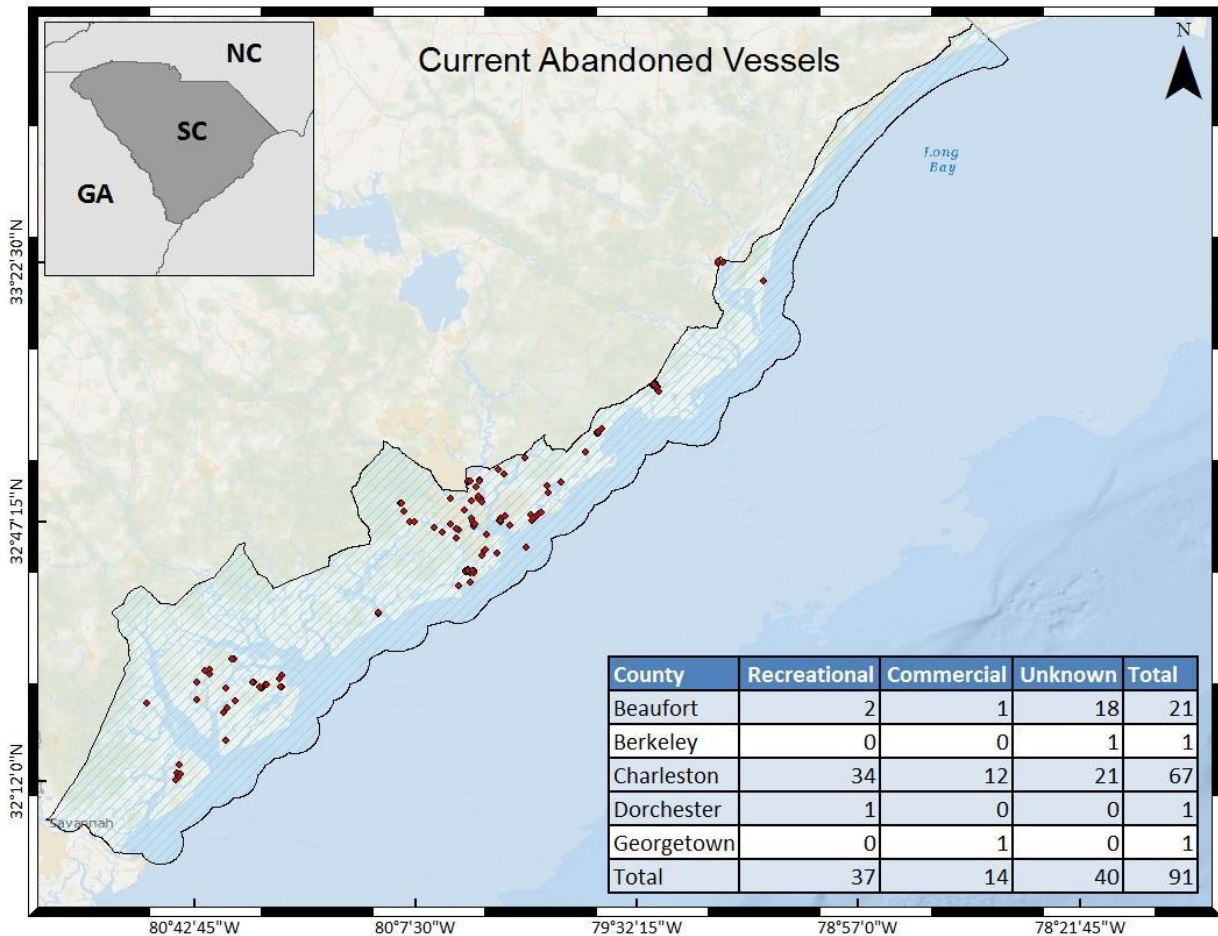


Figure 3: Abandoned Vessel Locations and Type

Adopt a Beach Program

The following map depicts the beachfront areas of the South Carolina coastline that are adopted by Adopt-a-Beach groups, and identifies the areas that are available for adoption. Currently, 36% of the beachfront is adopted by approximately 60 Adopt-a-Beach groups. Hilton Head Island (portrayed in the small data frame) is the only community that has 100% of the beachfront adopted by Adopt-a-Beach groups thus far. AAB groups participate in at least two clean up events each year and provide reports to DHEC-OCRM on the types of debris and estimated total weight (in pounds) of debris removed.

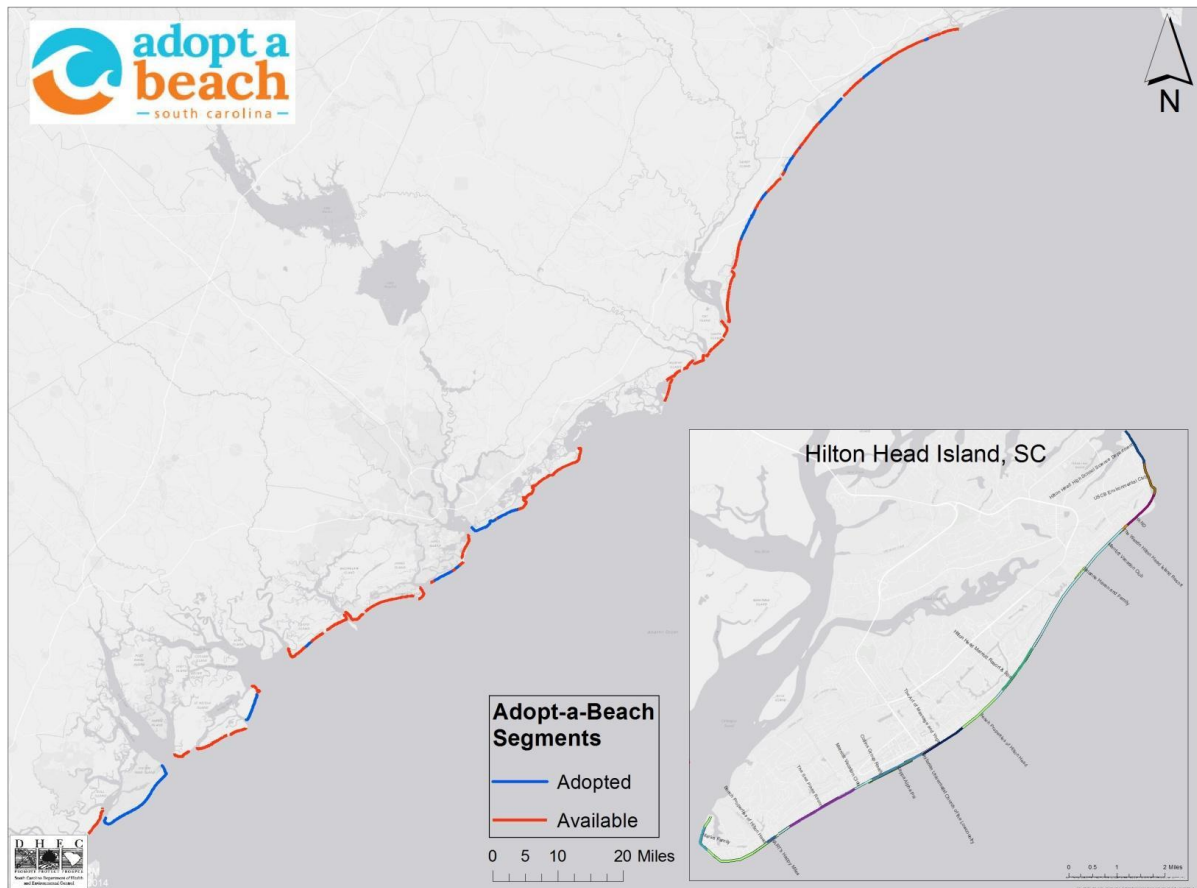


Figure 4. Adopt a Beach segments along the SC Coast.

Management Characterization:

1. Indicate if the approach is employed by the state or territory and if there have been any significant state- or territory-level management changes (positive or negative) for how marine debris is managed in the coastal zone.

Management Category	Employed by State/Territory	CMP Provides Assistance to Locals	Significant Changes Since Last Assessment
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	(Y or N)	that Employ (Y or N)	(Y or N)
Marine debris statutes, regulations, policies, or case law interpreting these	Y	Y	N
Marine debris removal programs	Y	Y	N

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
- Describe the significance of the changes;
 - Specify if they were 309 or other CZM-driven changes; and
 - Characterize the outcomes and likely future outcomes of the changes.

Enhancement Area Prioritization:

1. What level of priority is the enhancement area for the coastal management program?

High _____
Medium X
Low _____

2. Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

DHEC-OCRM continues to allocate state resources, when available, in conjunction with non-CZM federal funding for abandoned vessel and marine debris removal efforts. DHEC-OCRM works closely with the South Carolina Department of Natural Resources, South Carolina Sea Grant, the Coast Guard and municipal officials to address ongoing abandoned vessel issues along SC’s coast. DHEC-OCRM will continue to address marine debris issues under Section 306 programmatic efforts, such as Adopt a Beach, and will pursue other federal grant opportunities as they become available for targeted abandoned vessel removal projects.

The respondents to the external stakeholder survey did not rank marine debris as one of the top three priority enhancement areas for future Section 309 efforts.

Cumulative and Secondary Impacts

Section 309 Enhancement Objective: Development and adoption of procedures to assess, consider, and control cumulative and secondary impacts of coastal growth and development, including the collective effect on various individual uses or activities on coastal resources, such as coastal wetlands and fishery resources. §309(a)(5)

Resource Characterization:

- Using National Ocean Economics Program Data on population and housing,⁸ please indicate the change in population and housing units in the state’s coastal counties between 2012 and 2007.

Trends in Coastal Population and Housing Units				
Year	Population		Housing	
	Total (# of people)	% Change (compared to 2002)	Total (# of housing units)	% Change (compared to 2002)
2007	1,148,696	10.73%	592,783	9.72%
2012	1,271,948		650,419	

- Using provided reports from NOAA’s Land Cover Atlas⁹, please indicate the status and trends for various land uses in the state’s coastal counties between 2006 and 2011. You may use other information and include graphs and figures, as appropriate, to help illustrate the information.

