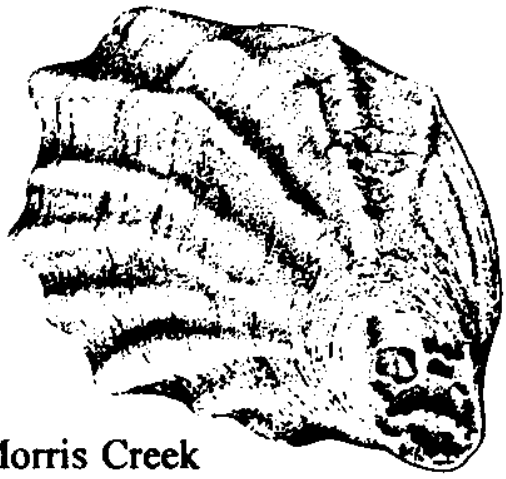
NEW HAVEN OYSTERS



Oysters are filter feeders, pumping up to 100 gallons per day through themselves and extracting tiny food particles. Hundreds of thousands of Eastern Oysters grow in beds at the bottom of New Haven Harbor, in the Sound just outside the harbor, and in the mouths of the rivers and creeks which feed into the harbor: the Quinnipiac River, the Mill River (from Hamden), the West River (from Woodbridge), and Morris Creek (from East Haven). This is a wonderful place for them because the rivers carry down an abundant food supply of algae and marsh detritus and because the fresh river water keeps the salinity low enough for spawning (oysters spawn only in water which is just slightly salty and relatively warm).

Aquaculture is used to increase productivity. Seed oysters are raised on clean "cultch" (shell) beds in New Haven. Then they are moved several times, spending at least 14 days in very clean waters near Guilford, Milford, and Norwalk, for purification, before sale. Enormous piles of cultch can be seen in Fair Haven. Oyster predators are also controlled through aquaculture. Cleaning the beds with suction hoses keeps down populations of oyster drills and mud crabs, and racks of yarn mops are used to entangle starfish and remove them from the sea floor.

HISTORY OF OYSTERING

Indians harvested them with rakes from dugout canoes, traveling long distances from inland areas. Oysters were an important food supply in colonial days, and oystering became a major industry in New Haven during the 1800's. The valuable oyster beds were divided up into hundreds of plots which oystermen leased from the State of Connecticut. Harvesting technology kept improving. Scissorlike tongs were invented, and then better and better oyster dredges. In 1848 oystermen began using sailboats called sharpies for harvesting. By 1903 there were 100 oyster steamers in use, each over 60 feet long. The harvest in 1900 was 4 million bushels. Almost everyone ate oysters several times a week.

Then came a long period of decline, in New Haven as well as in other Connecticut estuaries. Larger quantities of pollutants were entering the harbor and rivers, including raw sewage, heavy metals from industry, silt, and later petroleum products. For years many baby oysters or "spat" became established ("set") only in low numbers or not at all. Contaminated oysters caused outbreaks of diseases such as typhoid fever. Natural disasters like the hurricane of 1938 also destroyed several oyster crops. The food supply for oysters was reduced as thousands of acres of productive salt marshes were filled. New Haven became a major oil port, and the harbor was deepened; 7 million cubic yards were removed from the harbor after World War II, and most of the spoils were dumped in the salt marshes. Marshes were also lost due to filling for railroad yards, land fills, industrial parks, and highways. Most oystermen could no longer make a living, and they sold their leases to a few remaining oyster companies like Tallmadge Brothers, Inc. In 1972 the total harvest for Connecticut was only 32,468 bushels.

Oystering is once again a major industry in New Haven and Connecticut, although the harvest will never quite reach the levels of the 1800's because so much of the marsh land has been filled. In 1994 the Connecticut harvest was about 900,000 bushels, with more than half the seed oysters originating from New Haven. Dramatic water quality improvements have resulted from the 1972 Clean Water Act and other state and local laws, so that oysters can again "set" regularly. Improved aquaculture methods have also helped productivity. The National Shellfish Sanitation Program strictly regulates the growing and harvesting of oysters, for public safety. Oysters from the somewhat polluted but highly productive waters in the New Haven area must be moved to very clean waters for "depuration" prior to harvest. Although oyster sales were $50 - 60 million in 1994, ironically, more were sold to the midwest and the west coast than in Connecticut.

HOW DO FILTER FEEDERS HELP THE SOUND?

