Introduction

Marine ecosystem services refer to benefits that people obtain from marine ecosystems, including the open ocean, coastal seas, and estuaries. More than one third of the world’s population lives in coastal areas (Table 1), and people throughout the world depend intimately on the oceans and coasts, and the resources they provide, for survival and well-being. Yet marine ecosystems, and the resources they provide, are increasingly threatened by land-use change, overfishing, climate change, invasion of non-native species, and other impacts of a rapidly growing human population.

Types of marine ecosystem services

Ecosystem services can be divided into several categories (Table 2):

**Provisioning services.** These include food, water, timber, and fiber. More than a billion people worldwide rely on fish as their main source of protein. Fisheries and associated industries employ 38 million people directly, and another 162 million are indirectly supported. Other provisioning services from marine ecosystems include building materials from mangrove and coral reef areas, and pharmaceutical compounds derived from marine algae and invertebrates.

**Regulating services.** These include regulation of climate, natural hazards such as floods, disease, wastes, and water quality. For example, coastal wetlands play an important role in water quality regulation by capturing and filtering sediments and organic wastes in transit from inland regions to the ocean. On a global scale, fixation of atmospheric carbon by oceanic algae and its eventual deposition in deep water represents an important part of the global carbon cycle and thus influences climate trends.

**Cultural services.** These include recreational, esthetic, and spiritual benefits derived from nature. Coastal tourism is the
fastest-growing sector of the global tourism industry, and is a major part of the economies of many small island developing nations. Scuba diving and other nature-based tourism on coral reefs, for example, is estimated to contribute $30 billion to the global economy each year. Moreover, the cultures and traditions of many coastal peoples are intimately tied to the marine ecosystems on which they depend.

**Supporting services.** These include soil formation, photosynthesis, and nutrient cycling by healthy ecosystems, which support goods and services used more directly by humans. Coastal habitats such as seagrass beds and mangroves are important nursery areas for the young stages of fishes and invertebrates that support coastal communities and commercial and recreational fisheries.

**Threats to marine ecosystems and the services they provide**

Unsustainable use of marine resources poses serious threats to food security of many coastal nations, particularly in the developing world. Destruction and degradation of coastal habitats such as coral reefs, seagrass beds, and mangroves, increases risks to coastal communities from natural and human-induced hazards such as hurricanes. Coastal pollution and habitat degradation also endanger economies of coastal areas that depend on tourism.

**Further reading**


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