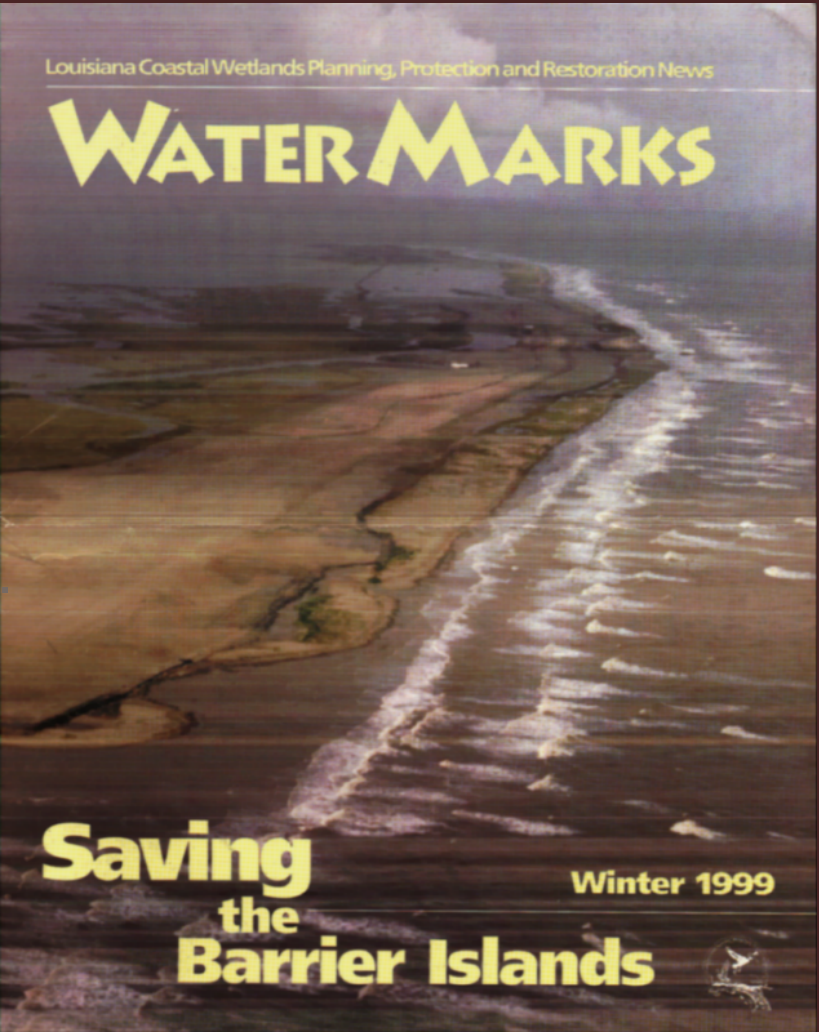
Louisiana Coastal Wetlands Planning, Protection and Restoration News

WATER MARKS



Saving the Barrier Islands

Winter 1999

WATERMARKS

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WaterMarks is published quarterly by the Louisiana Coastal Wetlands Conservation and Restoration Task Force to communicate news and issues of interest related to the Coastal Wetlands Planning, Protection and Restoration Act of 1990. This legislation funds wetlands enhancement projects nationwide, designating approximately $35 million annually for work in Louisiana. The state contributes 15 percent of the cost of project construction.

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About This Issue's Cover . . .

Trinity Island in the Isles Dernieres chain is just one of Louisiana's endangered barrier islands. (DNR Photo)

For more information about Louisiana's coastal wetlands and efforts planned and under way to ensure their survival, check out these sites on the World Wide Web:

http://www.lacoast.gov
http://www.savelawetlands.org

Icon Legend

COMPRA engineers rely on four basic techniques when creating project types. Appearing in issues of *WaterMarks*, the techniques used in each is identified by the icons explained below.

Vegetative
Vegetative techniques replace plant life lost through water ponding, erosion and saltwater intrusion.

Structural
Structural techniques use natural and man-made materials to protect existing wetlands subject to erosion or subsidence.

Sedimentary
Sedimentary techniques mimic the natural process of accretion (wetland building) by using diverted or dredged sediments.

Hydrologic
Hydrologic techniques increase or decrease the amount of water flowing into or out of wetlands, returning water flows to more natural patterns.

