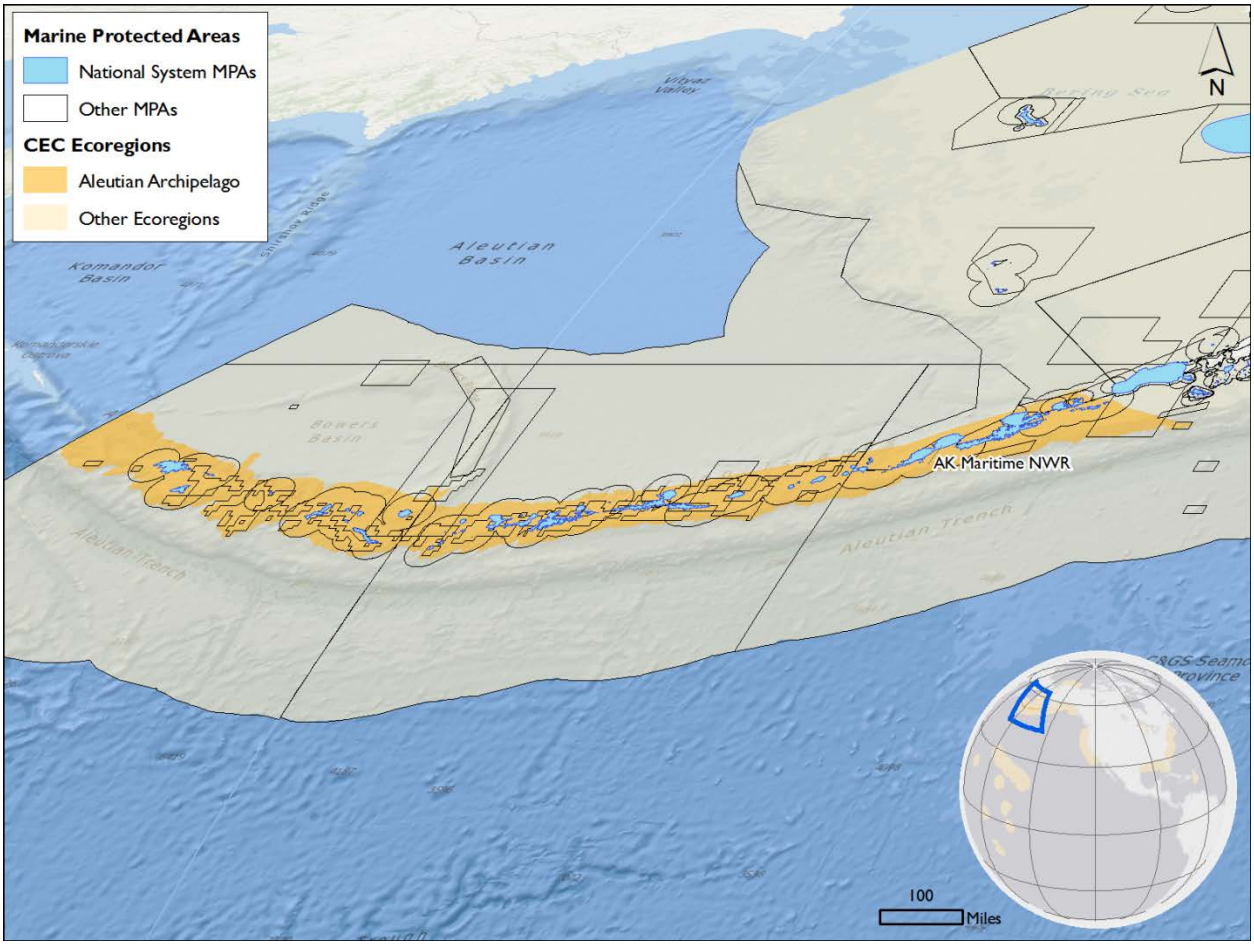
Aleutian Archipelago (Ecoregion 23)

Background

The Aleutian Archipelago Ecoregion stretches alongthe world's longest archipelago and is adjacent to the deep Aleutian Trench – a deep-sea underwater feature that is 3,700km long from Kodiak Island to the end of the Aleutian Island chain and 7,680m deep. These deep geological features create many high-velocity passes and straits between the many islands that connect and interchange temperate North Pacific Ocean water to subpolar Bering Sea water. This interconnection and mixing makes the area rich in biological resources. Although the archipelago is sparsely populated, but this ecoregion, which is included in U.S. government definitions of the Arctic, is experiencing rapid changes due to climate change.



