Seagrass

DEFINITION

A group of flowering plants found in marine or estuarine waters, that tend to develop extensive underwater meadows.

DESCRIPTION

Seagrasses are a unique group of flowering plants that grow in the shallow coastal waters of most continents [1]. Seagrasses can form vast aggregations, or meadows, which alter the flow of water, nutrient cycling and food web structure of the local environment [2].

GEOGRAPHIC DISTRIBUTION

Seagrasses are broadly distributed in most of the world's oceans and seas, including the Black and Caspian Seas. The global distribution of seagrasses extends up within the Arctic Circle, where they are present in northern Russia, Norway and Alaska. Seagrass has also been recorded as far south as New Zealand. Strong wave action, nutrient concentration, ice scouring, depth and water turbidity are some of the limiting factors to the distribution of seagrasses.

ECOLOGY

Seagrasses have evolved the ability to grow completely submerged by seawater, and have an underwater pollination system. They are able to cope with saline water, and have rooting structures which allow them to withstand the movement of water.

Seagrass meadows provide numerous ecological services, acting as essential habitat (e.g. spawning, nursery, refuge and foraging areas) for many animals, including commercially and recreationally important fish species [3, 4], whilst providing a major source of food for a range of large herbivores such as the Endangered green sea turtle (Chelonia mydas), and Vulnerable dugongs and manatees [5, 6]. Furthermore, the benefits provided by a healthy seagrass meadow extends beyond the local area, through exporting key nutrients (e.g. nitrogen and phosphate) and organic carbon to other parts of the

oceans, including some to the deep-sea where they provide a critical supply of organic matter in an extremely food-limited environment [7]. Much of the excess organic carbon produced is buried within the seagrass sediments, making seagrass habitat an important blue carbon habitat.

Seagrasses are considered to be ecosystem engineers. Ecosystem engineers play key roles in ecosystem organisation by providing conditions or resources essential for species to complete their life cycles, or by helping to maintain niche diversity such as by providing complex habitat structures [8]. They cover large areas and provide a complex structure which allow them to support thousands of other species. [9]

ECONOMIC & SOCIETAL VALUE

Seagrass meadows are one of the three 'blue carbon' habitats because of their carbon storage capability [10]. In addition to their value as a nursery and refuge for important fish species, seagrass meadows modify currents and waves, and trap and store sediments and nutrients, acting as a filter for coastal waters. They have an economic value attributed to such services estimated at US$ 34,000 $ha^{-1}yr^{-1}$, a figure greater than many terrestrial and marine habitats [11]. As outlined above, these habitats are of great importance for a range of reasons, and as such are recommended to be included in regional marine conservation priorities, e.g. in the Indo-Pacific [12].

THREATS & INTERNATIONAL THREAT STATUS

Seagrass habitats help stabilise the marine sediment and provide a framework for the accumulation of more sediment and other materials [9]. Seagrasses and the associated ecosystem services they provide are, however, under direct threat from a host of anthropogenic factors. A synthesis of 215 published studies showed that seagrass habitat has disappeared worldwide at a rate of 110 km^2yr^{-1} between 1980 and 2006 [11]. Of the 72 seagrass species listed in the IUCN Red List of Threatened Species, three are Endangered [6, 11]. As seagrasses require some of the highest light levels of any plant group worldwide, the primary threat is loss of water clarity and quality, often brought about by eutrophication and sediment loading stemming from reclamation, shoreline hardening, and dredging within coastal regions [7]. Additionally, seagrass meadows are threatened by a multitude of environmental factors that are currently changing or will change in the future including rising sea levels, changing tidal regimes, UV radiation damage, sediment oxygen depletion and deprivation, increases in sea temperatures and increases in the occurrence of storm and flooding events [13].

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Underwater view of seagrass. Rich Carey/Shutterstock.com

Category:

Marine biodiversity features

Tools

Ocean Data Viewer A tool for easy access to a range of datasets that are important for the conservation of marine and coastal biodiversity. The data can be downloaded or viewed online.

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