Distribution of Land Cover Types in Coastal Counties		
Land Cover Type	Land Area Coverage in 2011 (Acres)	Gain/Loss Since 2006 (Acres)
Developed, High Intensity	56474.3	7532.7
Developed, Low Intensity	144280.5	13134.6
Developed, Open Space	112603.2	8412.5
Grassland	133480.5	-10847.3
Scrub/Shrub	491397.7	51734.4
Barren Land	48630.0	1136.2
Open Water	892513.8	1660.2
Agriculture	385276.9	-9355.7
Forested	1030456.5	-52141.4
Wetlands	1961954.1	-11436.9

Note: area within the state mapped by C-CAP is 5257067.5 acres

⁸ www.oceaneconomics.org/. Enter “Population and Housing” section. From drop-down boxes, select your state, and “all counties.” Select the year (2012) and the year to compare it to (2007). Then select “coastal zone counties.” Finally, be sure to check the “include density” box under the “Other Options” section.

⁹ www.csc.noaa.gov/ccapatlas/. Summary data on land use trends for each coastal state is available on the ftp site.

3. Using provided reports from NOAA’s Land Cover Atlas¹⁰, please indicate the status and trends for developed areas in the state’s coastal counties between 2006 and 2011 in the two tables below. You may use other information and include graphs and figures, as appropriate, to help illustrate the information.

Development Status and Trends for Coastal Counties			
	2006	2011	Percent Net Change
Percent land area developed	284278.0 (5.4%)	313358.0 (6.0%)	29079.9 (10.2%)
Percent impervious surface area	80481.6 (1.5%)	89776.7 (1.7%)	9295.1 (11.5%)

How Land Use Is Changing in Coastal Counties	
Land Cover Type	Areas Lost to Development Between 2006-2011 (Acres)
Barren Land	4775.5
Emergent Wetland	7553.4
Woody Wetland	165.2
Open Water	1507.8
Agriculture	5146.9
Scrub/Shrub	5307.2
Grassland	7351.3
Forested	4775.5

4. Using data from NOAA’s State of the Coast “Shoreline Type” viewer,¹¹ indicate the percent of shoreline that falls into each shoreline type.

Shoreline Types	
Surveyed Shoreline Type	Percent of Shoreline
Armored	1
Beaches	5
Flats	13
Rocky	4
Vegetated	76

5. If available, briefly list and summarize the results of any additional state- or territory-specific data or reports on the cumulative and secondary impacts of coastal growth and development, such as water quality and habitat fragmentation, since the last assessment to augment the national data sets.

Management Characterization:

1. Indicate if the approach is employed by the state or territory and if there have been any significant state-level changes (positive or negative) in the development and adoption of procedures to assess, consider, and control cumulative and secondary impacts of coastal growth and development, including the collective effect on various individual uses or activities on coastal resources, such as coastal wetlands and fishery resources, since the last assessment.

¹⁰ www.csc.noaa.gov/ccapatlas/. Summary data on land use trends for each coastal state is available on the ftp site.

¹¹ <http://stateofthecoast.noaa.gov/shoreline/welcome.html>

Management Category	Employed by State or Territory (Y or N)	CMP Provides Assistance to Locals that Employ (Y or N)	Significant Changes Since Last Assessment (Y or N)
Statutes, regulations, policies, or case law interpreting these	Y	Y	N
Guidance documents	Y	Y	N
Management plans (including SAMPs)	Y	Y	N

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
- Describe the significance of the changes;
 - Specify if they were 309 or other CZM-driven changes; and
 - Characterize the outcomes or likely future outcomes of the changes.

Enhancement Area Prioritization:

1. What level of priority is the enhancement area for the coastal management program?

High _____
Medium X
Low _____

2. Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

Approximately 38% of the respondents ranked cumulative and secondary impacts as one of the top three priorities for the SC Coastal Program. The respondents identified the need for better assessment of cumulative impacts, monitoring, mapping and data availability, and improved communication and outreach. One respondent noted data gaps for estuarine shorelines, in particular the extent of shoreline armoring, dock build-out and non-point source pollution. The shoreline change analysis described under Coastal Hazards will help assess the extent of shoreline armoring and shoreline changes over time. The strategy developed for living shorelines will build upon this assessment to improve coastal management options for the regulated community.

Special Area Management Planning

Section 309 Enhancement Objective: Preparing and implementing special area management plans for important coastal areas. §309(a)(6)

The Coastal Zone Management Act defines a Special Area Management Plan (SAMP) as “a comprehensive plan providing for natural resource protection and reasonable coastal-dependent economic growth containing a detailed and comprehensive statement of policies; standards and criteria to guide public and private uses of lands and waters; and mechanisms for timely implementation in specific geographic areas within the coastal zone. In addition, SAMPs provide for increased specificity in protecting natural resources, reasonable coastal-dependent economic growth, improved protection of life and property in hazardous areas, including those areas likely to be affected by land subsidence, sea level rise, or fluctuating water levels of the Great Lakes, and improved predictability in governmental decision making.”

Resource Characterization:

1. In the table below, identify geographic areas in the coastal zone subject to use conflicts that may be able to be addressed through a special area management plan (SAMP). This can include areas that are already covered by a SAMP but where new issues or conflicts have emerged that are not addressed through the current SAMP.

Geographic Area	Opportunities for New or Updated Special Area Management Plans
	Major conflicts/issues
Unincorporated Horry County and North Myrtle Beach	Little River/Waites Island/Cherry Grove-Changing land use along Little River, increased recreational use of Little River and potential use conflicts, increased threat of development

2. If available, briefly list and summarize the results of any additional state- or territory-specific data or reports on the status and trends of SAMPs since the last assessment.

Management Characterization:

1. Indicate if the approach is employed by the state or territory and if there have been any significant state- or territory-level management changes (positive or negative) that could help prepare and implement SAMPs in the coastal zone.

Management Category	Employed by State or Territory (Y or N)	CMP Provides Assistance to Locals that Employ	Significant Changes Since Last Assessment (Y or N)

		(Y or N)	
SAMP policies, or case law interpreting these	Y	Y	N
SAMP plans	Y	Y	N

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
- Describe the significance of the changes;
 - Specify if they were 309 or other CZM-driven changes; and
 - Characterize the outcomes or likely future outcomes of the changes.

Enhancement Area Prioritization:

1. What level of priority is the enhancement area for the coastal management program?

High _____
Medium _____
Low X

2. Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

In order to engage in the SAMP process, a local government must formally request that a SAMP be authorized by the S.C. General Assembly. At this time, the SAMP process has not been identified as a priority by either a local government or by stakeholders. DHEC will continue to implement coastal planning efforts, primarily through the development of Local Comprehensive Beach Management Plans and technical assistance for local ordinance development.

Ocean and Great Lakes Resources

Section 309 Enhancement Objective: Planning for the use of ocean [and Great Lakes] resources. §309(a)(7)

Resource Characterization:

1. Understanding the ocean and Great Lakes economy can help improve management of the resources it depends on. Using Economics: National Ocean Watch (ENOW),¹² indicate the status of the ocean and Great Lakes economy as of 2010, as well as the change since 2005, in the tables below. Include graphs and figures, as appropriate, to help illustrate the information.

Status of Ocean and Great Lakes Economy for Coastal Counties (2010)				
	Establishments (# of Establishments)	Employment (# of Jobs)	Wages (Millions of Dollars)	GDP (Millions of Dollars)
Living Resources	62	248	\$4.4	\$10.6
Marine Construction	61	375	\$20	\$40.7
Marine Transportation	138	3,012	\$115.2	\$223.2
Offshore Mineral Extraction	17	63	\$2.5	\$5.4
Tourism & Recreation	2,605	57,329	\$1.0 Billion	\$2.4 Billion
All Ocean Sectors	2,922	63,011	\$1.3 Billion	\$2.8 Billion

Change in Ocean and Great Lakes Economy for Coastal Counties (2005-2010)				
	Establishments (% change)	Employment (% change)	Wages (% change)	GDP (% change)
Living Resources	-19.23%	-22.11%	-18.09%	-23.91%
Marine Construction	-22.97%	-15.18%	28.27%	32.75%
Marine Transportation	7.2%	-11.86%	-8.39%	-1.4%
Offshore Mineral Extraction	-19.05%	-49.17%	-40.12%	-49.41%
Tourism & Recreation	19.1%	10.69%	24.43%	24.06%
All Ocean Sectors	14.71%	7.39%	17.64%	13.82%

2. In the table below, characterize how the threats to and use conflicts over ocean and Great Lakes resources in the state's or territory's coastal zone have changed since the last assessment.

¹² www.csc.noaa.gov/enow/explorer/. If you select any coastal county for your state, you receive a table comparing county data to state coastal county, regional, and national information. Use the state column for your responses.

Significant Changes to Ocean and Great Lakes Resources and Uses	
Resource/Use	Change in the Threat to the Resource or Use Conflict Since Last Assessment (↑, ↓, -, unkwn)
Resource	
<i>Benthic habitat (including coral reefs)</i>	Increase
<i>Living marine resources (fish, shellfish, marine mammals, birds, etc.)</i>	Increase
<i>Sand/gravel</i>	Increase
<i>Cultural/historic</i>	Increase
<i>Other (please specify)</i>	
Use	
<i>Transportation/navigation</i>	Increase
<i>Offshore development¹³</i>	No Change
<i>Energy production</i>	Increase
<i>Fishing (commercial and recreational)</i>	Increase
<i>Recreation/tourism</i>	Increase
<i>Sand/gravel extraction</i>	Increase
<i>Dredge disposal</i>	Increase
<i>Aquaculture</i>	Increase
<i>Other (please specify)</i>	

3. For the ocean and Great Lakes resources and uses in Table 2 (above) that had an increase in threat to the resource or increased use conflict in the state’s or territory’s coastal zone since the last assessment, characterize the major contributors to that increase.

