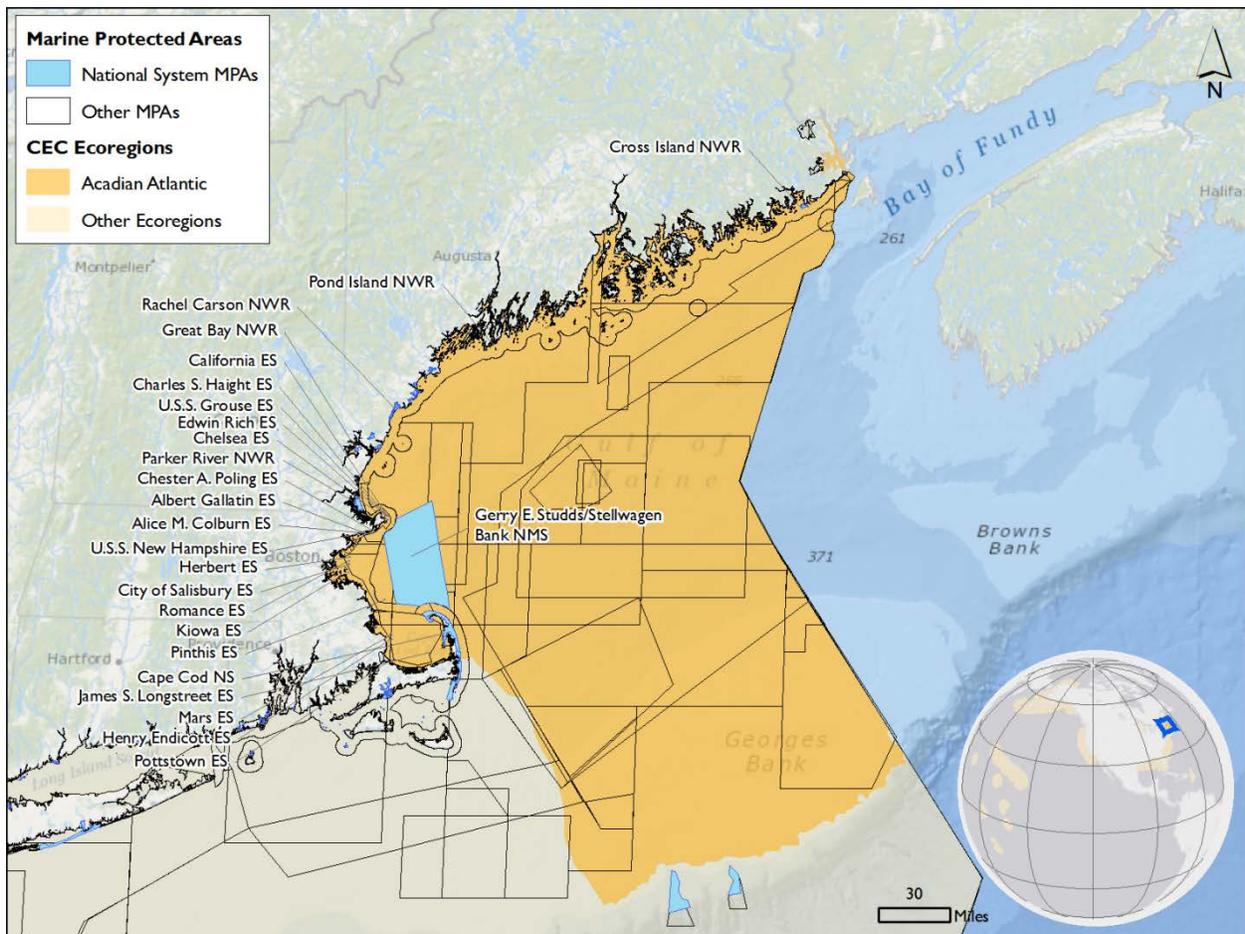


Acadian Atlantic (Ecoregion 7)

Background

The Acadian Atlantic Region is one of the most productive marine areas in the world and one of the most important, both culturally as well as commercially. The areas in the Gulf of Maine have been fished for centuries. Extending from Cape Cod northward along the continental shelf and slope past Nova Scotia and Newfoundland, this area has been valuable for many types of commercial and recreational fisheries for centuries. Characterized by a coastline heavily influenced by glacial processes, the ecoregion contains complex cliffs, rocky coastal zones and exposed bedrock. The ecoregion is also downstream and adjacent to some of the largest centers of urban and industrial development in the United States. Downstream is New York and Providence, to the west, Boston and Portland and to the north, Halifax, St. John and Quebec. Although the ecoregion extends into the Bay of Fundy (with one of the largest tidal ranges on earth), Gulf of St. Lawrence (freshwater inflows from the St. Lawrence River) and over the Grand Banks (productive fisheries catches for centuries), this assessment will be limited to those MPAs in waters of the United States.



