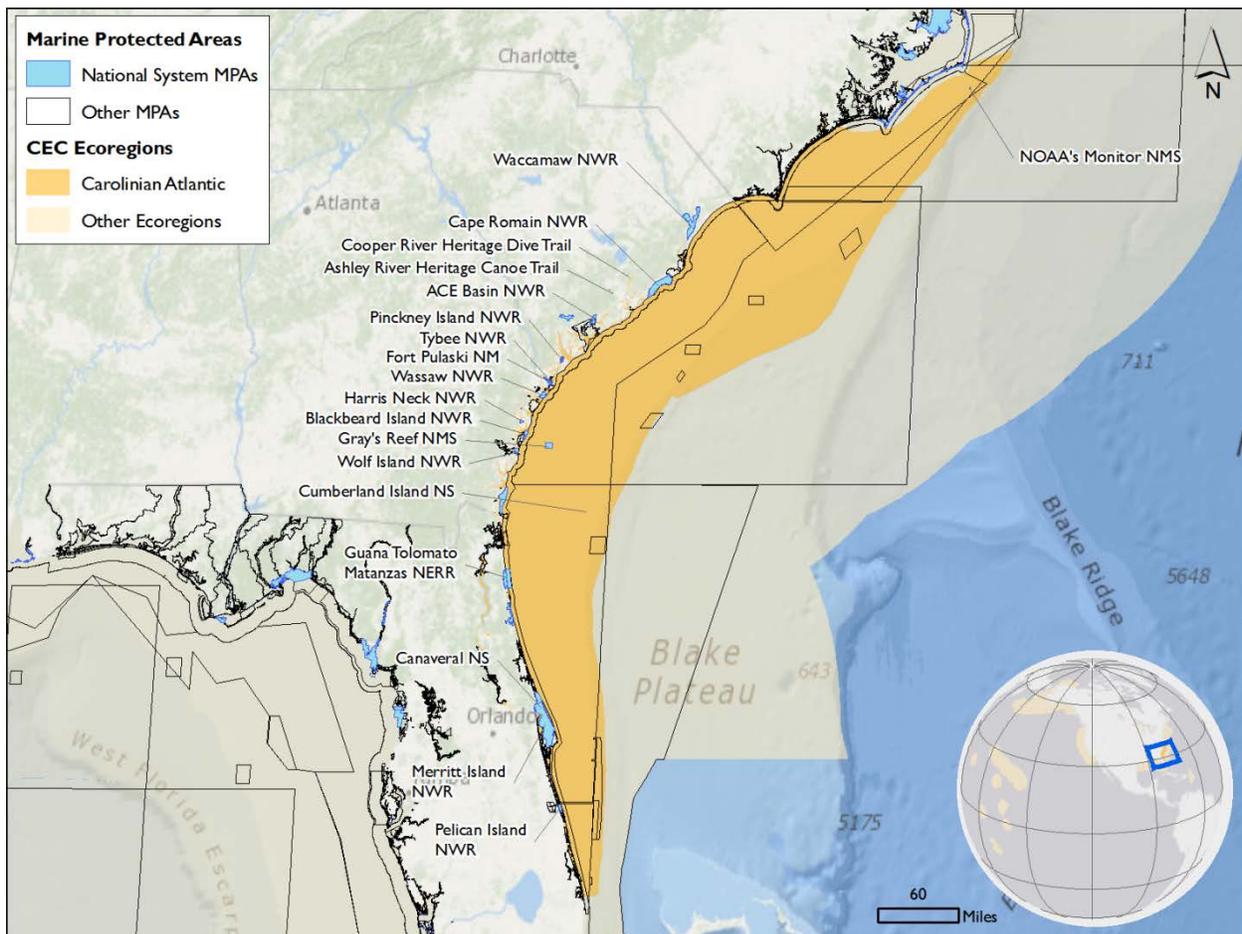


## Carolinian Atlantic (Ecoregion 11)

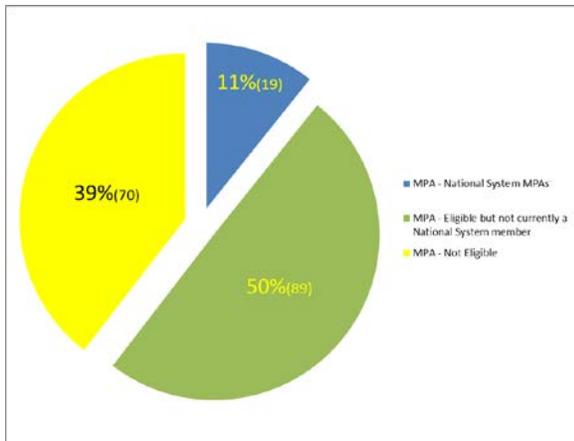
### Background

The Carolinian Atlantic ecoregion stretches along the shore of the East Coast from Palm Beach, Florida to North Carolina's Outer Banks. The ecoregion is defined by numerous tidal marshes and a broad continental shelf, and is bounded to the east by the Gulf Stream. The ecoregion receives a considerable amount of freshwater from the coastal rivers of Florida (St. Johns), Georgia (Savannah and Altamaha), South Carolina (Cooper and Santee) and North Carolina (Pamlico and Neuse). The ecoregion is highly stressed by urban development and agriculture, particularly livestock impacts on water quality.



### MPAs in the Carolinian Atlantic

Of the 178 MPAs in the Carolinian Atlantic Ecoregion, 19 (11%) are National System members, 89 (50%) are eligible but are not currently National System members and 70 (39%) are not eligible (Figure 1). The national system MPAs consist of several national wildlife refuges, two national marine sanctuaries (Gray's Reef and Monitor), a national estuarine research reserve (Guana Tolomato Matanzas in Florida) and two national seashores (Cumberland Island and Canaveral). Other MPAs include state parks and preserves, state conservation zones that have restrictions to protect select species (manatees), and several managed by the NOAA Fisheries