Major Contributors to an Increase in Threat or Use Conflict to Ocean and Great Lakes Resources												
Resource	Major Reasons Contributing to Increased Resource Threat or Use Conflict (Note All that Apply with “X”)											
	L	O	P	I				M		S	O	E
	a	f	o	n	F	A	R	a	D	a	c	n
	n	d	l	v	Fishing	Aq	R	r	r	n	e	e
	-	s	l	a	(Comm	uac	e	i	/	M	A	r
	b	h	l	s	& Rec)	ultu	r	i	M	i	c	g
	a	o	u	i		re	r	n	i	n	i	y
	r	r	t	v			T	r	n	e	d	P
	s	e	e	e			r	a	r	r	A	r
	e	d	d	s			r	n	E	r	c	o
	d	e	r	p			s	s	x	t	i	d
	e	v	r			p	p	r	i	f	u	
	v	e	u	e			o	o	t	i	i	c
	e	l	n	l			r	r	a	e	c	t
	l	o	o	s			n	a	r	t	i	i
	o	p	f	e								o
	m	f	f								n	

¹³ Offshore development includes underwater cables and pipelines, although any infrastructure specifically associated with the energy industry should be captured under the “energy production” category.

	p m e n t	e n t						t i o n		a c t i o n	o n
<i>Example: Living marine resources</i>		X	X	X	X	X		X	X		
<i>Benthic habitat (including coral reefs)</i>										X	X
<i>Living marine resources (fish, shellfish, marine mammals, birds, etc.)</i>	X		X		X			X			X
<i>Sand/gravel</i>									X	X	X
<i>Cultural/historic</i>	X										X
<i>Transportation/navigation</i>											X
<i>Energy production</i>					X		X	X		X	
<i>Fishing (commercial and recreational)</i>		X		X				X		X	X
<i>Recreation/tourism</i>	X		X								X
<i>Sand/gravel extraction</i>		X			X						X
<i>Dredge disposal</i>	X		X								X

4. If available, briefly list and summarize the results of any additional state- or territory-specific data or reports on the status and trends of ocean and Great Lakes resources or threats to those resources since the last assessment to augment the national data sets.

Under the prior Section 309 strategy for ocean resources, DHEC-OCRM convened a SC Ocean Planning Work Group (OPWG) in 2008 to consider emerging ocean resource issues, increase information exchange, and develop a foundational report to guide future ocean research, education, and policy discussions. The outcome of the OPWG was the development of the *South Carolina Ocean Report: A Foundation for Improved Management and Planning in South Carolina* released in July 2012. This report provides an overview of ocean authorities in South Carolina, followed by issue-oriented chapters, which include: Living Marine Resources and Habitats, Ocean Energy Development, Sand Resources, Ocean Aquaculture, Ocean Mapping, Ocean Monitoring, and Emerging Ocean Management Frameworks.

To gain significant public input in the process, the OPWG hosted a series of topic-oriented workshops to gather input from other agencies, industry, stakeholders and members of the public. Workshop participants were engaged to help identify gaps in data and/or regulatory regimes, and management priorities for the state.

The recommendations in the report are based on the results of the public workshops in addition to OPWG discussions and research, and are provided for consideration by state and local elected officials, as well as the ocean resource management community.

Recommendations include:

- *Develop a South Carolina Ocean Action Plan to ensure the sustainable use of our ocean resources.*
- *Coordinate with stakeholders, elected officials, and the public on ocean management issues to educate and gain input regarding preferred ocean uses.*

- *Reduce use conflicts and impacts to living marine resources from new and expanding ocean activities.*
- *Facilitate offshore wind energy development in South Carolina.*
- *Establish a leasing framework for state ocean waters.*
- *Develop a Regional Sediment Management Plan for South Carolina.*
- *Encourage sustainable coastal and ocean aquaculture development in South Carolina.*
- *Invest in seafloor and ocean use mapping in South Carolina's state ocean waters.*
- *Improve ocean monitoring information exchange and investment.*

A copy of the report and additional information about the OPWG and public meetings can be found online at <http://www.scdhec.gov/HomeAndEnvironment/Water/CoastalManagement/OceanManagement/>.

Management Characterization:

1. Indicate if the approach is employed by the state or territory and if any significant state- or territory-level changes (positive or negative) in the management of ocean and Great Lakes resources have occurred since the last assessment?

Management Category	Employed by State or Territory (Y or N)	CMP Provides Assistance to Locals that Employ (Y or N)	Significant Changes Since Last Assessment (Y or N)
Statutes, regulations, policies, or case law interpreting these	Y	N	N
Regional comprehensive ocean/Great Lakes management plans	N	N	N
State comprehensive ocean/Great Lakes management plans	N	N	N
Single-sector management plans	N	N	N

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
 - a. Describe the significance of the changes;
 - b. Specify if they were 309 or other CZM-driven changes; and
 - c. Characterize the outcomes or likely future outcomes of the changes.
3. Indicate if your state or territory has a comprehensive ocean or Great Lakes management plan.

Comprehensive Ocean/Great Lakes Management Plan	State Plan	Regional Plan
Completed plan (Y/N) (If yes, specify year completed)	N	N
Under development (Y/N)	Y-SC Ocean Action Plan for Energy Facilities and Regional Sediment Management	N
Web address (if available)		
Area covered by plan	State Jurisdictional Waters and Certain Activities in Federal Waters	N/A

Enhancement Area Prioritization:

1. What level of priority is the enhancement area for the coastal management program?

High _____
Medium x
Low _____

2. Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

Prior to the initiation of this 309 Strategy, DHEC will complete extensive research and develop a regulatory guidance document for ocean-related activities. Further, DHEC requested to review and received approval from NOAA to review five Geophysical and Geological (G&G) permit applications submitted to the Federal Bureau of Ocean and Energy Management for surveys off the Atlantic Seaboard. The G&G permit applications will precede multiple review points for the Agency if mineral or oil and gas resources are found. The CZC Section will have the opportunity to provide comments on the 5 Year (2017-2022) Lease Program and eventual requests for exploration and recovery. DHEC will continue to participate in coordinated state and federal planning efforts, including the Intergovernmental Renewable Energy Task Force.

Energy and Government Facility Siting

Section 309 Enhancement Objective: Adoption of procedures and enforceable policies to help facilitate the siting of energy facilities and Government facilities and energy-related activities and Government activities which may be of greater than local significance. §309(a)(8)

Resource Characterization:

1. In the table below, characterize the status and trends of different types of energy facilities and activities in the state’s or territory’s coastal zone based on best available data. If available, identify the approximate number of facilities by type. The MarineCadastre.gov may be helpful in locating many types of energy facilities in the coastal zone.

Status and Trends in Energy Facilities and Activities in the Coastal Zone				
Type of Energy Facility/Activity	Exists in CZ		Proposed in CZ	
	(# or Y/N)	Change Since Last Assessment (↑, ↓, -, unknwn)	(# or Y/N)	Change Since Last Assessment (↑, ↓, -, unknwn)
<i>Energy Transport</i>				
Pipelines ¹⁴	N	No Change	N	No Change
Electrical grid (transmission cables)	Y	Increase		
Ports	Y-6	No Change	Y-1	Increase; Facility Currently Under Construction- Charleston Naval Complex Marine Container Terminal
Liquid natural gas (LNG) ¹⁵	N	No Change	N	No Change
Other (please specify)				
<i>Energy Facilities</i>				
Oil and gas	N	No Change	N	No Change
Coal	Y	No Change	N	No Change
Nuclear ¹⁶	N	No Change	N	No Change
Wind	N	No Change	Y	Increase
Wave ¹⁷	N	No Change	N	No Change
Tidal	N	No Change	N	No Change
Current (ocean, lake, river)	N	No Change	N	No Change
Hydropower	N	No Change	N	No Change
Ocean thermal energy conversion	N	No Change	N	No Change
Solar	N	No Change	N	No Change
Biomass	N	No Change	N	No Change

¹⁴ For approved pipelines (1997-present): www.ferc.gov/industries/gas/indus-act/pipelines/approved-projects.asp

¹⁵ For approved FERC jurisdictional LNG import/export terminals: www.ferc.gov/industries/gas/indus-act/lng/exist-term.asp

¹⁶ The Nuclear Regulatory Commission provides a coarse national map of where nuclear power reactors are located as well as a list that reflects their general locations: www.nrc.gov/reactors/operating/map-power-reactors.html

¹⁷ For FERC hydrokinetic projects: www.ferc.gov/industries/hydropower/gen-info/licensing/hydrokinetics.asp

Other (please specify)			
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2. If available, briefly list and summarize the results of any additional state- or territory-specific information, data, or reports on the status and trends for energy facilities and activities of greater than local significance in the coastal zone since the last assessment.

Energy facilities have not been sited since the last assessment; however, applications for Coastal Zone Consistency of Geological and Geophysical (G&G) Surveys have been submitted for departmental review.

3. Briefly characterize the existing status and trends for federal government facilities and activities of greater than local significance¹⁸ in the state’s coastal zone since the last assessment.

Federal government facilities, particularly military installations, within South Carolina’s coastal zone have generally focused on maintenance and protection of existing infrastructure and expansion of basic facilities (i.e. parking). Several facilities are located in areas susceptible to coastal hazards, particularly flooding due to inundation, storm surge and sea level rise. DHEC is a principal member of the Southeast Regional Partnership for Planning and Sustainability (SERPPAS) and has engaged with federal partners on the examination of alternative shoreline stabilization structures to protect vulnerable infrastructure.

Management Characterization:

1. Indicate if the approach is employed by the state or territory and if significant state- or territory-level changes (positive or negative) that could facilitate or impede energy and government facility siting and activities have occurred since the last assessment.

