Seagrasses in Florida: An Overview

Biology
Seagrasses are flowering plants and a type of submerged aquatic vegetation (SAV). More than 50 species of seagrasses exist worldwide, only seven of which are found off the coast of Florida. Despite this, the seagrass community in Florida is one of the most extensive in the world and as such, is one of the most important marine ecosystems in South Florida. Seagrasses exhibit high productivity and diversity and are critical nursery habitat for commercially and recreationally important species.

Four of Florida’s seagrasses are common and widespread:

Turtle Grass (Thalassia testudinum) is the most abundant of the Florida seagrasses and can grow in extensive meadows throughout its range.

Shoal Grass (Halodule wrightii) is one of the first colonizers and often grows in disturbed areas which are either too shallow or too harsh for other seagrass species.

Manatee Grass (Syringodium filiforme) is the second most abundant seagrass in Florida and is often found in tropical coastal waters along with turtle grass and other seagrass species. As its name infers, manatee grass is a favorite food of the manatee.

Widgeon Grass (Ruppia maritima) is widely distributed in estuaries since it can grow in both fresh and saltwater. Widgeon grass can form extensive meadows in subtidal areas exposed to intense sun and can tolerate some desiccation.

The other three species of seagrass are small, fragile, and only sparsely distributed in Florida. They are all in the genus Halophila and include: Johnson’s grass (Halophila johnsonii), paddle grass (H. decipiens), and star grass (H. engelmannii). Johnson’s seagrass was the first marine plant to be listed as threatened under the Endangered Species Act.

Although seagrasses are not considered “true” grasses, like terrestrial grasses, they have roots, flowers, seeds, and leaves which photosynthesize. Since seagrasses use sunlight and carbon dioxide to make their own food and oxygen, seagrass distribution is limited to clear waters where sufficient light can penetrate for photosynthesis to occur. This is normally limited to protected bays and estuaries, lagoons, and shallow coastal waters.

Unlike terrestrial plants and grasses, seagrasses have developed adaptations to deal with wave action and salinity due to their marine environment. Their tolerance to salt water is one of the most important adaptations for seagrass species. In addition to light and air exposure, tolerance to salinity determines where a species of seagrass is found. While terrestrial plants have to contend with gravity and have strong stems and trunks to provide support and stability, seagrasses are supported by water’s natural buoyancy and have flexible blades that bend with water movement. Additionally, seagrasses have developed rhizomes for stabilization in areas with high wave energy and strong currents and they require substantial sediment for roots to anchor into.

Importance
Once seagrasses have become established they greatly influence the local physical and chemical conditions of the area. Their complex rhizome and root systems bind and stabilize the sediment and prevent erosion, whereas the seagrass leaves (and associated organisms) trap particles suspended in the water column thereby enhancing sedimentation. Additionally, seagrasses are extremely efficient in capturing and utilizing nutrients from the surrounding waters either through their leaves or roots. Thus, the removal and trapping of sediments and nutrients from the water column results in high water clarity and nutrient poor waters, two requirements for the survival of coral reefs.
These factors also act to make seagrasses a highly productive community that supports a complex food web. What results is a large biomass of organisms and microbes which help to make seagrasses one of the most productive environments on the planet. The accumulation of organic materials and seagrass detritus enriches seagrass sediments resulting in a large microbial population within the sediments. These microbes are responsible for the decomposition of detritus and organic matter. Smaller organisms (micro- and meiofauna) live within the detritus and feed on the bacteria and the dissolved organics produced from the bacterial decomposition. Phytoplankton and zooplankton that reside in the water column also consume these dissolved organics nutrients and are prey items for larger marine organisms. Macroalgae and epiphytes (plants that require another plant to grow on for support) also live within the seagrasses and become part of the detritus.

Seagrass beds also support large above- and below-ground communities since they provide food, shelter, and essential nursery habitat for many marine organisms, including those of commercial and recreational importance. Infaunal organisms, pen shells, annelid worms, and a variety of bivalve mollusks (clams), reside within the complex underground structures of the roots and rhizomes that deter predators from digging for them. Some of the invertebrates that reside within the seagrass communities rely on the seagrass epiphytes as their primary food source. These include the queen conch, sea urchins and sea cucumbers, some coral and sponge species, and a variety of crustaceans (shrimp, crabs, and lobsters).

Seagrass beds are also important habitat for a variety of fish species. Of these, there are those fish which are year-round residents of the seagrass meadows and those that are seasonal residents. Year-round residents tend to be small, cryptic animals such as pipefishes, seahorses, and lizardfish. Seasonal residents spend only part of their life cycle within the seagrasses. This may include their juvenile, subadult, or spawning stages. Many of these fish are commercially and/or recreationally important species such as drums, snappers, grunts, and porgies to name a few.

In addition to fish species, some higher vertebrates reside within seagrass beds. Green sea turtles are big consumers of turtle grass, whereas manatee grass is a favorite of manatees. Bottlenose dolphin, American crocodile, and numerous diving and wading birds also utilize seagrass beds as feeding grounds.

Threats
Because seagrasses support a diverse community and have specific water quality requirements they are an important indicator for health in shallow coastal ecosystems. Unfortunately, because they require clear waters for photosynthesis they are sensitive to many disturbances which either reduce water clarity or damage the seagrasses themselves. Pollution and nutrient inputs threaten seagrasses when they occur in excess. Pollution inputs may actually smother the seagrasses and increases in nutrients can result in excessive phytoplankton blooms which reduces the amount of light available for photosynthesis. Dredging and filling projects also threaten seagrasses by increasing sediment suspension in the water column.

Propeller scarring is also responsible for seagrass destruction. Nearly 30,000 acres of seagrass are scarred in Florida. When boats enter shallow waters, their propellers come into contact with the seagrass beds. When they damage the seagrass undergrowth, scarring may take years to recover leaving seagrass beds vulnerable to erosion and suspension of sediments.

Sources:
http://www.flmnh.ufl.edu/fish/SouthFlorida/seagrass/Introduction.html
http://www.sms.si.edu/IRLspec/Seagrass_Habitat.htm
http://www.dep.state.fl.us/coastal/habitats/seagrass/

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