MOTE NEWS

MOTE MARINE LABORATORY

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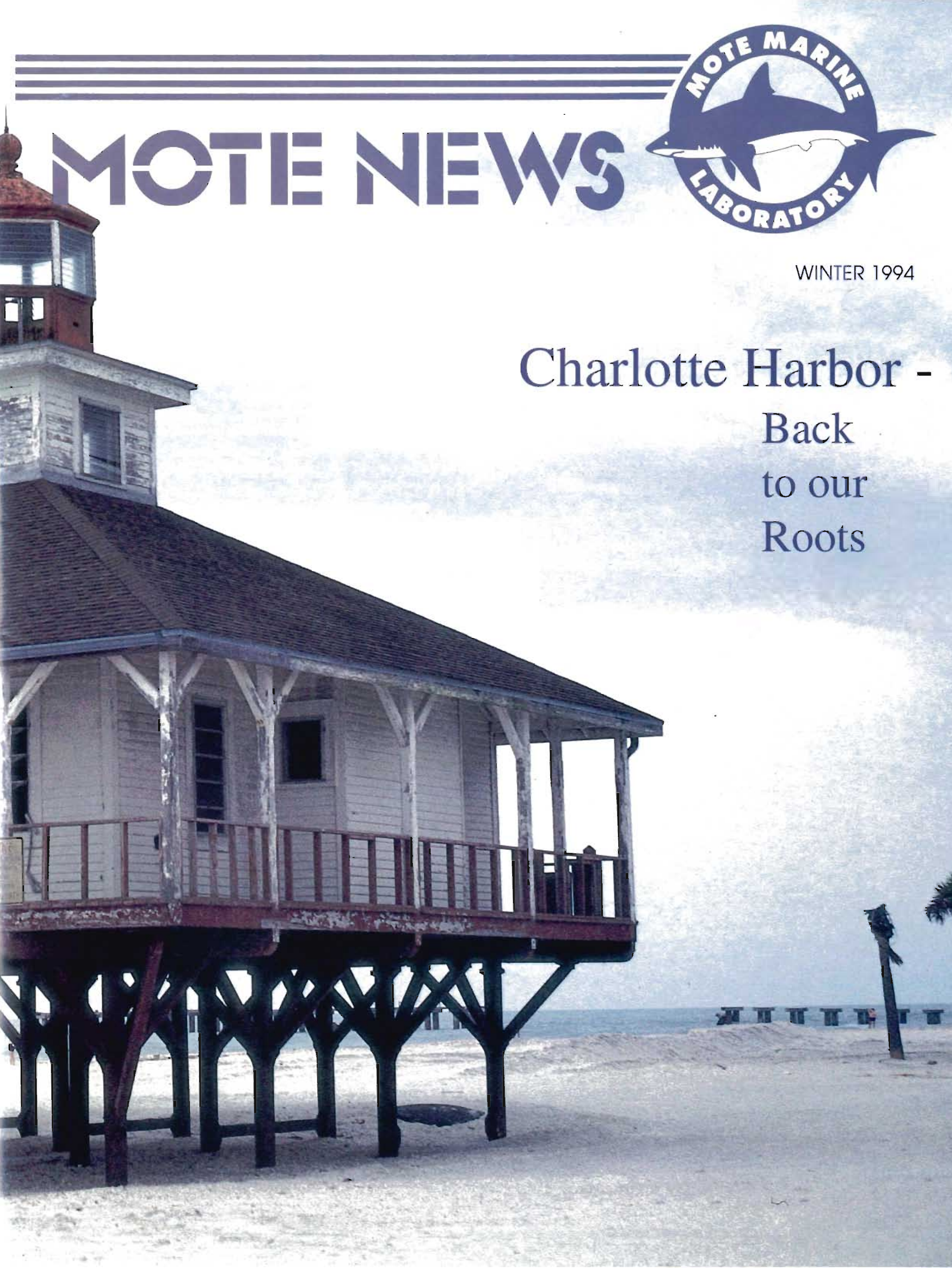
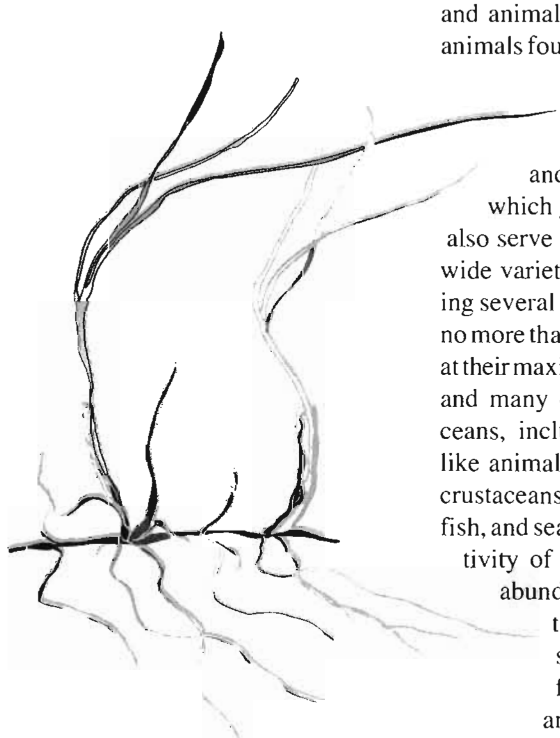


