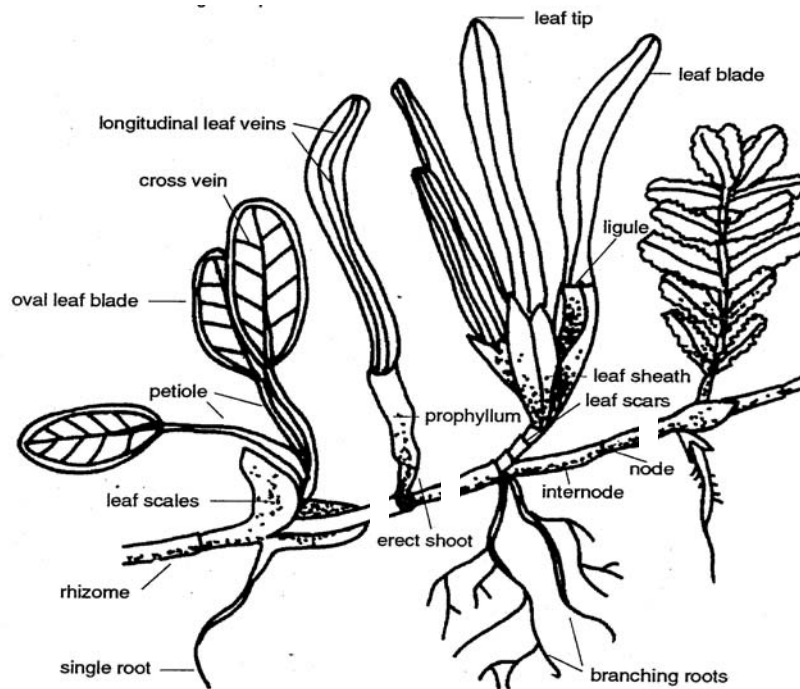


Western Pacific Seagrasses

Seagrasses are angiosperms (flowering plants) more closely related to terrestrial lilies and gingers than to true grasses. Seagrasses are a group of marine flowering plants living entirely submerged in marine waters. They grow in sediment on the sea floor and have:

- 1) erect leaves that need light to photosynthesize
- 2) buried root-like structure (rhizomes) that hold the plants in the sediments
- 3) roots that take up nutrients from sediments for growth.



Composite illustration demonstrating morphological features used to distinguish main seagrass taxonomic groups.
from Lanyon, . (1986)

There are 60 described species of seagrasses worldwide, within 12 genera. The Indo-Pacific has the largest number of seagrass species worldwide, with vast meadows of mixed species stands. There are 23 species (Short *et al.* 2001) of seagrasses found throughout the tropical Indo-Pacific (Region IX, in Short and Coles 2001). These include the genera of *Cymodocea*, *Enhalus*, *Halodule*, *Halophila*, *Syringodium*, *Thalassia*, *Zostera* and *Thalassodendron*. Seagrasses provide a sheltered, nutrient-rich habitat for a diverse range of flora and fauna. The Philippines is believed to be the area where seagrasses originally evolved, and has a high concentration of seagrass species. In the western Pacific there are 16 species recorded from the Philippines, 13 from Papua New Guinea, (Fortes 1998), and 15 from northern Australia (Lee Long *et al.* 2000) and 10 from Micronesia.

Seagrasses are unique amongst flowering plants, in that all but one genus can live entirely immersed in seawater. *Enhalus* plants are the exception, as they must emerge to the surface to reproduce; all others can flower and be pollinated under water. Adaptation to a marine environment imposes major constraints on morphology and structure. The restriction of seagrasses to seawater has obviously influenced their geographic distribution and speciation.

Seagrasses grow in waters where there is sufficient light and nutrients that are required for growth. Sediment runoff and over supply of nutrients from watersheds can reduce the amount of light needed for seagrasses to photosynthesize and grow. Too many nutrients from agricultural fertilizers and sewage inputs can cause seaweeds to grow and smother seagrass meadows. The causes of loss can also be natural such as cyclones and floods, or due to human influences such as dredging, agricultural runoff, industrial runoff or oil spills. Other factors that regulate the growth of seagrasses include temperature, salinity, waves, currents, depth, substrate and day length.

Tropical seagrasses occupy a variety of coastal habitats. Tropical seagrass meadows typically occur in most shallow, sheltered soft-bottomed marine coastlines and estuaries. Barrier reefs protect coastlines, and the lagoon formed between the reef and the mainland is protected from waves, allowing mangrove and seagrass communities to develop. Tropical seagrasses are also important in their interactions with mangroves and coral reefs. Seagrasses trap sediment and slow water movement, causing suspended sediment to fall out. This trapping of sediment benefits coral by reducing sediment loads in the water. All these systems exert a stabilizing effect on the environment, resulting in important physical and biological support for the other communities.

Mangroves trap sediment from the land, reducing the chance of seagrasses and corals being smothered. Sediment banks accumulated by seagrasses may eventually form substrate that can be colonized by mangroves. All three communities trap and hold nutrients from being dispersed and lost into the surrounding oceanic waters.

The habitat complexity within seagrass meadows enhances the diversity and abundance of animals. Seagrasses on reef flats and near estuaries are also nutrient sinks, buffering or filtering nutrient and chemical inputs to the marine environment. The high primary production rates of seagrasses are closely linked to the high production rates of associated fisheries. These plants support numerous herbivore- and detritivore-based food chains, and are considered as very productive pastures of the sea. The associated economic values of seagrass meadows are very large, although not always easy to quantify.