Management Category	Employed by State or Territory (Y or N)	CMP Provides Assistance to Locals that Employ (Y or N)	Significant Changes Since Last Assessment (Y or N)
Statutes, regulations, policies, or case law interpreting these	Y	N	N
State comprehensive siting plans or procedures	N	N	N

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
 - a. Describe the significance of the changes;
 - b. Specify if they were 309 or other CZM-driven changes; and

¹⁸ The CMP should make its own assessment of what Government facilities may be considered “greater than local significance” in its coastal zone, but these facilities could include military installations or a significant federal government complex. An individual federal building may not rise to a level worthy of discussion here beyond a very cursory (if any at all) mention).

- c. Characterize the outcomes or likely future outcomes of the changes.

Enhancement Area Prioritization:

- 1. What level of priority is the enhancement area for the coastal management program?

High _____
Medium X
Low _____

- 2. Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

As indicated in the Ocean Resources assessment, DHEC will soon conclude an extensive research and regulatory guidance document development effort which will inform its management of offshore energy development and transmission. Among stakeholders, Energy and Government Facility Siting was typically ranked within the lower-third of identified priorities.

Aquaculture

Section 309 Enhancement Objective: Adoption of procedures and policies to evaluate and facilitate the siting of public and private aquaculture facilities in the coastal zone, which will enable states to formulate, administer, and implement strategic plans for marine aquaculture. §309(a)(9)

Resource Characterization:

1. In the table below, characterize the existing status and trends of aquaculture facilities in the state’s coastal zone based on the best available data.

Type of Facility/Activity	Status and Trends of Aquaculture Facilities and Activities		
	# of Facilities	Approximate Economic Value	Change Since Last Assessment (↑, ↓, -, unkwn)
Aquaculture Farms	85	\$11,250,000	Increase

2. If available, briefly list and summarize the results of any additional state- or territory-specific data or reports on the status and trends or potential impacts from aquaculture activities in the coastal zone since the last assessment.

DHEC-OCRM currently has 49 active/operating general permits for mariculture activities within the state’s jurisdiction. DHEC-OCRM recently issued a joint Critical Area permit to allow a new mariculture technology for growing sterile oysters, called Charleston Salts, near St. Helena Sound in Beaufort County.

The South Carolina Sea Grant Extension Program’s Aquaculture Program works in conjunction with SC DNR and DHEC to support sustainable aquaculture practices. During this assessment period, SC Sea Grant has funded the following research projects related to aquaculture in SC:

- Commercialization of bait shrimp aquaculture
- New technologies to improve the economic viability and sustainability of mariculture activities
- Effects of thermal stress on the Eastern oyster and its susceptibility to virulent bacterial strains.

Management Characterization:

1. Indicate if the approach is employed by the state or territory and if there have been any state- or territory-level changes (positive or negative) that could facilitate or impede the siting of public or private aquaculture facilities in the coastal zone.

Management Category	Employed by State or Territory (Y or N)	CMP Provides Assistance to Locals that Employ (Y or N)	Significant Changes Since Last Assessment (Y or N)
Aquaculture comprehensive siting plans or procedures	Y	N	N
Other aquaculture statutes, regulations, policies, or case law interpreting these	Y	N	N

2. For any management categories with significant changes, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information:
 - a. Describe the significance of the changes;
 - b. Specify if they were 309 or other CZM-driven changes; and
 - c. Characterize the outcomes or likely future outcomes of the changes.

Enhancement Area Prioritization:

1. What level of priority is the enhancement area for the coastal management program?

High _____
Medium _____
Low X

2. Briefly explain the reason for this level of priority. Include input from stakeholder engagement, including the types of stakeholders engaged.

Permit applications for aquaculture within the estuarine system are administered in accordance with existing statute and regulations. Permit applications for offshore aquaculture will be administered with guidance from federal agencies and informed by the regulatory guidance document for ocean activities. DHEC does not receive permit applications for aquaculture on a frequent basis and stakeholder input ranked this priority area low compared to other management issues.

Phase II Assessment

Wetlands

In-Depth Resource Characterization:

Purpose: To determine key problems and opportunities to improve the CMP's ability to protect, restore, and enhance wetlands.

1. What are the three most significant existing or emerging physical stressors or threats to wetlands within the coastal zone? Indicate the geographic scope of the stressor, i.e., is it prevalent throughout the coastal zone or specific areas that are most threatened? Stressors can be development/fill; hydrological alteration/channelization; erosion; pollution; invasive species; freshwater input; sea level rise/Great Lake level change; or other (please specify). When selecting significant stressors, also consider how climate change may exacerbate each stressor.

	Stressor/Threat	Geographic Scope (throughout coastal zone or specific areas most threatened)
Stressor 1	Erosion	Estuarine Shorelines
Stressor 2	Development/Fill	Freshwater wetlands throughout the Coastal Zone
Stressor 3	Pollution	Nonpoint source pollution for both estuarine and freshwater wetlands

2. Briefly explain why these are currently the most significant stressors or threats to wetlands within the coastal zone. Cite stakeholder input and/or existing reports or studies to support this assessment.

Individual, cumulative and secondary impacts to wetlands/tidal marsh are top management priorities identified by stakeholders who participated in the 309 Assessment Survey. The combination of anthropogenic impact (armoring, dredging, boat wake) and gradual sea-level rise will have a profound impact on the habit, productivity and other ecosystem services that tidal wetlands provide. Internal and external stakeholders have expressed the need for regulatory guidance that facilitates the authorization of alternative shoreline stabilization, i.e. living shorelines.

3. Are there emerging issues of concern but which lack sufficient information to evaluate the level of the potential threat? If so, please list. Include additional lines if needed.

Emerging Issue	Information Needed
Impacts of sea level rise on wetlands	Improved mapping and GIS modeling to accurately calculate losses over time and to anticipate future losses due to sea level rise
Improved understanding of long-term impacts from human activities, particularly changes to coastal hydrology	Improved monitoring of coastal water tables/ground water to identify areas of saltwater intrusion

In-Depth Management Characterization:

Purpose: To determine the effectiveness of management efforts to address identified problems related to the wetlands enhancement objective.

1. For each additional wetland management category below that was not already discussed as part of the Phase I assessment, indicate if the approach is employed by the state or territory and if significant state- or territory-level changes (positive or negative) have occurred since the last assessment.

Management Category	Employed By State or Territory (Y or N)	CMP Provides Assistance to Locals that Employ (Y or N)	Significant Changes Since Last Assessment (Y or N)
Wetland assessment methodologies	N	N	N
Wetland mapping and GIS	Y	Y	Y
Watershed or special area management plans addressing wetlands	Y	Y	N
Wetland technical assistance, education, and outreach	Y	Y	N
Other (please specify)			

2. For management categories with significant changes since the last assessment, briefly provide the information below. If this information is provided under another enhancement area or section of the document, please provide a reference to the other section rather than duplicate the information.
 - a. Describe significant changes since the last assessment;
 - b. Specify if they were 309 or other CZM-driven changes; and
 - c. Characterize the outcomes or likely future outcomes of the changes.

In 2015, DHEC will complete a detailed and comprehensive mapping effort of its estuarine and beachfront shorelines. The results will include three time steps (1800s, 1940s and 2000s) which will allow for rate change analysis using AMBUR (Analyzing Moving Boundaries Using R). AMBUR provides specialized utility in coastal environments with curving shorelines and produces statistically defensible outputs that illuminate rate change. Further, the shoreline delineation process will result in a catalogue of anthropogenic structures/modifications to the shoreline, which will be incorporated into GIS. Currently, DHEC-OCRM is implementing a Section 309 Project of Special Merit to compare and contrast AMBUR with the more frequently used tool, DSAS (Digital Shoreline Analysis System). Preliminary results from the PSM indicate that AMBUR is a superior tool to calculate shoreline rate change along curving shorelines.

3. Identify and describe the conclusions of any studies that have been done that illustrate the effectiveness of the state’s or territory’s management efforts in protecting, restoring, and enhancing coastal wetlands since the last assessment. If none, is there any information that you are lacking to assess the effectiveness of the state’s or territory’s management efforts?

In 2013, DHEC received a final report from Dr. Chester Jackson of Georgia Southern

University entitled, “Mapping Coastal Erosion Hazards Along Sheltered Coastlines in South Carolina, 1852-2006.” Based on this mapping effort and subsequent AMBUR Analysis, Dr. Jackson identifies likely drivers of shoreline/marsh erosion, including: gradual sea level rise, estuarine meander processes, tidal current dynamics at stream confluences, wind/wave exposure (fetch), boat activity, shoreline armoring and alterations, and dredging activity. AMBUR has already been applied to assist the S.C. Department of Natural Resources identify suitable areas for oyster reef restoration.

Identification of Priorities:

1. Considering changes in wetlands and wetland management since the last assessment and stakeholder input, identify and briefly describe the top one to three management priorities where there is the greatest opportunity for the CMP to improve its ability to more effectively respond to significant wetlands stressors. *(Approximately 1-3 sentences per management priority.)*

Management Priority 1: Facilitate the use of alternative shoreline stabilization techniques, particularly living shorelines, to address estuarine wetland losses due to erosion and development

Description: DHEC-OCRM will develop and implement a multi-year strategy to develop regulatory guidance / promulgate regulation to facilitate the permitting of individual living shoreline/alternative shoreline stabilization projects. DHEC-OCRM will evaluate existing marsh restoration and living shoreline efforts to determine their efficacy in addressing chronic shoreline erosion in various environmental situations (i.e. fetch, boat traffic, etc.). DHEC-OCRM will analyze existing monitoring data and overlay AMBUR shoreline rate change analysis to determine suitability of various intervention strategies. These efforts will inform the development of a regulatory definition and specific performance criteria to facilitate DHEC-OCRM’s ability to issue site-specific permits for living shorelines/alternative shoreline stabilization.

2. Identify and briefly explain priority needs and information gaps the CMP has to help it address the management priorities identified above. The needs and gaps identified here do not need to be limited to those items that will be addressed through a Section 309 strategy but should include any items that will be part of a strategy.

