

**COASTAL ZONE  
MANAGEMENT PROGRAMS  
AND THE BLUE ECONOMY**



Updated: June 2018

## **Executive Summary**

The Blue Economy depends on the vibrant workforce, thriving industry, advanced infrastructure, and unparalleled natural resources of the nation's coastal zone. Across the nation, the challenges confronting coastal communities are vast and complicated. To ensure our coastal zones continue to enrich and sustain the Blue Economy, robust, adaptive, and efficient coastal management is necessary.

An exemplary state-federal partnership since 1972, the Coastal Zone Management Program (CZM Program) provides the *effective management, beneficial use, protection, and development* that the coastal zone needs. States and Territories take the lead to manage coastal resources using their expertise and firsthand experience working on local issues, and the National Oceanic and Atmospheric Administration (NOAA) provides guidance, funding, and program support.

### **State/Territory program responsibilities:**

- Provide planning, financial, and technical assistance to local communities
- Protect natural resources
- Manage development in high hazard areas
- Ensure coastal-dependent uses receive development priority
- Coordinate state and federal actions to create permit and regulatory efficiencies

State and Territory CZM Programs sustain the Blue Economy by assisting coastal communities to **reduce risk**, supporting **maritime commerce**, enhancing **tourism and recreation**, and managing **living resources** for sustainable development.

- Between 2012 and 2017, State and Territory CZM Programs worked with **1,165 communities** nationwide to undertake coastal hazard mitigation efforts, up **832%** from the previous 5-year period.
- Between 2008 and 2017, **426** communities conducted port and waterfront redevelopment efforts with assistance from State or Territory CZM funding or technical assistance.
- Between 2008 and 2017, State and Territory CZM Programs provided technical and financial assistance to create or enhance **2,879** public access sites to support the recreation and tourism.
- Between 2008 and 2017, State and Territory CZM Programs restored **34,147 acres** of coastal habitat, sustaining the natural systems that support coastal communities and the Blue Economy.

The State, Territory, and federal partners of the national CZM Program depend on one another to seamlessly deliver the services and resources needed to properly manage our shared coastal areas. This strong relationship enables the U.S. to confront the challenges of a changing coast and ensure a robust and sustainable Blue Economy and Coastal Zone for today and for future generations.



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### The Challenge

The nation depends on the Blue Economy for food, transportation of goods, recreation, and employment. The Blue Economy in turn depends on the coastal zone – its people, its industry, and its irreplaceable natural resources. The thriving cities, vibrant beaches and estuaries, and historic communities of the coastal zone derive their booming economies and cultural identity from their connection to the ocean and Great Lakes. As the most densely developed and most ecologically complex area of our nation, the coastal zone faces critical threats from changing physical and economic conditions. In order to support the Blue Economy, coastal communities must tailor strategies to meet their unique circumstances and challenges.

### Everyone wants to live the good life on the Coast

Spanning 95,000 miles, the U.S. coastal zone consists of the Pacific, Atlantic, Caribbean, and Gulf coasts, the Great Lakes coasts, and the island territories.<sup>1</sup> Across these coastal zones, the climate ranges from arctic to temperate, subtropical, and tropical, supporting an incredible diversity of natural resources, coastal processes and dynamics, and human uses.

While the coastal counties of the U.S. accounts for less than 10% of U.S. land area, they are home to 40% of the population – 125 million people. The population density of coastal shoreline counties is more than five times greater than the corresponding inland counties - with 446 people per square mile vs.

the U.S. average of 87 people per square mile (excluding Alaska)<sup>2</sup>. The coastal zone includes six of the nation's ten most populous cities: New York City, Los Angeles, Chicago, Houston, Philadelphia, and San Diego. While many people live near the coast currently, it is estimated that by 2025, nearly 75% of the population of the United States, over 250 million people, will live within 50 miles of a coast.<sup>3</sup>



Increasing populations and changes in land use are placing unprecedented pressures on the natural environment and the economy. NOAA data demonstrates that coastal land cover changes twice as fast as the rest of the nation - between 1996 and 2010, an area larger than the state of Florida experienced land use change.<sup>4</sup> This rapid development strains public infrastructure, concentrates risk exposure, and impacts the ecological functions that support the Blue Economy.

<sup>1</sup> NOAA Office for Coastal Management, *Shoreline Mileage of the United States*  
<https://coast.noaa.gov/data/docs/states/shorelines.pdf>

<sup>2</sup> U.S. Census Bureau, 2014, *American Community Survey (U.S. Census Bureau)* –  
<https://www.census.gov/data/developers/updates/acs-5-yr-summary-available-2009-2013.html>

<sup>3</sup> NOAA Office for Coastal Management, *Fast Facts - Economics and Demographics*,  
<https://coast.noaa.gov/states/fast-facts/economics-and-demographics.html>

<sup>4</sup> NOAA Office for Coastal Management, *Fast Facts – Land Cover Change*,  
<https://coast.noaa.gov/states/fast-facts/land-cover-change.html>

## The Challenge

### The Coastal Zone - a national economic powerhouse

Coastal counties are national economic drivers, employing more than 54.6 million people and generating \$7.9 trillion toward the nation's gross domestic product (GDP).<sup>5</sup> In 2014, the six economic sectors of the Blue Economy that depend on ocean and Great Lakes resources<sup>6</sup> contributed more than \$352 billion to the U.S. GDP and supported 3.1 million jobs. Tourism and recreation account for 72% of the ocean economy's total employment and 31% of its GDP. Offshore mineral extraction accounts for another 43% of the ocean economy's GDP, but only 5.5% of the employment. Coastal areas are also home to the nation's commercial ports and harbors, ocean-dependent maritime industries, tourism and recreation businesses, and vital cultural landmarks and centers. With 90% of international trade conducted by sea, our ports connect the nation to the oceangoing international trade network and the economic bounty of the world.<sup>7</sup>

### Coastal GDP

The 14% of U.S. counties that are adjacent to the coast produce 45% of the GDP. Taken together, this area constitutes the world's third largest economy.<sup>8</sup>

### Coastal ecosystems sustain communities

Coastal ecosystems comprise a diverse blend of various habitat types and geological features, making them some of the most diverse and productive ecosystems in the world. Our coastal ecosystems include everything from coastal plains, pine forests, salt and freshwater dunes, estuaries, bayous, mangroves, saltmarshes, and coral reefs. These ecosystems are critical to fisheries and wildlife, culturally vital to coastal communities, and provide ecosystem services including water quality protection, storm surge attenuation, and flood mitigation. Coastal wetlands slow the release of stormwater into estuarine systems and allow sediments and associated nutrients to settle out of suspension prior to entering the nearshore area. This buffer effect helps prevent harmful algal blooms and the negative impacts on local shellfish, while reducing sediment load and protecting corals from smothering.

### Natural hazards can lead to economic losses

The coastal area combines dense development and critical infrastructure in an area prone to flooding and exposed to severe weather. As such, these areas are often more susceptible to the impacts of severe weather than inland communities. Hurricanes, tsunamis, flooding, and storm surge can all damage coastal infrastructure, impede commerce, and take lives.

<sup>5</sup> NOAA Office for Coastal Management, *Fast Facts - Ocean Jobs*, <https://coast.noaa.gov/states/fast-facts/ocean-jobs.html>

<sup>6</sup> These ocean and Great Lakes economy sectors are: living resources, marine construction, marine transportation, offshore mineral extraction, shipbuilding, and tourism and recreation.