Tropical seagrass meadows vary seasonally and between years. The causes of loss can be natural such as cyclones and floods, or due to human influences such as dredging, agricultural runoff, industrial runoff or oil spills. Loss of seagrasses has been reported from most parts of the world, sometimes from natural causes, e.g., high-energy storms, or "wasting disease". More commonly, loss has resulted from human activities, e.g., as a consequence of eutrophication or land reclamation and changes in land use. Human impacts on seagrass meadows are continuing to destroy or degrade these coastal ecosystems and decrease their yield of natural resources. Responsive management based on adequate information will help to prevent any further significant areas and species being lost.

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Seagrass Watch in the Western Pacific

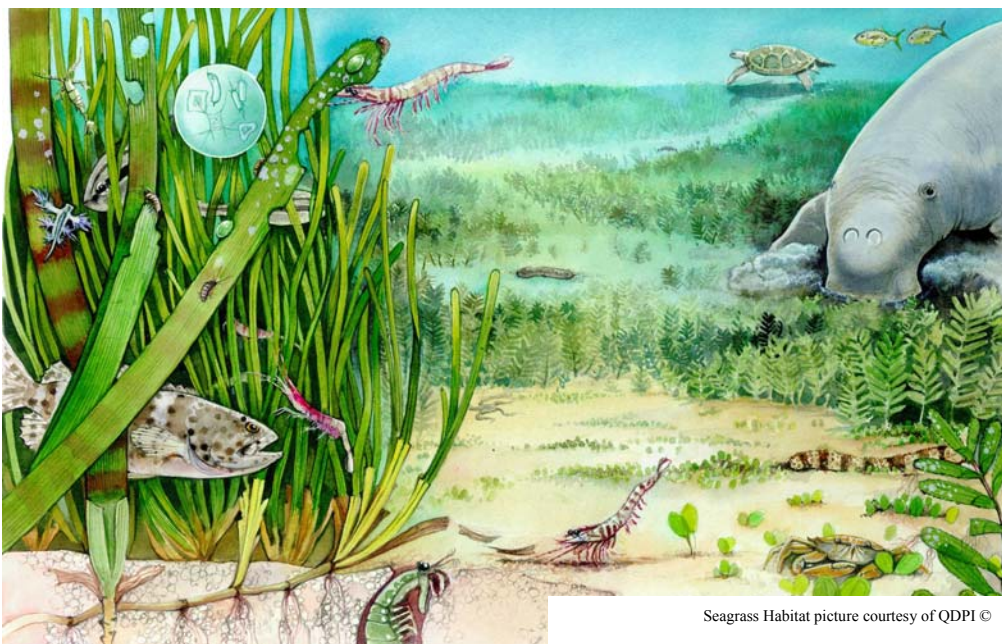
Often governments are unable to protect and conserve seagrass meadows without the assistance of local communities (eg. local residents, schools, non government organizations) Seagrass-Watch is a community based monitoring program that brings citizens and governments together for seagrass conservation. It identifies areas important for seagrass species diversity and conservation. The information collected can be used to manage coastal environments and to prevent significant areas and species being lost.

Monitoring seagrass resources is important for two reasons: it is a valuable tool for improving management practices; and it allows us to know whether seagrass meadows are improving or declining. Successful management of coastal environments (including seagrass resources) requires regular monitoring of the status and condition of natural resources.

Monitoring is important in improving our understanding of seagrass resources for:

- Identifying coastal environmental problems
- Determining the effectiveness of management practices
- Maintaining consistent records so that comparisons can be made over time
- Developing within the community a better understanding of coastal issues
- Developing a better understanding of cause and effect of watershed management practices on marine environments
- Assisting education and training, and helping to develop links between local communities, schools and government agencies
- Assessing new management practices
- Identifying and prioritising future management requirements and initiatives.

Seagrass-Watch Western Pacific is the community-based component of the Global Seagrass Monitoring Network, which also includes SeagrassNet, a scientific global seagrass monitoring program that investigates and documents the status of seagrass resources worldwide and the threats to this important ecosystem. Both SeagrassNet and Seagrass-Watch in the Western Pacific are supported through the University of New Hampshire (USA) by funding from the David and Lucile Packard Foundation.



The Seagrass-Watch Western Pacific Monitoring Program is modelled using techniques developed for the Australian based Seagrass-Watch program. This program originated from:

- Community concerns about seagrass loss and the value of habitats
- Community interest in marine science, and
- Scientific and community interest in long term monitoring of critical fisheries habitats

Seagrass-Watch Western Pacific monitoring program Goals & objectives

The goals of the Seagrass-Watch Western Pacific Monitoring Program are to develop:

- Partnerships between Government and non-government organisations
- Community participation and ownership of marine resources
- Long-term & broad-scale monitoring of habitat, seasonal patterns, condition and trend data
- An early warning system of coastal environment changes
- Community education on the importance of seagrass resources, and
- Community awareness of coastal management issues

The objectives of the Seagrass-Watch Western Pacific Community Monitoring Program include:

- To provide training to build the capacity of local communities in the use of the seagrass and associated fauna monitoring protocols.
- To provide training to allow communities to collect information useful for their ongoing management and protection of important marine resources.