

Public Health Fact Sheet

RED TIDE (Paralytic Shellfish Poisoning)

What is Red Tide?

Red Tide is caused by a "population explosion" of toxic, naturally occurring microscopic plankton (specifically, a subgroup known as dinoflagellates). "Blooms" of the poison-producing plankton are coastal phenomena caused by environmental conditions, which promote explosive growth. Factors that are especially favorable include warm surface temperatures, high nutrient content, low salinity, and calm seas. Rain followed by sunny weather in the summer months is often associated with red tide blooms. Organisms that cause these blooms around the United States are as follows:

- *Alexandrium fundyense*, along the Atlantic Northeast coast, ranging from the Canadian Maritimes to Southern New England;
- *Alexandrium catenella*, on the Pacific West Coast from California to Alaska; and
- *Karonia brevis*, in the Gulf of Mexico along the West Florida coast.

Does it really color the water?

Yes, water in coastal areas can be colored red by the algae, thus the term "red tide." Although toxic blooms often turn the water reddish brown, many nontoxic species or reddish brown plankton cause the same discoloration. Conversely, toxic plankton may be numerous enough to toxify shellfish, but not sufficiently abundant to discolor water. Discolored water should always be regarded with suspicion. However, it should be noted that even during high concentrations during a red tide event caused by *Alexandrium fundyense*, there is no risk with regard to swimming in the water.

What seafoods are unsafe to eat from waters where red tide occurs?

Only a few marine animals accumulate these toxins. Shellfish, including hard-shell clams, soft-shell clams, oysters, mussels and scallops, are particularly prone to contamination as they feed by filtering microscopic food out of the water. If toxic planktonic organisms are present, they are filtered from the water along with other nontoxic foods. Whelks and moon snails can also accumulate dangerous levels of the toxin during red tide as they feed on contaminated shellfish.

During red tide blooms, hard-shell clams, soft-shell clams, oysters, mussels, whelks, and moon snails harvested from areas affected by the blooms are not safe to eat. Since toxins are stored in the digestive tract (stomach) and viscera (intestines) of these animals, scallops are safe to eat as long as only cleaned adductor muscle (the only part generally eaten) is consumed. Lobster meat, crabs, shrimp, and most finfish do not normally accumulate toxin and are safe to eat from affected waters. Lobster tomalley (the green part or liver) is not safe to eat in general, and particularly during red tide events because this part of the lobster can build up high levels of toxins and other pollutants.

What happens if toxic shellfish are consumed?

Eating toxic shellfish can cause paralytic shellfish poisoning (PSP) in humans. PSP is caused by saxitoxin, which is produced by *Alexandrium fundyense* and is one of the most potent toxins known to scientists. After ingestion, this poison immediately affects the nervous system, with symptoms usually occurring within 30 minutes. Severity depends on the amount of toxin consumed. Initial reactions are tingling of the lips and tongue, which spreads to the face, neck, fingertips and toes. Headache, dizziness and nausea follow. These symptoms may be mistaken for drunken conditions and are further aggravated by alcohol consumption. In severe cases, muscular paralysis and respiratory difficulty may occur within 5 to 12 hours. Fatalities from respiratory paralysis have been reported.

What should one do if accidental ingestion of toxic shellfish is suspected?

Seek proper medical attention immediately. If a family doctor or other physician cannot be reached, the person should be taken to the nearest hospital emergency room or medical clinic. If none of these options are available, contact the nearest poison control center. The diagnosis of PSP is a reportable disease. Cases of suspected PSP poisoning should be reported to the Center for Environmental Health, Food Protection Program, at 617-983-6712 or to the Center for Hospitals and Clinical Laboratories, Bureau of Communicable Disease Control, at 617-983-6800.

How is red tide monitored so that toxic shellfish are not marketed?

All shellfish-producing states have monitoring programs that test water, sediments, and shellfish for contamination. The action level for humans is 80 micrograms per 100 grams of shellfish meat. In Massachusetts, for instance, the Division of Marine Fisheries (DMF) is responsible for year-round testing of shellfish and shellfish growing areas. Monitoring efforts are more intensive in the spring, summer and, fall. The DMF notifies affected city and town officials of closures. When blooms subside, shellfish purify themselves of the toxin, and when testing indicates a return to safe levels, the areas are reopened. Monitoring programs may differ in other states.

What precautions should recreational fisherman take?

Recreational shellfish gatherers should look for posted warnings and pay close attention to local media announcements. Also, it is advisable to contact appropriate state agencies and local shellfish constables for current news on closures.

Under no circumstance should individuals harvest shellfish from any area closed to shellfishing.

Toxic shellfish will taste and appear no different than nontoxic shellfish, and cooking does not destroy the red tide toxin. Testing is the only way to determine if shellfish contain unsafe levels of toxin.

Should consumers feel safe when purchasing shellfish at seafood markets?

Yes, consumers should feel confident about purchasing shellfish from established markets. Harvesting regulations for shellfish are strictly enforced. Even during periods of red tide, clams, oysters, mussels and whelks in seafood markets are harvested from clean waters. The U.S. Food and Drug Administration visits state labs to observe routine testing procedures, and public health

officials regularly monitor shellfish markets to ensure that only safe, nontoxic shellfish are available to consumers.

For more information contact:

- Massachusetts Department of Public Health Center for Environmental Health, Food Protection Program (617) 983-6712; or the Center for Hospitals and Clinical Laboratories, Bureau of Communicable Disease Control (617) 983-6800.
- Your local board of health (listed in the phone book under local government)
- Your local Shellfish Constable or Warden
- Massachusetts Division of Marine Fisheries (617) 626-1520 or (508) 563-1779; you may also visit the DMF web site at www.mass.gov/dfwele/dmf/