MPAs inthe Aleutian Archipelago

Of the 16 MPAs in the Aleutian Archipelago Ecoregion, one (6%) is a National System member. The other 15 (94%) are eligible but are not currently National System members (Figure 1). The one National System MPA is the Alaska Maritime National Wildlife Refuge, managed by the U.S. Fish and Wildlife Service. This refuge – which contains enormous diversity and abundance of species – represents one of the first protected areas established in America, and is the most remote in the. National Wildlife Refuge System. The Alaska Department of Fish and Game manages four of the other MPAs in the ecoregion

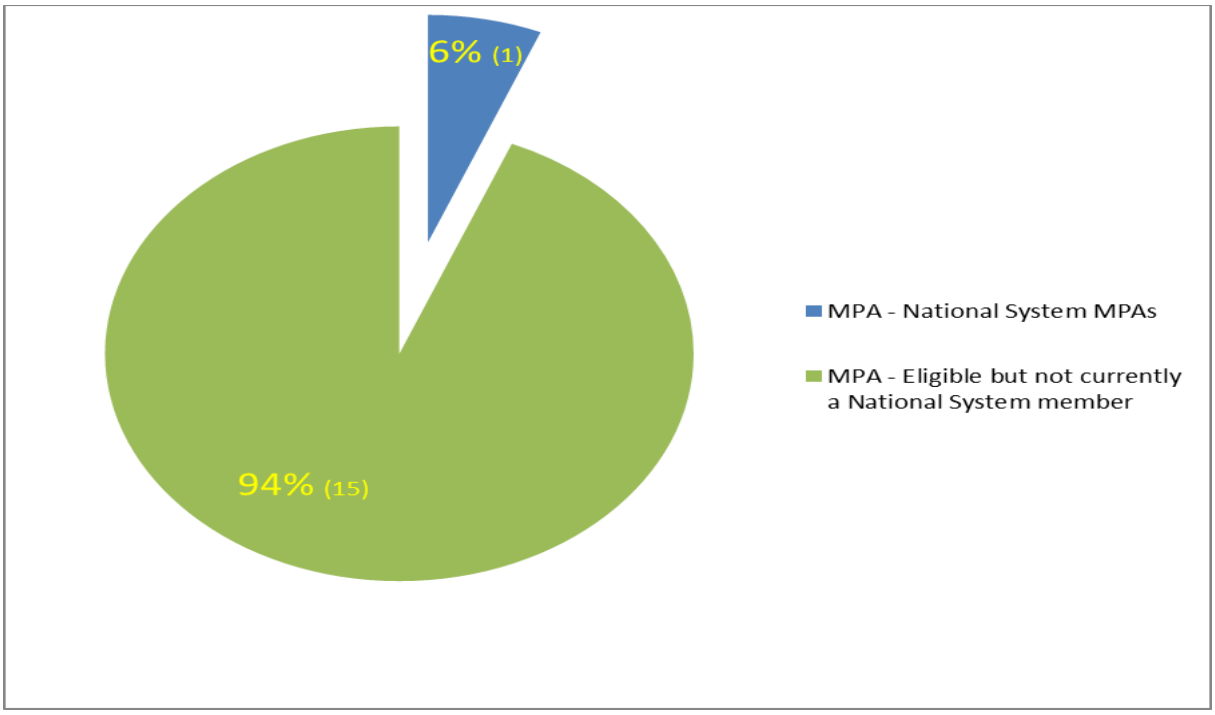


Figure 1. Percent of Marine Protected Areas(MPAs) within the Aleutian Archipelago (Ecoregion 23) that are members of the National System of MPAs (n=16)

and the remaining 11 MPAs are managed by the NOAA Fisheries Service. Many of these areas have been closed to all bottom fishing (trawling and bottom contact gear) and to protect specific species such as mackerel, lingcod and pollock as well as limiting nearshore fishing in order to protect feeding in marine mammals (e.g., Stellar Sea Lion Protection Area). These MPAs are primarily focused on alleviating impacts of bottom trawling and other fishing gear on the benthic and epibenthic fauna as well as reducing impacts to marine mammals, directly by harming these species in fishing gear or indirectly by reducing their prey species.