Oysters and other filter feeders consume algae and detritus, which could otherwise end up sinking to the bottom of the sound, decomposing and using valuable oxygen, and worsening hypoxia (severe oxygen shortage). Filter feeders are a vital link in the food web, which can help prevent the harmful

process of excess nitrogen leading to hypoxia. If nitrogen from a sewage treatment plant, lawn fertilizer, or decomposing marsh grasses fertilizes algae, which is then filtered from the river water by an oyster, which becomes food for a starfish or man, that nitrogen has been incorporated into the food web, instead of contributing towards hypoxia. Other filter feeders include hard shell and soft shell clams, fiddler crabs, ribbed mussels, mud snails, shrimplike creatures called scuds, and various worms (polychaete annelids). Some, like oysters, filter suspended particles from flowing water; others, like fiddler crabs, sift out food particles from mud. The 1.3 square miles of relatively undisturbed marshes along the Quinnipiac River are important as places where nitrogen can be turned via filter feeders into biological productivity, supporting a complex food web, including oysters, migratory birds, and game fish. Unfortunately, more than half of the Quinnipiac marshes have been filled.

HOW DO HUMAN ACTIVITIES HARM THE OYSTER?

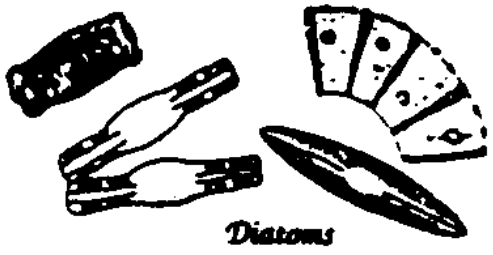
Although aquaculture benefits the oyster, the estuary ecosystem is vulnerable to various environmental changes and pollutants resulting from other human activities. Because of the economic importance of oystering, much research has been done on the impacts of a variety of pollutants and human activities on the Eastern Oyster. Probably many other less intensively studied organisms are affected in similar ways.

Silt and Turbidity: Oyster larvae swim for several weeks before settling or "setting" on a hard surface like a shell or a stone. Even a thin film of silt can prevent them from settling, and silt can suffocate or bury the young oysters or "spat" after they have settled. By lowering the pH of sea water, silt can kill oyster eggs and cause larvae to develop abnormally. Suspended soil particles interfere with filter feeding, and with breathing (this applies to all creatures with gills.) Turbidity also reduces the oyster food supply, by blocking sunlight and underwater photosynthesis by algae. Oystermen noted that during years of heavy dredging of New Haven Harbor, as it was turned into a major oil port, the oysters failed to "set" at all. Regulations now prohibit dredging between June 1st and September 30th, so that sediment will not be stirred up when oysters are spawning and larvae are settling. A wide variety of human activities disturb the soil and can cause turbidity and siltation, including road and bridge construction, grading of building sites, and plowing of farm fields.

Flooding: Flooding causes turbidity and siltation as it scours river banks and bottoms. Floodwaters can also roil up and scatter the beds of newly settled larvae. This has happened occasionally during great storms like the hurricane of 1938. However, serious flooding is occurring more often as the watershed is developed, due to runoff from non-absorbent surfaces like roads and roofs and loss of flood storage capacity when floodplains are filled.

Toxic Chemicals: Many studies have been done on the effects of heavy metals, pesticides, and petroleum hydrocarbons on oysters. Juvenile stages were found to be more sensitive than adults. Levels of exposure which were not lethal were sometimes found to increase susceptibility to disease or to cause behavioral abnormalities affecting spawning. Some compounds did not harm the oysters themselves, but killed their food organisms. Copper and lead were found to cause thinning of shells over time and changes in respiration. At high concentrations, certain petroleum compounds caused starvation, because the oysters closed their shells and stopped feeding. One study found exposure to pesticides in combination to have more severe effects than exposure to single pesticides. Oysters are vulnerable to a wide variety of point and non-point source pollutants. Although depuration in clean waters is 100% effective at removing bacteria and viruses, it does not always completely remove residues of other toxic chemicals; this could pose a hazard to human health, especially if environmental regulations are loosened to allow higher pollution levels.

Filling of Wetlands: Marsh filling reduces the oyster food supply since marshes are where nutrients from upstream and from decaying vegetation are transformed into single-celled algae such as diatoms, the favorite food of oysters. Diatoms have glass-like walls and a wide variety of lovely, symmetrical shapes. Because wetlands trap sediments and pollutants and slow floodwaters, filling them also worsens the effects of all the problems listed above.



Produced in May 1995 by the Quinnipiac River Watershed Association, 99 Colony St., Meriden CT 06450. Written by Sigrun Gadwa. Funding provided by the Community Foundation of Greater New Haven and the Long Island License Plate Fund. Information provided by the Aquaculture Division of the State of Connecticut Department of Agriculture, by Tallmadge Brothers, Inc., and by the New Haven Historical Society. Oyster illustration reprinted from The Sound Book, with permission from the Long Island Soundkeeper Fund, Inc.

Printing donated by Northeast Utilities