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Woods Hole Sea Grant: 2000-2002 Projects

Augmenting the Lobster Catch: Oyster Aquaculture in Modified Lobster Traps

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Collaboration between extension, academia, and industry is widely recognized as an effective means to identify and resolve problems. This study will draw upon that successful model to determine if small-scale oyster culture can be integrated successfully and economically with inshore lobster fishing. The objectives of the study are: to determine if lobster traps can be suitably modified to permit the addition of an oyster growout cage; to determine if the integration of oyster culture with lobster traps impacts lobster catch; to determine oyster survival and growth in modified lobster traps; to quantify the economic return associated with this experiment; and, to involve and educate fishers and regulatory groups as to the benefits of an integration of fishing and aquaculture. The project will be divided into three phases: setup, field testing, and data analyses and reporting. Ten Massachusetts lobster fishers will be involved in conducting a portion of the experiment and collecting data, and investigators will set up a control experiment. The data generated by the lobster fishers and the investigators will be compared and analyzed; these results will be compared with production data from conventional oyster grow-out technology. With the current status of the lobster as "overfished," management efforts to reduce lobster catches are imminent. Aquaculture, though not a global solution to regulated fisheries, offers a way for fishers to supplement their incomes and remain in a vocation tied to the sea. (R/A-43)

Effects of the Asian Shore Crab, Hemigrapsus sanguineus, in New England: Changes in Resident Crab Populations?

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Quantification of the ecological effects of non-indigenous marine species is a relatively new area of research. Non-indigenous species can have several effects on native species, causing them to decrease, increase, or remain unchanged in abundance. Changes, if any, to a community during and after a bioinvasion must be clearly shown for increased public support for prevention, suppression, or eradication measures. This project will seek to determine if the recent establishment of a Massachusetts marine bioinvader, the Asian shore crab Hemigrapsus sanguineus, has affected populations ofresident crabs, namely the green crab (Carcinus maenas), rock crabs (primarily Cancer irroratus), and mud crabs in the family Xanthidae. The investigator will follow temporal changes in crab populations as Hemigrapsus invades and increases in abundance and compare spatially separated populations to determine whether any changes observed are consistent in direction and magnitude among sampling sites. (R/B-161)

The following project is part of a National Strategic Investments (NSI) competition in Oyster Disease Research, made possible by a special National Sea Grant College Program award.

Investigations into the Prevalence and Mortality Associated with SSO and SSO-like Infections of Crassostrea virginica on the East Coast of the U.S.

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Haplosporidium costale (a.k.a., Seaside Organism, or SSO) was first identified as a cause of significant disease in the Eastern Oyster (Crassostrea virginica) on the Atlantic coast of Virginia in 1962. SSO parasites and the disease caused by the organism are now endemic in Eastern oysters in Virginia and Maryland. Though SSO infected oysters have been identified, sporadically, in Eastern oysters from Virginia to Maine, significant mortalities have been thought to occur only from Virginia to Maryland. During the 1980s, SSO infected oysters were identified in various areas of Massachusetts, though mortality was not observed and shipment of positive-test animals was not restricted. During the spring of 1998, oyster culturists on Martha's Vineyard experienced mortality in 20-70 percent of their oysters. Histological examinations showed SSO infections with sporulating forms, marking the first time that mortality resulting from SSO infections were noted in this area. Unfortunately, standard histological techniques cannot distinguish between the plasmodial stages of SSO, fall sporulating SSO-like, or MSX organisms (MSX, short for multinucleated sphere unknown, is another oyster disease). This severely hampers the ability to attribute mortality to one or another of these Haplosporidium parasites. Recent DNA-based molecular diagnostic techniques, however, do allow for differentiation of morphologically similar organisms. This project, involving investigators from multiple states, employs such techniques to determine if SSO is a significant cause of mortality in Eastern oysters in Massachusetts, Virginia, and Connecticut. Their research, now in its second year, will determine if SSO-like organisms are indeed Haplosporidium costale, or another, similar organism, and whether or not mortality results from infections with this SSO-like organism. Investigators will also attempt to define the SSO life cycle and tissue location in various phases of the annual infection cycle by elucidating the seasonal patterns of the disease. Oysters have been deployed and will be monitored and analyzed at one site each in Massachusetts, Connnecticut, and Virginia. (R/B-156)

The following project is part of a National Strategic Investments (NSI) competition in Sea Grant Technology, made possible by a special National Sea Grant College Program award.

Reducing the Risk of Open Ocean Aquaculture Facilities to Protected Species

Walter Paul, Woods Hole Oceanographic Institution

The possible entanglement of endangered and protected marine mammals, in particular the North Atlantic Right Whale, in open ocean

aquaculture installations is impeding the permitting process for future offshore operations. This project seeks to develop a wireless communication link, using a low Earth-orbiting satellite system, that would reliably sense an entanglement event and communicate the occurrence to shore in order to initiate rescue efforts. The investigator, an ocean engineer, will work with colleagues to first conduct a survey of responses of entangled right whales to determine which response can most reliably identify an entanglement event. This will involve identifying a suitable longline sensor, possibly a section of breakaway material that fails when tension on the longline exceeds normal operational limits. This so-called "weak link" mechanism would be designed to fail at the time an entanglement event, triggering emergency communication to shore. This project involves a partnership with an industry partner to assemble a satellite transmitter buoy that broadcasts a signal when its release is triggered by the weak link mechanism. The weak link and transmitter buoy will be tested at a submerged aquaculture longline structure located in open waters southwest of Martha's Vineyard to study the function and survivability of the setup. (R/M-43).

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