Priority Needs	Need? (Y or N)	Brief Explanation of Need/Gap
Research	Y	Effects of sea level rise, changes in coastal hydrology and other stressors on freshwater and estuarine wetlands
Mapping/GIS	Y	Accurate assessment of current wetland coverage, losses over time and projected losses due to sea level rise
Data and information management	N	
Training/capacity building	N	

Decision-support tools	N	
Communication and outreach	Y	More effective outreach and education on the importance of wetlands as essential habitat, and for flood mitigation and non- point source pollution reduction
Other (Specify)		

Enhancement Area Strategy Development:

1. Will the CMP develop one or more strategies for this enhancement area?

Yes _____ **X**_____

No _____

2. Briefly explain why a strategy will or will not be developed for this enhancement area.

A strategy will be developed for the Wetlands priority management area due to stakeholder input /concern about the proliferation of armored estuarine shorelines and the lack of clear regulatory guidance for the permitting of living shorelines/alternative shoreline stabilization techniques. With the advent of new analytical tools and the availability of demonstration projects for detailed analysis, the opportunity exists to affect a positive program change.

Coastal Hazards

In-Depth Resource Characterization:

Purpose: To determine key problems and opportunities to improve the CMP’s ability to prevent or significantly reduce coastal hazard risks by eliminating development and redevelopment in high-hazard areas and managing the effects of potential sea level rise and Great Lakes level change.

1a. **Flooding In-depth** (for all states besides territories): Using data from NOAA’s *State of the Coast* “Population in the Floodplain” viewer¹⁹ and summarized by coastal county through NOAA’s Coastal County Snapshots for Flood Exposure,²⁰ indicate how many people at potentially elevated risk were located within the state’s coastal floodplain as of 2010.

2010 Populations in Coastal Counties at Potentially Elevated Risk to Coastal Flooding²¹				
	Under 5 and Over 65 years old		In Poverty	
	# of people	% Under 5/Over 65	# of people	% in Poverty
Inside Floodplain	95,603	24%	52,226	13%
Outside Floodplain	111,944	14%	119,910	15%

1b. **Flooding In-depth** (for all states besides territories): Using summary data provided for critical facilities, derived from FEMA’s HAZUS²² and displayed by coastal county through NOAA’s Coastal County Snapshots for Flood Exposure,²³ indicate how many different establishments (businesses or employers) and critical facilities are located in the FEMA floodplain. You can provide more information or use graphs or other visuals to help illustrate or replace the table entirely if better information is available.

Critical Facilities in the FEMA Floodplain⁴⁴						
	Schools	Police Stations	Fire Stations	Emergency Centers	Medical Facilities	Communication Towers
Inside Floodplain	64	10	15	2	10	15
Coastal Counties	362	30	111	8	24	47

2. Based on the characterization of coastal hazard risk, what are the three most significant coastal hazards²⁴ within the coastal zone? Also indicate the geographic scope of the hazard, i.e., is it prevalent throughout the coastal zone or are specific areas most at risk?

¹⁹ <http://stateofthecoast.noaa.gov/pop100yr/welcome.html>

²⁰ <http://www.csc.noaa.gov/digitalcoast/tools/snapshots>

²¹ To obtain exact population numbers for the coastal floodplain, download the excel data file from the State of the Coast’s “Population in Floodplain” viewer.

²² <http://www.fema.gov/hazus>; can also download data from NOAA STICS <http://www.csc.noaa.gov/digitalcoast/data/stics>.

Summary data on critical facilities for each coastal state is available on the ftp site.

²³ <http://www.csc.noaa.gov/digitalcoast/tools/snapshots>

²⁴ See list of coastal hazards at the beginning of this assessment template.

	Type of Hazard	Geographic Scope (throughout coastal zone or specific areas most threatened)
Hazard 1	Flooding	Throughout the coastal zone
Hazard 2	Shoreline Erosion	Beachfront, particularly unstabilized inlet areas, and estuarine environments
Hazard 3	Coastal Storms	Shallow coastal flooding areas are most threatened by inundation from storm surge; however, impacts from a significant storm would be throughout the coastal zone

- Briefly explain why these are currently the most significant coastal hazards within the coastal zone. Cite stakeholder input and/or existing reports or studies to support this assessment.

The geomorphology of the South Carolina coastline is extremely dynamic, both along the beachfront and estuarine shorelines. Coastal population growth continues to drive private development throughout the area, including in moderate and high-hazard areas. Stakeholder survey results highlight Coastal Hazards as a top management priority, particularly in light of legal and legislative challenges to existing statutes and regulations that restrict development along the beachfront. Further, nuisance flooding has emerged as a highly visible chronic coastal hazard, particularly in areas inland from the beachfront. In 2014, DHEC-OCRM launched the South Carolina King Tides Initiative to raise public awareness of nuisance flooding and to capture qualitative data that can be linked to quantitative data for long-term analysis of event frequency and impact.

DHEC-OCRM has also engaged with stakeholders and government at all levels to promote coastal management policy goals and programmatic goals. In 2014, DHEC-OCRM provided planning and evaluation assistance to the U.S. Department of Homeland Security, Office of Infrastructure Protection for a pilot table-top exercise (TTX) in Charleston. The TTX convened high-level representatives from public and private sector organizations to evaluate infrastructure vulnerability based on current environmental conditions and likely climate change scenarios. The TTX produced a detailed hazard analysis for the Charleston region and an after-action report.

- Are there emerging issues of concern, but which lack sufficient information to evaluate the level of the potential threat? If so, please list. Include additional lines if needed.

Emerging Issue	Information Needed
Nuisance flooding	Localized quantitative data to determine threshold levels for vulnerable coastal populations and event frequency

In-Depth Management Characterization:

Purpose: To determine the effectiveness of management efforts to address identified problems related to the coastal hazards enhancement objective.

- For each coastal hazard management category below, indicate if the approach is employed by the state or territory and if there has been a significant change since the last assessment.

Management Category	Employed by State/Territory (Y or N)	CMP Provides Assistance to Locals that Employ** (Y or N)	Significant Change Since the Last Assessment (Y or N)
Statutes, Regulations, and Policies:			
<i>Shorefront setbacks/no build areas</i>	Y	Y	N
<i>Rolling easements</i>	N	Y	N
<i>Repair/rebuilding restrictions</i>	Y	Y	N
<i>Hard shoreline protection structure restrictions</i>	Y	Y	N
<i>Promotion of alternative shoreline stabilization methodologies (i.e., living shorelines/green infrastructure)</i>	N	Y	N
<i>Repair/replacement of shore protection structure restrictions</i>	Y	Y	N
<i>Inlet management</i>	Y	Y	N
<i>Protection of important natural resources for hazard mitigation benefits (e.g., dunes, wetlands, barrier islands, coral reefs) (other than setbacks/no build areas)</i>	Y	Y	N
<i>Repetitive flood loss policies (e.g., relocation, buyouts)</i>	N	Y	N
<i>Freeboard requirements</i>	N	N	N
<i>Real estate sales disclosure requirements</i>	Y	Y	N
<i>Restrictions on publicly funded infrastructure</i>	Y	Y	N
<i>Infrastructure protection (e.g., considering hazards in siting and design)</i>	Y	Y	N
<i>Other (please specify)</i>			
Management Planning Programs or Initiatives:			
<i>Hazard mitigation plans</i>	Y	Y	N
<i>Sea level rise/Great Lake level change or climate change adaptation plans</i>	N	Y	N
<i>Statewide requirement for local post-disaster recovery planning</i>	N	Y	N
<i>Sediment management plans</i>	N	Y	N
<i>Beach nourishment plans</i>	Y	Y	N
<i>Special Area Management Plans (that address hazards issues)</i>	N	Y	N
<i>Managed retreat plans</i>	Y	Y	N
<i>Other (please specify)</i>			
Research, Mapping, and Education Programs or Initiatives:			
<i>General hazards mapping or modeling</i>	Y	Y	Y
<i>Sea level rise mapping or modeling</i>	Y	Y	Y
<i>Hazards monitoring (e.g., erosion rate, shoreline change, high-water marks)</i>	Y	Y	Y
<i>Hazards education and outreach</i>	Y	Y	Y
<i>Other (please specify)</i>			

**Assistance refers to technical assistance provided by SC CZMP staff on Local Comprehensive Beach Management Plan updates and local comprehensive planning efforts.

2. Identify and describe the conclusions of any studies that have been done that illustrate the effectiveness of the state’s management efforts in addressing coastal hazards since the last assessment. If none, is there any information that you are lacking to assess the effectiveness of the state’s management efforts?

In 2010, DHEC’s Shoreline Change Advisory Committee (SCAC) produced a final report to provide a technical foundation for improved coastal management and planning in the Coastal Zone. The report is segmented into four (4) broad goals, which are supported by specific policy recommendations: (1) Minimize Rises to Beachfront Communities; (2) Improve the Planning of Beach Renourishment Projects; (3) Maintain Prohibitions and Further Restrict the Use of Hard Stabilization Structures; and (4) Enhance the Management of Sheltered Coastlines. The SCAC report cites many recent scientific and policy studies as the basis for its recommendations. Reflecting on over 20 years of complex coastal topics, the SCAC report acknowledges the context and challenges associated with coastal management, but also identifies opportunities to improve coordination, share information and improve decision-making at the state and local level.

Identification of Priorities:

1. Considering changes in coastal hazard risk and coastal hazard management since the last assessment and stakeholder input, identify and briefly describe the top one to three management priorities where there is the greatest opportunity for the CMP to improve its ability to more effectively address the most significant hazard risks. (*Approximately 1-3 sentences per management priority.*)

Management Priority 1: Integrate the FEMA National Flood Insurance Program’s Community Ratings System (CRS) into existing coastal planning efforts.