<sup>7</sup> NOAA Office for Coastal Management, *Fast Facts - Ports*, – <https://coast.noaa.gov/states/fast-facts/ports.html>

<sup>8</sup> NOAA Office for Coastal Management, *Fast Facts - Ocean Jobs*, <https://coast.noaa.gov/states/fast-facts/ocean-jobs.html>

The cumulative cost of the 16 separate billion-dollar weather events in the U.S. in 2017 alone totaled \$306.2 billion, exceeding the previous record of \$214.8 billion set in 2005.<sup>9</sup> The impacts from Hurricane Maria are still escalating as Puerto Rico and US Virgin Islands continue to recover. The 2017 hurricane season included three of the five most expensive natural disasters in U.S. history.

Year	Hurricane	Financial Loss*	Lives Lost
2005	Katrina	\$160.1	1,833
2017	Harvey	\$125	89
2017	Maria	\$90	65
2012	Sandy	\$70.9	159
2017	Irma	\$50	97
1992	Andrew	\$47.8	No Data
	<b>Total</b>	<b>\$543.8</b>	<b>2,243</b>

\*CPI Adjusted Financial Losses, reported in billions

### Changing climate brings new challenges

Global mean sea level is projected to increase up to an additional 2.5 meters by 2100, intensifying the effects of coastal hazards and permanently inundating some developed coastal areas.<sup>10</sup> Adapting to these changes is an unprecedented planning challenge. Regional variations in sea level rates and subsidence further compounds the issue in some areas. Some critical locations such as Norfolk, New England, and New Orleans are seeing some of the globe’s steepest rates of sea level rise.



Photo Credit – NH Coastal Adaptation Work Group

Impacts to coastal areas from higher sea levels vary dramatically from state to state and community to community. Higher sea levels infringe on coastal wetlands and marshes, elevate ground water tables leading to salt water intrusion, increase base flooding events, make coastal storms more severe in both flood depth and areal coverage, undermine, damage, or destroy infrastructure, and

create a pervasive pattern of nuisance flooding which debilitates economies. Forecasts predict that by 2050, up to \$106 billion of coastal property will likely be below sea level.<sup>11</sup> This cumulative, progressive drag on the Blue Economy is a critical threat to the nation, requiring comprehensive, community-tailored solutions.

<sup>9</sup> NOAA National Centers for Environmental Information (NCEI), *U.S. Billion-Dollar Weather and Climate Disasters* (2018). <https://www.ncdc.noaa.gov/billions/>

<sup>10</sup> NOAA NOS CO-OPS, 2017, *Global and Regional Sea Level Rise Scenarios for the United States*, NOAA Technical Report NOS CO-OPS o83. [https://tidesandcurrents.noaa.gov/publications/techrpt83\\_Global\\_and\\_Regional\\_SLR\\_Scenarios\\_for\\_the\\_US\\_final.pdf](https://tidesandcurrents.noaa.gov/publications/techrpt83_Global_and_Regional_SLR_Scenarios_for_the_US_final.pdf)

<sup>11</sup> Risky Business, *The Economic Risks of Climate Change in the United States*: <https://riskybusiness.org/report/national/>

## The Coastal Zone Management Program

The Coastal Zone Management Program (CZM Program) is a successful, voluntary federal-state partnership to confront the challenges facing our coasts today and tomorrow. The founding principle of the CZM Program is that healthy coastal resources support both business and conservation, and that long-term planning is essential for coastal areas to remain the economic drivers they are today.

The CZMA sets forth processes, funding, and tools to manage land use and associated risks within the coastal areas. Each State and Territory CZM Program is unique, thanks to the flexibility of the CZMA empowering States and Territories to enact programs that fit their needs, their institutions, and their laws, while still ensuring that every State and Territory program meet the management needs of the nation’s coastal zone. In some coastal States and Territories, CZM programs serve as central regulatory agencies, while others are structured as networked programs that coordinate the policies and responsibilities of diverse agencies across state government. The State and Territory programs comprise 34 out of 35 States and Territories along Atlantic, Gulf, Great Lakes, Pacific, & Islands coastlines, serving both Republican and Democratic statehouses.

### Coastal Zone Management Act

Established in 1972 by the Coastal Zone Management Act (CZMA), the CZM Program achieves the congressionally recognized national priority of supporting “*effective management, beneficial use, protection, and development of the coastal zone.*”

Leveraging resources with a state-match requirement, the CZMA entrusts coastal States and Territories to:

- Provide financial and technical assistance to local communities
- Protect natural resources
- Manage development in high hazard areas
- Ensure coastal-dependent uses receive development priority
- Coordinate state and federal actions to create permit and regulatory efficiencies

The CZMA sets forth different categories of funding for State and Territory CZM Programs to use in addressing coastal issues. Funding categories include:

- § 306 – core program funding for support activities, planning, education and outreach, and applied research
- § 306A – low cost construction and land acquisition
- § 309 – program enhancements to improve program delivery
- § 310 – technical assistance in support of § 309 activities

In FY 2018, States and Territories matched over \$58.6 million in federal investment in the CZM Program. The CZM Program funding line of \$74.8 million supports the base § 306/306A funding and § 309 funding. States and Territories allocated the bulk of the federal funding, and associated state match, to mitigating coastal hazards, protecting and restoring coastal habitat, and supporting coastal community development.

### FY2017 Base CZM Program Funding (Source: NOAA OCM)

Category	Federal	State	Combined
Protecting and Restoring Coastal Habitat	18.2	17.1	35.3
Mitigating Coastal Hazards	13.5	6.9	20.4
Coastal Community Development	10	8.7	18.7
Expanding Public Engagement	9.5	6.9	16.4
Protecting Coastal Water Quality	7.4	7.6	15
Enhancing Public Access	4.6	4.6	9.2
Implementing State Program Management	4.3	2.8	7.1
Planning for Our Ocean and Coastal Waters	1.8	2.3	4.1
<b>Total</b>	<b>69.3</b>	<b>56.9</b>	<b>126.2</b>

Amounts in millions of dollars

**CZMA § 306 and 306A** provide financial and technical assistance for State and Territory CZM Programs to implement their federally approved Coastal Management Program. States match these funds 1-to-1. These core tasks are critical to program capacity and empower State and Territory Coastal Programs to address critical coastal issues. It is important to note that many if not all of these initiatives would not be possible without the financial and technical support of the National CZM Program.

**CZMA § 309** provides opportunities to enhance programs through **nine key areas**:

Section 309 Theme	Blue Economy Theme			
	Reducing Risk	Maritime Commerce	Tourism & Recreation	Living Resources
Coastal Hazards	✓	✓		✓
Ocean and GL Resources	✓	✓	✓	✓
Cumulative\Secondary Impacts	✓			✓
Wetlands	✓		✓	✓
Public Access	✓		✓	✓
Special Area Mgt. Planning	✓	✓	✓	✓
Energy and Gov. Fac. Siting	✓	✓	✓	✓
Marine Debris	✓	✓	✓	✓
Aquaculture	✓		✓	✓

CZM Programs develop CZMA § 309 assessments every 5 years, and craft 5-year strategies to meet priority needs and opportunities for improvement. Programs may also pursue Projects of Special Merit (PSM) under this provision.