Louisiana's barrier islands are the fragile front line of defense against the attacks of wind and water that batter the state when the inevitable hurricanes strike. From the Chandeleur chain to the Isles Dernieres, they take the brunt of these storms, reducing the height of hurricane storm surges — the most destructive element of a hurricane. In addition, barrier islands absorb wave energy and reduce erosion of the priceless wetlands immediately behind them.

Adding Up the Costs of Losing the Barrier Islands

Oil and gas facilities populate the bay side of Whiskey Island in the Isles Dernieres barrier island chain in Terrebonne Parish. Continued depletion of Louisiana's coastal barrier islands could lead to millions of dollars in relocation and construction costs for the oil and gas industry, which relies on barrier islands to protect its facilities from hurricane and storm damage. (DNR Photo)

That's a lot of benefit from what are essentially shifting ribbons of sand. But the future of the barrier islands is in jeopardy today. As a result of severe hurricane damage, rising sea levels, a limited sand supply and human interference, the barrier islands are eroding at such an alarming rate that the protection they have offered may soon be gone. If nothing is done to protect and restore them, how will Louisiana be affected?

New economic information from the Barrier Shoreline Feasibility Study, a comparative analysis of barrier island issues facing coastal Louisiana being conducted by the Louisiana Department of Natural Resources, has set forth the first estimates of the costs in dollars and cents if no action is taken to protect the islands.

continued on the following page

Adding Up the Costs of Losing the Barrier Islands

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I. Baker Smith, a consulting firm contracted by the department, has identified two major areas of economic impact under a "no-action" scenario: wetlands loss and increased storm-flooding damages. (It is important to note that these results are still in draft form and are subject to further revision.)

Wetlands Loss

If Louisiana's barrier islands continue to break down, the coastal wetlands that lie behind them, already severely threatened by subsidence, changes in hydrology and rising sea level, will face still more danger. As some of the most productive natural environments on the face of the earth, these wetlands provide the largest habitat for Louisiana's massive fish and wildlife resource. The state's billion-dollar-a-year commercial fishing industry hinges on the wetlands to provide nursery ground for the shrimp, blue crabs, crawfish, oysters, menhaden and wild catfish that make up its catch. The DNR study predicts that over 30 years, the loss to commercial fishing from barrier island disintegration will amass into millions of dollars.

Additionally, wetlands loss will result in reduced recreational enjoyment – and economic damage to the recreation and tourism industries. Currently the barrier islands provide superior opportunities for birdwatching, nature photography and painting, beachcombing, boating, shelling, swimming and sightseeing. According to the study, the loss or diminishment of these opportunities could affect Louisiana's economy substantially over the next 30 years. If the

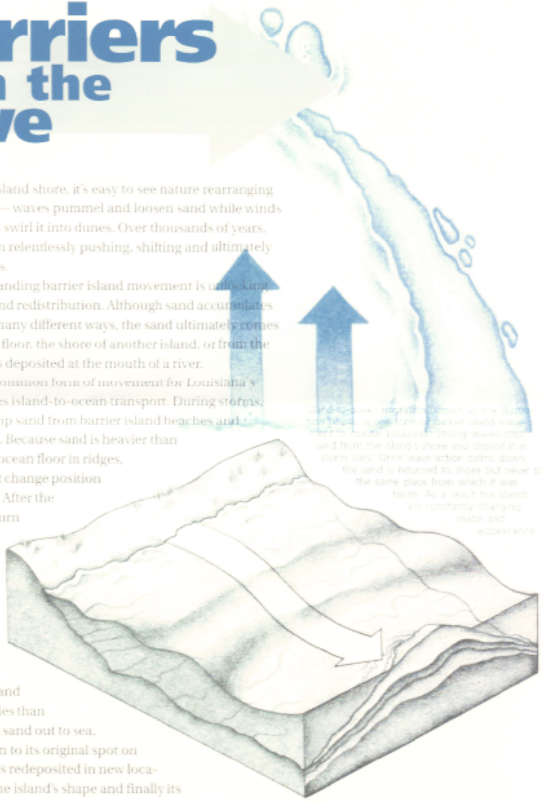
continued on page 5

Barriers on the Move

From a barrier island shore, it's easy to see nature rearranging the landscape — waves pummel and loosen sand while winds whisk it off and swirl it into dunes. Over thousands of years, these forces have been relentlessly pushing, shifting and ultimately moving barrier islands.