Charlotte Harbor - Back to our Roots

Charlotte Harbor's Seagrass Beds

by Dr. Mike Marshall

Seagrass beds have been recognized by marine biologists as being one of the most productive of all marine habitats. The production of living plant tissue within a tropical or subtropical seagrass bed rivals that of the best corn fields in Iowa. Seagrass plants support a very complex community that includes many plants and animals, both small and large. The animals found within seagrass beds graze on the seagrasses, on detritus (small decaying particles of seagrass blades and roots), and on the many kinds of algae which grow on the seagrasses. They also serve as shelter and substrate for a wide variety of marine animals, including several small shrimp species ... some no more than the length of your fingernail at their maximum adult size! These shrimp and many other kinds of small crustaceans, including amphipods (sandflea-like animals) and isopods (pill bug-like crustaceans), marine worms, snails, starfish, and sea urchins, connect the productivity of the plant community to the abundance of large marine fishes that are found in and around seagrass meadows. Juvenile fishes eat the small crustaceans and then grow into the adult fishes that are sought by both recreational and commercial fishermen.

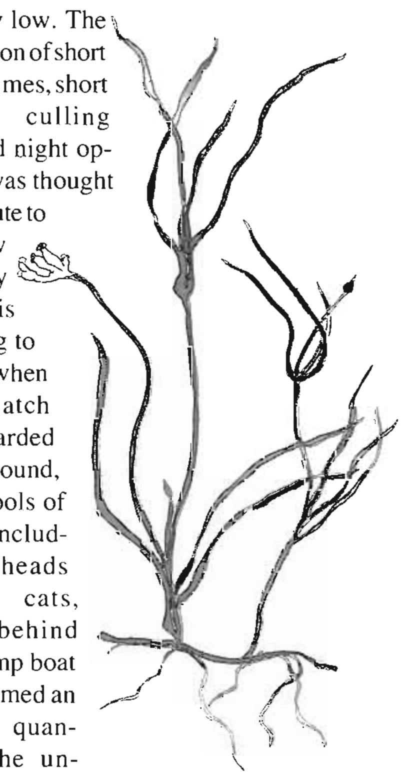


Shoal grass - *Halodule wrightii* - grows in shallow, intertidal areas and can tolerate lower salinities than turtle and manatee grasses.