Service that are closed to fishing gear that harms bottom habitat. Several offshore non-national system MPAs managed by NOAA Fisheries in this ecoregion are designated Habitat Areas of Particular Concern (HAPCs), high priority areas for conservation, management, or research because they are rare, sensitive, stressed by development, or important to ecosystem function. One of these HAPCs, the Oculina Bank HAPC off Florida, contains

Figure 1. Percent of Marine Protected Areas (MPAs) within Carolinian Atlantic (Ecoregion 11) that are members of the National System of MPAs (n=178)

the only known ivory tree coral (*Oculina varicosa*) in the world.

MPAs in this ecoregion protect many coastal habitats, such as sand dunes (e.g., found in 32% of the ecoregion’s MPAs), beaches (46%) and coastal barrier islands (34%). Many rivers and streams (23%) flow from the Appalachians to the low-lying coastal wetlands and estuaries, supporting many estuarine-dependent species. Nutrients from these coastal watersheds support ecologically important biogenic habitats such as seagrass (27%), wetlands and mudflats (63%), benthic algae (25%) and kelp/algae (8%). The region contains relatively little non-biogenic habitat such as rocky intertidal (2%) found in a few of this ecoregion’s MPAs (Figure 2).

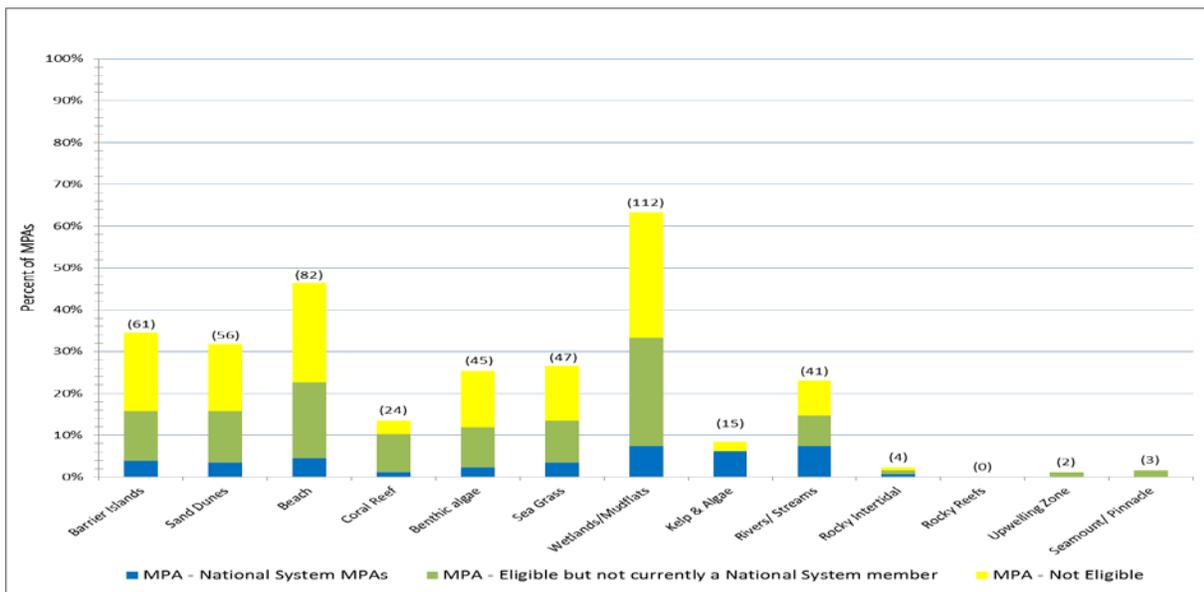


Figure 2. Percent of MPAs that contain certain habitat groups in the Carolinian Atlantic (Ecoregion 11)