Across 32 participating programs, 84 CZMA § 309 strategies for 2016-2020 support the Blue Economy through **reducing risk**, supporting **maritime commerce**, enhancing **tourism and recreation**, and managing **natural resources**.<sup>12</sup>

- Coastal Hazards (25 strategies)
- Ocean and Great Lakes Resources (15)
- Cumulative and Secondary Impacts (11)
- Wetlands (11)
- Public Access (7)
- Special Area Management Plans (6)
- Energy Facility Siting (5)
- Marine Debris (2)
- Aquaculture (2)

The funds invested across all categories sustain and improve the Blue Economy. Coastal restoration projects protect nursery habitat for fin and shellfish, restore natural buffers from storms, and enhance public access and recreational opportunities. CZM Programs mitigate coastal hazards, protect working waterfronts, and ensure that the coastal zones remain productive and safe.

**Federal consistency** is the cornerstone of CZMA's 45-years of innovative cooperative federalism. This coordinated process framework empowers States and Territories to manage their coasts, in support of the national interest, and achieves regulatory efficiencies. Federal Consistency review is an early coordination effort that can increase regulatory efficiencies and at the same time recognize State and Territory rights. It is a vehicle to convene applicants and all federal/state relevant permitting authorities at the same table from the outset of the process to coordinate permitting, avoid waste, and avert conflict. Industry relies on coastal management and federal consistency to provide a dependable, predictable process for major project development.

The State and Territory CZM Programs are a key part of the coastal economic engine and provide expertise and firsthand experience contributing to the Blue Economy. Programs provide coastal communities with financial and technical resources to improve hazard resilience planning and implementation, rehabilitate vital ecosystems, sustain tourism and recreation, support land-based comprehensive planning, create public access improvements, and implement ocean resource management plans.

### Nonprofit Partner on Coastal Issues



The **Coastal States Organization** (CSO) is a nonprofit organization that represents the Governors of the Nation's coastal states and territories. CSO works closely with governor-appointed delegates, most often the head of the coastal zone management programs in each of the coastal states, to support their work to maintain the health and vitality of our coasts.

The following sections highlight some examples of how these programs support the **Blue Economy** through **reducing risk**, **maritime commerce**, **recreation and tourism**, and **living resources**.

<sup>12</sup> Abt Associates, 2017, *National Coastal Zone Management Program Enhancement Program Synthesis* (note - total number of strategies is less than sum total as one strategy may address multiple categories)

### Reducing Risk

CZM Programs provide funding, planning support, technical assistance, and critical interagency coordination services for coastal communities to reduce disaster impacts. Their work saves lives and money, and defends a robust national Blue Economy from evolving coastal hazards. This locally-focused, regionally-integrated work involves coordination across federal and state agencies with jurisdiction over flood risk management, land use management, natural resources, environmental protection, and planning to confront coastal hazards such as flooding, erosion, hurricanes, nor'easters, tsunamis, and sea level rise. CZM Programs have confronted these challenges by:

### CZM Defends Communities

Between 2012 and 2017, State and Territory CZM Programs worked with **1,165 communities** nationwide to undertake coastal hazard mitigation efforts; up **832%** from the previous 5-year period.<sup>13</sup> Every dollar invested in the mitigation of storm-surge effects of coastal communities saves the U.S. Taxpayer four dollars in losses from natural hazards.<sup>14</sup>

### Assisting and funding hazard mitigation in Maryland communities

[Maryland's Chesapeake & Coastal Service](#) (CCS) assists coastal communities to address short- and long-term coastal hazards through the CoastSmart Communities program, an integrated program of funding, data, and technical assistance.<sup>15</sup> CoastSmart delivers essential coastal mapping data through the Coastal Atlas and provides technical assistance and training to municipal governments and private practitioners to implement mitigation practices. The CoastSmart Scorecard helps communities assess risk and plan for mitigation. CCS leverages CZMA § 309 funding with state and EPA funds to support community projects in the Community Resilience Grant Program, which has invested over \$1.5 million in 23 counties to develop local flood mitigation plans, update floodplain ordinances, and create a comprehensive hazard mitigation plan for the City of Baltimore.



Photo Credit – Mass CZM

<sup>13</sup> NOAA Office for Coastal Management, 2017, *The National Coastal Zone Management Program – Building Stronger Coastal Communities and Economies*

<sup>14</sup> Multihazard Mitigation Council, *Natural Hazard Mitigation Saves*, Volume 1, page iii

<sup>15</sup> NOAA Office for Coastal Management, 2016, *CoastSmart Communities Reduce Vulnerabilities*. <https://coast.noaa.gov/states/stories/coastsmart-communities-reduce-vulnerabilities.html>

**Developing post-disaster recovery plans for urban and rural Georgia communities**

The [Georgia Coastal Management Program](#) (GCMP) used a CZMA § 309 strategy to work with Chatham, Brantley, and Glynn Counties to develop specialized Disaster Recovery and Redevelopment Plans (DRRP). The DRRP process, using planning guidance published by GCMP that includes cost estimates, funding sources, and key partners, assists communities to identify vulnerabilities, develop action items to manage and reduce risks, and identify ordinance changes that can be implemented post-disaster to encourage rebuilding while reducing risk. GCMP is now using a NOAA Coastal Resiliency Grant to work with the remaining coastal counties in the Georgia coastal zone to create DRRPs. In addition, GCMP is collaborating with the Georgia Emergency Management Agency to develop a statewide DRRP, and convening a small-business/private sector DRRP in partnership with the Georgia Chamber of Commerce and the Georgia Department of Economic Development.

**Fast-tracking post-storm permitting and supporting recovery in South Carolina**

The [South Carolina Department of Health and Environmental Control](#) (DHEC) Office of Ocean and Coastal Resource Management hit the ground running after Hurricane Matthew slammed the state's coast in 2016, where it caused nearly \$341 million in damages.<sup>16</sup> Within two weeks, DHEC coastal specialists had evaluated 1,466 sites and issued more than 200 emergency permits for structure repair. DHEC emergency orders enabled residents to use sand bags, sand scraping, and beach nourishment for oceanfront protection. For structures damaged beyond repair, the program offered technical engineering assistance to complete assessments and guide property owners through regulatory processes for rebuilding or, in the case of erosion-control structures, removal.

**Providing coastal hazards planning guidance for coastal communities in Indiana**

The [Indiana's Lake Michigan Coastal Program](#) is providing financial and technical assistance to local communities to manage coastal hazards in a changing climate. While adaptation measures are becoming increasingly necessary for existing structures and developed areas, early planning in areas of new development or redevelopment can minimize potential future damage to life and property along the Lake Michigan shoreline. Coastal and shoreline structure planning and zoning decisions are made at the local level and vary between municipalities. Broad in scope, Coastal Hazards Planning Guidance for Indiana Coastal Communities provides information for local governments about coastal hazards and planning techniques to help officials make informed coastal hazard planning and mitigation decisions. The document introduces coastal hazard concepts, provides information about planning underway in Indiana shoreline communities, and presents coastal hazards model ordinance provisions.

