

## Chapter 2. Ecological Significance

Coastal Connecticut is home to many commercially, recreationally and ecologically important species of molluscan shellfish<sup>4,5,6</sup>. Bivalve molluscs have two hinged shells or valves, and are uniquely adapted to survive and thrive in the dynamic estuarine waters (mixing of salt and fresh waters) of Long Island Sound. Bivalve shellfish are found in a variety of habitats throughout the inshore and coastal zones and play an essential role in maintaining healthy ecosystems.

Shellfish are important links in the marine food chain. Bivalves are filter feeders that pump water through their gills, consuming and removing microscopic plants (phytoplankton), as well as bacteria and detritus from the water column, enhancing visibility and light penetration. Bivalves also remove excess nitrogen and other nutrients that can lead to an overgrowth of plankton leading to the formation of harmful algal blooms. Consumption by shellfish keeps plankton communities in ecological balance and can prevent phytoplankton blooms. This is important because the decay of phytoplankton blooms reduces dissolved oxygen concentrations and can result in fish kills. Live shellfish and their empty shells also create structure on the seafloor, which provides attachment substrate for other invertebrates, refuge for young fish and stabilization of sediments.

The Eastern oyster, *Crassostrea virginica*, is common to intertidal and subtidal areas, and attaches to the surface of rocks, shells and other substrate by producing a cement-like material. Oysters, which settle on and adhere to other oysters, create reefs that protect shorelines from coastal erosion due to sea level rise and storm surge. Oysters are considered “ecosystem engineers”, creating habitat and refuge for a multitude of sessile and mobile organisms.

Numerous species of clams are native to Long Island Sound. Northern quahog or hard clam, *Mercenaria mercenaria*, are found from the intertidal zone to deeper waters where they live buried just a few inches under seafloor sediments. The Softshell clam or steamer, *Mya arenaria*, and Razor clam or Atlantic jackknife, *Ensis directus*, both create deep burrows in sandy and muddy intertidal sediments while the surf clam, *Spisula solidissima*, prefers sandy subtidal areas. Through their movements and feeding activities, clams transfer nutrients between the seafloor sediments and the water column.

Remnant populations of the bay scallop, *Argopecten irradians*, reside in the eastern waters of Long Island Sound, where they are often found in association with eelgrass beds. Scallops prefer the sheltered water of shallow bays and estuaries. By quickly opening and closing their shells, young scallops can swim up into the water column to escape from predators.

Blue mussels, *Mytilus edulis*, occur in the rocky intertidal zone where they attach to rocks, and pilings and can withstand wave activity, tidal changes and intermittent air exposure. The ribbed mussel, *Geukensia demissa*, populates the lower edges of salt marshes often embedded in the marsh peat, and buffers the coastline from wind and waves. Ribbed

mussels enhance productivity of marsh vegetation by depositing particles and waste on the marsh surface to enrich surface sediments<sup>7</sup>. Mussels anchor themselves to substrate using strands of strong fiber material called byssal threads, secreted from the byssus gland located near the animal's foot.

Bivalve shellfish provide a source of food, act as shelter and habitat for coastal seafloor communities and serve as an important link in the food chain between nutrient rich seafloor sediments and organisms living in the water column. Cultivation of shellfish through aquaculture helps to ensure sustainable populations of ecologically important bivalve mollusks prosper along the Connecticut coastline.