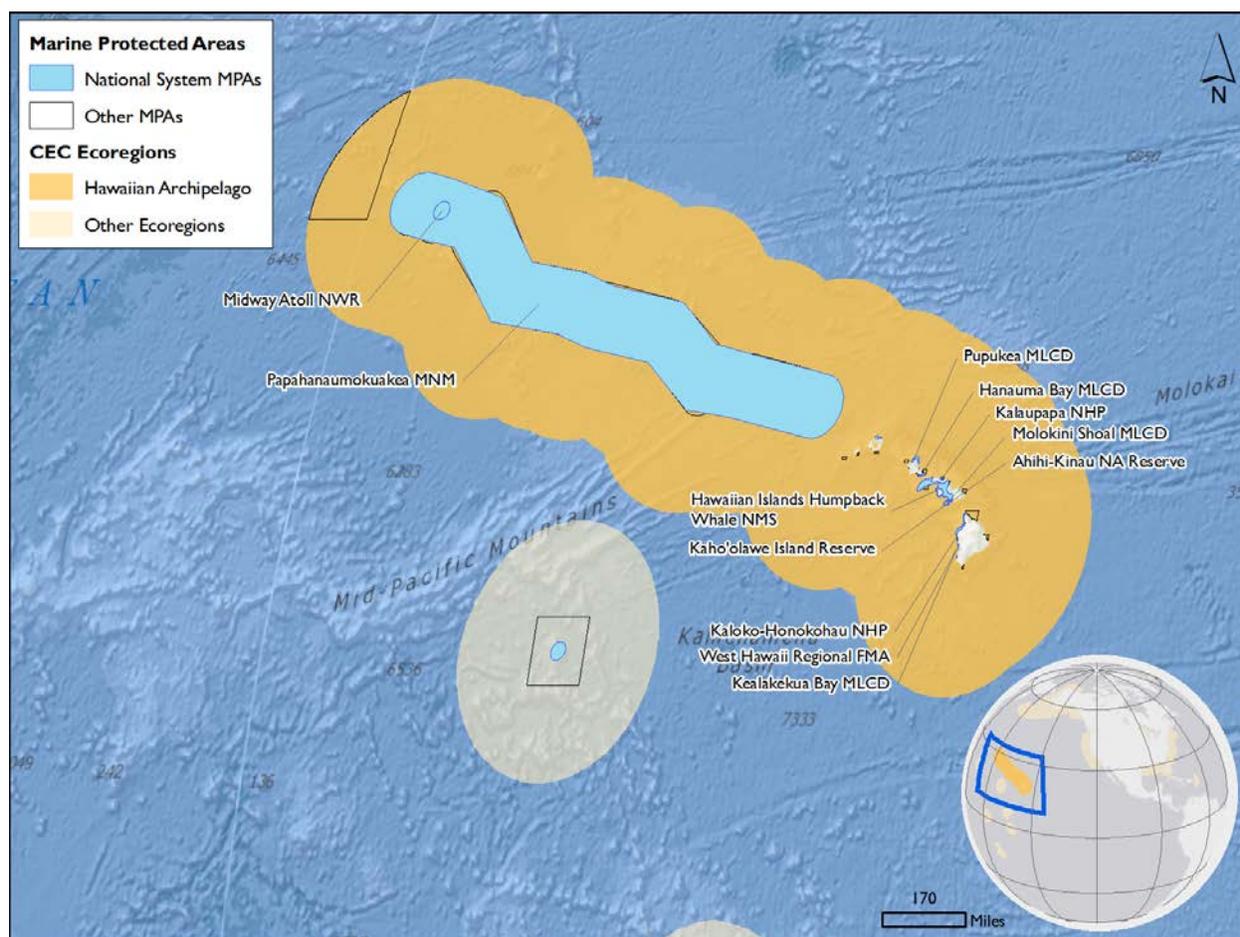


Hawaiian Archipelago (Ecoregion 24)

Background

The Hawaiian Archipelago is one of the most remote island chains in the world. Consisting of eight volcanic oceanic islands, 124 smaller islands, atolls, banks and numerous seamounts, the ecoregion has a relatively low faunal diversity compared to the rest of the Indo-West Pacific Ocean but a high amount of endemism due to the islands' isolation. The northern extent of the North Equatorial Current is the major oceanic driver affecting the island chain. The main urban center in the Hawaiian Islands is Honolulu on the island of Oahu, and an estimated 7 million tourists visit the Hawaiian Islands each year.