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<sup>16</sup> NOAA Office for Coastal Management, 2017, *Storm-Recovery Actions Bring Quick Results*. <https://coast.noaa.gov/states/stories/storm-recovery-actions-bring-quick-results.html>

### Developing a statewide Texas Coastal Resilience Master Plan

The [Texas General Land Office](http://www.glo.texas.gov) (GLO) CZM program led a statewide effort to develop the Texas Coastal Resiliency Master Plan in 2017.<sup>17</sup> The Texas coast is critical to the Blue Economy, with a population of 6.5 million, bustling ports, military installations, 25% of the nation's refining capacity, and most of the nation's strategic petroleum reserve. These communities are also highly risk exposed, with severe threat from hurricanes and 65% of the state's coastline eroding at an average rate of two feet per year. The Master Plan confronts these challenges by identifying and prioritizing vulnerabilities, and selecting and implementing the most cost-effective projects to contain those vulnerabilities, using a natural infrastructure approach in project design to balance competing demands on ecosystems and coastal economies. GLO is also leveraging federal partnerships through a U.S. Army Corps of Engineers Coastal Texas Protection & Restoration Feasibility Study to stabilize and protect the Texas Gulf Intracoastal Waterway and natural barriers surrounding the Houston shipping channel to defend industries and densely populated neighborhoods. These planning efforts have already significantly assisted the state's recovery efforts after Hurricane Harvey.

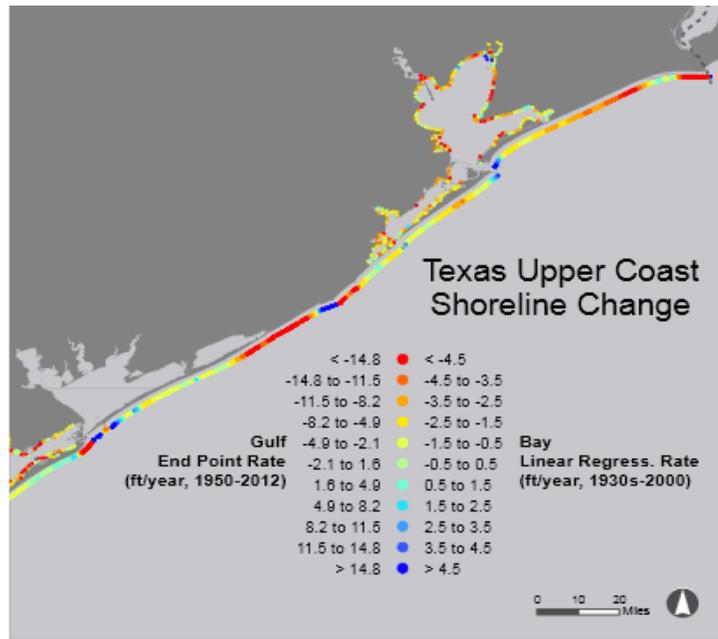


Figure 4.7: Texas Upper Coast Shoreline Change<sup>91,113</sup>

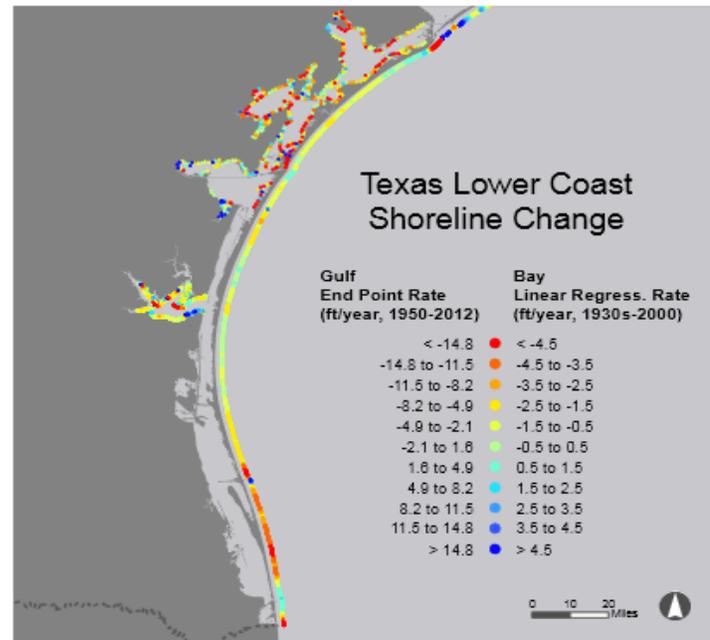


Figure 4.8: Texas Lower Coast Shoreline Change<sup>91,113</sup>

<sup>17</sup> Texas General Land Office, *Texas Coastal Resiliency Master Plan*, March 2017 - <http://www.glo.texas.gov/coastal-grants/projects/files/Master-Plan.pdf>

### Helping Alabama communities join the Community Rating System

The [Alabama Department of Conservation and Natural Resources](#) (ADCNR) is undertaking a 5-year project under a CZMA § 309 strategy to increase Community Rating System (CRS) participation and ratings of communities in the state's two coastal counties.<sup>18</sup> Under the Community Resiliency Initiative - Planning for Resilient Communities project, ADCNR is undertaking to:

- Develop and conduct a needs assessment survey of communities' coastal resilience conditions and capacity to enroll and advance in the CRS,
- Conduct the FEMA Quick Check Tool with communities,
- Identify and fill data gaps in available flooding, sea level rise, and natural barriers information,
- Develop and conduct training workshops responsive to the needs identified by the needs assessment survey and the FEMA Quick Check Tool,
- Conduct an outreach program based around the Mississippi/Alabama Sea Grant "Step by Step: A Primer for Getting Started in the CRS Program,"
- Publish technical bulletins to supplement the primer with in-depth information.
- Provide technical assistance to guide at least two communities through enrolling in the CRS.

### Adjusting to higher flood levels in Louisiana

The [Louisiana Office of Coastal Management](#) (OCM) is working with partners to reduce risks from coastal hazards. The efforts are multi-pronged and include a mix of guidance and technical assistance. During high rain events, flooding isolates many coastal communities, making emergency travel difficult and disrupting commutes, lengthening the disruption of daily commerce. OCM and partners worked with St. Tammany Parish to develop a model ordinance regarding base elevation for all new subdivision roads. This § 309 project used historical flood information to set a recommended level for new roads, increasing resilience of the community, improving accessibility for emergency response, and reducing long-term maintenance costs.<sup>19</sup> The Parish adopted the ordinance for all new roads. Another § 309 project is developing a method by which to



Photo Credit – LA Dept. of Natural Resources, Office of Coastal Management

incorporate the Community Rating System (CRS) criteria from the National Flood Insurance Program (NFIP) into local coastal use permit authorizations, utilizing a Local Coastal Management Program (LCMP) as the model for development.

<sup>18</sup> The CRS is Federal Emergency Management Agency program that incentivizes communities to increase flood resilience by offering flood insurance rate discounts in the National Flood Insurance Program.