The MPAs along the Aleutian Island Chain include many sensitive habitats of ecological importance. Biogenic habitats such as seagrass (13%), kelp and algae (63%), and coastal wetlands (6%) support thriving fish and invertebrate populations. Rocky shore intertidal areas where giant kelp forest flourish from upwelled water (31%) are reported in 63% of the ecoregion's MPAs. Recent exploration of the area's seamounts (19%) has revealed rich, deepwater ecosystems of stony coldwater corals and octocoral, reported in one (6%) of the MPA. There are at least 44 species of deep-sea corals recorded in Alaska and this may rival tropical coral reefs seen in South Florida/Caribbean Atlantic, Caribbean Sea and Hawaiian Archipelago Ecoregions.

The mixing of cold polar (Bering Sea) and temperate (North Pacific Ocean) water masses passing over important bathymetric features (seamounts, pinnacles) and upwelled from great depths make these areas rich in fisheries of national and international importance.

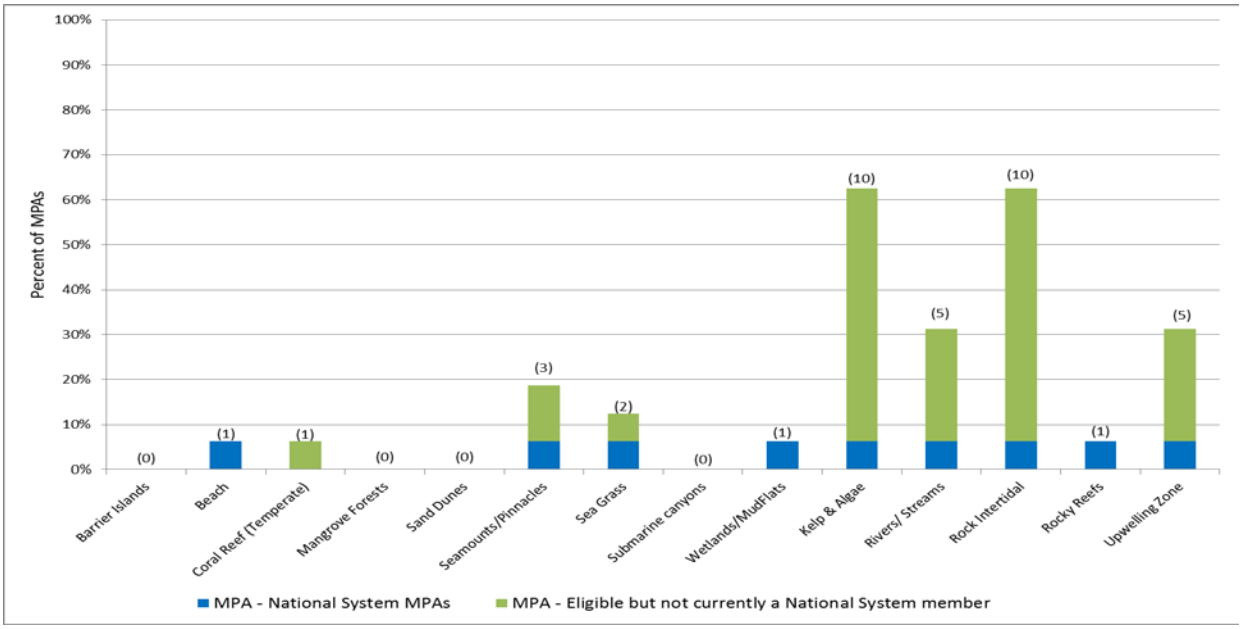


Figure 2. Percent of MPAs that contain certain habitat groups in the Aleutian Archipelago (Ecoregion 12)

Dutch Harbor, Alaska has the largest annual fish landings (by weight) in the United States. Anadromous and estuarine/coastal fish such as salmon migrate offshore from many of the coast's rivers and streams during part of their life cycle, and are reported in approximately 81% and 69%, respectively, of the ecoregion's MPAs (Figure 3).