MPAs in the Hawaiian Archipelago

Of the 59 MPAs in the Hawaiian Archipelago Ecoregion, 12 (20%) are National System members, 19 (32%) are eligible but are not currently National System members and 28 (48%) are not eligible (Figure 1). The largest and mostly highly protected MPA in the U.S. is in this ecoregion – the Papahānaumokuākea Marine National Monument. Other National System MPAs include small local marine life conservation districts and reserves managed by the Hawaii Department of Land and Natural Resources, a national marine sanctuary and two national

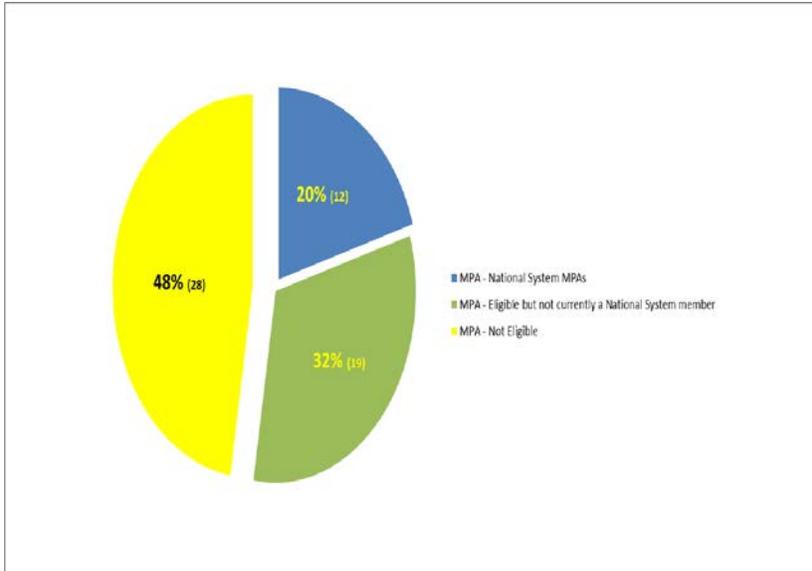


Figure 1: Percent of Marine Protected Areas (MPAs) within the Hawaiian Archipelago (Ecoregion 24) that are members of the National System of MPAs (n=59)

historic parks. Most other MPAs in the ecoregion are managed by the Hawaii Department of Land and Natural Resources or the NOAA Fisheries Service and focus on restricting or banning fishing gear that harms bottom habitat or adds to bycatch (e.g., Longline Protected Species Zone). These MPAs are primarily focused on alleviating impacts of fishing gear on the habitat and benthic and epibenthic fauna ecosystems that fish depend on (e.g., Ni’ihau Bottomfish Restricted Fishing

Area). Ecologically important biogenic habitats such as seagrass (e.g., reported in 12% of the ecoregion’s MPAs), kelp/algae (22%) and corals (73%) are all found in the ecoregion (Figure 2) There are approximately 60 species of stony corals found throughout the nearshore coral reef ecosystems. There are no non-biogenic habitat such as rocky reefs and rocky intertidal areas