<sup>19</sup> *Louisiana Parish Creates a Model Subdivision Ordinance to Enhance Public Safety and Resilience to Coastal Storms and Flood Events*, NOAA Digital Coast <https://coast.noaa.gov/digitalcoast/training/tammany-parish.html>

### Providing tools to empower Rhode Island citizens and communities to prepare for future hazards

The [Rhode Island Coastal Resources Management Council](#) (CRMC) provides a suite of data and resources to state residents and coastal communities through [STORMTOOLS](#), a service developed as part of the Shoreline Change Special Area Management Plan (Beach SAMP). Using funding under a CZMA § 309 Strategy and PSM, CRMC has developed quantitative, statewide mapping of highly vulnerable areas and created a Coastal Environmental Risk Index to illustrate the overall vulnerability of the coastline to the risks of coastal erosion, storm surge, wave action, and sea level rise. These resources, along with technical assistance to municipalities to improve codes and ordinances, are provided through a web portal and through in-person trainings. CRMC also works with trade associations and the insurance industry to incentivize hazard mitigation techniques in private home construction, repair, and renovation projects. The Beach SAMP works hand-in-hand with other CRMC Special Area Management Plans, including the Rhode Island Ocean Special Area Management Plan (Ocean SAMP), the nation's first state ocean plan to encompass federal waters. The innovative Ocean SAMP provides a predictable permitting pathway for new ocean uses, while being considerate of and blending with existing uses of Rhode Island's ocean waters.

Home ▾ STORMTOOLS for Beginners



### Maritime Commerce

CZM Programs ensure that the national policy of prioritizing ocean-dependent uses and the Blue Economy is implemented in state and local policy. Communities and the private sector rely on these programs to protect and support the cultural and economic value of maritime industries. CZM Programs also provide a vital bridge between national ocean science programs and the local ports, marinas, and coastal economies that depend on them, ensuring that coastal communities have a voice in national marine policy. Some of the critical work CZM Programs perform in the maritime space includes:

#### CZM Sustains Development

Between 2008 and 2017, **426** communities conducted port and waterfront redevelopment efforts, with assistance from State or Territory CZM funding or technical assistance.<sup>20</sup>



Photo Credit Larry Chowning

### Securing the economic vitality of Virginia's working waterfronts

The [Virginia Coastal Zone Management Program](#) used CZMA § 309 funds to develop a working waterfront master plan.<sup>21</sup> Government and private sector participants worked together to create the plan, leading to the passage of several bills that support working waterfronts through waterway maintenance financing and fast-tracking permits for special dredging projects. Cities and counties are also using the plan information to bolster their comprehensive plans and zone designations. Gloucester County, for instance, created an economic development plan that established a "working waterfronts district" designation. In 2012, Virginia's 600 working waterfronts represented the third-largest producer of marine products in the nation, with a dockside value of \$192 million. Virginia's master plan addressed threats to long-term viability of working waterfronts including: an aging workforce, competition for waterfront land, problems with water quality and water access, and more frequent and severe floods and storms. The work of the CZM program ensures a high return on investment and protects the long-term economic sustainability of the area.

<sup>20</sup> NOAA Office for Coastal Management, 2017, *Performance Management Data 2008-2017*

<sup>21</sup> NOAA Office for Coastal Management, *Master Plan Secures Economic Vitality of Working Waterfronts*, <https://coast.noaa.gov/states/stories/master-plan-secures-economic-vitality-of-working-waterfronts.html>

### **Partnering with industry on a strategic plan for Wisconsin's ports**

The [Wisconsin Coastal Management Program](#) partnered with the Wisconsin Commercial Ports Association, the National Center for Freight and Infrastructure Research and Education, the Great Lakes Maritime Research Institute, the Wisconsin Economic Development Corporation, and county governments to implement the [Wisconsin Commercial Ports Development Initiative](#). Supporting the Initiative with pass-through grants from CZMA § 306 funding and leveraging private and federal funds, the coastal program worked with partners to develop a strategic framework for transportation and economic development at Wisconsin commercial ports. This effort produced a statewide port infrastructure and business inventory, a market and commodity benchmarking assessment, stakeholder input, and a scenario-based analysis of potential new markets and corridors for maritime transportation through Wisconsin ports in preparation for growing freight transportation demand in the region.



### **Sustaining strategic partnerships at Illinois International Port District**

Along the Calumet River and Lake Michigan, Illinois International Port District's Port of Chicago is at the intersection of shipping, rail, and road, poised to foster economic development locally and regionally. The Port moves more cargo than any other on the Great Lakes; through shipping alone, it moves 19 million tons annually. Under new leadership, the Port District is embarking on several initiatives to revitalize and strengthen the Port, and the [Illinois Department of Natural Resources \(IDNR\) Coastal Management Program](#) is a key partner in this transformation. A \$75,000 IDNR § 306 coastal grant is enabling the Port District to undertake a market analysis, which fills a critical information gap in its master planning efforts. The market analysis will inform future port investments such as opportunities for land development (both commercial and recreational) and expansion of maritime industries.

The program also spearheaded several partnerships focused on the port's revitalization. One brings together funders and other like-minded entities to align and leverage their support, which has collectively totaled more than \$2.5 million in grants and in-kind work. As a part of this effort, IDNR and Chicago Community Trust are providing a joint \$100,000 seed grant to build port capacity in grant management, planning, and stakeholder facilitation and engagement. This additional capacity would enable the port to develop new revenue streams and better leverage recent funding from new state and regional sources. Another IDNR-led partnership engages the Prairie Research Institute's Illinois Sustainable Technology Center and Illinois Environmental Protection Agency on environmentally conscious working waterfront practices.

**Tourism and Recreation**

State and Territory CZM Programs provide funding, planning support, technical assistance, and critical interagency coordination services for coastal communities to bolster the thriving tourism sector, improve public access, restore natural coastal systems, and plan for multiple uses of coastal resources. Each State and Territory balances consumptive use with conservation of the unique coastal features that sustain the nation’s critical tourism industry.

**CZM Creates Access**

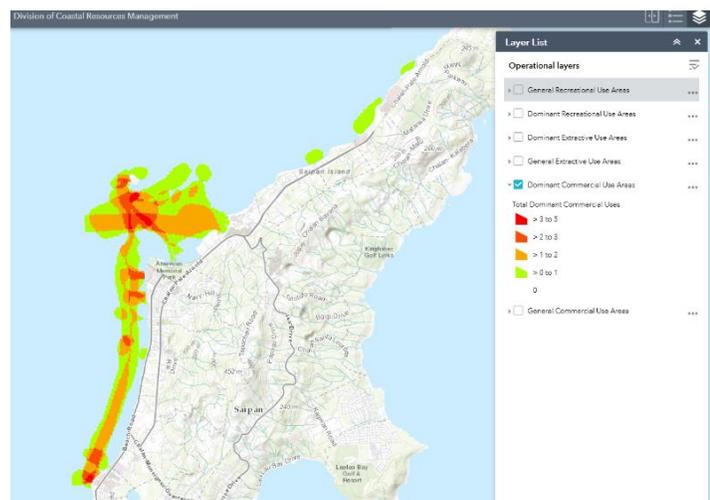
Between 2008 and 2017, State and Territory CZM Programs provided technical and financial assistance to:

- create **637** new access sites
- enhance **2,242** existing access sites
- protect **37,458 acres** of coastal habitat
- educate **38,851 people** about public access opportunities (2008-2015)<sup>22</sup>
- train **3,286 coastal decision makers** on how to comprehensively plan for and manage coastal access<sup>23</sup>

Some of the key roles CZM Programs play in the Tourism and Recreation sector include:

**Using participatory mapping methods to maintain a safe and healthy Saipan Lagoon in the Commonwealth of the Northern Marianas Islands**

The [Division of Coastal Resources Management](#) in the Commonwealth of the Northern Marianas Islands engaged local stakeholders in an effort to understand current and emerging usage patterns and user conflict in the Saipan Lagoon.<sup>24</sup> The lagoon is the focal point for recreational, commercial, and extractive uses by residents and visitors alike. The project used participatory GIS, bringing together local stakeholders to identify the areas where they engage in lagoon-dependent activities on a digital map. The participatory mapping workshop and supplemental surveys led to the creation of the most detailed use maps of Saipan Lagoon to date. The Division used these maps to inform the Saipan Lagoon Use Management Plan, which sets forth management priorities and recommendations to reduce conflict between users and ensure the sustainable use of the lagoon resources. The maps and the data layers from the project have been shared publically in an [interactive web mapping application](#) and through [the Digital Coast](#).