MPAs in the Acadian Atlantic

Of the 92 MPAs in the Acadian Atlantic Ecoregion, 25 (27%) are National System members, 39

(42%) are eligible but are not currently National System members and 28 (31%) are not eligible to become National System members (Figure 1). National System MPAs in the

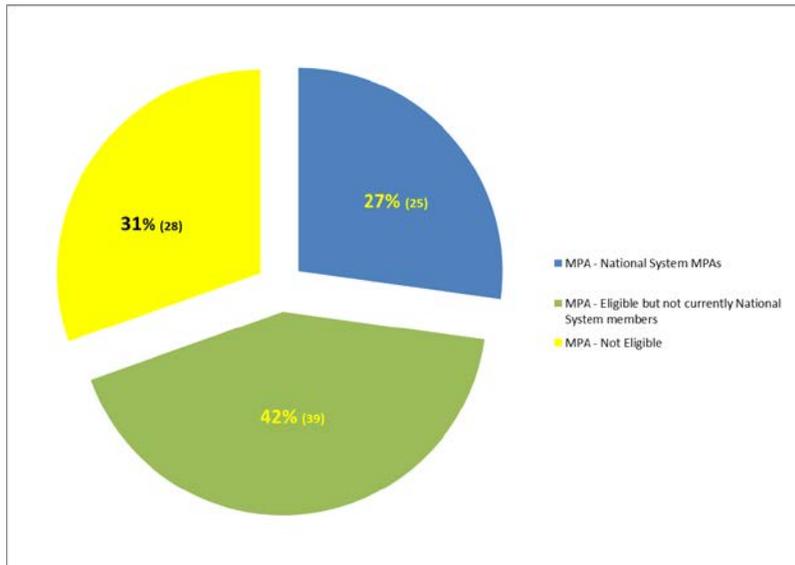


Figure 1: Percent of Marine Protected Areas (MPAs) within the Acadian Atlantic (Ecoregion 7) that are members of the National System of MPAs (n=92).

ecoregion include a national park (Cape Cod National Seashore), a national marine sanctuary (Stellwagen Bank) and five national wildlife refuges (Cross Island, Great Bay, Parker River, Pond Island, Rachael Carson). The remaining National System MPAs are "Exempt Sites" managed by the Massachusetts Board of Underwater Archaeological Resources that protect shipwrecks and the surrounding area. The majority (74%) of the MPAs in the ecoregion that are eligible to become national system

members are managed by NOAA's Fisheries Service. Many of these MPAs are habitat protection areas that ban bottom trawling and other bottom contact gear, protecting habitat and associated species (from kelp beds to juvenile cod) from potentially destructive fishing gear. Other MPAs in the ecoregion are closed to fishing to provide a refuge for commercially valuable species (e.g., cod, haddock, flounder, pollock) to allow them to recover from historical overfishing in the Gulf of Maine.

Ecologically important non-biogenic and biogenic habitats are found throughout the ecoregion (Figure 2). Sandy and rocky beaches (reported in 35% of the ecoregion's MPAs) are found from Cape Cod to Maine and are visited by millions of vacationers each year. Sand dunes (3%) and coastal barrier islands (7%) are economically and ecologically important as well. Biogenic habitats such as seagrass (9%), benthic algae (12%), kelp and algal beds (2%) and rocky reefs (3%) are important to the juvenile life stages of many species, including those that support New England's fishing industry. Recent expeditions to several of the area's seamounts (7%) have revealed several lush coral gardens (4%) along the New England Seamount Chain. These areas are important refuges for many juvenile species as well as feeding and aggregating sites for adults. Freshwater input gives rise to wetlands and mudflats (36%). Non-biogenic habitat such as rocky reefs (3%) originates from New England's rocky coastline. Rocky intertidal areas (7%) along the coast of Maine, for example, are known for their many tide pools and the species associated with them.