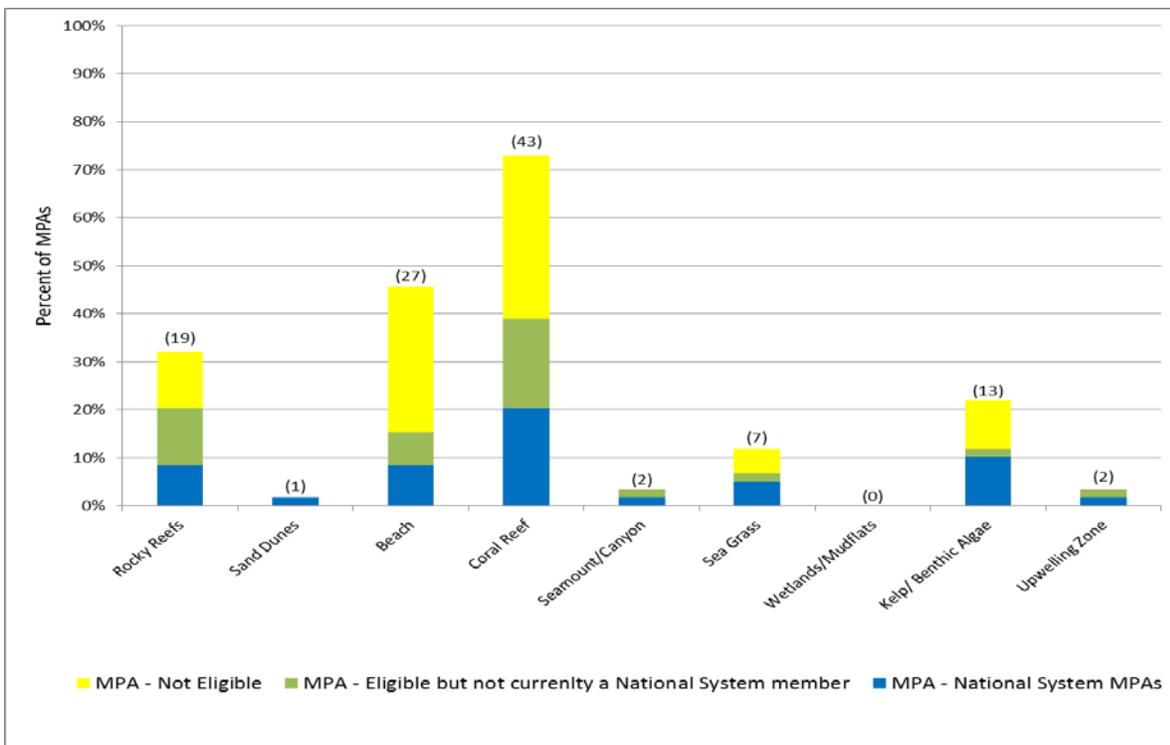


Figure 2. Percent of MPAs that contain certain habitat groups in the Hawaiian Archipelago (Ecoregion 24)

reported in any of this ecoregion’s 59 MPAs. There are seamounts reported within the two (3%) of the ecoregion’s MPAs. Hancock Seamounts is located approximately 2500 km northwest of Honolulu and supports a highly productive ecosystem and is known to be an excellent fishing ground for highly migratory pelagics such as various species of tuna, as well as armorhead and other epibenthic species.

The Hawaiian Islands are extraordinarily rich in fish diversity. More than 557 of reef and shore fish species have been recorded in the Archipelago. Anadromous fish are not present in the ecoregion (Figure 3). Estuarine fish species are reported in 5% of the ecoregion’s MPAs. Coastal fish migrate offshore during part of their life cycle and are reported in approximately 29% of the ecoregion’s MPAs. Various types of marine fishes are reported throughout the ecoregion, including important highly migratory species (27%) such as tuna, billfish and sharks. As expected, reef-dependent fish dominate the ecoregion’s ecosystems, reported in 80% of its MPAs. The ecoregion also supports internationally significant populations of marine mammals, including cetaceans (e.g., found in 32%) such as the humpback whale; pinnipeds (29%) such as the Hawaiian monk seal; and sea turtles (51%) such as the green, hawksbill and leatherback. The ecoregion is home to North America’s largest nesting ground for the green sea turtle. Deepwater fauna are found in 8% of the ecoregion’s MPAs, such as the Southeast Hancock