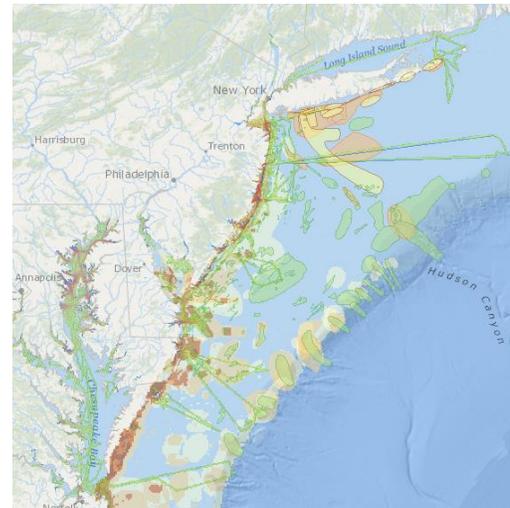
<sup>22</sup> NOAA Office for Coastal Management, 2017, *Performance Management Data 2008-2017*

<sup>23</sup> NOAA Office for Coastal Management, *The National Coastal Zone Management Program – Measuring Performance – Coastal Habitat*, <https://coast.noaa.gov/czm/media/czmperfhabitat.pdf>

<sup>24</sup> Digital Coast, *Using Participatory Mapping Methods to Maintain a Safe and Healthy Saipan Lagoon*. <https://coast.noaa.gov/digitalcoast/stories/saipan-pgis.html>

### Coordinating across states to identify recreational areas in the Mid-Atlantic

The State CZM Programs of [Virginia](#), [Maryland](#), [Delaware](#), [New Jersey](#) and [New York](#) engaged across state lines, in partnership with NOAA's Coastal Services Center and Monmouth University to map 22 recreational uses across the Mid-Atlantic region. Through stakeholder workshops and survey instruments, the CZM programs cataloged coastal-dependent uses from scenic and wildlife viewing to shoreline fishing, sailing, and snorkeling, as well as boating density and popular routes. The findings of this effort are publically available through the CZM Programs' Mid-Atlantic Regional Council on the Ocean (MARCO) Ocean Data Portal.<sup>25</sup>



### Deploying green infrastructure solutions to stem runoff and safeguard Puerto Rico's corals

The [Puerto Rico Coastal Management Program](#) used CZMA § 306 funds to address sedimentation of a nearshore coral ecosystem that is critical to the local economy.<sup>26</sup> The project focused on Playa Tamarindo, a popular beach destination for locals and tourists on Puerto Rico's Culebra Island. The beach area is prone to sediment and pollution runoff issues. Bare soils cause sediment runoff, while cars driven on the beach pose pollution concerns for the local waterway that is part of NOAA's Habitat Blueprint designation. Project partners developed a plan using green infrastructure solutions to reduce runoff, installing plantings to vegetate bare soil and pervious parking to help absorb some of the excess water. After green infrastructure installation, the team utilized OpenNSPECT software to evaluate the effectiveness of this restoration activity on reducing nonpoint pollution and sediment loadings. Initial studies show that overall sediment loads to Playa Tamarindo's marine habitats have decreased, thus reducing the impacts to local coral communities.



<sup>25</sup> <http://portal.midatlanticocean.org> - Economic data can also be accessed through the portal's "socioeconomic" data theme.

<sup>26</sup> Digital Coast, *Applying Green Infrastructure to Stem Runoff and Safeguard Puerto Rico's Corals*. <https://coast.noaa.gov/digitalcoast/stories/playa-tamarindo.html>



Photo Credit: VA CMP

**Working with Wisconsin communities to plan for recreation and tourism development**

The [Wisconsin Coastal Management Program](#) provided funds from multiple cooperative agreement years to further comprehensive planning for outdoor recreation, water trails, shipwrecks, regional trails, and public travel guide information. These initiatives further public awareness of and access to recreational activities, fueling tourism revenues associated with the Blue Economy. The suite of projects funded include:

- *The Lakeshore Coastal Recreation Study*
- *The Wisconsin Lake Michigan Water Trail*
- *The Wisconsin Lake Superior Water Trail*
- *The Twin Rivers Water Trail Plan (in progress)*
- *The Milwaukee Urban Water Trail Map Update*
- *Paddling Through History: Shipwreck Interpretation for Paddlers (in progress)*
- *The Iron County Regional Trail Plan (in progress)*
- *The City of Superior Comprehensive Outdoor Recreation Plan (in progress)*
- *The Wisconsin Harbor Towns Travel Guide*



Photo Credit: WI CMP

### Revisioning a historic industrial harbor for the future in Illinois

Once a highly contaminated area with a legacy of manufacturing activity, Waukegan Harbor and the nearby waterfront area is experiencing a tremendous period of renewal and growth. [Illinois' Coastal Management Program](#), using EPA Great Lakes Restoration Initiative funding, is working with US Environmental Protection agency to facilitate cleanup and monitor the remediation. The Coastal Program's partnership with Waukegan goes beyond remediation to create a foundation for transformative revitalization. Illinois' Coastal Program funded several important planning efforts to



Photo Credit: IL DNR CMP

identify community priorities and strategies to encourage recreation, resource protection, and redevelopment of the area. These included the Lakefront Active Implementation Plan, Waukegan Port District Master Plan, Sustainable Shoreline Plan, and a Beach and Dune Management Plan. These efforts provide the blueprint for creative opportunities to promote public access and sustainable development.

