

Columbian Pacific (Ecoregion 21)

Background

The Columbian Pacific ecoregion begins offshore of San Francisco and gradually extends in to shore in northern California and northward along the coast to the Strait of Juan de Fuca and Puget Sound in the United States and Vancouver Island in Canada. The Columbian Pacific has a moderately broad continental shelf and a steep continental slope, and includes many islands, large bays and fjordal inlets. Offshore features include banks and seamounts that rise 100m or more above the edge of the continental shelf, causing the area's major current, the California Current, to flow over and around it, producing eddies. The Columbian Pacific Region has a temperate flora and fauna, including many ecologically and economically important species.



MPAs in the Columbian Pacific

Of the 110 MPAs in the Columbian Pacific Ecoregion, 39 (35%) are National System members, 36 (33%) are eligible but are not currently National System members and 35 (32%) are not eligible (Figure 1). National System MPAs in the ecoregion include marine reserves and marine conservation areas managed by several state agencies, the Olympic Coast National Marine Sanctuary, several national wildlife refuges and national historic parks. Most other MPAs in the ecoregion are managed by the NOAA Fisheries Service as Essential Fish Habitat (EFH) Conservation Areas or species-specific conservation areas (e.g., Stonewall Bank Yelloweye Rockfish). EFH includes all types of aquatic vegetation (wetlands, coral reefs, seagrasses), rivers (where fish spawn, breed, feed, or grow to maturity) and other areas that are important to the critical life stages of certain species. Impacts from certain fishing practices as well as coastal and marine development threaten to alter, damage, or destroy these habitats. Many of the EFH areas restrict or prohibit many bottom contact gear and are primarily focused on alleviating impacts of bottom trawling and other fishing gear on the benthic and epibenthic fauna of these ecosystems. In these MPAs, the sensitive habitats of ecological importance are coldwater corals

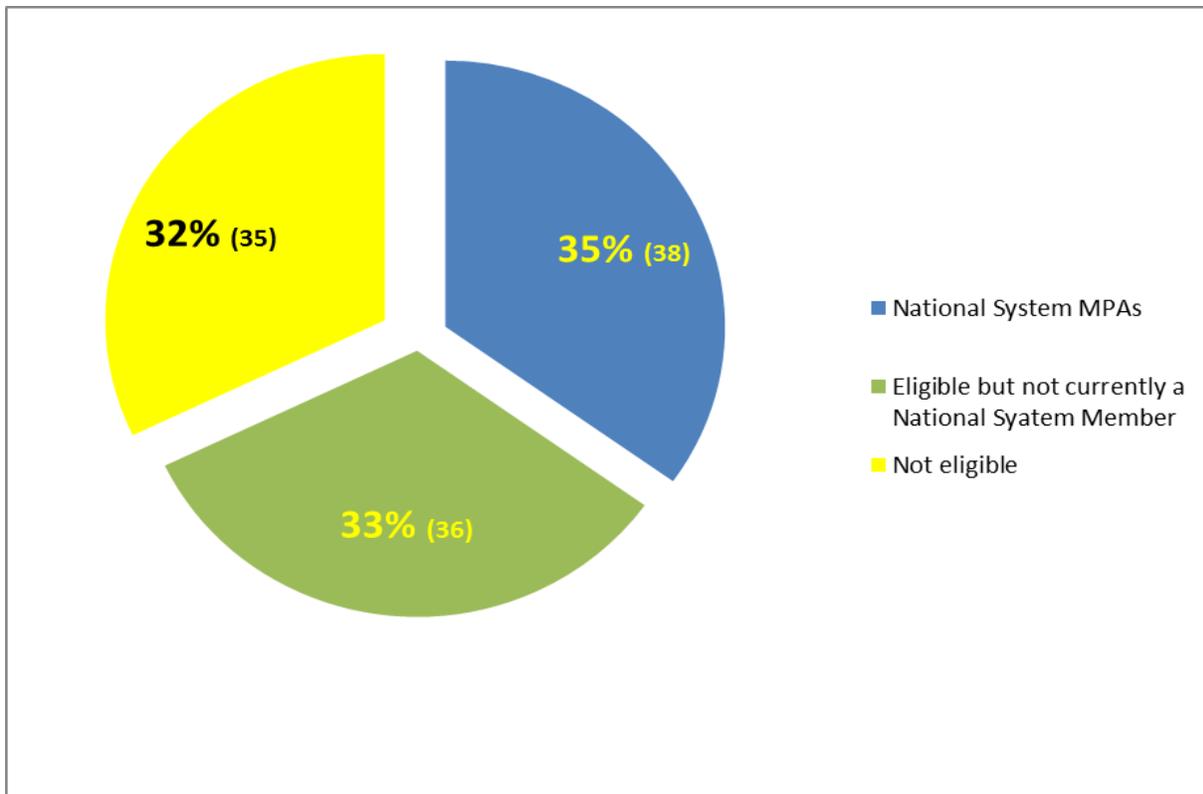


Figure 1. Percent of Marine Protected Areas (MPAs) within the Columbian Pacific (Ecoregion 21) that are members of the National System of MPAs (n=109)