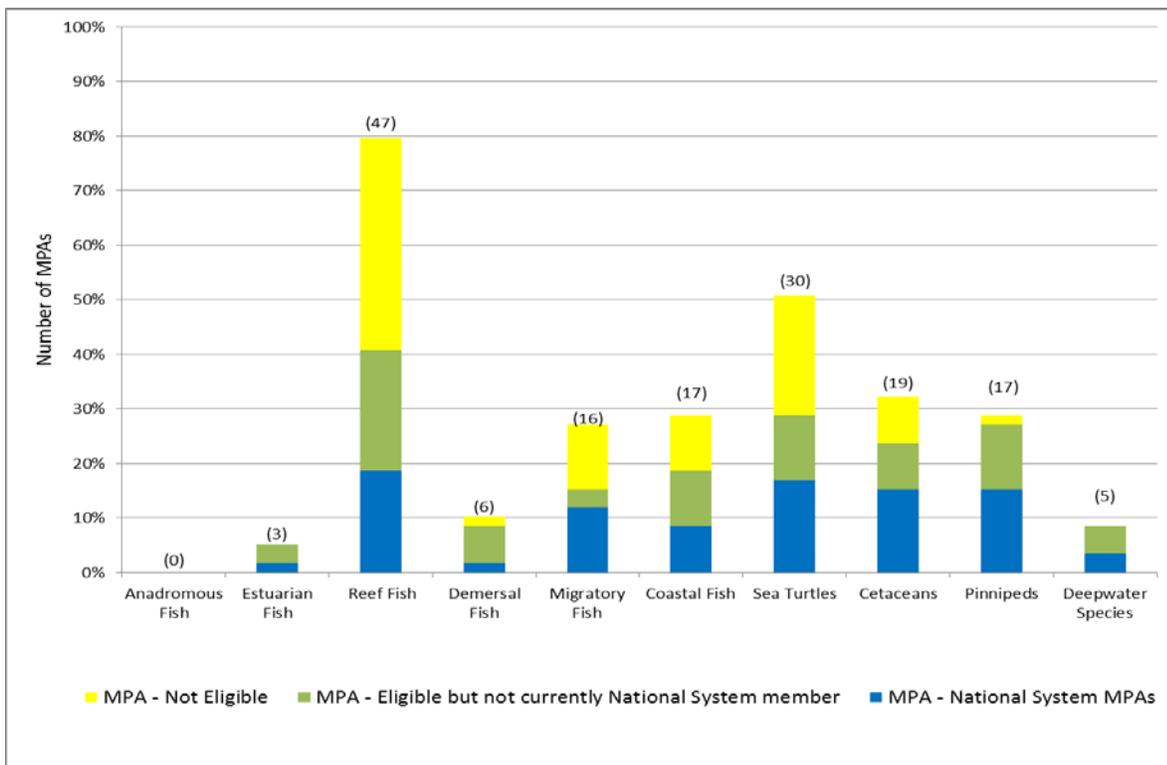


Figure 3. Percent of MPAs that contain certain Fish and Marine Mammal Groups in the Hawaiian Archipelago (Ecoregion 24)

Seamount.

Birds are classified as waterfowl, estuarine or seabirds, signifying where their principal feeding areas occur and are reported in several of the ecoregion’s 59 MPAs (Figure 4). Waterfowl from