The City of Waukegan and the Waukegan Port District are now implementing their planned vision for a vibrant and welcoming locale for residents, tourists, and business alike. The Port District has welcomed new regional businesses, attracted local residents for events like the Earth Day Cleanups, and plans to open an ADA accessible canoe and kayak launch as part of the Lake Michigan Water Trail this year. The city has focused on improving the swimming beach and offering a suite of activities, from morning yoga to concerts under the lakefront pavilion. Food trucks are now part of the summertime scene at the beach because of the City's investment in parking infrastructure and permitting changes. Stormwater management improvements, designated dune trails and wayfinding, and interpretive signs are also in the works for this year. The Illinois Coastal Management Program investments, via NOAA Coastal Zone Management Act funding, in planning, coordination, and partnership building are reaping dividends in lakefront improvements for the community of Waukegan.<sup>27</sup>



<sup>27</sup> *Waukegan Port District Master Plan*, 2017 <https://waukeganharbor.com/wp-content/uploads/170630-Waukegan-Harbor-Master-Plan.pdf>

## Living Resources

### Living Resources

CZM Programs manage the vital living resources that sustain the Blue Economy by balancing ecosystem conservation and management with prudent coastal development – ranging from working with industry to plan and site innovative aquaculture projects, to protecting the estuarine habitats that sustain offshore fisheries, to conserving the coral reefs and beaches that drive coastal tourism. CZM Programs lead in coordinating across sectors, including by:

### CZM Restores Resources

CZM Programs used outreach and coordination, funding, permitting, research, and restoration to ensure that coastal development remains strong without compromising natural systems, with significant return on CZM Program investment:

- **34,147 acres** of coastal habitat restored
- **22.6 M pounds** of marine debris removed
- **502,000 people** educated about importance of and how to protect coastal habitat<sup>28</sup>
- As much as **\$11** in natural goods and services is returned to the public for every \$1 invested in land conservation<sup>29</sup>

### Collaborating to develop science-based planning tools for aquaculture in Washington

[Washington's Coastal Zone Management Program](#) has worked since 2011 with local government partners, the shellfish aquaculture industry, federal government, Tribes, and non-government entities to implement the Washington Shellfish Initiative, a partnership to restore and expand the state's shellfish resources through environmentally responsible planning and regulations.<sup>30</sup> Using CZMA § 309 funding, the CZM Program co-chaired and now participates in the Shellfish Interagency Permitting Team of regulators that works to improve the timeliness of permit decisions while ensuring regulatory compliance. The Program was instrumental in establishing a state aquaculture coordinator position within the Washington State Department of Agriculture and developing products that improve the permit application process. The Program also published guidance for local aquaculture polices and regulations in 2015 to improve regulatory consistency and effectiveness, and is updating that guidance in 2018. The Program is working with state agencies and the National Centers for Coastal Ocean Science to develop guidance and recommendations for marine finfish aquaculture consistent with recent legislative direction.

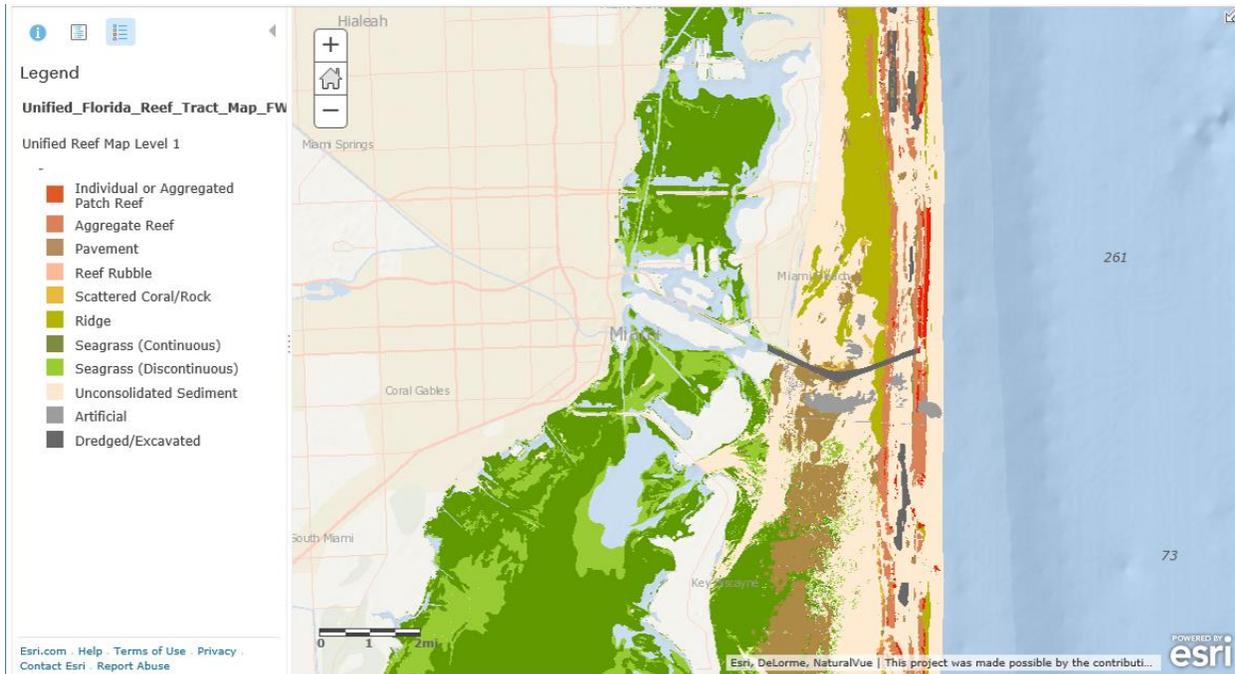
<sup>28</sup> NOAA Office for Coastal Management, 2017, *Performance Management Data 2008-2017*

<sup>29</sup> The Trust for Public Land, 2014, *New Hampshire's Return on Investment in Land Conservation*.  
<https://www.tpl.org/sites/default/files/nh-state-roi-report.pdf>

<sup>30</sup> Washington Governor Inslee, March 6, 2018. *Gov. Inslee's Shellfish Initiative*.  
<https://www.governor.wa.gov/issues/issues/energy-environment/shellfish>

### Coordinating the science and management of federal, state, and local agencies to save Florida's coral reefs

Southeastern Florida's 300-mile reef system is the backbone of the state's coastal economy and a powerhouse for the national Blue Economy, supporting 61,000 jobs and \$5.7 billion in sales and income annually.<sup>31</sup> Serious threats confront this natural system, however, including in recent years an unprecedented, widespread coral disease outbreak.



The [Florida Coastal Office](#) leads in coordinating federal, county, and local governments and NGO partners in addressing these challenges. The CZM Program used a Coastal Zone Management pass-through grant with CZMA § 306 funding to support the Southeast Florida Coastal Reef Initiative (SFCRI) in conducting a community planning process across four counties to protect the commercially-vital northern third of Florida corals that lie outside Marine Protected Areas. The CZM Program also employed a CZMA § 309 strategy to collaborate with NOAA to create a unified geodatabase for spatial analysis and data visualization of the Florida reef tract: [The Unified Florida Reef Map](#). The coordinated coral/hard bottom-mapping project received PSM funding for on-going benthic mapping and project enhancement. Technical assistance, education, and outreach were provided by a technical team to introduce the Unified Map to marine resource managers in technical meetings, and to the public through SFCRI Community Working Groups. These deliverables support efficient and timely management of the coral reefs that drive Florida's tourist economy.