The mixing of cold (Labrador Current) and warm (Gulf Stream eddies) water masses passing over major bathymetric features (seamounts, canyons, banks) support abundant communities of marine mammals, birds and fish. More than 250 fish species have been

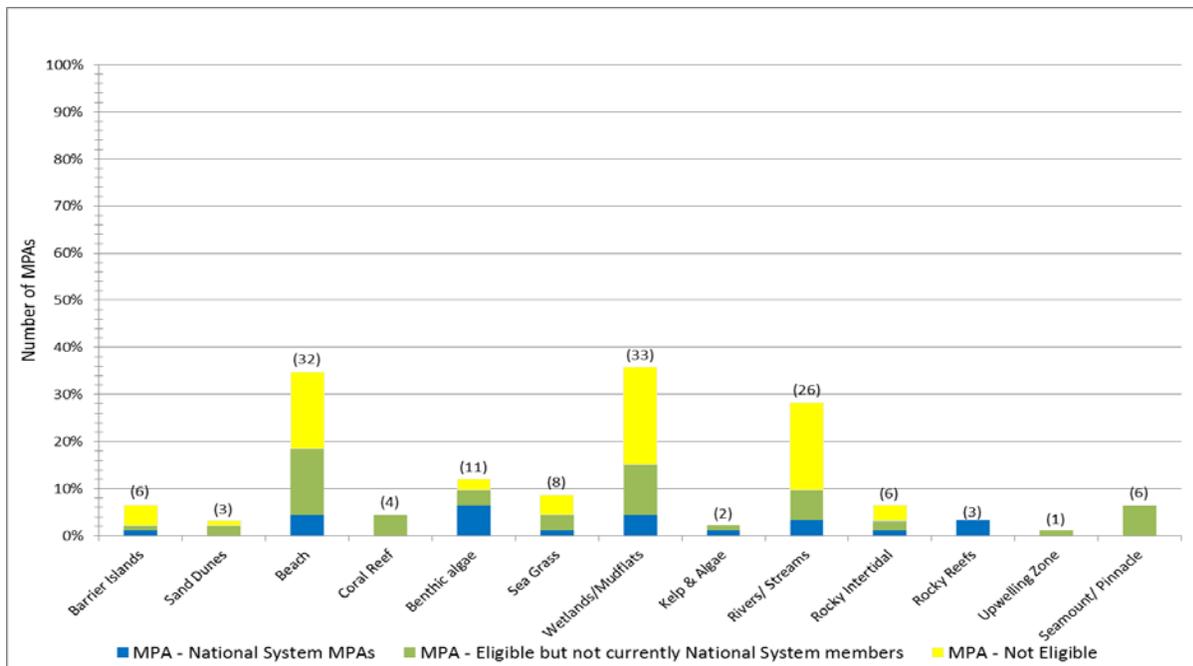


Figure 2. Percent of MPAs that contain certain habitat groups in the Acadian Atlantic (Ecoregion 7).

recorded in this area, including highly migratory species (such as tunas and billfish, found in 25% of the ecoregion's MPAs). Anadromous and estuarine/coastal fish, such as Atlantic salmon and herring, migrate offshore from coastal rivers and streams during part of their life cycle, and are reported in approximately 26% and 45%, respectively, of the ecoregion's MPAs (Figure 3). Various types of other marine fishes are found throughout many of the ecoregion's 92 MPAs, including coastal pelagic fishes in 34%, and commercially important demersal groundfish species (42%) such as cod, haddock and flounder (2%). The ecoregion also supports major populations of marine mammals, including 22 species of cetaceans (found in 39% of the ecoregion's MPAs), such as North Atlantic Right, fin and humpback whales. Sperm and blue whales favor the offshore deep and temperate waters within the ecoregion. The ecoregion also supports six species of pinnipeds (20%), an important predator as well as prey species. Leatherback sea turtles frequent the area and sea turtles are reported in 21% of the ecoregion's MPAs.

