

Pfiesteria piscicida: Facts about a Fish Killer



A PUBLIC SERVICE BULLETIN

Pfiesteria piscicida, a single-celled organism, is believed to be responsible for major fish kills that have occurred in estuarine waters from North Carolina to Delaware. In Delaware, an extensive fish kill in 1987 was later attributed to *Pfiesteria*. North Carolina has experienced *Pfiesteria*-caused fish kills in the early 1990s and this year. Closer to home, in August 1997, the microscopic organism caused a fish kill in the Pocomoke River in Maryland. Delaware's Department of Natural Resources and Environmental Control collected water samples at five stations in Indian River/Bay and Rehoboth Bay in August 1997. Two of the samples from the Indian River showed toxic forms of *Pfiesteria* present in numbers considered sufficient to harm aquatic life, but no fish kills have occurred.

Biology of *Pfiesteria*

Pfiesteria is a primitive life form, a type of dinoflagellate, that is capable of assuming both animal and plant characteristics in its more than two dozen life stages. The cell can masquerade as a plant by digesting all but the chlorophyll-manufacturing portion of a plant cell, and thus appear to be manufacturing its own food, as plants do.

Scientists agree that *Pfiesteria* has been present for thousands of years, but the ecological balance has been such that it is naturally kept in check and does not cause great concern. In recent years, populations of toxic dinoflagellates, including *Pfiesteria*, have increased, especially in eutrophic estuarine water. Under these nutrient-rich conditions, the organism's population increases dramatically or "blooms." The degradation of water quality due to excessive nutrient run-off from residential, agricultural, and industrial areas is a probable cause of the increase in *Pfiesteria* populations.

Pfiesteria is capable of taking the form that is most advantageous to its current environment. In one of its many life stages, it can propel itself through the water with flagella or whip-like projections. And in the presence of a school of fish, it can become a toxic form. Affected fish, partially paralyzed from toxin, start gasping at the water's surface, or can be found dead or dying with telltale sores and bleeding lesions in their flesh. Once the fish are dying, *Pfiesteria* will take an amoebic form, capable of feeding on tissue and blood. In unfavorable conditions, it can encyst into a resting state.

Human Risk

The risks that *Pfiesteria* poses to human health are not fully understood. Although there seems to be no imminent danger, people who work or play near infested waters should take common-sense precautions to avoid situations that would bring them in contact with *Pfiesteria* or fish that have been affected by the organism. Recommendations for the general public are

that when there is no visible evidence of a *Pfiesteria* fish kill, there are no immediate risks involved in recreational activities.

Skin lesions and sores have been reported after exposure to infested waters by a water skier and commercial fishermen. More critical symptoms including narcosis ("a drugged effect"), severe headaches, acute loss of short-term memory, and impaired liver and kidney function have been reported by researchers who worked with high concentrations of the organism in its toxic form in the laboratory.

Pfiesteria and Seafood

The effect of *Pfiesteria* on seafood is not well-researched at this time. Recommendations are to avoid eating seafood with bleeding sores or peeled skin. Restaurant and retail seafood is carefully inspected and safe to eat.

Precautions

- ◆ Leave an area where fish are floating at the water's surface — a fish kill may be in progress.
- ◆ After swimming or wading in natural surface water, rinse with clean water.
- ◆ If you fish recreationally, do not keep fish with sores or lesions.
- ◆ Avoid touching sores or lesions of dead or dying fish. If you must handle fish with sores, use gloves.
- ◆ As a general precaution, consumers should completely cook finfish and shellfish. Never eat fish that exhibit evidence of sores or disease. Do not eat fish that seem diseased or dying when caught.
- ◆ If you experience illness you think is related to exposure to natural surface water, please see your physician.

REPORTING FISH KILLS

If you observe numerous fish gasping at the surface of the water, or come upon many dead fish with sores and lesions, or if you notice discolored water, especially a mahogany color that has been associated with fish kills in other regions, notify one of the following authorities:

In Delaware, call the Department of Natural Resources and Environmental Control immediately at 302-739-4411 during the week, or 302-739-4580 on weekends or after hours.

In Maryland, call the Maryland Department of Natural Resources toll-free hotline at 1-888-584-3110.

In Virginia, call toll-free 1-888-238-6154.

This report is based on materials available October 1, 1997. Information was gathered from *Pfiesteria piscicida* Fact Sheet, by Ben Anderson, Delaware Department of Natural Resources and Environmental Control; *The Inland Bays Citizen Monitor*, by Joseph Farrell, University of Delaware Sea Grant; *Killer Dinoflagellate Fact Sheet*, by North Carolina Sea Grant; the North Carolina State University Aquatic Botany Laboratory *Pfiesteria piscicida* Home Page (http://www2.ncsu.edu/unity/lockers/project/aquatic_botany/pfiest.html); and the University System of Maryland *Fish Health in the Chesapeake Bay* Web Site (<http://www.mdsg.umd.edu:80/fish-health/pfiesteria/index.html>).