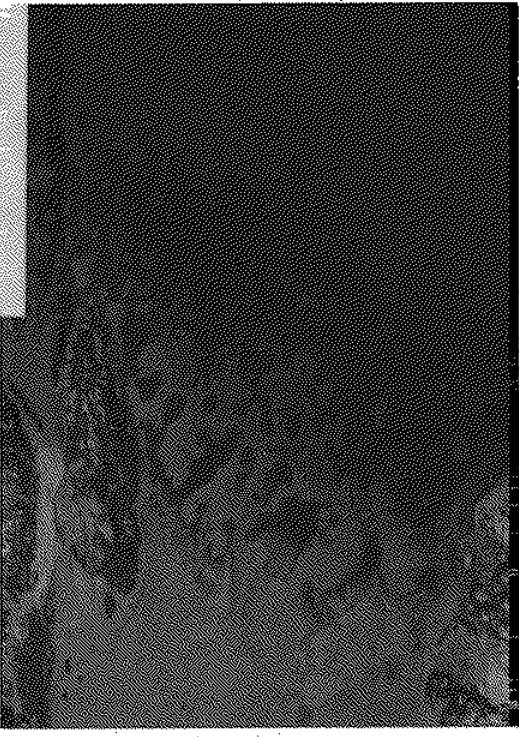


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Mussels &algae

Habitat Management to Enhance
a Positive Natural Interaction

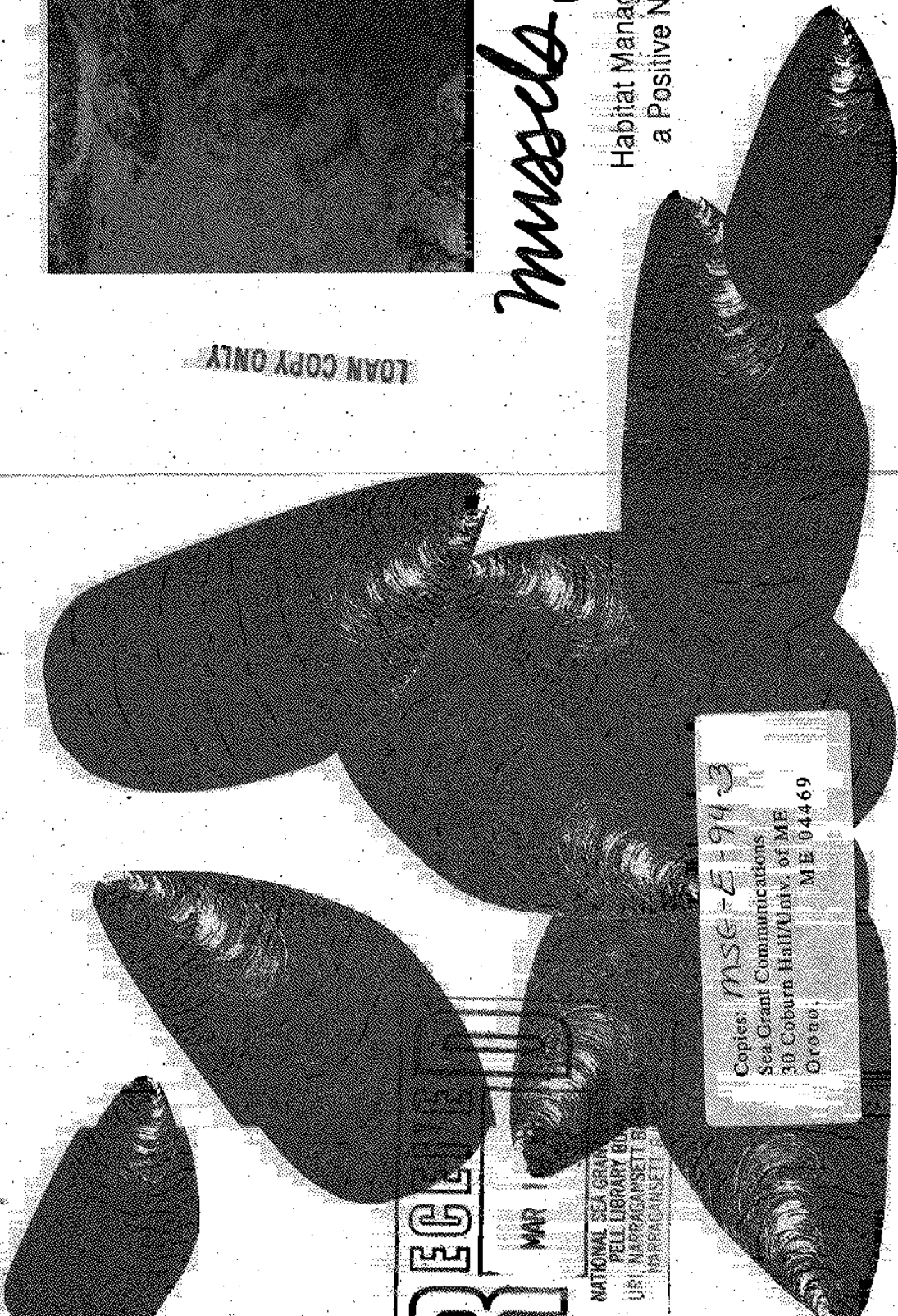
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Eelgrass, a trimerine flowering plant, is a valuable coastal resource growing in underter beds along the Atlantic coast from North Carolina to Maine. Eelgrass ntributes to the productivity of estuaries and coastal waters by stabilizing sediment, filtering coastal waters, and providing sheltered nursery are for juvenile fish and shellfish. When it dies, eelgrass decomposes into detrital "soup" that is an essential part of the ocean's food web.

