Illustration by Robert Perry

Coastal Zone Species Profile Series No. 18 Eelgrass

Eelgrass, *Zostera marina*, is a green flowering plant (Anthophyta) that has 'returned to the sea'. Other common names include seagrass, barnacle grass and grass wrack.

Physical Characteristics

- This green flowering aquatic plant has true leaves and stems that contain specialized cells for transporting nutrients throughout the plant. The roots and rhizomes (creeping runners) are extensive and this plant reproduces by unique flowers that have adapted to function underwater. They are fertilized by waterborne pollen in special waterproof packets.

- Eelgrass is a perennial plant (i.e., more than one growing season) with leaves ranging from 6-12 mm wide and can grow to a length of 0.9 m at maturity. Three, sometimes five, principal veins run the length of the leaf. They grow from rhizomes that send up leafy stems at intervals and are anchored by fibrous roots to the mud or sand substrate. Small, inconspicuous flowers produce ribbed, oval, rice-sized seeds specially designed to anchor and germinate in shallow, sandy habitats.

Distribution

- Eelgrass is found on both sides of the north Atlantic (east coast of North America and west coast of Europe). On the east coast of North America, eelgrass occurs from northern Labrador south to South Carolina. It is also found on the north Pacific coast of North America.

- Eelgrass is primarily a subtidal species that penetrates to some extent into the intertidal zone. It is common on mud flats that are exposed at low tide, in estuaries and in shallow, protected bays.

Natural History

* Life Cycle

- Eelgrass has a typical flowering plant life cycle. In New England, the life cycle is water temperature dependant (i.e., no growth at <10°C, growth between 10-15°C, flower and seed production between 15-20°C and decreased plant vitality and death of the older parts at >20°C). In Newfoundland and Labrador, eelgrass grows in places that never reach these water temperatures, therefore we must have cold tolerant strains compared to the south. However, no research has been conducted to test this hypothesis.

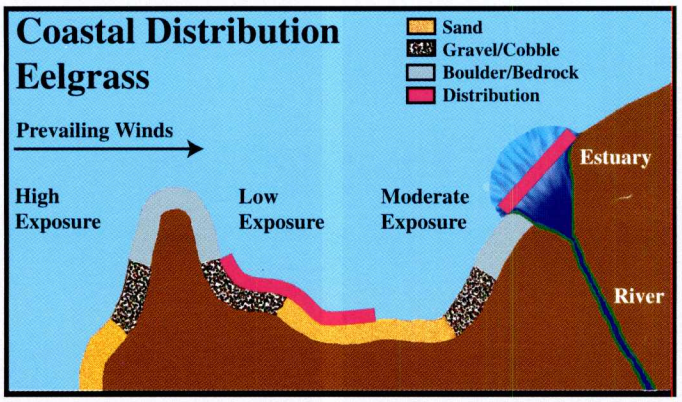
- Eelgrass flowers in late spring to early summer producing shoots bearing fruits that house rows of rice-sized seeds. The shoots detach, float to the surface and are transported by water currents. The ripe fruits are shed during this transport and sink to the bottom. Some of the seeds released from the ripe fruit will germinate in early autumn, while the majority will germinate in the spring, producing the new eelgrass when the risk of dessication (drying) and freezing is low.

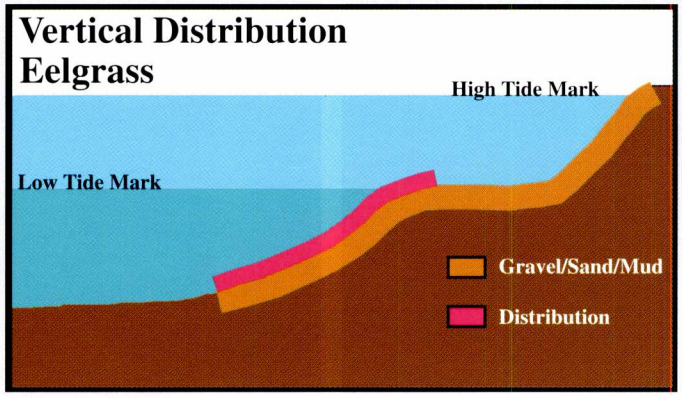
* Habitat Requirements

- Eelgrass tolerates a range of salinities. It is found growing on mud, firm sand or gravel mixed with coarse sand. Eelgrass traps and stabilizes sand and other sediments, often changing gravelly areas into sand beds. The amount of suspended material in the water, tides, waves and bottom type affect the distribution of eelgrass because they affect the amount of light, nutrients and space available for growth.

* Ecological Importance

- Eelgrass is an important aquatic plant that stabilizes soft sediments and is important in the formation of coastal marshes. The dense leaves reduce water





velocity near the sediment surface and promote the settling of organic and inorganic matter which initiates sulfate reduction and maintains the sulfur cycle in estuarine sediments. The sulfur cycle is important for the stimulation of plant growth. Further, the anaerobic (low oxygen) conditions in the root systems also promote growth of nitrogen fixing bacteria. These bacteria enhance primary production.

- The seeds are winter food items for brant geese (*Branta bernicla*), other geese, ducks and even some fish. Dense beds of eelgrass provide shelter for Age-0 juvenile Atlantic cod (*Gadus morhua*), three-spined sticklebacks (*Gasterosteus aculeatus*) and other invertebrates (e.g., crustaceans). Large amounts of eelgrass detritus (debris from decaying eelgrass and other particles) are exported by storms to deeper habitats or to the shore where they can form massive windrows. These windrows decay and support a great diversity and abundance of microbes and invertebrates that contribute to seabird and fish food webs.

- Eelgrass is periodically stricken by blight, a plant disease, which decimates the entire community. The last episode was between 1930 and 1940, along the Atlantic coasts of North America and Europe. However, the eelgrass community in both Newfoundland and Labrador was not affected by the blight of the 1930s.

Potential Impacts of Nearshore/Coastal Development

- Human activities (e.g., dredging) that increase the amount of material suspended in the water and decrease water clarity may have a negative effect on the eelgrass community because an increase in suspended sediment and/or decaying material reduces the amount of light available for growth. Further, large amounts of sediment may also smother the eelgrass beds.

- Effluent discharge from industrial plants can change water temperature and salinity, or chemical characteristics, thereby disrupting biochemical processes such as growth and reproduction. These processes are cued to a narrow range of water quality characteristics. Further, boat anchors, heavy wakes and dredging often destroy eelgrass beds. These areas are subsequently subject to considerable erosion after the eelgrass has been removed.

Commercial Applications

- Eelgrass is no longer of any direct commercial value. However, historical uses included stuffing for mattresses and upholstery, principal material for sea-dikes in 19th century Holland and packaging material. The indirect commercial value of eelgrass pertains to its ecological importance as habitat for commercially valuable juvenile fish as well as a substrate for epiphytic flora and fauna that are consumed by the juvenile fishes.

Selected References and Further Reading

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For further information, please contact your local office of Fisheries and Oceans Canada.