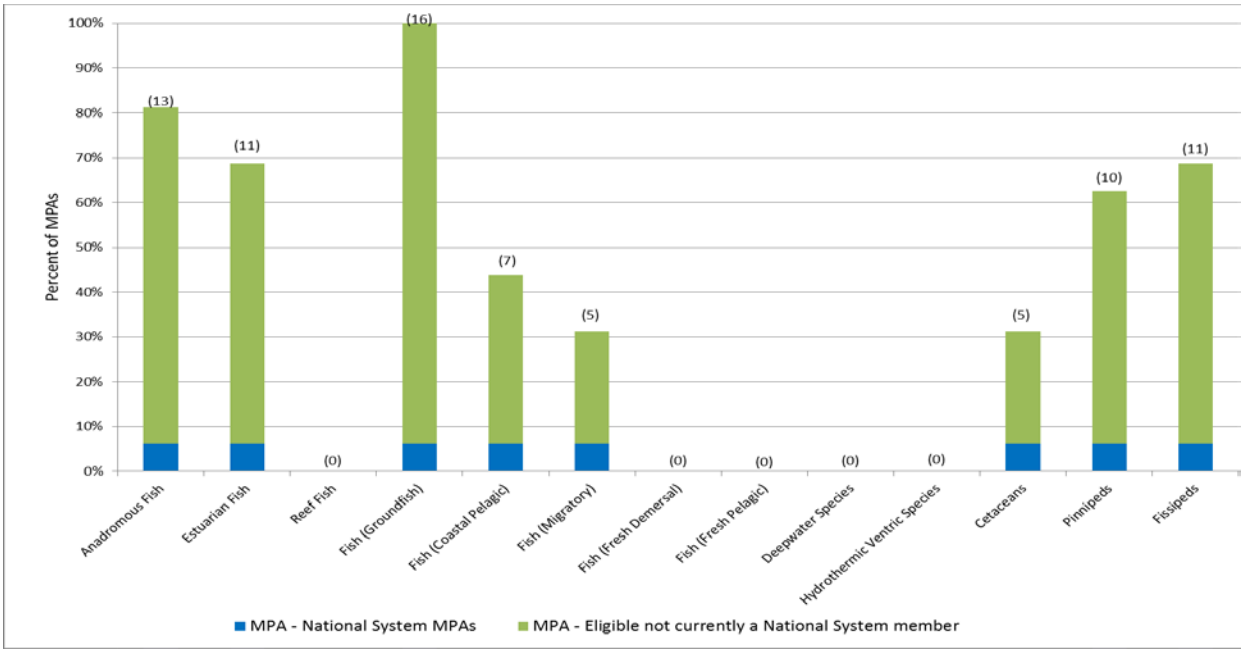


Figure 3. Percent of MPAs that contain certain fish and marine mammal groups in the Aleutian Archipelago (Ecoregion 23)

Various types of economically important marine fishes are found throughout many of the ecoregion's MPAs, including coastal pelagic species such as Pollack, mackerel, rockfish and

Pacific cod, and are reported in 44% of the ecoregion's MPAs. Commercially important groundfish such as halibut and flounder were reported in all 16 MPAs. The ecoregion also supports internationally significant populations of marine mammals, including cetaceans (reported in 31%) such as sperm and blue whales that favor deep temperate waters, and Arctic bowhead whales. Pinnipeds, such as Stellar sea lions and Northern elephant seals, are found in 63% of the ecoregion's MPAs, and fissipeds (69%), such as sea otters are found in 69%. Leatherback sea turtles are occasionally sighted around the Aleutian Islands but aren't recorded in any of the ecoregion's 16 MPAs.