Description: The CRS Program provides financial incentive for municipalities to identify flooding hazards, enhance public information and adopt ordinances and codes to mitigate potential flood losses. This program is a natural complement to DHEC-OCRM’s beachfront planning efforts and may result in meaningful improvements to integrative planning efforts at the state and local level.

2. Identify and briefly explain priority needs and information gaps the CMP has for addressing the management priorities identified above. The needs and gaps identified here should not be limited to those items that will be addressed through a Section 309 strategy but should include any items that will be part of a strategy.

Priority Needs	Need? (Y or N)	Brief Explanation of Need/Gap
Research	Y	Continued research on coastal hazards will contribute to the body of literature available for reference by federal, state and local planning entities
Mapping/GIS/modeling	Y	Mapping of coastal hazards is a critical component to DHEC’s ability to communicate the risk associated with coastal hazards.
Data and information	Y	High quality data, including spatial data with metadata, is critical to

management		building valid planning tools.
Training/Capacity building	Y	Many coastal towns do not employ full-time technical staff
Decision-support tools	Y	Decision-support tools need to be localized and accessible for lay-audiences
Communication and outreach	Y	Successful mitigation strategies will depend on the availability of high-quality information and outreach. Existing outreach and planning effort may be leveraged and coordinated
Other (Specify)		

Enhancement Area Strategy Development:

1. Will the CMP develop one or more strategies for this enhancement area?

Yes _____ X__

No _____

2. Briefly explain why a strategy will or will not be developed for this enhancement area. Coastal Hazards has, and will continue to be, a cornerstone of DHEC’s coastal management program strategy. DHEC has invested in its mapping, data management and planning capacity and has strived to integrate these resources across its programmatic efforts. New opportunities to apply these tools and services are emerging, notably through the Community Ratings System.

Section 309 Strategy for 2016-2020

Wetlands: Living Shorelines

I. Issue Area(s)

The proposed strategy or implementation activities will support the following high-priority enhancement areas (*check all that apply*):

- | | |
|--|---|
| <input type="checkbox"/> Aquaculture | <input type="checkbox"/> Cumulative and Secondary Impacts |
| <input type="checkbox"/> Energy & Government Facility Siting | <input checked="" type="checkbox"/> Wetlands |
| <input checked="" type="checkbox"/> Coastal Hazards | <input type="checkbox"/> Marine Debris |
| <input type="checkbox"/> Ocean/Great Lakes Resources | <input type="checkbox"/> Public Access |
| <input type="checkbox"/> Special Area Management Planning | |

II. Strategy Description

A. The proposed strategy will lead to, or implement, the following types of program changes (*check all that apply*):

- A change to coastal zone boundaries;
- New or revised authorities, including statutes, regulations, enforceable policies, administrative decisions, executive orders, and memoranda of agreement/understanding;
- New or revised local coastal programs and implementing ordinances;
- New or revised coastal land acquisition, management, and restoration programs;
- New or revised special area management plans (SAMP) or plans for areas of particular concern (APC) including enforceable policies and other necessary implementation mechanisms or criteria and procedures for designating and managing APCs; and,
- New or revised guidelines, procedures, and policy documents which are formally adopted by a state or territory and provide specific interpretations of enforceable CZM program policies to applicants, local government, and other agencies that will result in meaningful improvements in coastal resource management.

B. Strategy Goal

The goals of the strategy are to use existing information from the South Carolina Department of Natural Resources (SCDNR) and additional monitoring data to 1) establish a regulatory definition for living shorelines and 2) develop specific regulatory project standards for the permitting of living shoreline projects in South Carolina.

C. Through the SC Oyster Restoration and Enhancement Program (SCORE) and the National Estuarine Research Reserve System (NERRS) Science Collaborative, SCDNR staff have constructed approximately 200 oyster-based living shoreline projects throughout the state, with the majority of these being located on public property for habitat restoration purposes. These projects were constructed using either loose oyster shell (71), bagged oyster shell (75), oyster “castles” (13), or concrete-dipped crab traps (33). Oyster castles are manufactured with a conventional concrete block machine, and each castle has a 12” x 12” base, is 8” high, and has a 3” cutout that enables the castles to be stacked and interlocked. Unlike standard concrete blocks, the oyster castles are made from several raw materials including limestone, cement, pozzolan, and crushed oyster shell. This combination of

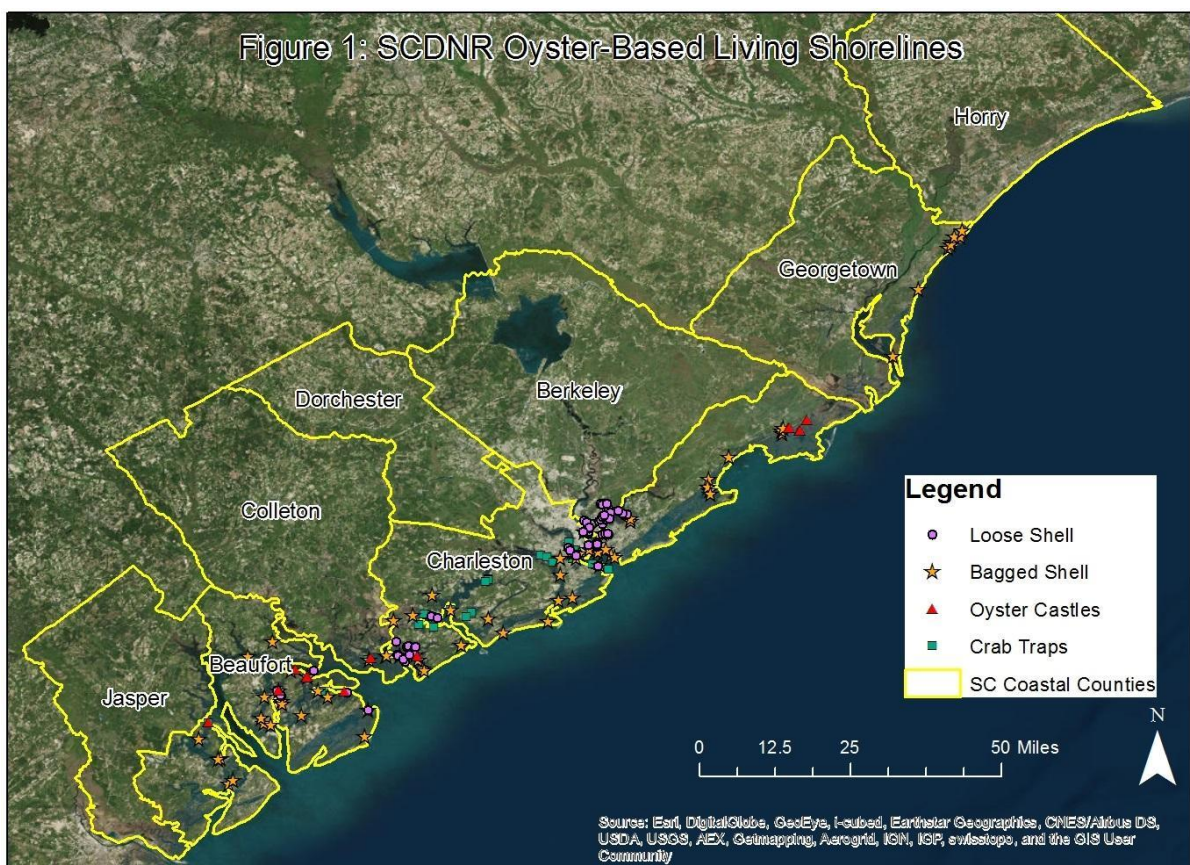
materials has been shown to recruit oysters more effectively. The SCORE Program created the loose shell and bagged shell structures, and the others were constructed through funding from the NERRS Science Collaborative. Although some State agencies and environmental nonprofits have constructed living shoreline projects for habitat restoration there are relatively few examples of living shorelines in South Carolina that have been constructed to mitigate erosion on private property. The use of bulkheads and revetments for estuarine shoreline erosion control is widespread because these types of structures are familiar to marine contractors, property owners, and regulators. However, better shoreline management options may exist for sites with certain conditions. Unlike bulkheads and revetments, living shorelines have the potential to improve shoreline habitat and water quality while protecting property from erosion.

Choosing the appropriate shoreline management approach is highly site-specific, but living shorelines are likely a viable alternative for sites with low to moderate wave energy. Information is available in other coastal states (e.g. Maryland and North Carolina) on erosional sites being evaluated for the effectiveness of different shoreline management techniques, including structural, non-structural, and hybrid approaches. However, South Carolina's estuarine shorelines vary from many of the areas across the country that have started to implement living shorelines. In particular, the greater tidal ranges (compared to Maryland and North Carolina) could make use of some living shoreline techniques challenging. Additionally, oysters in South Carolina settle in the intertidal zone whereas oysters in most other states settle in the subtidal zone. Therefore, to more fully understand the challenges of implementing living shorelines in South Carolina, it is important to construct and monitor demonstration projects at sites with varying environmental conditions to evaluate their effectiveness.

SCDNR has focused on oyster-based living shoreline projects instead of riprap sill structures since oysters have many ecosystem services and occur naturally in South Carolina's estuaries. Unlike many parts of the country, South Carolina has an abundance of oyster spat (larvae), but a lack of sufficient substrate is the factor that most significantly limits oyster growth. Living shorelines constructed of loose shells, bagged shells, oyster castles, and concrete-dipped crab traps provide additional substrate for oyster spat to attach to. According to SCDNR, the different structure types have been built along shorelines with varying site conditions. Loose oyster shell requires a low energy environment, bagged oyster shell can be successful along shorelines with slightly more energy, and oyster castles can help mitigate erosion along shorelines with moderate energy. Shorelines with very fine, muddy sediments are not ideal for loose shell, bagged shell, or oyster castle living shorelines because the oyster materials sink into the sediment. To address this issue, SCDNR has evaluated concrete-dipped crab traps as substrate because the larger surface area and relatively light weight of the crab traps allows them to rest on the surface of the sediment without sinking too deep.