(e.g., reported in 13% of the ecoregion's MPAs), deepwater seamounts (8%) and submarine canyons (8%) (Figure 2). The coastline is mainly forested and rural and includes spectacular coastal headlands and beaches (39%) and sand dunes (5%). The ecoregion is home to the Columbia and Fraser Rivers and these and other rivers and streams (17%) empty a vast amount of freshwater and nutrients into the marine and estuarine areas. These areas support temperate seagrass (21%) and benthic algae (34%). Submerged rocky reefs (26%) and rocky intertidal areas (34%) also contain kelp beds (27%) that valuable habitat for a variety of species. Bull kelp provides important surface canopy and is most abundant in this ecoregion. The regional has seasonal upwelling (26%) that contributes to the area's moderately high productivity. Underwater canyons (8%) such as the Astoria and Juan de Fuca have unique deepwater habitats and ecosystems.

The mixing of temperate California Current and cold subpolar water masses passing over important bathymetric features (seamounts, canyons) supports an area rich in fisheries. The Strait of Georgia and Puget Sound are the largest and most important estuaries in the region. Anadromous (48%) and estuarine (17%) fish such as chinook, coho, chum and steelhead salmon migrate offshore from the coast's rivers and streams during part of their life cycle (Figure 3). Various types of marine fishes are found throughout many of the ecoregion's MPAs, including coastal pelagic fish in 20%, and commercially important groundfish (65%) such as cowcod rockfish, bocaccio and Pacific hake. The ecoregion also supports internationally significant marine mammals, including cetaceans (found in 27%) such as blue and sperm whales that favor