The key to understanding barrier island movement is unlocking the complexities of sand redistribution. Although sand accumulates on barrier islands in many different ways, the sand ultimately comes from either the ocean floor, the shore of another island, or from the littoral material that is deposited at the mouth of a river.

Perhaps the most common form of movement for Louisiana's barrier islands involves island-to-ocean transport. During storms, strong waves often strip sand from barrier island beaches and carry it into the ocean. Because sand is heavier than water, it settles to the ocean floor in ridges, called storm bars, that change position with wave movement. After the storm ends, waves return to a steady, calm current. The sand from the ridges rides these currents back to the island's shore. But because these calm waves approach the island from different angles and with different intensities than those that washed the sand out to sea, the sand doesn't return to its original spot on the beach. Instead, it is redeposited in new locations, first changing the island's shape and finally its actual location.



a Day at the Beach

An Overview of Barrier Island Restoration and Protection Projects

Barrier island projects have been an instrumental part of the Breaux Act's restoration and protection efforts from the beginning. The first priority project list, published in 1991, included two such projects — a vegetative plantings demonstration project on Timbalier Island and the first phase of the massive Isles Dernieres restoration. To date, the Act's seven priority project lists identify seven funded barrier island projects:

- three restoration projects and one demonstration project located in the Isles Dernieres chain, which stretches from Caillou Bay to Terrebonne Bay in Terrebonne Parish
- two restoration projects and one demonstration project situated in the Timbalier Islands chain, which reaches from eastern Terrebonne Bay to Timbalier Bay in Lafourche and Terrebonne parishes

A brief summary of each of these projects, including their major features and current status, are presented at right.

Isles Dernieres

(enlarged map area shown below)

Whiskey Island Restoration

Whiskey Island, situated in the western part of the Isl… experiencing rapid disintegration and would have be… restoration efforts had been made. Breaux Act efforts… which began in February 1998 and were completed in… of a back-bay retention dike and creation of marsh pl… filling of Coupe Nouvelle as well as a series of breache… tolerant vegetation.

In total, these efforts have protected the island fro… end of 20 years there should be over 1,200 acres of sal… Gulf side and the installed back-bay dike. Total projec…

Raccoon Island Breakwaters Demonstration Project

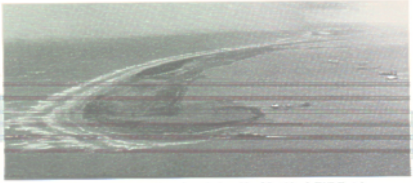
This demonstration project, completed in July of 1997, is designed to test the effectiveness of off-shore, segmented breakwaters in protecting beaches and bay side barrier island marshes from wave and storm erosion. A total of seven segmented breakwaters were installed on the east end of Raccoon Island, the westernmost island of the Isles Dernieres chain. Each 300-foot breakwater has a 16-foot top width and varies in height from 6 to 10 feet, depending on the depth of the water in which it is placed. Early observations indicate that this project has been effective at trapping sand and reducing island erosion. Total project cost was $2 million.

Barge-mounted cranes construct one of the seven breakwaters installed at Raccoon Island (NRCS photo)

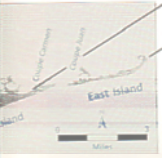
East Island and Trinity Island

Both of these Breaux Act projects are directed to two of the four islands in the Isles Dernieres chain. Each project involves dredging of sediment from nearby Lake Pelto to build up dunes on the Gulf side of each island. Sediment is also being used to close breaches in the islands and build back-bay dikes. In addition, elevated marsh areas will be created, sloping from the dunes to the back-bay dikes. Once the sediment work is complete, the marsh areas will be planted with a variety of salt-tolerant vegetation.

Dredging work, initiated in January 1998, was completed in September. Vegetative planting in the marsh areas should be completed by the summer of 1999. In combination, these Isles Dernieres projects should strengthen the islands and restore more than 119 acres of wetlands at a cost of $20.7 million.



Dredging and construction crews begin work on the bay side of East Island. (DNR Photo)



East Timbalier Island Sediment Restoration — Phases 1 and 2

Restoration and protection efforts at East Timbalier Island, located in the southeastern area of Timbalier Bay, are split into two Breaux Act projects. The first-phase project involves dredging of sand from nearby underwater locations to create dunes and wetland habitats at three locations on the island. Phase two involves further dredging of nearby sand to create dunes and wetlands in the central, submerged portion of the island. In addition, rock will be added to an existing rock breakwater to protect the new dunes and habitat from wave-induced erosion.