<sup>31</sup> NOAA Office for Coastal Management, 2017, *Florida*, <https://coast.noaa.gov/states/florida.html>

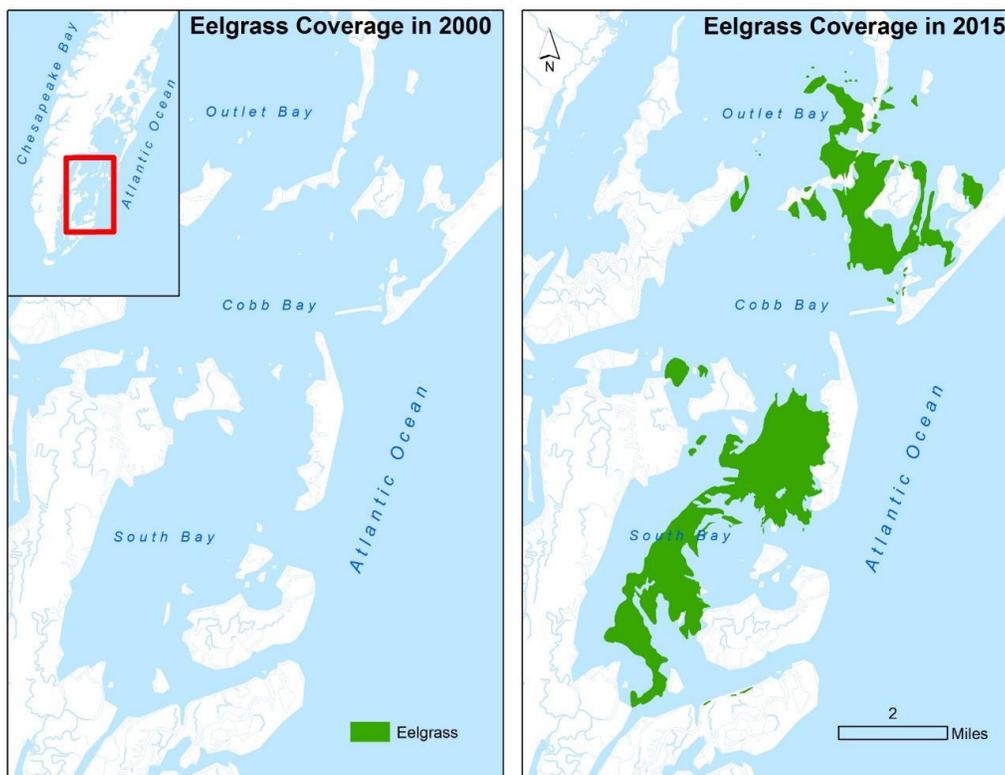
## Living Resources

### Supporting Mid-Atlantic fisheries with the world’s largest and most successful eelgrass restoration project in Virginia



The [Virginia Coastal Management Program](#) partnered with the Virginia Institute of Marine Science (VIMS) and others to restore aquatic resources on the Seaside of Virginia’s Eastern Shore. The project team has strategically distributed over 71 million eelgrass seeds since 2000. Those seeds have since grown to cover over 7,145 acres where there had been none since the 1930s when hurricanes and an eelgrass disease wiped out a crucial portion of Virginia eelgrass beds.<sup>32</sup> These eelgrass beds provide critical habitat for commercially important juvenile

fish such as menhaden, herring, shad, spot, croaker, weakfish, red drum, and silver perch, as well as blue crabs. They also improve coastal water quality by absorbing nutrients and trapping fine sediments, sequestering CO<sub>2</sub>, and protecting shorelines from erosion by absorbing wave energy. Additionally, the CZM program worked with VIMS and others to reintroduce bay scallops into the eelgrass beds. Over 200,000 bay scallops have been reared to maturity and the wild population is now estimated at over 78,000. These natural resources are critical to the economies of the Eastern Shore’s rural coastal communities.



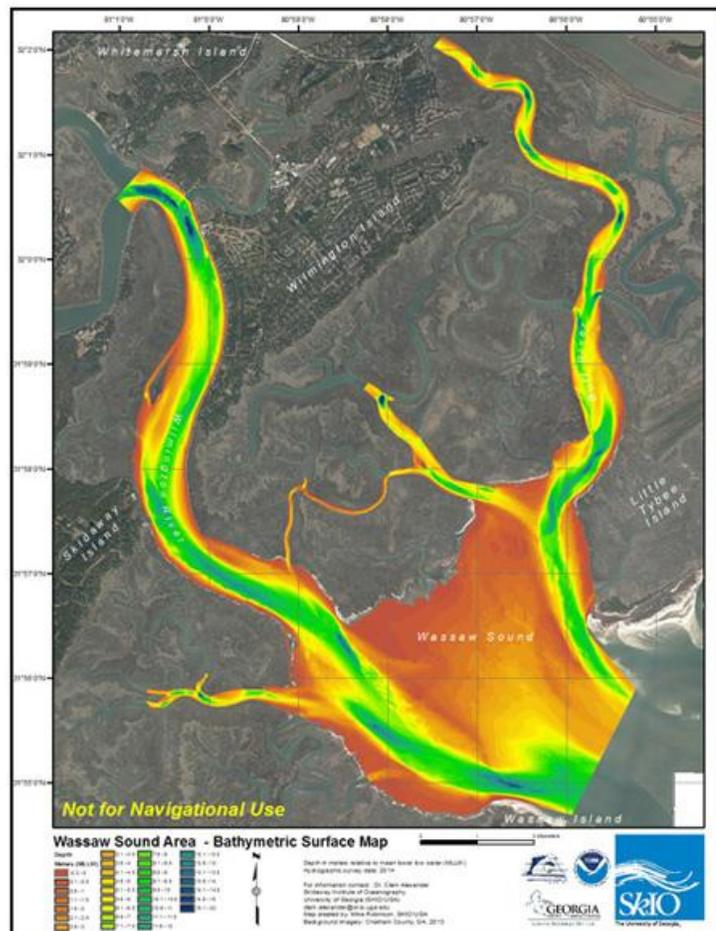
<sup>32</sup> NOAA Office for Coastal Management, 2017, *World’s Most Successful Eelgrass Restoration Project*. <https://coast.noaa.gov/states/stories/worlds-most-successful-eelgrass-restoration-project.html>



Photo Credit – GA CZM

## Supporting Georgia’s ocean science and mapping coastal systems

The [Georgia Coastal Management Program](#), through its CZMA § 306 pass-through “Coastal Incentive Grant Program (CIG),” funded the University of Georgia (UGA) to map bathymetry in coastal sound systems, using a recently acquired bathymetric sonar system that collects both bathymetry and sidescan (bottom roughness and character) data simultaneously. The Georgia coastal bathymetry was last comprehensively mapped in the 1930s. The new datasets are currently under review by NOAA for inclusion into their official bathymetric datasets. Upon inclusion, and for the first time in 80+ years, bathymetric data contained in the NOAA charts for three of the six Georgia sounds, not routinely charted by the U.S. Army Corps of Engineers, will have been produced with support from the CIG Program and the UGA Skidaway Institute of Oceanography.



### Conclusion

#### Conclusion

The State and Territory CZM Programs, though varied by structure and location, are all critical in supporting the U.S. Blue Economy. The examples shared here provide a glimpse into the diversity and number of activities that State and Territory CZM programs implement across the nation. Though State and Territory economies and environments vary widely state-to-state and region-to-region, States and Territories have developed the coastal management strategies that work best for them, and in turn work best for the overall National CZM Program and the Blue Economy. The technical and financial assistance that the NOAA CZM Program provides is critical to carrying out the mission of this unified program. The State, Territory, and NOAA CZM Program depend on one another to seamlessly deliver the services and resources needed to properly manage our shared coastal areas. This strong relationship ensures a robust and sustainable Blue Economy and Coastal Zone for today and for future generations.



Photo Credit – Texas GLO



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Coastal States Organization  
Hall of the States  
444 North Capitol St., NW, Suite 638  
Washington, D.C. 20001