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Threats to Marine Ecosystems

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Human activity affects marine life and habitats through overfishing, habitat loss, and introduction of invading species, marine pollution, ocean acidification, and ocean warming. These affect marine ecosystems and food networks and can have unrecognized consequences for biodiversity and survival of marine life. According to the IPCC (2019), "many marine organisms in different groups have changed in response to ocean warming, changes in sea ice, and biogeochemical changes in habitats since 1950. Only 13% of the population is still wilderness and is estimated to be predominantly in the open ocean rather than along the coast.

Marine ecosystems are the largest of Earth's aquatic ecosystems and exist in waters that have a high salt content. These systems contrast with freshwater ecosystems, which have a lower salt content. Marine waters cover more than 70% of the surface of the Earth and account for more than 97% of Earth's water supply and 90% of habitable space on Earth. Seawater has an average salinity of 35 parts per thousand of water. Actual salinity varies among different marine ecosystems. Marine ecosystems can be divided into many zones depending upon water depth and shoreline features. The oceanic zone is the vast open part of the ocean where animals such as whales, sharks, and tuna live [1].

The benthic zone consists of substrates below water where many invertebrates live. The intertidal zone is the area between high and low tides. Other near-shore (neritic) zones can include mudflats, sea grass meadows, mangroves, rocky intertidal systems, salt marshes, coral reefs, lagoons. In the deep water, hydrothermal vents may occur where chemosynthetic sulfur bacteria form the base of the food web [2].

Marine ecosystems are characterized by the biological community of organisms that they are associated with and their physical environment. Classes of organisms found in marine ecosystems include brown algae, dino flagellates, corals, cephalopods, echinoderms, and sharks [3].

Marine ecosystems are important sources of ecosystem services and food and jobs for significant portions of the global population. Human uses of marine ecosystems and pollution in marine ecosystems are significantly threats to the stability of these ecosystems. Environmental problems concerning marine ecosystems include unsustainable exploitation of marine resources (for example overfishing of certain species), marine pollution, climate change, and building on coastal areas. Moreover, much of the carbon dioxide causing global warming and heat captured by global warming are absorbed by the ocean, ocean chemistry is changing through processes like ocean acidification which in turn threatens marine ecosystems. Because of these opportunities in marine ecosystems for humans and the threats created by humans, the international community has prioritized "Life below water" as Sustainable Development Goal 14 to "Conserve and sustainably use the oceans, seas and marine resources for sustainable development" [4].

Human exploitation and development

Coastal ecosystems are facing population growth, with nearly 40% of the world's population living within 100 km of the coast. Humans often gather near coastal habitats and use ecosystem services. For example, coastal fishing from mangrove and coral reef habitats is estimated to be worth at least US $ 34 billion annually. However, many of these habitats are either slightly protected or completely unprotected. The coverage of mangroves in the world has declined by more than one-third since 1950, and now 60% of the world's coral reefs are under imminent or direct threat. Human development, aquaculture and industrialization often lead to the destruction, replacement and deterioration of coastal habitats [5].

Offshore mobile pelagic marine systems are directly threatened by overfishing. The landing volume of the world's fisheries peaked in the late 1980s, but is now declining despite increasing fishing efforts. Average nutrient levels in fish biomass and landings are declining, leading to reduced marine biodiversity. Local extinctions, in particular, have led to a decline in large, long-lived, slow-growing and narrow-geographic species. Decreased biodiversity can lead to associated declines in ecosystem services. Longitudinal studies have reported a 74-92% reduction in shark catch per unit effort off the coast of Australia between the 1960s and 2010s [6].

Pollution

This section is an excerpt from Marine pollution

Marine pollution occurs when substances used or spread by humans, such as industrial, agricultural and residential waste, particles, noise, excess carbon dioxide or invasive organisms enter the ocean and cause harmful effects there. The majority of this waste (80%) comes from land based activity, although marine transportation significantly contributes as well. Since most inputs come from land, either via the rivers, sewage or the atmosphere, it means that continental shelves are more vulnerable to pollution. Air pollution is also a contributing factor by carrying off iron, carbonic acid, nitrogen, silicon, sulphur, pesticides or dust particles into the ocean. The pollution often comes from nonpoint sources such as agricultural runoff, windblown debris, and dust [7-9].

These nonpoint sources are largely due to runoff that enters the ocean through rivers, but windblown debris and dust can also play a role, as these pollutants can settle into waterways and oceans. Pathways of pollution include direct discharge, land runoff, ship pollution, atmospheric pollution and, potentially, deep sea mining. The types of marine pollution can be divided into marine pollution, plastic pollution including micro plastics, marine acidification, nutrient pollution, toxins, and underwater noise. Marine plastic pollution is a

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form of marine plastic pollution that comes in a variety of sizes, from large raw materials such as bottles and bags to micro plastics resulting from fragmentation of plastic materials. Marine debris is primarily abandoned human debris that floats or floats in the ocean. Plastic pollution is harmful to marine life [10].

Invasive species

Global aquarium trade

Ballast water transport

Aquaculture

Climate change

Global warming temperature

Increased storm frequency / intensity

Ocean acidification

Sea level rise

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Conflict of Interest

The authors declare that they are no conflict of interest.

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