Several MPAs contain primarily deepwater mesotopic and coldwater corals. For example, Gray’s Reef National Marine Sanctuary off the coast of Georgia contains the largest sandstone

reef in the southeastern United States and attracts a large number of sportfishers and divers. Seamounts are found within 2% of the ecoregions MPAs, and are important for a variety of offshore fisheries.

Highly productive estuaries and habitats such as salt marshes and seagrass beds support abundant fisheries. Anadromous, estuarine, and coastal fish pelagic species such as Atlantic sturgeon, American shad, Atlantic menhaden, bluefish and striped bass migrate offshore from the east coast’s rivers and streams during part of their life cycle, and are present in 14%, 67% and 54% of the ecoregion’s MPAs, respectively (Figure 3). Manatees are frequently reported in the ecoregion’s MPAs (47%) due to the extensive seagrass beds and protective coastal marshes and estuaries, and the many sandy beaches and offshore reefs are sought out by sea turtles (56%). The offshore waters of this ecoregion are also highly productive, with short-lived phytoplankton blooms generated from the nearby Gulf Stream. Various types of marine fishes are found throughout many of the ecoregion’s MPAs, including reef fish (21%) associated with warm mesotopic and deeper coldwater corals, commercially important dermal fish (49%) and deepwater fish (7%). The ecoregion also supports marine mammals, including cetaceans (reported in 51% of MPAs) such as North American Right and fin whales and several species of coastal dolphins.

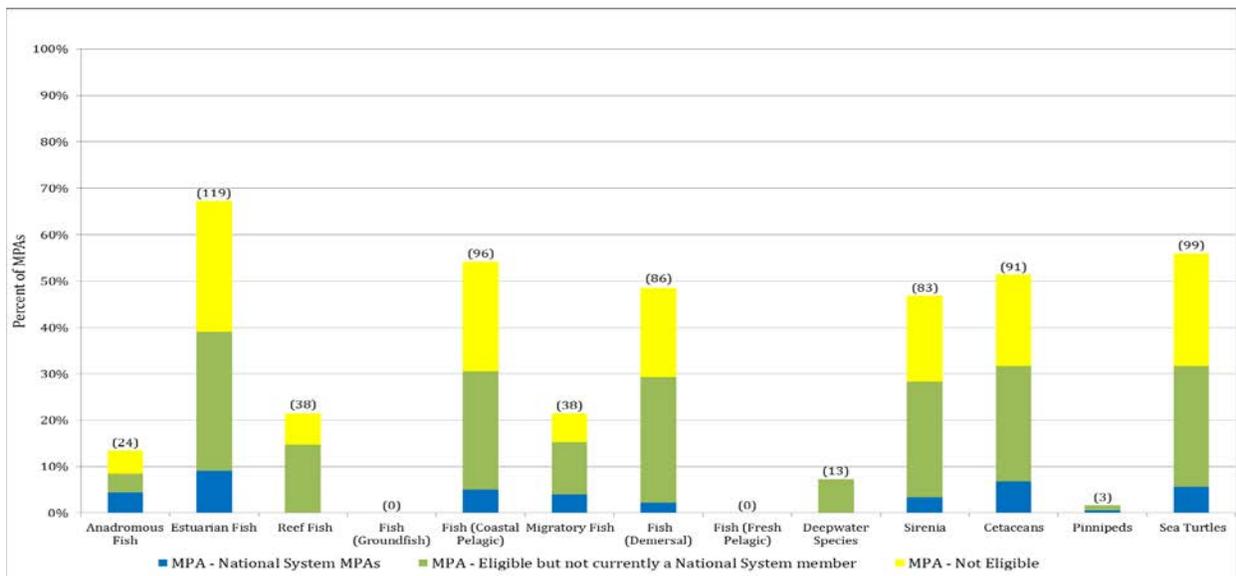


Figure 3. Percent of MPAs that contain certain fish and marine mammal groups in the Carolinian Atlantic (Ecoregion 11)

Birds are classified as waterfowl, estuarine or seabirds, signifying where their principal feeding areas occur, and are found in 55%, 78%, and 69%, respectively of the ecoregion’s MPAs (Figure 4). Waterfowl and estuarine birds are found in the many coastal ponds and rivers and streams flowing into salt marshes and estuaries. Seabirds use both onshore and offshore MPAs for resting and actively feeding on fish. Birds not classified in any of these feeding guilds are found in 72% of the ecoregion’s MPAs.