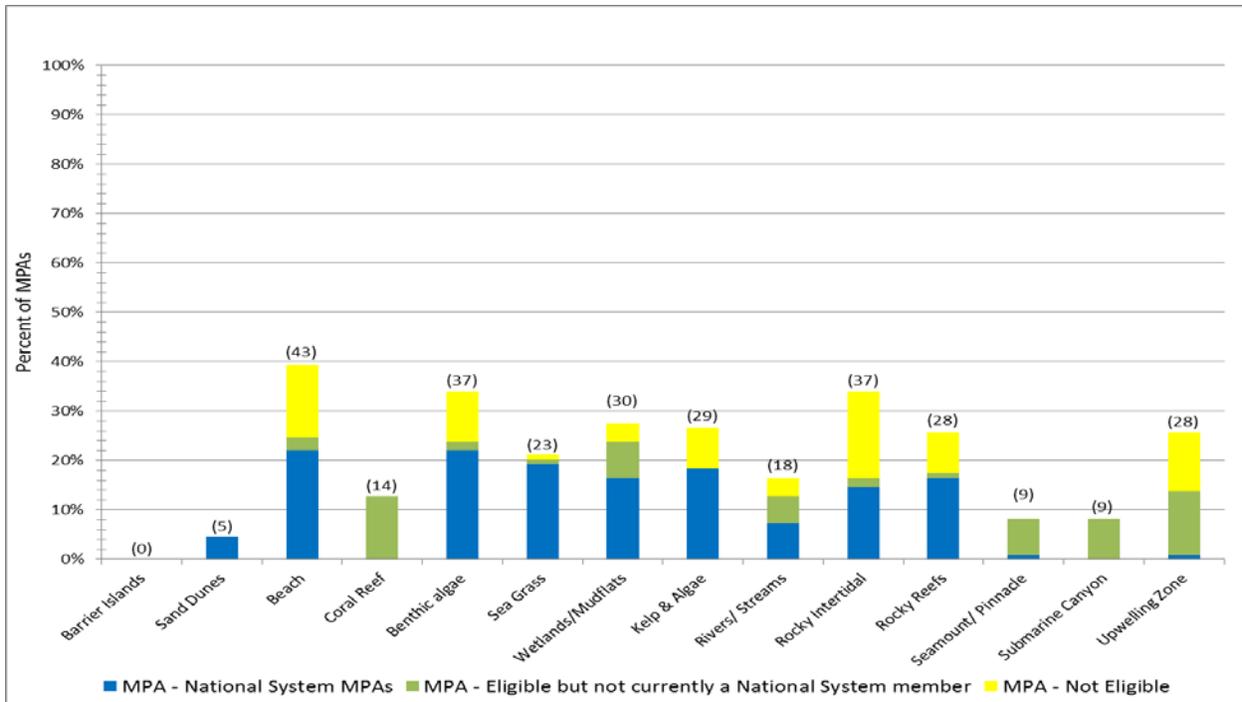


Figure 2. Percent of MPAs that contain certain habitat groups in the Columbian Pacific (Ecoregion 21)

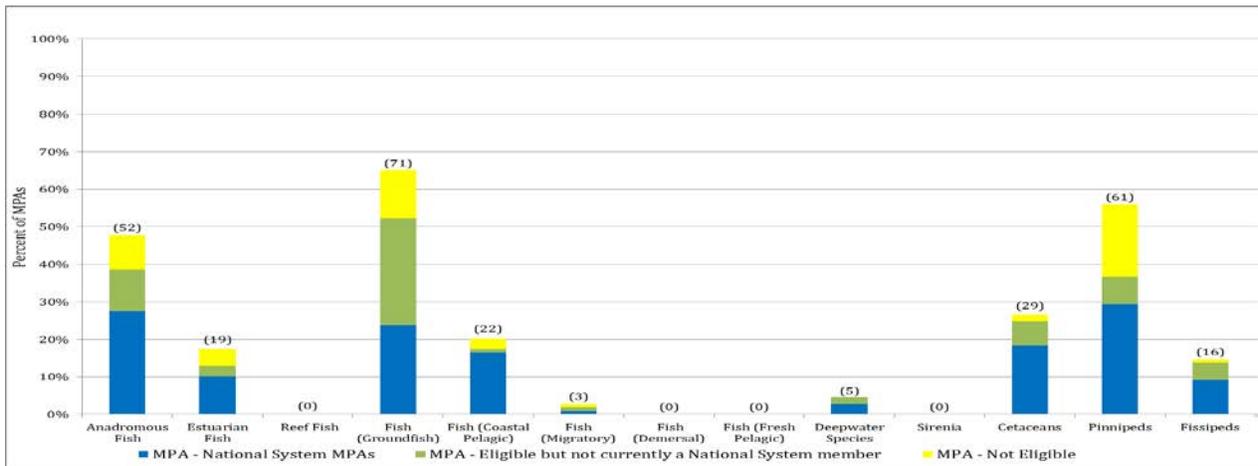


Figure 3. Percent of MPAs that contain certain fish and marine mammal groups in the Columbian Pacific (Ecoregion 21)

the deep and temperate waters and coastal gray whales. The ecoregion is also home to major adult populations of killer whales. As this ecoregion stretches along coastlines and offshore areas fueled by the upwelling of nutrients, temperate marine mammals thrive, including pinnipeds (56%) such as harbor seals and fissipeds (15%) such as the sea otter, important predators (on fish) as well as prey species (for killer whales). Birds are classified as waterfowl, estuarine or seabirds, signifying where their principal feeding areas occur and are found in several of the ecoregion's MPAs (Figure 4). Waterfowl (43%) and estuarine-dependent birds (56%) are reported in the ecoregion's rivers and streams that flow into estuaries such as Puget Sound. The numerous rocky cliffs and shoreline rocky areas, bays and islands provide valuable

