

## Protecting Marine Animals

### The Ecology of Shellfish Diseases

In the northeastern United States, shellfish—including clams, oysters, scallops, mussels, and other bivalve molluscs—are important components of both the ecosystem and the economy.

In the 1990s, farmed quahogs (hard clams) in some areas began to die in alarming numbers. The cause of death for these usually hardy animals turned out to be a disease-causing organism, or pathogen, called QPX.

Little is known about the ecology of many marine pathogens, including the factors that help them spread. This project is investigating one important ecological feature that may serve as a pathway for the spread of shellfish disease: aggregates, or loose associations of living and nonliving materials.

Aggregates are found throughout the marine environment. They include marine snow (so called because its small particles suggest snowflakes) and flocs. They range in size from microscopic to a few millimeters in diameter.

Aggregates form by natural processes, become enriched with many types of microorganisms, and sink rapidly to the sea bottom. There, bottom-dwelling shellfish are continually exposed to them and to the various microorganisms, including pathogens, that they contain.

This project is exploring the role of marine aggregates as a link between shellfish and their pathogens. The hypothesis is that marine aggregates increase the spread of shellfish diseases by harboring the pathogens and by facilitating their transmission to the shellfish.

Researchers are collecting aggregates to determine the number and types of pathogens they harbor, as



**Quahogs, or hard clams, are vulnerable to pathogens that have devastated clam populations in the Northeast.**

well as how long the pathogens can live within the aggregates. They are also studying factors (such as temperature and salinity) that may encourage aggregates to form and pathogens to grow. For example, some human activities can speed the formation of marine aggregates, which may influence the range and abundance of shellfish pathogens and the severity of the diseases they cause.

Although the diseases that affect these shellfish do not affect human health, they can devastate ecologically and commercially important shellfish populations. The results of this research may lead to better disease-prevention practices for commercial shellfisheries and aquaculture operations.

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