Scheduled for construction start in the spring of 1999, the combined efforts of phases one and two will cost more than $8.5 million and should result in over 1,200 acres of marsh and barrier island at the end of 20 years.

The photo clearly illustrates the disintegrating state of East Timbalier Island. Restoration efforts under the Breaux Act will help minimize further breakup. (NMFS Photo)

Timbalier Island Vegetative Plantings

A demonstration project completed in the summer of 1998, the Timbalier Island Vegetative Plantings project involves a series of sediment trapping fences to accumulate wind-blown and tidal sand to aid in the formation of sand dunes. The fences were installed along the Gulf side of the island and parallel to the shoreline. Vegetation was then planted behind the fences to stabilize the accumulated sand. Total cost to restore and protect 169 acres of marsh and barrier island: $430,000.

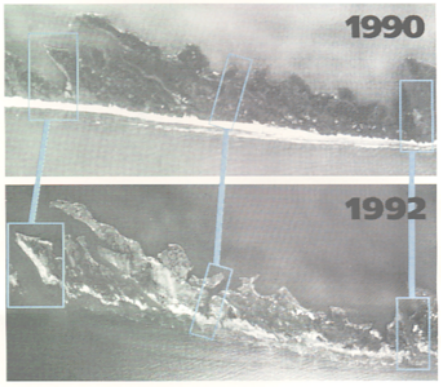
Sediment trapping fences line the shore at Timbalier Island. (ACOE Photo)

Adding Up the Costs of Losing the Barrier Islands

demand for recreational use were to increase over its present level, the effect could be even greater.

Increased Flood Damage

More significant, however, than the role the islands play in protecting wetlands is their importance to coastal residents and infrastructure. A key function of barrier islands has always been to provide a buffer zone that absorbs the frontal attack of frequent winter storms and occasional hurricanes. If the islands continue to erode and eventually disappear, this protection will be gone, and increased damage is likely to occur to residential, commercial, and public structures, as well as to roads and coastal industries.



These two photos of Raccoon Island give a clear picture of the damage a hurricane can inflict upon a barrier island. The top photo was taken in 1990, two years before Hurricane Andrew, a Category 4 hurricane, roared through the Gulf Coast's coast. The bottom photo shows Raccoon Island two months after Andrew's passage. As you can see, a significant amount of the island that was heavily land and baseline marsh in 1990 are simply gone in the 1992 photo. The effects of the hurricane's storm surge and resulting overwashing created three new islets in the vicinity. (USGS Photos)

Damage to structures is typically the most expensive outcome of storms and hurricanes along the coast. If no action were taken to restore the barrier islands and reduce the rate of wetlands loss, structural damages would be expected to increase considerably over the 30-year period considered in the study. It should be noted that these costs have been projected only for expected Category V storms — hurricanes with winds in excess of 155 miles per hour. Factoring in the effects of Category III and IV storms, which occur more frequently than Category V events, would undoubtedly raise damage costs resulting from barrier island loss.

For roads and coastal industries, damage should be less than that suffered by structures. In the Category V-storm, 30-year scenario, expected road damage will run into millions of dollars. For the oil and gas industry, which has perhaps one of the highest stakes in the barrier islands, the cost of relocating and reburying pipelines that cross both barrier islands and wetlands, and increased structural costs of future well platforms lying bayside of the islands will climb substantially over the coming 30 years. ❍

The Way They Were

Barrier Islands from a Historical Perspective

When we look at Louisiana's Isles Dernieres, Grand Isle and Grand Terre today, it's difficult to picture them as bustling communities. But their colorful history ranges from pirate dens to prestigious resorts.

For example, in the early 1800s pirates were pillaging ships throughout the Gulf Coast, and by 1810 they were storing their treasures on Grand Terre. To make room in their overflowing warehouses, the pirates often had to sell their bounty in illegal public auctions. Although Louisiana authorities overlooked the activity on Grand Terre, in 1814 the U.S. Navy closed down all local pirate operations.