Birds are classified as waterfowl, estuarine or seabirds, signifying where their principal feeding areas occur and are found in many of the ecoregion's MPAs (Figure 4). Waterfowl, concentrated along the coastal rivers and streams flowing into the Gulf of Alaska, are reported in 25% of the ecoregion's MPAs. These coastal rivers and streams also support a

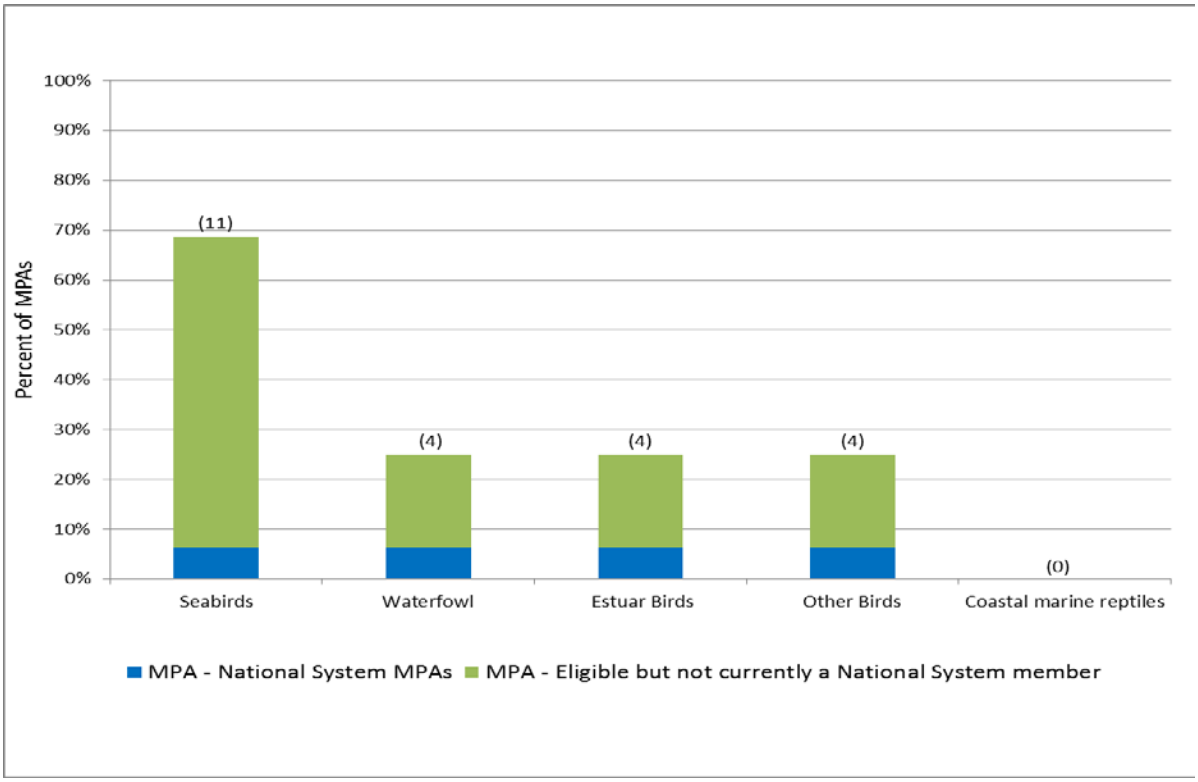


Figure 4. Percent of MPAs that contain certain marine birds and other marine resource groups in the Aleutian Archipelago (Ecoregion 23)

variety of estuarine birds, also reported in 25% of the ecoregion's MPAs. Nearly 40 million seabirds, representing 30 species, are recorded as breeding and feeding in the Aleutians. Seabirds such as puffin, albatross and guillemot migrate in huge numbers into this ecoregion and are reported in 69% of the MPAs. Birds not classified in any of these feeding guilds are found in 25% of the ecoregion's MPAs.

A mixture of oceanic, subpolar and temperate waters transports nutrients, phytoplankton

and zooplankton throughout the ecoregion and the presence of diverse habitats support one of the largest marine invertebrate communities in the world. Benthic invertebrates are reported in 81% of the ecoregion's MPAs (Figure 5) and include many of the economically important crab and shrimp species. Rocky intertidal invertebrates such as important clams and scallops are reported in 38% of the MPAs. Submerged rocky areas also provide substrate for benthic algae, reported in 31% of the MPAs and provide feeding and refuge for many species. Likely due to harsh high-energy physical oceanographic conditions, rocky intertidal algae is only reported in one MPA in the ecoregion, the National System member Alaska Maritime National Wildlife Refuge.

