

Understanding Involvement and Magnitude of Coastal Ecosystem Functionalities

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DESCRIPTION

The coastal ecosystem is a dynamic and complex system that is formed by the interaction of the land, sea, and atmosphere. It is one of the most diverse and productive ecosystems on earth, providing habitat for a wide variety of species, supporting commercial and recreational fisheries, and protecting coastlines from erosion.

The coastal ecosystem is characterized by a variety of habitats including sandy and rocky beaches, mangroves, salt marshes, estuaries, lagoons, and coral reefs. These habitats are interconnected and interdependent, forming a complex network of ecological processes that support the health and productivity of the entire system.

Yet, these ecosystems are dealing with a wide range of regional and global issues brought on by human activity, such as urbanization, engineering changes, overfishing, etc., which is causing a gradual change in the ecology of these ecosystems. Eutrophication and atypical phytoplankton blooms are results of excessive nutrient loadings in estuaries, bays, and coastal waters from household, industrial, and domestic sources. Hypoxia that occurs frequently has led to a considerable decline in fishing harvests, toxic algal blooms, and biodiversity loss. The operation of biogeochemical cycles is also impacted by environmental factors such as global warming scenarios, an increase in heat waves and cyclones, extreme precipitation and flooding events, sea level rise, changes to global hydrological cycles, and changes in monsoon behavior, among others.

Threats to the coral reefs in the Gulf of Mannar come from both natural (climate change, ocean acidification, and coral bleaching) and man-made (indiscriminate fishing and trawling) causes. In order to effectively conserve and manage coastal resources and to enhance the standard of living for coastal people, the National Centre for Coastal Research (NCCR) created a Field Research Center in the Gulf of Mannar Biosphere Reserve (GoMBR).

One of the key features of the coastal ecosystem is its high biological diversity. The complex network of habitats provides a wide range of niches and microhabitats for a vast array of organisms. These include everything from microscopic plankton to large mammals such as whales and dolphins. In addition to supporting a diverse array of marine life, the coastal ecosystem is also home to a variety of terrestrial species such as birds, reptiles, and mammals.

Another important function of the coastal ecosystem is to support commercial and recreational fisheries. Many species of fish and shellfish rely on the coastal ecosystem for their habitat and food, and support local economies through commercial fishing and tourism. In addition, the coastal ecosystem provides a variety of other ecosystem services, such as carbon sequestration, nutrient cycling, and water purification.

Despite its importance, the coastal ecosystem is facing a number of threats. One of the biggest threats is habitat loss and degradation due to human activities such as coastal development, pollution, and overfishing. These activities can lead to the loss of critical habitat for species, disruption of important ecological processes, and a decline in the overall health and productivity of the ecosystem.

Climate change is also posing a major threat to the coastal ecosystem. Rising sea levels, ocean acidification, and changes in temperature and weather patterns are all affecting the functioning of the ecosystem, and are expected to have significant impacts on coastal communities, economies, and biodiversity in the coming decades.

To protect the coastal ecosystem, it is important to take a holistic approach that considers the entire system and the many interactions between its different components. This requires a combination of strategies such as habitat restoration, pollution reduction, sustainable fishing practices, and coastal planning and management.

In conclusion, the coastal ecosystem is a complex and dynamic system that plays a vital role in supporting biodiversity, fisheries, and a wide range of ecosystem services. However, it is facing a number of threats, and urgent action is needed to protect and conserve this important ecosystem for future generations.

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