Both Isles Dernieres and Grand Isle offered vacationers prime recreational beachfront in the 1800s. Early in the 19th century, many of the region's wealthy visited Isles Dernieres' resorts. The island's lure ended in 1856 when a hurricane killed hundreds of visitors and destroyed the resorts. Grand Isle endured a similar disaster when an 1893 hurricane killed 25 vacationers and severely damaged the island's resorts. ○

Ruins of the steamer Joe Webre lie on Grand Isle after the hurricane of 1893.
(Heard by wind and water: A historical and cultural history of the Gulf Coastal)

Palmetto houses were common throughout coastal Louisiana in the 19th century.
(National Archives)

Fun at the beach — the above aerial view of Grand Isle on July 4, 1938, shows cars on the beach and a few camps visible in the background.
(Louisiana Photographic Archives)

This map of Grand Isle shows property ownership and the township range system on Grand Terre, circa 1843.
(National Archives)

The WATERMARKS Interview

Katherine Vaughan

Assistant Secretary

Louisiana Department of Natural Resources
Office of Coastal Restoration and Management

In this interview, Assistant Secretary Vaughan underscores the importance of restoring the state's vanishing barrier islands.

Q: What was the purpose of the Barrier Shoreline Feasibility Study?

A: The study, which was funded under the Breaux Act, evaluated two possible barrier island restoration strategies to achieve a more historic island configuration. The two alternatives evaluated were to rebuild the islands to a "footprint" similar to that of a century ago with the added component of nearshore wave energy absorbers adjacent to the bay-fringing marshes, or to rebuild the islands to a "footprint" similar to that of the 1960s.

The study sought to quantify wetland loss problems linked to the declining protection provided by the barrier islands, and the impact that restoration of the islands in these two alternative configurations might have in reducing these losses.

Q: What are the main benefits of barrier island restoration in Louisiana?

A: Barrier island restoration will provide habitat and functional benefits to both our state and the nation as a whole. If Louisiana's barrier islands are allowed to disappear, critical shore and seabird nesting, resting, and feeding habitat will be forever lost. If this comes to pass, we can expect a concomitant decline in these bird populations because similar habitat and protection from predators is at a premium in Louisiana. The islands also provide important feeding, pupping and nursery habitat for many species of shark. Shark populations are already in a state of decline in the Gulf, and loss of the islands is likely to exacerbate the demise of these populations. There are also certain fish, such as the Florida Pompano and the Gulf Kingfish, that depend on nearshore beach habitat for feeding.

Restoring the islands would reduce wave energy in Terrebonne, Timbalier and Barataria Bays. More importantly, loss of the islands will result in significant increases in wave energy in the bays and fringing marshes. This has obvious financial implications to our state's important commercial and recreational fishing industries that contribute over $2 billion annually to our economy. Loss of the islands also has significant financial ramifications to oil and gas infrastructure located in our bays. To build or refurbish oil and gas infrastructure in the open Gulf costs roughly twice as much as it does in the more protected bay environment.

Q: Is there any danger that when restoration is completed, a Category V hurricane like the one that recently hit Honduras could destroy all of the restoration efforts?

A: Hurricanes are a fact of life in Louisiana, and it is not only the big hurricanes that we have to contend with. Smaller hurricanes, tropical storms and cold front passages all play integral roles in sculpting our coast. If, or should I say when,

we are hit by such a large and damaging storm, it is important to keep in mind that island restoration is expected to reduce the height of the hurricane surge. In theory, this should reduce the magnitude of flooding and resultant damage to our coastal communities. That is to say, if the islands were clobbered by a Category V hurricane, the economic losses due to damage to restoration efforts might be at least partially offset by the protection provided to our coastal cities and communities.

Where do we go from here?

There is little doubt that many of our barrier islands will be lost unless we take strong and decisive action very soon, as we have at the Isles Dernieres where substantial restoration has occurred. With this massive restoration project on the ground, and with the East Timbalier barrier island restoration projects about to go to construction, we have created a natural laboratory that will give us hard data on the effectiveness of barrier island restoration. We will learn much from this real-world test case with respect to how island restoration affects the near-term and long-term sustainability of our coastal marshes.

Barrier island restoration is a Coast 2050 strategy endorsed by the CWPPRA Task Force, the Louisiana Coastal Wetland Conservation and Restoration Authority, and all twenty parishes in our coastal zone. As a restoration strategy, island restoration is closely linked with other strategies that seek to sustain our coast by restoring the connections between the barrier islands, wetlands, and the Mississippi River.