Of the oyster restoration and living shoreline projects that have been constructed in South Carolina to date, nine are located in Georgetown County, 130 are located in Charleston County, 17 are located in Colleton County, and 36 are located in Beaufort County (Figure 1). Each site has been characterized by shoreline type, sediment type, sediment

“sinkability”, relative slope, relative current/wave energy, and relative erosion rate. Information on each project is also available including type of structure, dimensions, and year of construction. Perhaps more importantly, most of the projects have included post-construction monitoring. Depending on the individual project, the following changes have been measured over time: the footprint of the structure, oyster recruitment, marsh vegetation, and sediment characteristics. The results of these monitoring efforts can be used to demonstrate the performance of the various structure types in different settings. However, although significant data exists, the primary purpose of most of these projects was oyster restoration and not shoreline stabilization. The existing data has not been compiled or analyzed to establish relationships between site conditions and living shoreline performance, particularly in terms of shoreline stabilization. This type of analysis is needed to help refine future policy and permitting guidelines.



Prior to an award of Coastal Zone Management Act (CZMA) Section 309 funding from NOAA, DHEC-OCRM and SCDNR intend to work together to compile existing information, identify information gaps, and construct additional living shoreline study projects. DHEC-OCRM and SCDNR partnered on a pre-proposal to the NERRS Science Collaborative and were recently invited to submit a full proposal. Both agencies are hopeful that the project will be selected for funding to continue building the living shorelines knowledge base in South Carolina. Past monitoring has been short-term and insufficient to definitively document the performance of oyster-based living shorelines. Since recycled oyster shells are a finite resource, other natural materials, such as marsh vegetation plantings

and coconut fiber (coir) logs, need to be evaluated further. At some low-energy sites, marsh restoration projects with coir logs for toe stabilization may be sufficient to mitigate erosion. Using 309 funding, success criteria will be developed before additional monitoring begins to determine project performance, especially in terms of shoreline stabilization. Once success criteria are developed, a subset of each type of existing living shoreline will be selected for continued monitoring and evaluation. The selected projects will represent a broad cross section of site conditions and structure types and will have baseline data from previous monitoring efforts. The subset of living shoreline projects will be monitored at least once each year for two years, and they will also be evaluated if a significant coastal storm impacts the area. The monitoring results and success criteria will indicate whether the living shorelines are able to provide shoreline stabilization benefits while enhancing marsh or oyster habitat.

In South Carolina, bulkhead and revetment permits can be obtained relatively rapidly, and the projects can be installed quickly since their design criteria are well-known. Typically, the permit application fee for a bulkhead or revetment on individual, noncommercial properties is \$250, and permit decisions are made within 30 days. Alternative shoreline management approaches on private property, like living shorelines, typically require a longer permitting process and are not always available from marine contractors. Most of the SCDNR living shorelines constructed to date did not require a permit from DHEC-OCRM because they qualified for the permitting exception in R.30-5(A)(2). This regulation states that “the conservation, replenishment and research activities of State agencies” does not require a permit from DHEC-OCRM. Since living shorelines are often constructed channelward of the DHEC-OCRM Critical Line, these types of projects are reviewed by additional agencies like the U.S. Army Corps of Engineers (USACE) to ensure that navigation and water quality are not affected. Therefore, living shorelines on private property currently require more effort to utilize than traditional erosion control structures.

DHEC-OCRM does not have specific project standards or regulations to guide the permitting and construction of living shoreline projects. Currently, if an application for a living shoreline project is received, it is evaluated based on ten general considerations for all projects in the State’s Critical Area and three further guidelines pertaining to cumulative impacts. The lack of specific project standards, or even a regulatory definition, for living shorelines results in longer review times, loose design requirements, and potentially ineffective projects (both in terms of habitat and shoreline stabilization benefits). The outcomes of this strategy will be a regulatory definition for living shorelines and the development of specific project standards for living shorelines in South Carolina with the goal of streamlining the permitting process where possible. The standards will be based in part on lessons learned from the continued monitoring of existing oyster-based living shorelines and anticipated new projects funded through the NERRS Science Collaborative. The permitting rules and regulations for living shorelines in other southeastern states will also be evaluated for their applicability to South Carolina. Regulatory development will proceed according to SC Administrative Procedures Act (APA) requirements.

III. Needs and Gaps Addressed

The proposed strategy for living shorelines supports the enhancement areas of Coastal Hazards and Wetlands. These enhancement areas were identified as high-priority in the draft Phase 1 assessment for 2016-2020. Currently, there are no specific project standards for living shorelines in South Carolina. Some private property owners are interested in constructing living shoreline projects, but the lack of specific project standards results in longer review times and uncertainties about project performance. Therefore, most are either reluctant to pursue alternatives to bulkheads and revetments or they are unaware of living shorelines and the benefits that they can provide.

IV. Benefits to Coastal Management

Living shorelines, when constructed at appropriate estuarine shoreline sites, can lead to habitat improvement, water quality improvement, and greater hazard resilience. This suite of benefits cannot be attained through the use of bulkheads or revetments. Through the continued monitoring of a subset of existing living shoreline projects, DHEC-OCRM and other agencies such as SCDNR (including the NERRS) and USACE will gain information about design features and environmental conditions that work and those that do not. Furthermore, the results will help inform the development of specific project standards, which will in turn allow DHEC-OCRM to evaluate proposed living shoreline permit applications more effectively and efficiently and allow for others to implement these projects appropriately.

V. Likelihood of Success

There is a high likelihood of attaining the strategy goal and program change during the five-year assessment cycle. Provided that the living shoreline projects show the potential benefits compared to more traditional erosion control methods, there should be interest among property owners and policy makers in at least putting living shorelines and bulkheads and revetments on equal footing in terms of the required permitting process. Through the development of specific project standards for living shorelines, permitting efficiency will be improved. The State constantly strives for improved efficiency and decision-making in its regulatory programs. To build future support for living shorelines, and based on successful legislative outcomes of this strategy, the State will develop education and outreach materials to target estuarine shoreline property owners and marine contractors.

VI. Strategy Work Plan

Strategy Goal: Develop success criteria for evaluating performance of living shorelines; continue monitoring of existing living shorelines; establish a regulatory definition of living shorelines; develop specific regulatory project standards for the permitting of living shoreline projects in South Carolina.

Total Years: 5

Total Budget: \$775,000

Year: 1 (July 2016 – June 2017)

Description of activities:

- Convene Living Shorelines Workgroup to ensure collaboration between State and Federal agencies, environmental nonprofits, and marine contractors. The Workgroup will guide the development of the success criteria
- Develop success criteria for evaluating performance of living shorelines. Metrics of success will likely include oyster recruitment, marsh vegetation, sediment characteristics, elevation, and shoreline change rates
- Identify subset of existing living shoreline projects for continued monitoring
- Draft Request for Proposals (RFP), review proposals, and select contractor

Major Milestones:

- Final success criteria for future evaluation of living shorelines
- List of existing projects, site conditions, and baseline data selected for two years of additional monitoring
- Contractor selected to perform additional monitoring

Budget: \$125,000

Year: 2 (July 2017 – June 2018)

Description of activities:

- Convene workgroup meetings to ensure information exchange among agencies;
- Coordinate contract for monitoring of selected sites based on the established monitoring protocol;
- Gather independent input and data on monitoring outcomes at non-selected sites

Major Milestones:

- Annual monitoring reports that document changes at each selected living shoreline site.
- The monitoring reports will be provided to NOAA

Budget: \$225,000

Year: 3 (July 2018 – June 2019)

Description of activities:

- Evaluate and analyze monitoring data and compare outcomes with baseline data to determine and document physical change at selected sites;
- Convene workgroup meetings to ensure information exchange among agencies

Major Milestones:

- Annual monitoring reports that document changes at each selected living shoreline site
- Final monitoring report with findings and recommendations
- The monitoring reports will be provided to NOAA

Budget: \$225,000

Year: 4 (July 2019 – June 2020)

Description of activities:

- DHEC-OCRM drafts and adopts internal regulatory guidance document/Standard Operating Procedure (SOP) for the review and permitting of living shoreline project proposals
- DHEC-OCRM releases Notice of Drafting for proposed regulatory changes
- DHEC-OCRM establishes regulatory definition for living shorelines to encapsulate the range of potential projects that specific project standards would apply to
- DHEC-OCRM develops draft specific project standards for review by the DHEC Board.

Major Milestones:

- Regulatory definition for living shorelines would allow DHEC-OCRM staff to objectively determine if a proposed project qualifies as a living shoreline
- Draft specific project standards for living shorelines

Budget: \$100,000

Year: 5 (July 2020 – June 2021)

Description of activities:

- SC Administrative Procedures Act (APA) process will be followed to promulgate regulations (new regulatory definition of living shorelines and specific project standards for living shorelines)
- Assuming successful legislative outcomes, DHEC-OCRM will work with partners to develop education and outreach materials to target estuarine shoreline property owners and marine contractors

Major Milestone:

- New regulatory definition of living shorelines and specific project standards become part of the State's Critical Area Permitting Regulations
- Education and outreach materials distributed

Budget: \$100,000

VII. Fiscal and Technical Needs

A. Fiscal Needs:

CZMA Section 309 funds should be sufficient to carry out the proposed program changes.

B. Technical Needs:

DHEC-OCRM does not possess the technical knowledge, skills, or equipment to adequately monitor existing oyster-based living shoreline projects. Proposals would be solicited from qualified individuals, companies, NGOs, or State agencies or universities that are experienced with installing and monitoring living shoreline projects. DHEC-OCRM staff would assist with monitoring of the projects and would also lead the development of specific project standards for living shorelines.

VIII. Projects of Special Merit (Optional)

To be determined.