Ecologically important areas that support where species breed, nest, spawn and rest can be found in many of the coastal and deepwater ecoregion's MPAs (Figure 6). These include coastal habitats (e.g., rivers/streams, wetlands, seagrass) and submerged rocky areas as well as coldwater corals that serve as fish spawning area, reported in 50% of the

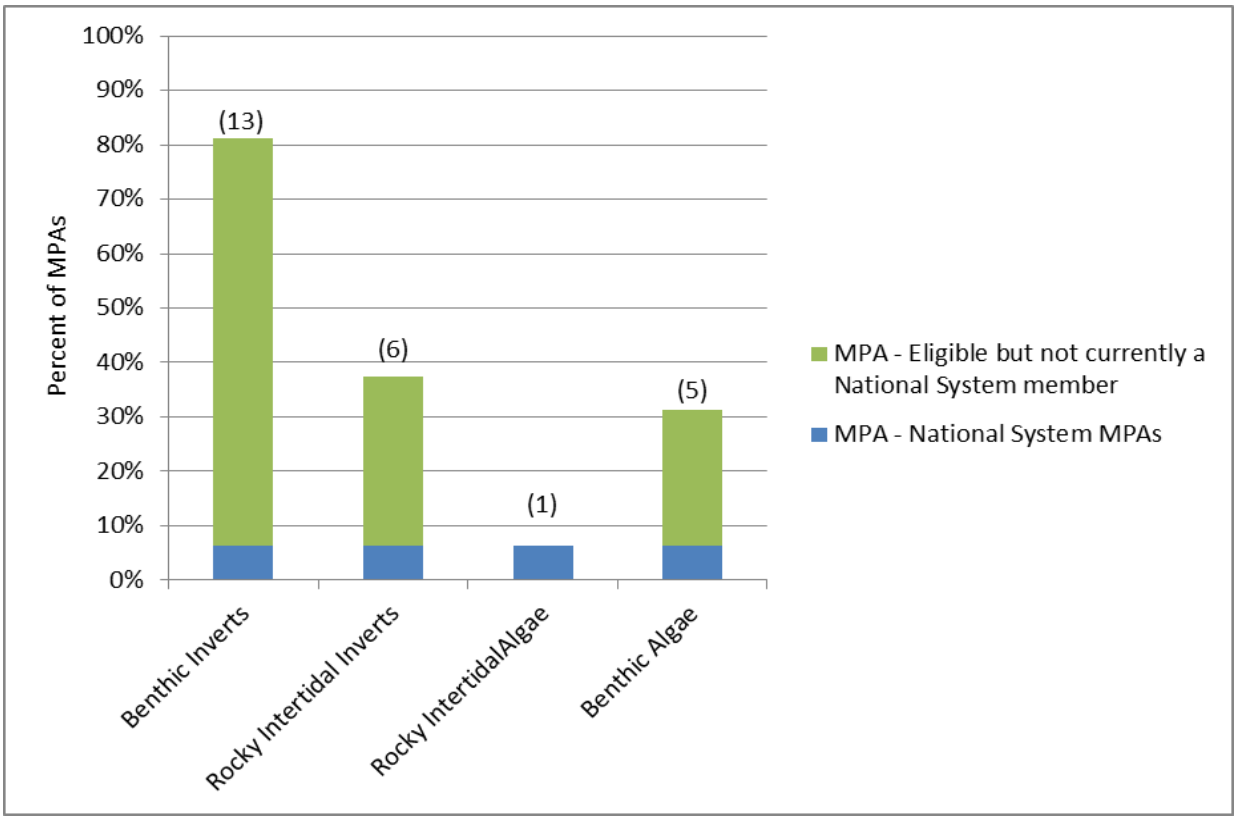


Figure 5. Percent of MPAs that contain Benthic Invertebrates and Benthic Algae in the Aleutian Archipelago (Ecoregion23)

ecoregion's MPAs. Millions of birds migrate (69%) through the area to feed and nest (69%) throughout the many isolated islands. NOAA Fisheries Service has jurisdiction over 102 threatened and endangered species listed under the Endangered Species Act (ESA), many of which (including several species of whales, seals and sea lions and sea otters) are found in this ecoregion and in 50% of the ecoregion's MPAs.