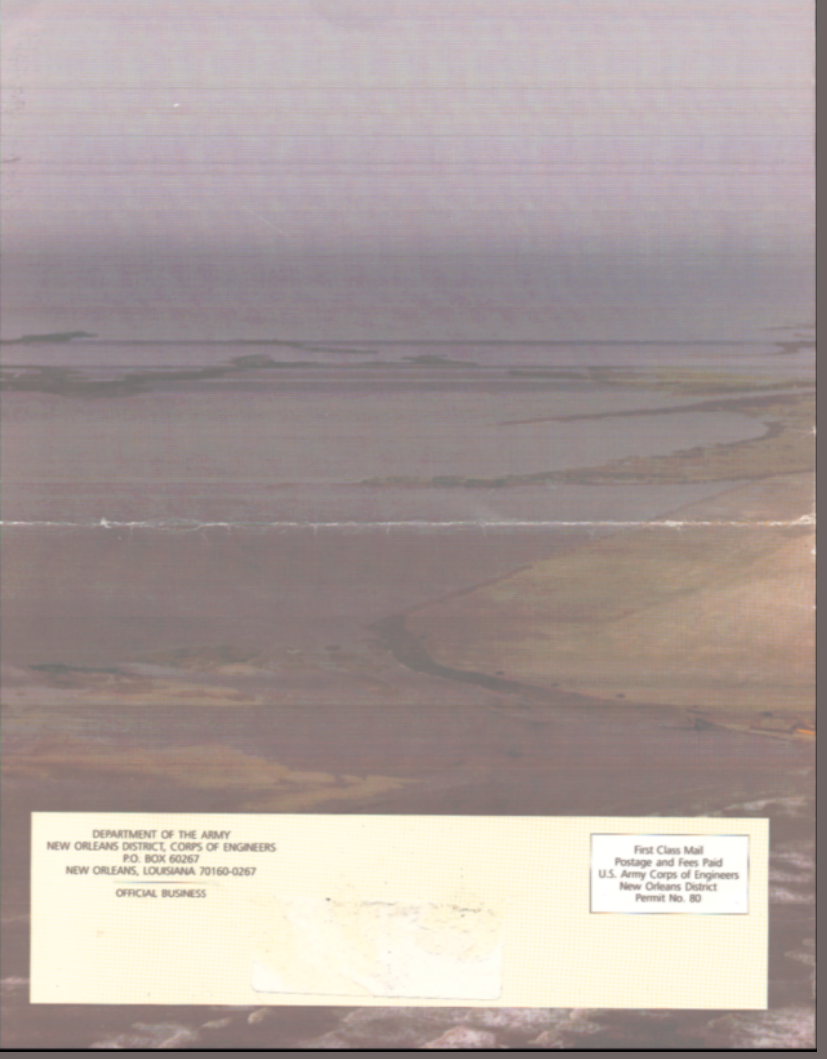
"There is little doubt that many of our barrier islands will be lost unless we take strong and decisive action very soon...."

There are three related ecosystem-level strategies in the Coast 2050 Plan that address both marsh and barrier island loss. In the near term, we should build the West Bay sediment diversion project. This will substantially restore the flow of riverine sediments into the littoral drift where once again sediment will be available for island nourishment. Also in the near term is evaluation of a sediment trap in the Mississippi River south of Venice. The purpose of this strategy is to reduce the loss of river sediments to the deep waters over the continental shelf. The essential concept is to excavate a deep hole in the riverbed above Head of Passes that will trap sediment carried by the Mississippi. The trapped sediment could then be removed by dredge and used beneficially for wetland and island restoration.

Over the long term, we need to evaluate diverting the main river channel both east and west to restore the land-building processes that existed before the levees were built on the river. This would be a major source of sediment for natural barrier island maintenance in the Barataria Basin. As we are already doing, we should continue to beneficially use materials from channel dredging for our coastal system, including barrier islands, whenever feasible and cost-effective.

What is a realistic timetable for barrier island restoration, and roughly how much might it cost?

Restoration of the islands will undoubtedly be an ongoing effort for decades to come. It is probable that restoration of the islands will be incrementally accomplished as funding becomes available and as the Coast 2050 strategies are implemented. If either of the alternatives considered in the study were implemented, the cost estimates of restoring the islands from Raccoon Point to Sandy Point range between $508 million to $900 million, depending on the scale of restoration. ❍



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