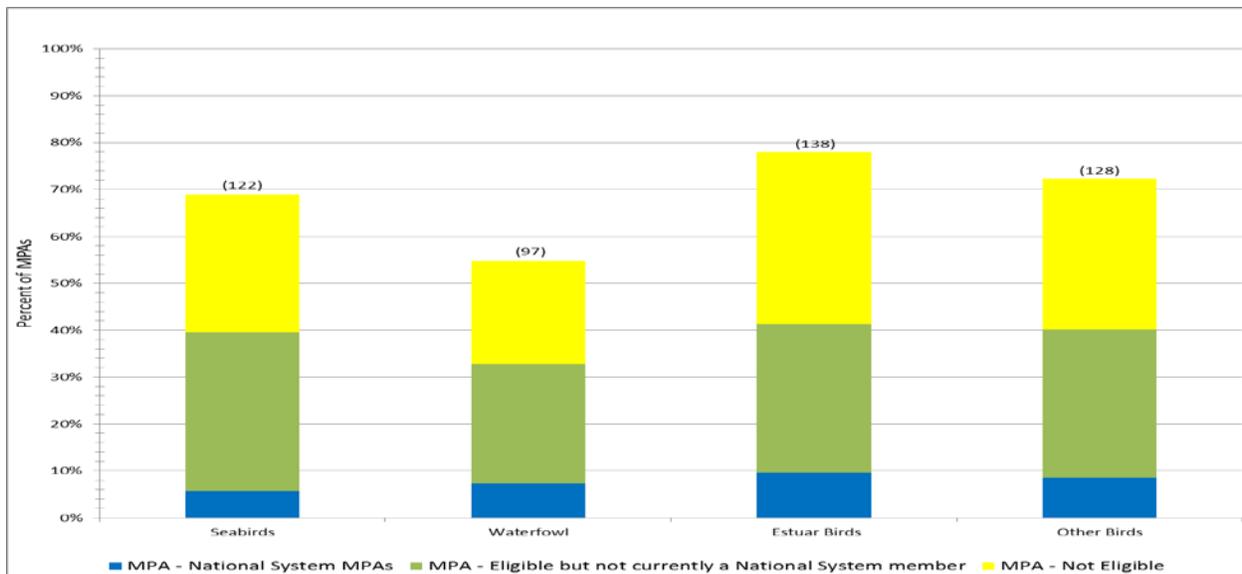


Figure 4. Percent of MPAs that contain marine birds and reptiles in the Carolinian Atlantic (Ecoregion 11)

The ecoregion's wetlands, coastal marshes and intertidal mudflats support a highly productive benthos (Figure 5). Eastern oyster reefs form at the mouths of many coastal rivers. Subtidal invertebrates such as white, brown, and pink shrimp, blue crab and spiny lobster thrive due to freshwater nutrient input, habitat and strong tidal flushing found in many of the ecoregion's MPAs. Subtidal benthic algae (29%) provide both a food source and protective habitat for many estuarine-dependent fish and invertebrate species.

Ecologically important areas that support where species breed, nest, spawn and rest can be found in the ecoregion's estuarine and offshore areas. As seen in Figure 6, the many wetlands, mangroves (29%), coastal marshes and shellfish beds (44%) act as nursery grounds (31%), fish spawning areas (24%), nesting sites for both birds (60%) and turtles (32%) and resting places for migrating (60%) bird species. The NOAA Fisheries Service has jurisdiction over 102 threatened and endangered species listed under the Endangered Species Act (ESA), many of which (such as North Atlantic Right and fin whales, dolphins, as well as green, hawksbill, loggerhead and leatherback sea turtles) are found in this ecoregion and in 67% of the ecoregion's MPAs.

## Conclusions

The 178 MPAs in this ecoregion contain the major habitat and species groups and ecologically important areas found in the ecoregion as a whole. These resources are also frequently found in more than one MPA, resulting in some replication of ecological features (species, habitats and ecological processes) -- one of the criteria identified by the Convention on Biological Diversity (CBD) in designing effective MPA networks.

## Suggested Reading

Christian, Robert. R. The Value of Healthy Estuaries.