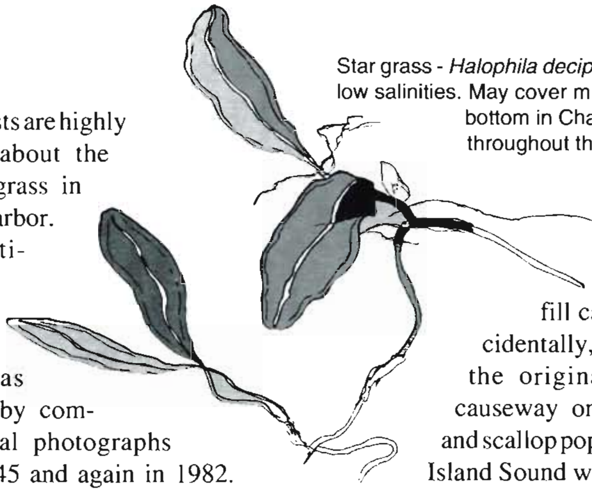
Large populations of pink shrimp, one of the most widely recognized species of high commercial value in Florida, are dependent on the seagrass beds of Charlotte Harbor and Pine Island Sound. As juveniles, they are abundant throughout this estuarine area before they migrate offshore. The Sanibel offshore shrimp grounds produce a large portion of Florida's annual catch of pink shrimp for human consumption. Bait shrimpers also harvest many tons of pink shrimp directly from Charlotte Harbor's seagrass beds. Bait shrimpers have been accused of damaging seagrass beds because they fish in very shallow water and because they pull trawls (called roller-frame bait shrimp trawls) through the seagrass meadows.

Through a contract from the Florida Department of Environmental Protection, Mote was called on to investigate the effects of bait shrimping on seagrass beds and by-catch (non-target species caught coincidentally) within Pine Island Sound. We documented the effects of trawling on seagrass beds as being minimal with the trawls actually causing very little immediate damage to seagrass plants, since the trawls are designed to roll over the grasses.

As for by-catch, fifty-seven species of fish were collected in the trawls during the study. The death rate of fishes in these trawls, also of concern to the Department of Environmental Protection, was found to be very low. The combination of short trawling times, short on-deck culling times, and night operations was thought to contribute to the low mortality rates. It is interesting to note that when this by-catch was discarded into the sound, large schools of catfish, including hardheads and sail cats, trailed behind each shrimp boat and consumed an unknown quantity of the unwanted fish and undersized shrimp.



Widgeon grass - *Ruppia maritima* - very tolerant of low salinities.



Star grass - *Halophila decipiens* - intolerant of low salinities. May cover much of the deeper bottom in Charlotte Harbor and throughout the Gulf of Mexico.

Scientists are highly concerned about the loss of seagrass in Charlotte Harbor. A total estimated loss of 29% of the seagrass acreage was discovered by comparing aerial photographs taken in 1945 and again in 1982. More than 50% of the loss took place within the Pine Island Sound and Matlacha areas. Speculations on the causes of this change include decreased water clarity caused by dredge and fill operations, alterations of the freshwater supply to this estuarine area, and overenrichment by nutrients (from fertilizers and sewage). Well planned studies will be needed to learn why the seagrasses are being lost. Mote will continue its involvement with these studies and in making recommendations to halt seagrass loss.

Changes in water quality will undoubtedly be needed to protect the remaining seagrasses of Charlotte Harbor. One possible change will occur with the replacement of the bridge which connects Sanibel Island to the mainland. Currently, the bridge and its solid fill causeway block the natural flow of tidal and freshwater through the area, reducing salinity and causing a large scallop population to disappear completely. The design for the new bridge will lengthen the bridge's span and reduce the solid fill causeway. Coincidentally, the effects of the original bridge and causeway on water quality and scallop populations in Pine Island Sound were predicted in 1960 by Arthur Marshall, a biologist who worked for the U.S. Fish and Wildlife Service in Vero Beach, and my father.

Hopefully, the reconstruction of the Sanibel causeway will lead to rapid changes in water quality that will promote the growth of seagrasses within the southern part of the Charlotte Harbor estuary. Much of the seagrass-covered bottom land in Charlotte Harbor is included in several state aquatic preserves. This status protects the seagrass beds from destruction by dredging operations and other kinds of direct mechanical destruction, but it cannot prevent them from being damaged or destroyed by changes in water clarity due to dredging and nutrient overenrichment caused by activities occurring in other parts of the Charlotte Harbor estuary. Much more research will be needed to identify all of the threats to Charlotte Harbor's seagrass meadows.

For more information about this study, or any of Dr. Marshall's work, please call Mote's Research Office at 813-388-4441.

Turtle grass - *Thalassia testudinum* - grows in shallow, subtidal flats throughout Charlotte Harbor. Requires high salinities and clear water.

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Manatee grass - *Syringodium filiforme* - grows on channel sides and mixed in with turtle grass.