

The purpose of this section is to create an overview of the natural resources of the Los Angeles/Long Beach port areas and approaches for consideration by members of the Harbor Safety Committee ("HSC") regarding natural habitat and biota which might be impacted by recommendations of the Harbor Safety Plan. In addition, listed below are several local experts who are willing to consult with the HSC on environmental concerns as needed.

Executive Summary: The Ports of Los Angeles and Long Beach (referred to below collectively as "the harbor") and their associated approach areas support a high diversity of biological communities in both artificial and natural habitats. These habitats may be defined as benthic (hard and soft bottom), water column, salt marsh, kelp bed, special designation habitats, and bird/marine mammal habitat.

Hard Bottom Benthic Habitats: The benthic habitats include hard substrate, soft bottom and intertidal. Hard substrate habitat is abundant, owing to the prominence of riprap (boulders and concrete rubble), walls, cobble, wood and cement pilings. In general, the hard substrate habitat of the Outer Harbor resembles that found on natural rocky shores of the adjacent coast, while the Inner Harbor resembles natural bays and estuaries of the Southern California Bight. This type of habitat provides foraging and resting areas for shorebirds along with food and shelter for numerous fishes. Primary inhabitants include acorn barnacles, mussels, limpets, shore crabs, filter-feeding gastropods, articulated coralline algae, purple sea urchin, octopus, leopard shark, rockfish, kelp bass, corbina and bat ray.

Algal beds, including giant kelp (discussed below in more detail), feather boa kelp and sargassum, are well developed in various hard substrate parts of the harbor and adjacent coastline and provide a critical nursery habitat for numerous species of fish and invertebrates, the most abundant of which are kelp bass, blacksmith, señorita, surfperch and barred sand bass. The 87 species of marine algae found in the harbor are primary producers, providing a food source for many species.

Surfgrass (*Phyllospadix* spp.) beds occur on rocky substrates in the high-energy, low intertidal and shallow subtidal reef habitats. Composition of invertebrate communities in surfgrass beds is typical of low rocky intertidal habitats except for some smaller gastropods that are specialized to live on surfgrass leaves. Transplant projects to restore damaged surfgrass beds have been largely unsuccessful. As with many species that are persistent over long periods of time, surfgrass recovers very slowly when removed and the low intertidal community is often substantially altered in its absence.

Kelp Beds: Giant Kelp (*Macrocystis pyrifera*) is an important source of primary production in coastal waters and provides food and habitat for nearshore fish and invertebrates. Kelp and macroalgal communities are narrowly distributed within the harbor areas, being principally restricted to the shallow hard bottom environments associated with riprap shorelines, breakwaters, pier structures, and most shallow horizontal hard-bottom substrates. In general giant kelp can grow up to two feet per day and creates a biogenic habitat that supports over 800 species, including birds, mammals, sharks and rays, fish, invertebrates, algae, and more. Ribbon kelp (*Egregia menziesii*) is also present. The bottom of the harbor kelp forest is dominated by gorgonians, purple urchins, lobsters, sea stars and snails. The fronds support a variety of mobile

invertebrates such as nudibranchs, amphipods, shrimp, crabs, mollusks and polychaete worms. Twenty eight species of fish also reside in the kelp community.

The harbor kelp beds are significant for two reasons. First, the kelp coverage in adjacent areas is no more than 25% of historic levels, so every acre is critical. Second, the frond density, and therefore productivity, of kelp beds in the harbor is two to three times that of most California coastal beds, due mainly to the shelter provided by the breakwater. Giant kelp communities within LA-LB Harbor cover approximately 25 acres in the spring and declining to about 14 acres in the fall. Seasonally, up to 50% of kelp is consumed by fish and invertebrates within the kelp forest, while significant portions of the remainder is shed and drifts to adjacent habitats where it is eaten by benthic invertebrates. Much uneaten kelp sheds and drifts to other benthic habitats, where it feeds a myriad of marine life. Whereas algal beds include 87 species of macro-algae, there is a general decline of algal diversity from the outermost portions of the harbors to the innermost channel.

Soft Bottom Benthic Habitats: Soft bottom habitat makes up most of San Pedro Bay, taking up over 10,000 acres of the Outer Harbor, and supports organisms that burrow within the sediments ("infauna"), for example worms, and those which live on the surface of the sediments ("epifauna"), for example sea stars, urchins and bottom-dwelling fish such as halibut. In general, the Outer Harbor areas have higher diversity and lower density of faunal populations than the Inner Harbor. Sandy intertidal habitats in the harbor are present along Cabrillo Beach, the 190 acre landfill in Los Angeles Harbor, and along the shore east of the Los Angeles River mouth in Long Beach. Burrowing invertebrates, such as polychaete worms and sand crabs live in this environment, while shore birds (during low tide) and fish (during high tide) forage on these invertebrates.

Sand and mud bottom habitat: Sand and mud soft bottom habitat comprises most of the harbor with over 10,000 acres of outer harbor. It supports a diversity of burrowing organisms and bottom-dwellers. The outer harbor supports more diverse and less dense fauna than the inner harbor.

Eelgrass beds: Eelgrass (*Zostera spp.*) grows in shallow coastal, marine bays and estuaries around the world and forms the basis of a specialized coastal and estuarine habitat of great ecological value. Eelgrass is a major source of primary production in nearshore marine systems, supplying detrital based food chains. In addition, several fish, invertebrates, and birds directly graze upon it, thus contributing to the system at multiple trophic levels.