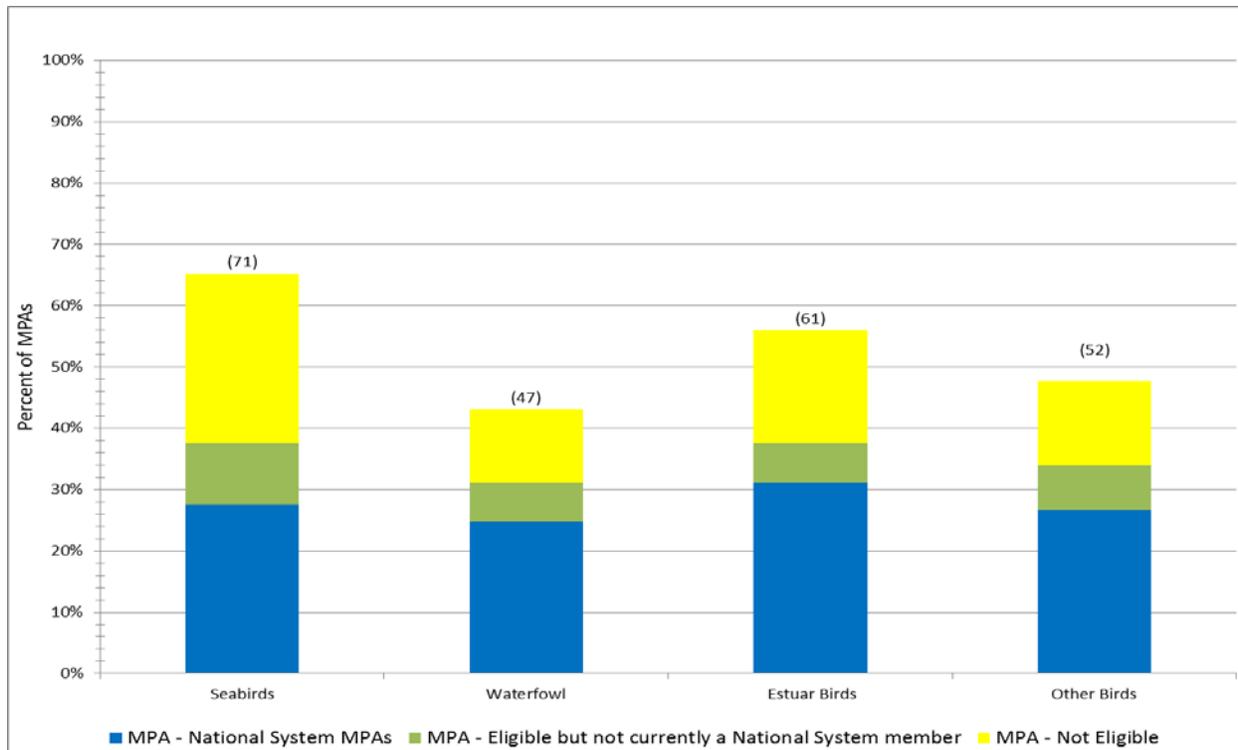


Figure 4. Percent of MPAs that contain certain marine birds and other marine resource groups in the Columbian Pacific (Ecoregion 21)

habitat for many shorebirds (65%) such as the common murre. Birds not classified in any of these feeding guilds are found in 48% of the ecoregion's 109 MPAs. Large amounts of freshwater and nutrients input stimulate phytoplankton and algae growth and support a highly productive benthos (Figure 5). The Columbia Pacific is home to the greatest oyster and clam production in North America, part of a very ecologically and economically important subtidal invertebrate community (reported in 69% of the ecoregion's MPAs). As the region is composed mainly of coastal mountains and rocky shores, rocky intertidal invertebrates (32%) and attached rocky intertidal algae (21%) frequent the coast. Ecologically important areas that support where species breed, nest, spawn and rest can be found throughout many of the ecoregion's MPAs. Coastal marshes, estuarine wetlands and oyster/shellfish reefs (39%) serve as nursery grounds (21%), fish spawning (42%) and bird nesting (48%) areas for many species within the ecoregion (Figure 6). The NOAA Fisheries Service has jurisdiction over 102 threatened and endangered species listed under the Endangered Species Act (ESA), many of which (such as whales, dolphins, sirenids and various species of sea turtles) are found in this ecoregion and in 72% of the ecoregion's MPAs.

Conclusions

The 109 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.