Coastal Hazards

IX. Issue Area(s)

The proposed strategy or implementation activities will support the following high-priority enhancement areas (*check all that apply*):

- Aquaculture
- Energy & Government Facility Siting
- Coastal Hazards
- Ocean/Great Lakes Resources
- Special Area Management Planning
- Cumulative and Secondary Impacts
- Wetlands
- Marine Debris
- Public Access

X. Strategy Description

D. The proposed strategy will lead to, or implement, the following types of program changes (*check all that apply*):

- A change to coastal zone boundaries;
- New or revised authorities, including statutes, regulations, enforceable policies, administrative decisions, executive orders, and memoranda of agreement/understanding;
- New or revised local coastal programs and implementing ordinances;
- New or revised coastal land acquisition, management, and restoration programs;
- New or revised special area management plans (SAMP) or plans for areas of particular concern (APC) including enforceable policies and other necessary implementation mechanisms or criteria and procedures for designating and managing APCs; and,
- New or revised guidelines, procedures, and policy documents which are formally adopted by a state or territory and provide specific interpretations of enforceable CZM program policies to applicants, local government, and other agencies that will result in meaningful improvements in coastal resource management.

E. Strategy Goal

The Coastal Hazards strategy goal reflects a coordinated effort to identify and mitigate the threat of episodic and chronic coastal hazards to private property, public infrastructure and public trust resources through efficient, incentive-based planning efforts.

Through DHEC-OCRM's 309 Assessment survey tool and other communication, coastal municipal governments and communities have expressed a significant interest in the National Flood Insurance Program's (NFIP) Community Ratings System (CRS). The CRS Program is a voluntary program that rewards communities that take a proactive approach to flood mitigation beyond minimum standards by reducing flood insurance premiums. Communities may garner points through a graduated scoring system that recognizes efforts to reduce flood damage to insurable property and encourage a comprehensive approach to floodplain

management (<https://www.fema.gov/national-flood-insurance-program-community-rating-system>). Currently within CRS communities in South Carolina, approximately 193,000 NFIP policies are in force, with annual NFIP premiums of approximately \$120,470,000. By participating in CRS, these communities save a combined total of approximately \$22,600,000 in premiums.

DHEC-OCRM will leverage its existing relationships with coastal municipal governments through its Local Comprehensive Beach Management Plan (LCBMP) planning process to integrate CRS-based principles into the guidance and procedures for updating LCBMPs. LCBMPs are a statutory and regulatory requirement for all beachfront municipalities to inventory natural and physical features and analyze shoreline dynamics, coastal hazards and disaster preparedness (S.C. Code §48-39-350) and serve as an opportunity to improve strategic planning to mitigate threats to public and private property. Among the 18 coastal municipalities and counties that are required to develop Local Comprehensive Beach Management Plans, 15 currently participate in the CRS program with scores ranging from 711 (Horry County) to 3,267 (Charleston County); the average score for these communities is 2021 (Source: http://crsresources.org/files/200/state-profiles/sc-state_profile.pdf).

Although statute prescribes the minimal requirements for the elements of a state-approved beach management plan, DHEC-OCRM will develop a guidance document(s) to introduce the CRS coastal erosion hazard-based element into the LCBMP process. Further, DHEC will identify opportunities above and beyond the minimum requirements of the LCBMP that municipalities may leverage for more robust plans and CRS point credit. Specifically, DHEC-OCRM sees opportunities to help communities build credit in the 300 Series (Public Information) and 400 Series (Mapping and Regulations).

Through this effort, the LCBMP process will be enhanced and DHEC-OCRM's municipal partners will have the opportunity to realize significant cost savings for their citizens while improving their resilience to coastal flooding and other hazards. To accomplish these goals, DHEC-OCRM will coordinate closely with the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP), South Carolina's Flood Mitigation Program (administered by S.C. Department of Natural Resources), ACE Basin and North Inlet-Winyah Bay National Estuarine Research Reserve Coastal Training Programs and other federal/state partners through a standing workgroup. The workgroup will advise on specific CRS criteria as it relates to beachfront communities and the development and dissemination of the most accurate and technically-accessible information available.

XI. Needs and Gaps Addressed

Building resilience to coastal hazards was identified in the DHEC-OCRM stakeholder survey as a top priority for programmatic efforts. In addition to disaster resilience, stakeholder communities are becoming more aware of chronic hazards that are exacerbated by relative sea level rise, such as nuisance flooding and coastal erosion.

Statute requires that DHEC-OCRM to work with coastal municipalities to develop and update Local Comprehensive Beach Management Plans every five (5) years. As a result of

locally- and state-adopted plan, coastal municipalities avail themselves to state funding assistance for beach management efforts, notably beach renourishment funding. However, state funding for renourishment has steadily decreased as the cost of renourishment projects has continued to rise. DHEC-OCRM recognizes that the LCBMP planning process requires a concerted effort on the part of its municipal partners and recalibration of the approach and alignment with CRS program guidelines will continue to build value and relevance of the LCBMP process and support coastal zone management policy goals. Additionally, a key finding by DHEC's Shoreline Change Advisory Committee (funded under previous section 309 Strategy) strongly encouraged strengthening the role of local governments in coastal hazard mitigation strategies and the integration of LCBMPs into complementary planning efforts at the local level. This strategy will address these challenges and opportunities by aligning the LCBMP process outcomes with the NFIP Community Ratings System framework.

XII. Benefits to Coastal Management

Building resilience to chronic and episodic coastal hazards within coastal communities is a cornerstone of South Carolina's Coastal Management Program. By establishing a direct relationship between LCBMP planning efforts and the CRS program, DHEC-OCRM will foster additional incentives for communities to adequately identify and mitigate coastal hazards associated with erosion, nuisance flooding and potential future disasters. Further, DHEC-OCRM will build and reinforce programmatic links among federal and state agencies charged with hazard mitigation responsibilities.

A. Likelihood of Success

There is a high likelihood of success for this outcome due to the statutory requirement for coastal municipalities to create and update state-approved LCBMPs and the interest in the CRS program expressed by municipal officials. Because the strategic approach and guidance document will encourage voluntary efforts, there is no need for statutory or regulatory change. However, within communities that implement the new CRS-aligned guidance for LCBMP efforts, the local and state adoption of the plan will result in an enforceable mechanism to execute the plan.

B. Strategy Work Plan

Strategy Goal: To advance the policy goals of the S.C. Coastal Management Program through the alignment of Local Comprehensive Beach Management Plan (LCBMP) planning efforts with the NFIP Community Ratings System and the creation/identification of incentives for coastal hazard mitigation planning.

Total Years: 5

Total Budget: \$465,000

Year: 1 (July 2016 – June 2017)

Description of activities:

- Establish advisory group to inform the development of CRS guidance to beachfront municipalities;
- Identify and evaluate localized visualization and analytical tools for municipalities to identify areas that are vulnerable to coastal flooding, relative sea-level rise and storm surge

Major Milestones:

- Establishment and convening of inter-agency and inter-governmental coastal CRS advisory group

Budget: \$115,000

Year: 2 (July 2017 – June 2018)

Description of activities:

- Convene CRS workgroup;
- Development of revised interim guidelines for CRS integration into LCBMPs;
- Implementation of visualization tools and product development, including web application

Major Milestones:

- Completion of revised interim guidelines

Budget: \$115,000

Year: 3 (July 2018 – June 2019)

Description of activities:

- Convene CRS workgroup;
- Organize/contribute to CRS workshop(s) for coastal municipalities, Realtors, homebuilders and other stakeholders in partnership with federal and state agencies;
- Initiate LCBMP process with pilot community (ies) and integrate mapping/information required for CRS program recognition

Major Milestones:

- Participate in CRS workshop(s);
- Completion of kick-off meeting with selected municipality (ies);
- Delivery of revised interim guidelines to municipalities

Budget: \$115,000

Year: 4 (July 2019 – June 2020)

Description of activities:

- Convene CRS workgroup;
- Continue support of CRS-based LCBMP process with pilot community;
- Initiate development of a case study document

Major Milestones:

- Completion of LCBMP process, including revised plan production

Budget: \$110,000

Year: 5 (July 2020 – June 2021)

Description of activities:

- Convene CRS workgroup;
- Development of case study;
- Municipality and DHEC will hold a joint public hearing and open a 30-day public comment period prior to final state review for adoption

Major Milestone:

- Completion of case study;
- Local and state-adoption of CRS-aligned LCBMP

Budget: \$110,000

C. Fiscal and Technical Needs

a. **Fiscal Needs:** CZM section 309 funds should be sufficient to carry out the proposed program changes. Additional staff time will be accounted for under section 306 as necessary to support ongoing programmatic effort associated with this 309 strategy.

b. **Technical Needs:**

To be determined; DHEC-OCRM will need to build its own capacity and credential to provide CRS-based planning services to municipal partners. DHEC will also need to leverage the expertise of CRS/Certified Floodplain Managers and other professionals in federal and state agencies.

D. Projects of Special Merit (Optional)

To be determined

5-Year Budget Summary by Strategy

At the end of the strategy section, please include the following budget table summarizing your anticipated Section 309 expenses by strategy for each year.

Strategy Title	Year 1 Funding	Year 2 Funding	Year 3 Funding	Year 4 Funding	Year 5 Funding	Total Funding
Wetlands/Living Shorelines	\$125,000	\$225,000	\$225,000	\$100,00	\$100,000	\$775,000
Coastal Hazards	\$115,000	\$115,000	\$115,000	\$110,000	\$110,000	\$565,000
Administration	\$60,000	\$60,000	\$60,000	\$40,000	\$40,000	\$260,000
Total Funding	\$300,000	\$400,000	\$400,000	\$250,000	\$250,000	\$1,600,000

Notes/Wetlands Strategy: Approximately \$100,000 of funding in YR 2 and YR 3 will support contractual monitoring of selected oyster restoration/living shoreline sites.

Notes/Administration: DHEC-OCRM will include a Section 309 Administration task each year to cover personnel and operating expenses associated with oversight of strategy implementation, including the management of pass-through contracts and in-house project development and execution. Administrative functions also include the preparation of bi-annual progress reports and fiscal and personnel management in accordance with federal and state policies and procedures.