State of South Carolina

Governor Henry McMaster

Thomas S. Mullikin, Chairman

South Carolina Floodwater Commission

ARTIFICIAL REEF SYSTEMS TASK FORCE

BACKGROUND

Of a total boundary length of 824 miles, South Carolina's **coastline measures 187 miles**. South Carolina's "tidal shoreline" is 2876 miles. NOAA defines the tidal shoreline as including offshore islands, sounds, bays, rivers, and creeks to the head of tidewater or to a point where tidal waters narrow to a width of 100 feet.

The impacts of coastal flooding are substantial and growing given population growth and coastal development. Evidence shows that reefs serve as natural, low-crested, submerged breakwaters, which provide flood reduction benefits through wave breaking and wave energy attenuation. These processes are functions of reef depth and rugosity (seafloor geometry/roughness). The flood reduction benefits of reefs and other coastal habitats are predicted to be high and even cost effective in comparison to traditional approaches.

In June of 2018, the International Journal of Science and Nature published a study "*The global flood protection savings provided by coral reefs*" concluding that "Coral reefs can provide significant coastal protection benefits to people and property. The expected damages from flooding would double, and costs from frequent storms would triple without reefs. For 100-year storm events, flood damages would increase by 91% to $272 billion without reefs."

Coral reefs provide protection from storms and rising sea level and offer critical support for coastal protection. The effects are comparable to artificial breakwaters that are engineered specifically to dissipate wave energy. Artificial reefs' hydrodynamic features act to reduce incoming waves and alter current patterns and shoreline adjustments behind the artificial reefs. The reef structure buffers shorelines against waves, storms, and floods, helping to prevent loss of life, property damage, and erosion.

Another benefit of artificial reefs, particularly in South Carolina, is the enhancement of the South Carolina coastal marine eco-system thus providing more opportunity for South Carolina fisherman and divers and the fishery industry, recreation, and tourism.

According to the South Carolina Department of Natural Resources, the majority of the continental shelf off the South Carolina coast is covered with sand several feet deep, while only about 5 to 10 percent of the bottom has the appropriate geological makeup to allow for the formation of a reef community. This also results in limited opportunities for fishermen and divers to pursue their interests. To enhance recreational fishing and sport diving opportunities in coastal waters, and to increase the amount of productive hard-bottom habitat available overall, man-made, or "artificial" reefs can be created. This is accomplished by placing suitable long-lived, stable and environmentally safe materials (usually steel or concrete) on a selected area of ocean bottom. Once in place it acts in the same way that naturally occurring rock outcroppings do in providing hard substrate necessary in the basic formation of a live-bottom reef community. When properly designed, located and constructed, man-made reefs can be equally as productive as naturally occurring hard bottom habitats.

Artificial reef development in South Carolina's coastal and offshore waters is currently managed through the South Carolina Department of Natural Resources, Marine Resources Division (MRD). The state's Marine Artificial Reef Program is a part of the MRD's Office of Fisheries Management (OFM). Marine artificial reefs are currently constructed in South Carolina primarily to enhance saltwater fishing opportunities for recreational anglers, and to provide additional locations of interest for the growing number of sport divers in the state. Nearly 20 square miles of ocean bottom are currently permitted for this purpose.

A similar program with similar goals is the rebuilding of depleted oyster reefs with recycled oyster shells such as the Coastal Oyster Recycling and Restoration Initiative (CORRI). Oyster reefs provide structure and food thus increasing other forms of aquatic life. Additionally, the beds control erosion by acting as natural breakwaters along the shoreline.

OBJECTIVES

To design, construct, and install an artificial reef system along the South Carolina Coast which will diminish the effects of coastal flooding while enhancing opportunities for fishing, diving, and tourism.

To seek out and promote similar innovative programs such as the Oyster Recycling and Restoration Initiative to assist in constructing organic breakwaters.

DELIVERABLES

- Expansion of South Carolina DNR, Marine Resources Division’s artificial reef program objectives to include construction of artificial reefs for the additional purpose of coast line protection.

- Identification and solicitation of potential stakeholders such as wildlife and fishing organizations, tourist and recreational businesses and industries, and others for assistance in planning and construction of the artificial reefs in coordination with DNR.
- Research of new or existing programs such as CORRI and recommendations for improvement.

TIME FRAME

1Q ’19 Inclusion of “coastline protection” as a stated goal for SC DNR artificial reef program.
1Q ’19 Education and solicitation of potential stakeholders for assistance in planning and constructing artificial reefs.
2Q ’19 Artificial Reef construction plan (with time line) complete for significant coverage along the SC coast.
2Q ’19 Initial artificial reefs deployed with primary objective of shoreline protection.
2Q ’19 Recommendations completed for new or existing programs such as CORRI.