The steep, rocky cliffs and islands provide ideal habitat for some of the world's largest seabird colonies. Birds are classified as waterfowl, estuarine or seabirds, signifying where their principal feeding areas occur, and are found in 52%, 61% and 61%, respectively, of the ecoregion's 92 MPAs (Figure 4). Waterfowl from New England's numerous coastal kettle ponds, and estuarine birds from the many rivers and streams flowing into the Gulf of Maine, find food within the wetland marshes and on the sandy beaches of the ecoregion's MPAs. Seabirds such as gulls, cormorants, puffins, gannets, murres and storm petrels are found in 60% of the ecoregion's MPAs. Birds not classified in any of these feeding guilds are found in

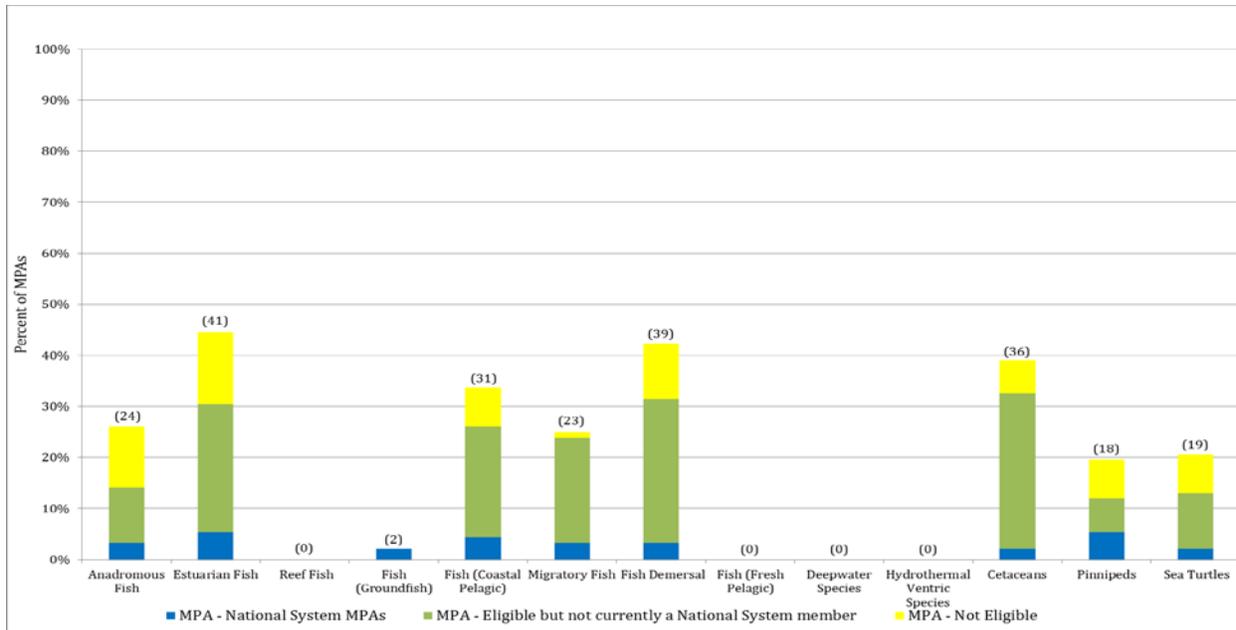


Figure 3. Percent of MPAs that contain certain fish and mammal groups in the Acadian Atlantic (Ecoregion 7).