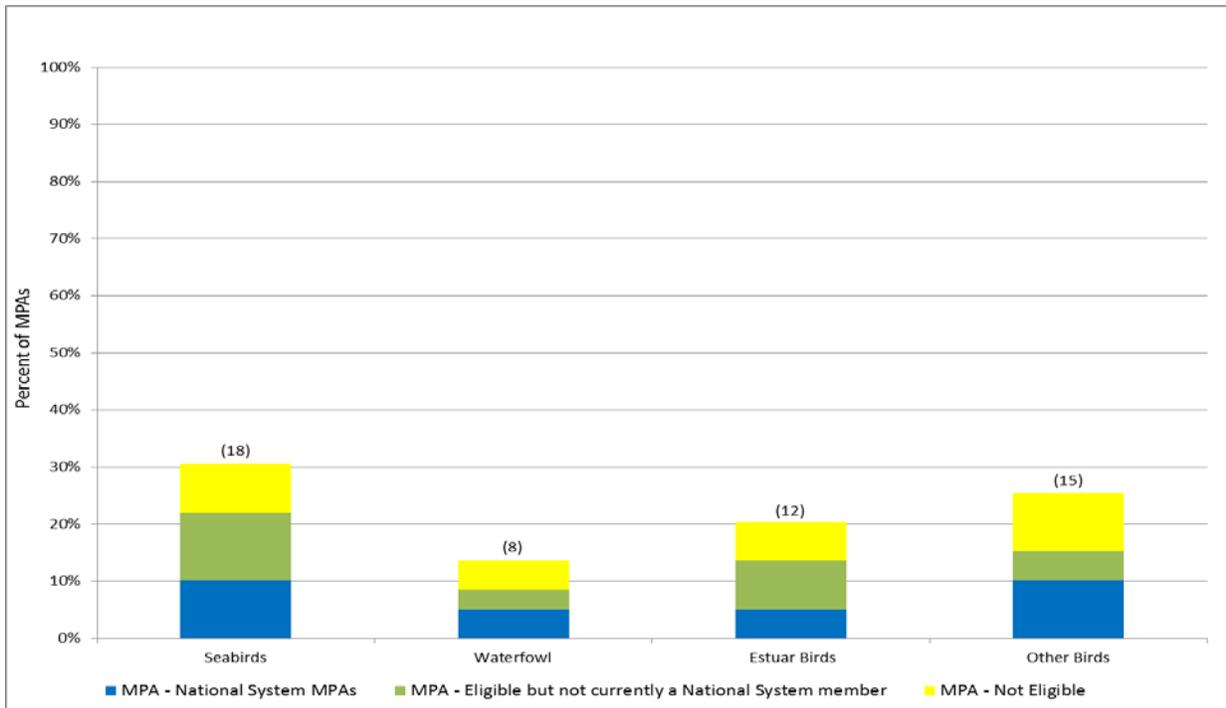


Figure 4. Total number of MPAs that contain Marine Birds and reptiles in the Hawaiian Archipelago (Ecoregion 24)

inland ponds, rivers and streams are reported in 14% of the ecoregion’s MPAs, with estuarine-dependent birds reported in 20%. The ecoregion’s remote islands contain some of the largest and most important seabird colonies in the world, including petrels, sheerwaters, and albatross, and are reported in 31% of the ecoregion’s MPAs. Birds not classified in any of these feeding guilds are found in 25% of the ecoregion’s 59 MPAs.

The Hawaiian Archipelago is characterized by highly productive nearshore seagrass and coral reef ecosystems, which support a highly productive benthos. Scientific studies report approximately 100 sponge species, 1071 marine mollusks species and 884 crustacean species, and benthic invertebrates (e.g., reported in 76% of the ecoregion’s MPAs) thrive through the region. Fueled by warm water and abundant sunlight, benthic algae are reported occurring in 22% of the ecoregion’s MPAs. As no rocky reef or rocky intertidal habitat was reported as occurring in the ecoregion, the three MPAs reporting rocky intertidal invertebrates (5%) (Figure 5) are likely more closely associated with biogenic substrate such as corals.

Ecologically important areas that support where species breed, nest, spawn and rest can be found in several of the ecoregion’s MPAs (Figure 6). The ecoregion’s seagrass beds and coral reefs serve as nursery grounds (37%) and attract fish spawning aggregations (8%). Remote sandy beaches and coral reefs serve as important areas for marine mammals to breed (10%) and haul out (17%). The ecoregion is a major breeding, calving and nursery area for the humpback whale. Sea turtles (2%) and birds (12%) also use these remote areas to nest. The

