

The state of red

By **Michelle Portman**/ Special To The Tab
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What blooms like a flower, was found off the Massachusetts coast in great numbers in 2005 and is red all over? You probably guessed it by now: the notorious red tide. Actually, scientists prefer to call this phenomenon harmful algal bloom because algal blooms are common, discolor ocean waters and are usually not harmful. During a "red tide" event, algae, made up of microscopic, single-celled plants called phytoplankton, grow very fast or "bloom". They release noxious odors, irritating vapors and slim. Those that occurred in New England this past spring caused dangerous toxins to accumulate in shellfish. Human consumption of shellfish contaminated by these toxins can be harmful, even fatal.

The syndrome is called paralytic shellfish poisoning and can result from eating large quantities of affected shellfish. No cases of death attributed to PSP have been reported in New England, although there have been such fatalities reported elsewhere in the U.S. The Division of Marine Fisheries is responsible for monitoring for PSP; the agency's staff conducts coastline monitoring on a weekly basis from April to November. This year DMF was extremely busy. The New England region suffered the worst HAB since the first massive outbreak in 1972 that followed Hurricane Carrie.

Scientists are unsure what exactly caused the recent bloom that prompted the shutdown of shellfish harvesting throughout most Massachusetts coastal waters. The blooms begin in Maine and spread southward. Some of the more productive shellfishing areas off of Cape Cod and the South shore re-opened in the beginning of July, but damage done to the shellfishing industry was already substantial and prompted lawmakers to ask for federal disaster relief. Despite tight budgets, DMF may be required by the federal Food and Drug Administration to add more testing sites and to monitor for additional biotoxins, such as Amnesic Shellfish Poisoning and Diarrhetic Shellfish Poisoning, based on findings from this past season. Also, new sampling sites in Buzzards Bay, off Nantucket and Martha's Vineyard are being considered.

Despite lingering questions about the local causes of HAB, scientists have established a clear connection between red tide and one of the most widespread, chronic problems in coastal ocean waters: eutrophication. Eutrophication is caused by the buildup of excess nutrients in water and it is wrecking havoc on our seas. Human activities including agriculture, waste disposal, coastal development and fossil fuel use, have greatly increased the discharge of nitrogen, phosphorous and other nutrients that invariably end up in ocean waters via streams, rivers, groundwater, sewage outfall and even the atmosphere.

All these nutrients stimulate the growth of tiny marine plants including algae. During HAB, the growth of particularly species of algae is excessive. Although only about a hundred species of algae are toxic, increased blooms of non-toxic species cause ecological problems too. Large surplus blooms of seaweed, or macroalgae, can coat beaches thus interfering with recreational activities. Others can choke coral reefs and seagrass beds that provide habitat for fish spawning necessary for biodiversity and maintenance of commercial fisheries. The gravely endangered Northern Right Whale

have been affected too when large algae blooms in Cape Cod Bay clogged surface waters making it difficult for the whales to find food.

In the U.S. and other developed countries, monitoring and fishery closures have reduced human illness from HAB however, biodiversity and ecosystem health continue to be impacted. Also, monitoring and closures have economic costs. It is hard to decide what the right public policy response should be for long-term remedies and prevention of red tide. So many activities are related to eutrophication; scientists concede that cause and effect is complex. This phenomenon again highlights the influence that our everyday activities - use of fertilizers, disposal of sewage, fuel combustion, etc., - have on the environment, economics and public health in areas miles, even nautical miles, away.

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