Eelgrass meadows are also of vital importance as habitat and have an important role in the life cycle of many ecologically and economically important aquatic species by serving as nursery areas. In addition to the habitat and resource values that eelgrass provides, it also functions to trap and remove suspended particles, thus improving water clarity, reduces erosion by providing sediment stabilization, adds oxygen to the surrounding water, and cycles nutrients. Extensive eelgrass canopies absorb wave shock, thereby protecting adjacent shorelines. Not only does eelgrass provide high ecosystem value, but it also is used as an indicator of estuarine health because it responds to environmental factors by changing in distribution and abundance.

Because of the susceptibility of eelgrass to stresses such as pollution, it is used as one of the five sensitive indicators of pollution in the NOAA National Estuarine Eutrophication Assessment. Eelgrass requires some of the highest light levels of any plant group worldwide which means it is acutely responsive to water clarity changes.

Sandy intertidal habitats: Sandy intertidal habitats along Cabrillo Beach and Los Angeles Harbor's 190-acre landfill support burrowing invertebrates, which provide food for shore birds at low tide and fish at high tide.

Water Column: Phytoplankton, zooplankton and 130 species of fish, many which are commercially and recreationally important, are abundant throughout the harbor in the water column. Dominant fish species include northern anchovy, white croaker, sardine, smelt, grunion, blennies, gobies and queenfish, all important food sources for resident and migratory bird populations. Significant populations of rays, white sea bass, halibut, sand dab, shad, cusk eel, barracuda and mackerel are also present. Fish population density is higher inside the harbor than outside; although its overall productivity is 20 - 50% lower than similar, nearby, completely natural habitats. However, the shelter provided by the harbor, combined with the fact that over 90% of natural wetlands Bight-wide have been developed, make it an important nursery for virtually all of the fish species that reside there as adults. Egg and larval abundance tend to be highest in late winter and early spring. Birds and larger fish spawn, breed and forage in the shallow water habitat near the former seaplane anchorage, the Los Angeles breakwater near Cabrillo Beach, and along the east side of the Pier 400 Corridor. These habitats, although in some cases new and not yet fully productive, are proving environmentally significant.

Salt Marsh: The 3.5 acre constructed Cabrillo salt marsh lagoon provides significant spawning and nursery habitat as well as foraging habitat for birds. It is the only extant wetlands habitat in Los Angeles-Long Beach Harbor and is located next to the Port of Los Angeles' Cabrillo Beach area. The historic wetlands in the area were largely converted to port uses before World War II; only the wetlands in and around the Seal Beach Naval Weapons Station remain.

Bird Habitat: The harbor supports an abundance and diversity of birds, primarily water-associated species, up to 16,500 individuals being present during winter migrations when the harbor becomes an important foraging and roosting habitat along the Pacific Flyway. By late spring/early summer, that number drops to around 3,000. In all, 153 species have been observed in the harbor area in the past decade. The Inner harbor is a major site for roosting while the Outer Harbor is dominated by feeding activity. Flight activity is high near the breakwater and areas of human activity. Some birds require five times their normal intake of food to maintain body weight when flushed from their habitat repeatedly by human interference.

Shallow water habitat is used for foraging by loons, grebes, cormorants, pelicans, diving ducks, gulls and terns. Deeper waters are used by brown pelicans, a state and federally listed endangered bird. Pelicans nest mainly in the Channel Islands, but large numbers (several thousand between July and November) return annually to the harbor to forage, mainly feeding on northern anchovy. The breakwaters provide an important roosting area to these species as well. Local nesting species which rely on the harbor habitat include the western gull, American kestrel, killdeer, belted kingfisher, mallard, black oystercatcher, barn swallow, Anna's

hummingbird, mockingbird, Caspian tern, elegant tern and royal tern. Port of Long Beach relocated a large colony of black-crowned night herons from the former Long Beach Naval Station to Gull Park at the end of the Navy Mole in 1998.

As noted above, the harbor also provides important nesting habitat for the least tern, which feeds primarily on the abundance of northern anchovy found here. Least terns are very vulnerable to disruption of nesting activity from noise, predators, interference with foraging territory close to nesting sites, and pollution stresses.

The peregrine falcon, a state listed endangered species, also nests within the harbor area, hunting shorebirds in and adjacent to Cabrillo Salt Marsh Lagoon.

Marine Mammal Habitat: Common dolphin, Pacific white-sided dolphin, and bottlenose dolphin are present in the harbor area throughout the year, with resident populations reaching record numbers in 1995. Pacific Gray whales migrate through the area, including three to four entering into the harbor itself each year, between November and February (southward migration) and between March and May (northward). In early 1995, a Navy vessel struck and killed a large adult gray whale just outside the break wall, highlighting the need for caution during migration times. Blue whales, orca whales and five other whale species have also been observed. California sea lions and harbor seals haul out on the breakwaters and other rocky areas of the harbor. Although not a significant birthing area, the harbor is an important foraging and resting area for sea lions.

Federally endangered green sea turtles have been observed sporadically in the harbor area as well as three other species of marine turtle.

Special Designation Habitats: Within the harbor approach areas are two sensitive ecological preserves, the Point Fermin Marine Life Refuge and the Seal Beach National Wildlife Refuge. In addition, Terminal Island hosts approximately 13% of the state's total California Least Tern population in the Least Tern Management Area, an important nesting habitat for the endangered species (located on the southern portion of the Pier 400 Stage 1 landfill). Shallow water habitats in the harbor feed the terns and also provide a nursery for halibut.

References

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