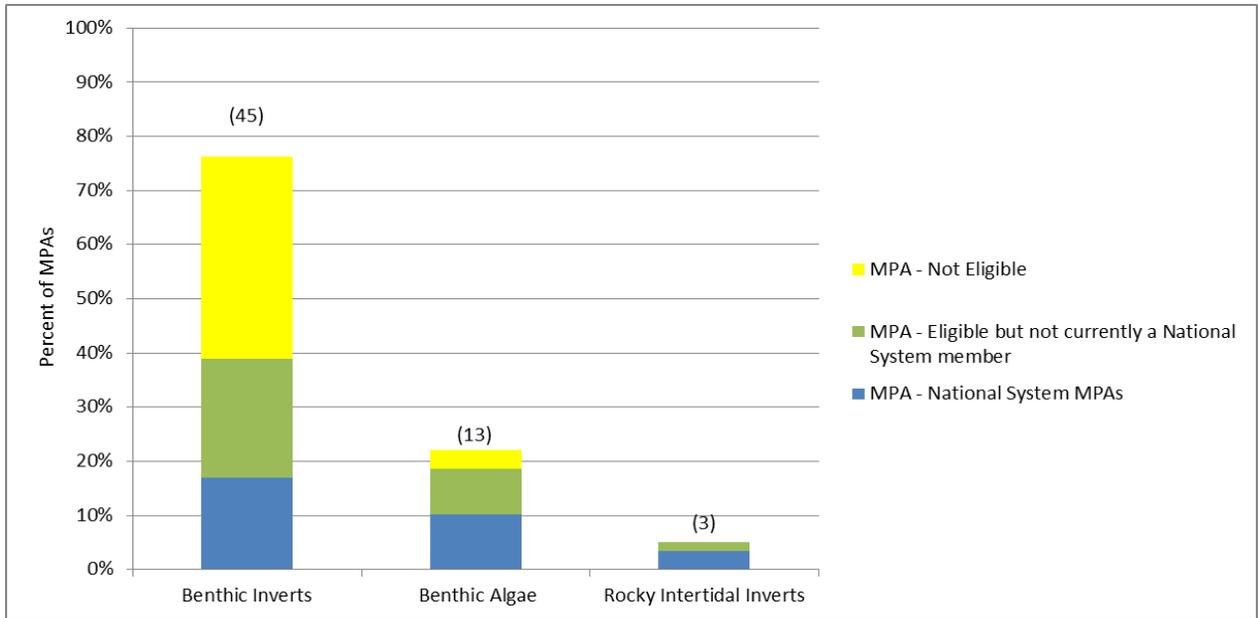


Figure 5. Percent of MPAs with Invertebrates and Algae in the Hawaiian Archipelago (Ecoregion 24)

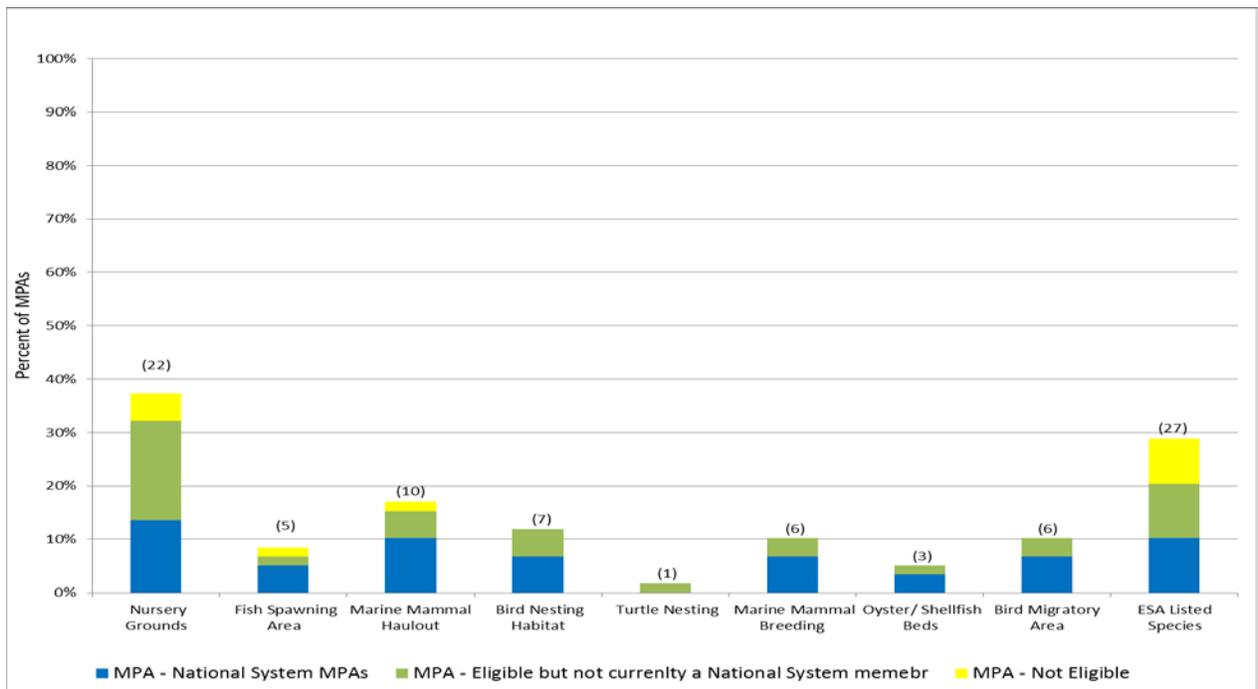


Figure 6. Percent of MPAs with ecologically important areas in the Hawaiian Archipelago (Ecoregion 24)

NOAA Fisheries Service has jurisdiction over 102 threatened and endangered species listed under the Endangered Species Act (ESA), many of which (such as humpback whales, Hawaiian monk seals as well as green, loggerhead and leatherback sea turtles) are found in this ecoregion and in 46% of the ecoregion's MPAs.

Conclusions

The 59 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. The ecologically important use group lacking this CBD replication criterion is nesting sea turtles, listed as being present in just one MPA in the ecoregion.

Suggested Reading

Alan Friedlander et al. The State of Coral Reef Ecosystems of the Main Hawaiian Islands.
<http://ccma.nos.noaa.gov/ecosystems/coralreef/coral2008/pdf/hawaii.pdf>