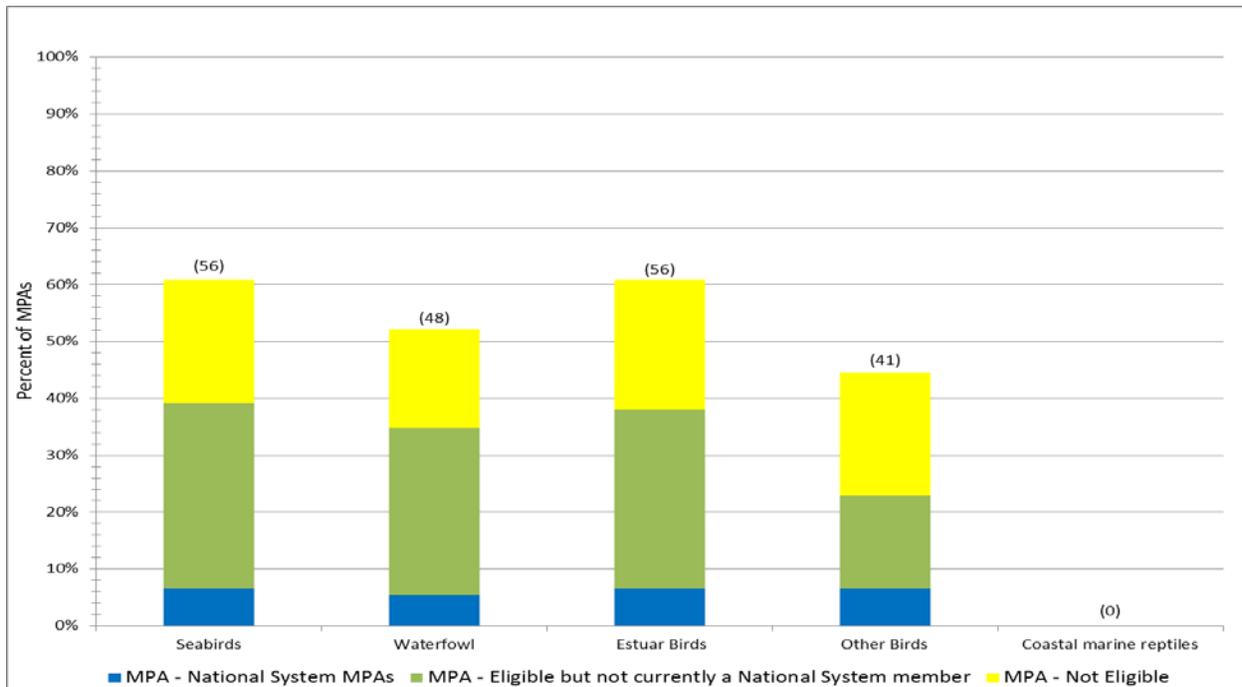


Figure 4. Percent of MPAs that contain marine birds and reptiles in the Acadian Atlantic (Ecoregion 7).

45% of the ecoregion's MPAs.

Benthic communities in the ecoregion are very diverse (Figure 5). Subtidal invertebrates such as American lobsters, clams, scallops and crabs are reported in 27% of the ecoregion's MPAs. Rocky intertidal invertebrates are abundant along the rocky coastline, especially in the

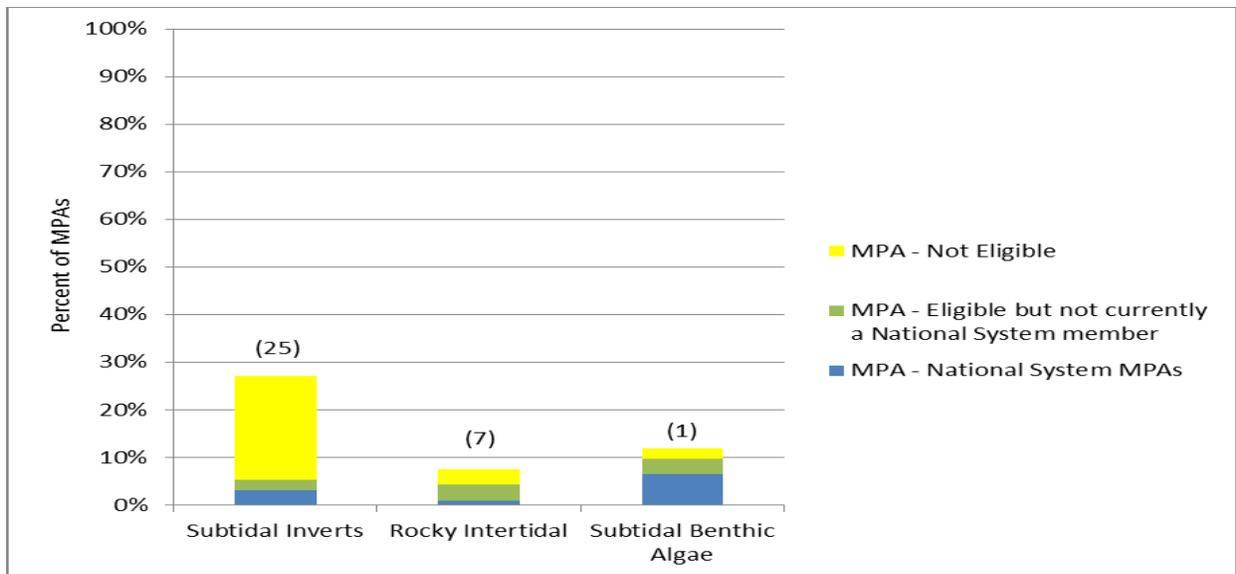


Figure 5. Percent of MPAs that contain Benthic Invertebrates and Benthic Algae in the Acadian Atlantic (Ecoregion 7).

northern part of the ecoregion, and are reported in 8% of the ecoregion's MPAs. A variety of marine plants, such as seaweeds and kelps, as well as subtidal benthic algae (brown, red and green) are present, although only reported in 1MPA (Great Bay National Wildlife Refuge).