<http://www.actionbioscience.org/environment/christian.html>

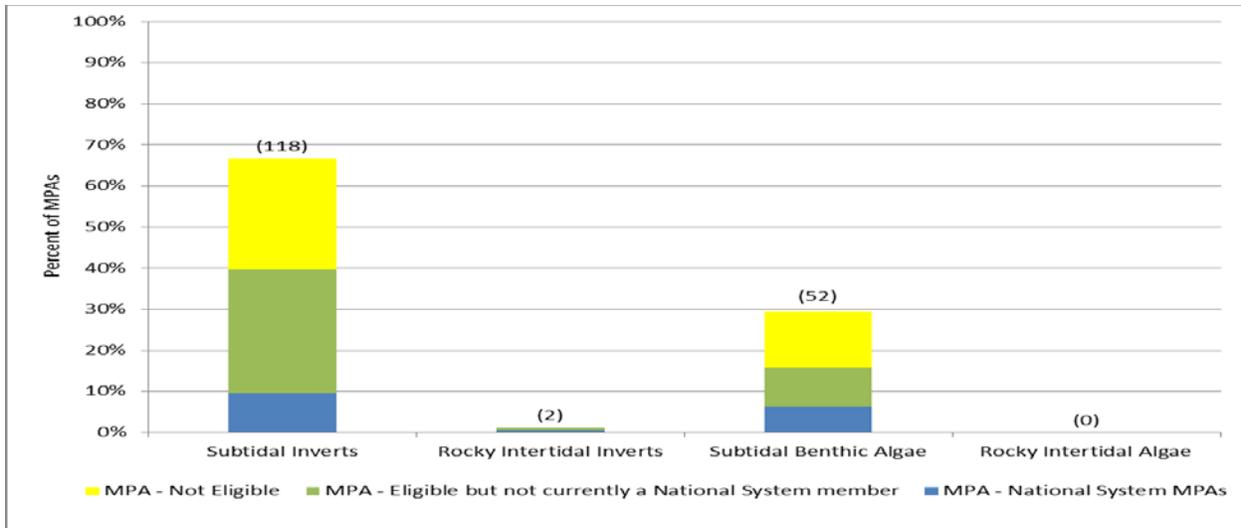


Figure 5. Percent of MPAs that contain Invertebrates and Algae in the Carolinian Atlantic (Ecoregion 11)

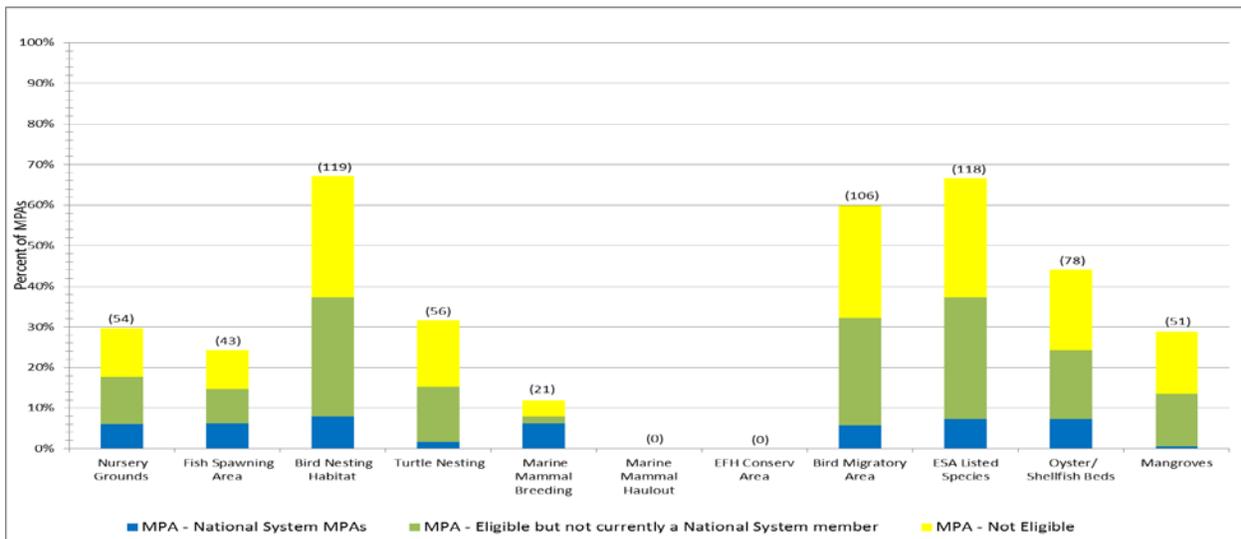


Figure 6. Percent of MPAs with ecologically important areas in the Carolinian Atlantic (Ecoregion 11)