

Impacts of harmful algal blooms

Problem Statement

We do not know enough about the biology and ecology of toxic phytoplankton in coastal estuaries, bays, or oceans to rapidly assess the health risks they pose or to minimize the economic impacts of fisheries closures they make necessary.

Critical Factors

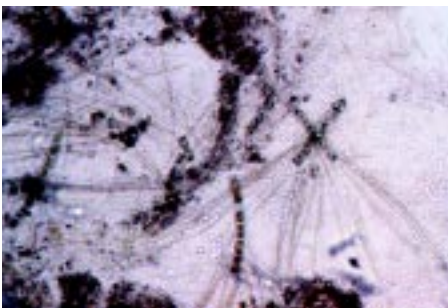
- Marine biotoxins have been a historically persistent problem on the West Coast of North America.
- Naturally occurring marine toxins produced by marine phytoplankton can accumulate in shellfish, finfish, and marine mammals.
- These toxins threaten human health and also the health of marine mammals.
- Fish and shellfish exposed to biotoxins have demonstrated unusually high incidences of carcinogenesis, immune system depression, and depressed growth.
- Economically-depressed coastal communities that depend on shellfish and finfish face significant risks from outbreaks of marine toxins that force regulators to close harvests.
- Closures of recreational fisheries can also economically devastate coastal communities.
- The U.S. and Canadian shellfish industries have been damaged by the presence of domoic acid in Dungeness crab and Canadian mussels.
- The primary algal species that produce domoic acid and the environmental factors that trigger toxin production are unknown.

Status of Research

The Northwest Fisheries Science Center's (NWFSC) Marine Biotoxins Program is developing methods of 1) identifying and analyzing marine toxins and the algae that produce them, 2) identifying the conditions that produce blooms of noxious phytoplankton, 3) determining how the toxins are transmitted to, and how they affect, target organisms, and 4) determining the health risks that biotoxins pose for fish and shellfish. NWFSC scientists are studying: Paralytic Shellfish Poisoning (PSP); Domoic Acid or Amnesiac Shellfish Poisoning (ASP), and Diarrhetic Shellfish Poisoning (DSP). They are also collecting and identifying phytoplankton in the water column and studying the production of toxins by certain phytoplankton species.

Future Considerations

To reduce the health and economic risks posed by toxic algal blooms, we must continue to learn more about the biological mechanisms through which toxins are produced and transmitted. As new information becomes available, it must be transferred quickly to other government agencies, trade groups, and industry. In addition, new, efficient technologies for identifying marine biotoxins must be developed so that time and expense can be reduced in the management of harmful algal blooms (HABs).



Phytoplankton *chaetoceros* sp.

Key Players

Environmental Conservation (EC) Division, NWFSC
Marine Sanctuary Program, NOAA
Center for Coastal Monitoring & Assessment, NOAA
Washington Department of Fish & Wildlife
Washington Department of Health
Oregon Department of Agriculture
Interstate Shellfish Sanitation Conference
U.S. Environmental Protection Agency
U.S. Food & Drug Administration
California State Health Services (Food and Drug Branch)
University of Washington
Monterey Bay Aquarium Research Institute
Quileute Indian Tribe
Quinault Indian Tribe
Olympic Coast Marine Sanctuary Program

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