Ecologically important areas that support where species breed, nest, spawn and rest are found throughout many of the ecoregion's MPAs (Figure 6). Many of wetlands, seagrass, stony corals and octocorals, seamounts, banks and shellfish beds all support a variety of important biological uses including serving as areas for nursery grounds (37%), fish spawning (27%) and marine mammal breeding (11%). The ecoregion's rocky cliffs and outcrops provide excellent nesting areas (46%) and marine mammal haulouts (17%). NOAA's Fisheries Service has jurisdiction over 102 threatened and endangered species listed under the Endangered Species Act (ESA), many of which (e.g. whales, dolphins and sea turtles) are found in this ecoregion and in 39% of the ecoregion's MPAs.

Conclusions

The 92 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 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. Subtidal algae and the presence of upwelling are each only listed as present in one MPA in the ecoregion, lacking this CBD replication criterion.

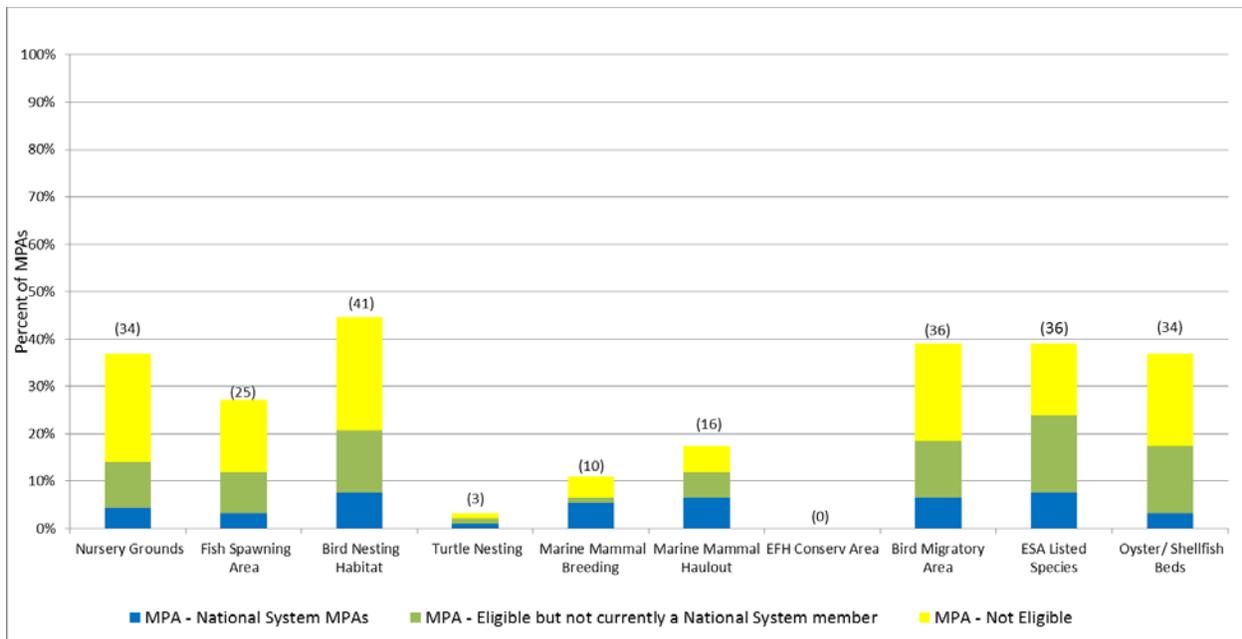


Figure 6. Percent of MPAs ecologically important areas in the Acadian Atlantic (Ecoregion 7).

Suggested Reading

Gulf of Maine Council on the Marine Environment. [Gulf of Maine Ecosystem-Based Management Toolkit Survey Report](http://www.gulfofmaine.org) (www.gulfofmaine.org)