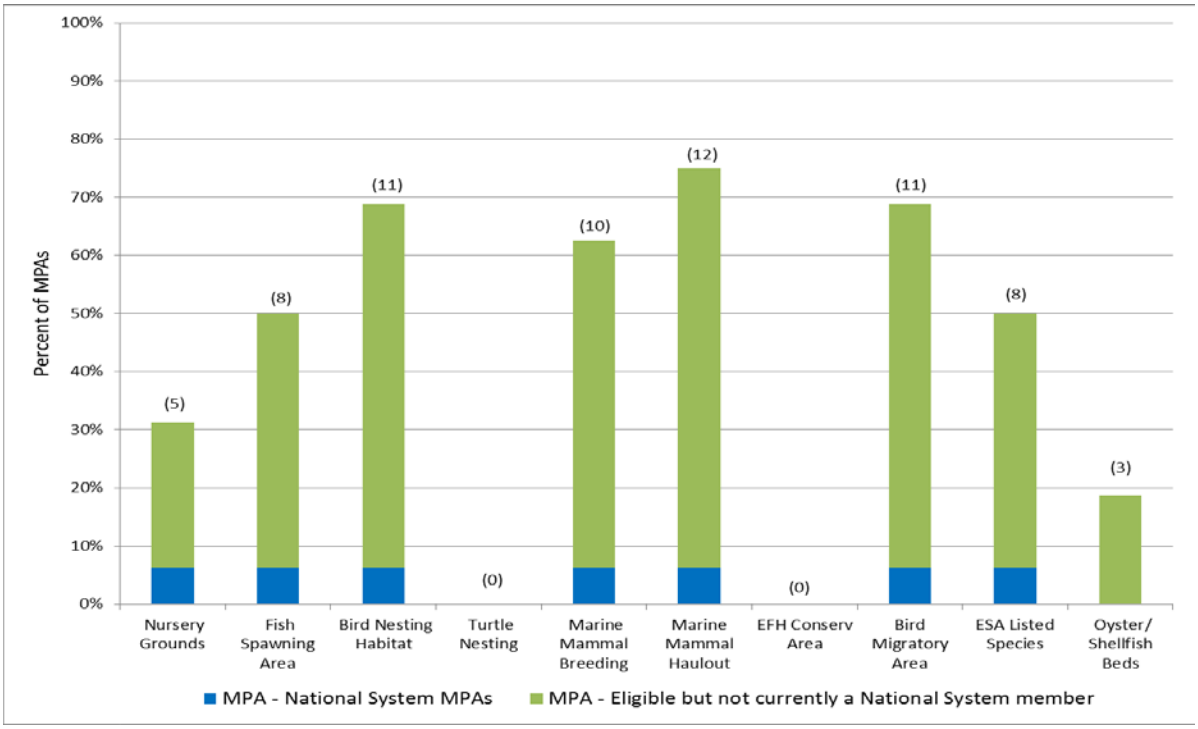


Figure 6. Percent of MPAs with ecologically important areas in the Aleutian Archipelago (Ecoregion 23)

Conclusions

The 16 MPAs in this ecoregion contain the major habitat and species groups and ecologically important areas found in the ecoregion as a whole. In some cases, 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.

Several ecologically important habitats -- including beaches, coldwater corals, rocky reefs, andwetlands/mudflats -- are only reported as being present in one MPA in the ecoregion, lacking this CBD replication criterion.

Suggested Reading

North Pacific Fishery Management Council. 2007. Aleutian Islands Fishery Ecosystem Plan. http://www.npfmc.org/wp-content/PDFdocuments/conservationissues/AIFEP/AIFEP1207.pdf