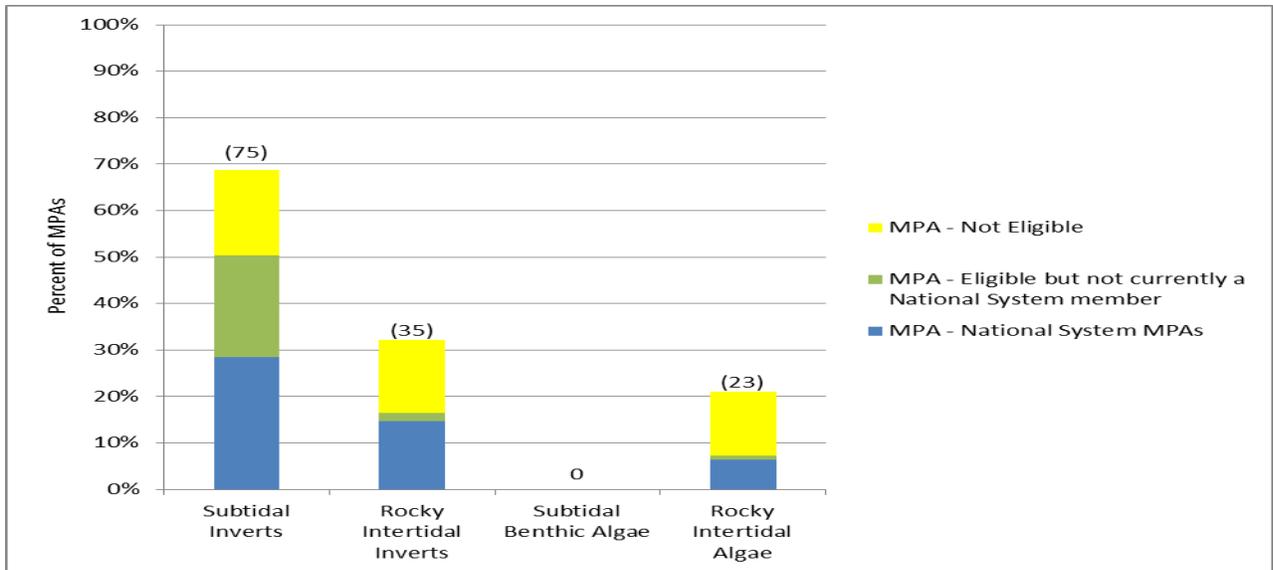


Figure 5. Percent of MPAs that contain Invertebrates and Algae in the Columbian Pacific (Ecoregion 21)

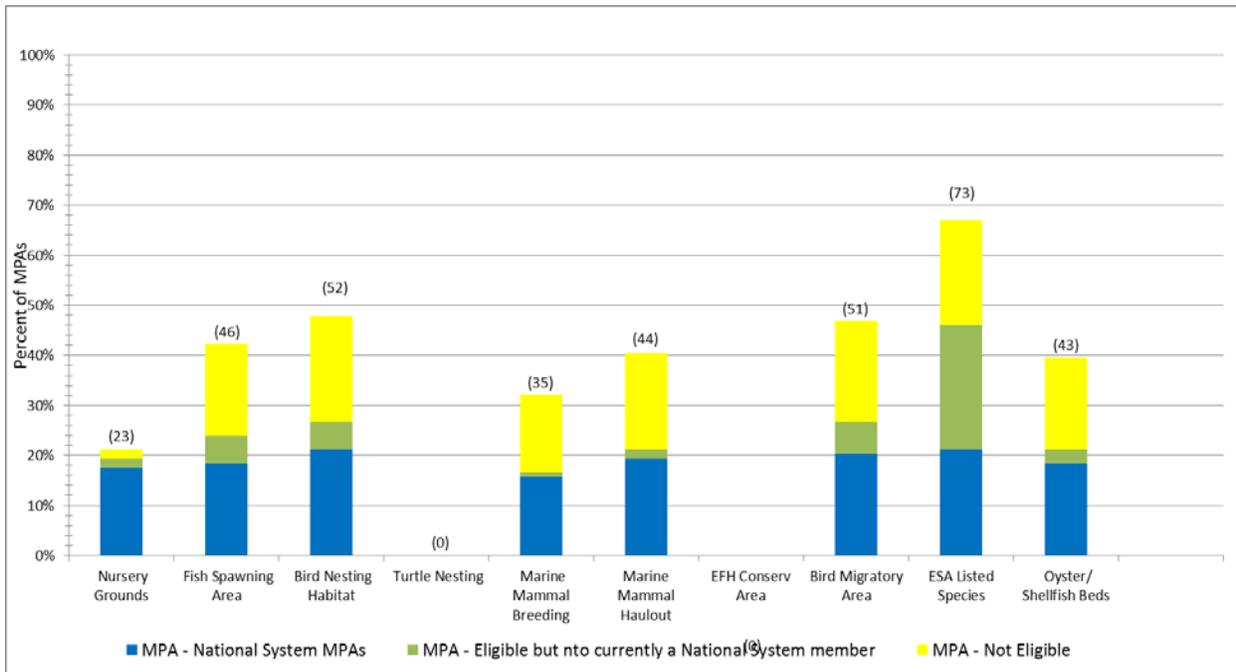


Figure 6. Percent of MPAs with ecologically important areas in the Columbian Pacific (Ecoregion 21)

Suggested Reading

Puget Sound Partnership Resource Center. [Puget Sound – where land and sea meet.](http://www.psparchives.com/puget_sound.htm)