Coastal restore managers are learning that eelgrass habitat is important to protect for the any species of coastal marine life that depend on it and for the vital role it pla in coastal processes. Fishermen and waterfowl enthusiasts recognize eelgrass for its function in the life cycles of striped bass, flounder, lobsterducks, geese, and brant. Healthy eelgrass is also an indicator of the orall health of an estuary or coastal ecosystem.

New researchhows that eelgrass plays an important role in the life cycle of mussels, an ireasingly popular and profitable sea delicacy. Mussel aquaculture can nefit from understanding this relationship between eelgrass and musse

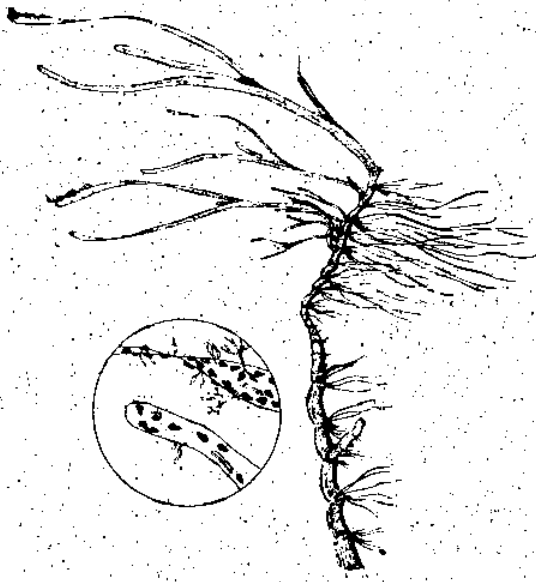
The Mussel-EelgrassConnection

Mussels and eelgrass are connected, literally, in the beginning stages of the mussel's life cycle. Tiny mussel larvae commonly use eelgrass as an attachment site soon ar they hatch. Floating through the water, the 250 micron larvae attach themselves to whatever is in their path. This process is called *primary settlement*. For a period of four to six weeks, the mussel larvae stay anchored to the eelgrass substrate and grow up to four times their larval size, becoming *juvenile* or *seed mussels*.

As mussels develop from larvae into seed mussels, they change into the recognizable mussel shape and grow special organs at the base of the foot called stem glands that secrete long, sail-like threads. These drifting byssal threads, which grow to over 100 times the length of the 1 millimeter mussel shell, are crucial for the seed mussels' next voyage from eelgrass to a mussel bed where they will spend the rest of their lives.

Juvenile mussels let go of eelgrass and "sail" through the water, following the currents. They may be guided by some chemical signal in the water to a bed of adult mussels. Juveniles settle on these beds, using their byssal threads to attach firmly to mussel shells or rocks, where they will stay and grow to maturity.

Mussel aquaculture operations depend on having a steady and abundant source of seed mussels to transplant for grow-out on leased coastal areas. Currently, aquaculture operations dredge mussel beds to obtain seed mussels and then spread them on inshore leases. These farmed mussels on leased sites grow five times faster than natural mussels and achieve market size in one to two years. As the mussel aquaculture industry expands, it needs to find new, reliable sources of mussel seed.



Mussel Cultch

The cultching process, used successfully in oyster aquaculture for years, now provides the mussel aquaculture industry with a steady, environmentally acceptable source of mussel seed.

Research shows that mussel cultch, composed of old mussels and shells, collects juvenile mussels leaving eelgrass beds in search of permanent attachment sites. After juveniles settle on the cultch, the seed-laden cultch can be moved to lease areas and spread out so that seed mussels can grow to maturity.

The best place to spread cultch is inshore of eelgrass beds, in such a way that tides and currents ensure seed mussel emigration from eelgrass to cultch.



Eelgrass Matters

Studies have shown that eelgrass can play a very positive role in mussel aquaculture. The question is: How can managers of estuarine waters with a mussel aquaculture industry enhance eelgrass health while encouraging a profitable mussel harvest?

First, managers can make sure eelgrass beds are not disturbed from June through September, the time when mussels attach to the eelgrass blades and grow to the seed mussel stage. In addition, managers can map eelgrass beds so that mussel farmers can locate their cultch most effectively. Cultch should be spread near the eelgrass, but not on it, to ensure that eelgrass is available for next year's primary settlement of mussel larvae.



The Long Term

Protecting eelgrass habitat means better mussel harvests. The basics of eelgrass protection are:

- 1) *Lower nutrient levels in the water from both point and non-point sources.* Although eelgrass can absorb some nutrients from the water, too many nutrients produce excessive algal and epiphyte blooms which shade eelgrass and reduce its vigor. Research has shown that clearer water means healthier eelgrass.
- 2) *Protect eelgrass from mechanical damage.* Netting menhaden in eelgrass beds in the summer may damage eelgrass and attached larval mussels. Similarly, mussel draggers should avoid eelgrass beds, especially during mid-summer. Boat moorings should not be located within eelgrass beds. In addition, dredge and fill operations in and around eelgrass beds should be curtailed.
- 3) *Identify eelgrass distribution.* By determining where eelgrass is located, mechanical damage can be minimized by directing boat and fishing traffic away from the beds. In addition, mapping an area over a period of years gives a clear idea of whether eelgrass is increasing, declining, or remaining stable.
- 4) *Educate commercial fishermen and the public about the value of eelgrass.* It all comes down to information and understanding. When people are convinced that a resource is valuable to them, they will work to protect it.

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