



## Overview of Ecology and Habitats of the Coastal Marine Ecosystem

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### DESCRIPTION

Coastal marine ecosystems are marine ecosystems that occur where land and sea meet. Coastal marine ecosystems include various types of marine habitats such as river mouths and lagoons, salt marshes and mangrove forests, sea grass beds and coral reefs, kelp forests and backwaters. They directly and indirectly provide humans with a variety of ecosystem services, Carbon isolation, nutrient and element circulation, nursery and fishery provision for commercial fishing, prevention of coastal erosion and mitigation of extreme events, provision of recreational services and tourism assistance.

Coastal waters are a highly productive system that provides humanity with a variety of ecosystem services, including: Treatment of nutrient wastewater from land and climate regulation. However, coastal ecosystems are threatened by human pressures such as climate change and eutrophication. In coastal areas, the nutrient and carbon fluxes and conversions that maintain the function and service of coastal ecosystems are strongly regulated by the biological and chemical processes of benthic organisms (that is, those that occur on the seafloor).

Coastal systems also help regulate climate and nutrient cycles by efficiently treating anthropogenic emissions from land before they reach the ocean. Given that most of the world's population lives near the coast, the high value of these ecosystem services is clear. Today, coastal waters around the world are experiencing significant ecological changes caused by human pressure, such as climate change, anthropogenic nutrient input, overfishing, and the spread of invading species.

Estuaries occur where there is a marked change in salinity between salt and freshwater sources. This is usually found in the sea or where the river meets the sea. Wildlife found at estuaries is unique because the water in these areas is brackish: A mixture of freshwater and salty seawater that flows into the sea. There are other types of estuaries that have characteristics similar to traditional brackish water estuaries. The Great Lakes are a typical example. There, the river water mixes with the lake water to form a freshwater estuary.

Coral reefs are one of the most well-known marine ecosystems in the world, the largest being the Great Barrier Reef. These reefs

are made up of large coral colonies of various species that live together. Corals have multiple symbiotic relationships with surrounding organisms. Coral reefs are strongly affected by global warming. They are one of the most endangered marine ecosystems. Warming ocean heat waves put coral reefs at risk of severe decline, loss of important structures, and increased frequency of ocean heat waves.

Coastal wetlands are one of the most productive ecosystems on the planet, providing important services that benefit human societies around the world. Sediment stabilization from wetlands such as salt marshes and mangroves helps protect coastal communities from storms, floods and land erosion. Coastal wetlands also reduce pollution from human excrement, remove excess nutrients from water columns, trap pollutants, and sequester carbon. Coastal waters include estuaries and the entire continental shelf. They occupy about 8% of the total ocean area and about half of the total ocean productivity. The main nutrients that determine eutrophication are coastal nitrogen and lake phosphorus. Both are found in high concentrations in guano (seabird droppings), which is used as fertilizer for the surrounding seas and adjacent lakes. Uric acid is the major nitrogen compound and various forms of nitrogen are produced during its mineralization.

Food web theory predicts that the current global decline of marine predators can have undesired consequences for many marine ecosystems. In coastal plant communities such as kelp, sea grass beds, mangrove forests and salt marshes, some studies have demonstrated widespread effects of changing predator populations. In coastal ecosystems, the loss of marine predators appears to be detrimental to coastal plant communities and the ecosystem services they provide. Seascape Ecology is a marine and coastal version of landscape ecology. It is now evolving into an interdisciplinary and spatially explicit ecology related to marine management, biodiversity conservation and restoration. A seascape is a complex ocean space formed by dynamic, interconnected patterns and processes that occur on various spatial and temporal scales. Rapid advances in geospatial technology and the proliferation of sensors both above and below sea level have revealed complex and scientifically interesting ecological patterns and processes. Some of them are the result of human activity.

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