

# Red-tide Timeline

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16th century -- A Spanish explorer records stories by Florida Indians of toxic "red water" and the resulting death of birds and fish.

1844 -- The first scientifically documented red-tide episode in U.S. waters occurs in the Gulf along what is called the West Florida Shelf, off the Panhandle near Panama City.

1878 -- Florida's first protracted period of red-tide episodes begins and continues for 10 years.

1880 -- A widespread episode of bird mortality affects the Florida Gulf. It is believed by some to have resulted from red tide.

1884 -- The first incident of human sickness from red-tide-infected shellfish is recorded in Florida.

1947 -- After record rains in the Panhandle, a massive red-tide bloom along the Florida Gulf Coast lasts nearly a year, all but destroying the commercial fishing industry and killing the sponge beds near Tarpon Springs. All along the coast, Time magazine reported, "The spray of the poisoned surf inflamed human throats and lungs. Tourists deserted the hotels; schools were closed; beach areas evacuated." Among the communities affected was Venice, site of the first documented evidence of red tide on the lower Gulf Coast.

1953 -- The longest single red-tide episode recorded to that date begins an 18-month stay along the Florida Gulf Coast.

1994 -- A two-year red-tide bloom begins, eclipsing the 40-year record for sustained episodes.

1996 -- After a brief respite, red tide returns to the Gulf again in January, and within a month extends from Pinellas County nearly to Key West. Red tide is blamed for the deaths of 238 manatees, 10 percent of the total population.

1998 -- First year of the unbroken run of annual red-tide episodes that continues to this day.

2001 -- The Apalachicola Oyster Festival imports oysters after the bay is closed to shellfishing because of red tide.

2002 -- An April bloom closes shellfishing along the Gulf and fouls beaches from Naples to Nokomis. The bloom contributes to a 60-mile patch of black water visible by satellite.

2003 -- Three dogs on Little Gasparilla Island are diagnosed with red-tide poisoning, the first time such infection is seen in dogs outside the lab.

2005 -- A red-tide bloom lasting most of the year results in a "dead zone" the size of Rhode Island on the Gulf floor. Sarasota County health officials propose posting red-tide alert signs on area beaches, but tourism officials warn that they could have an adverse affect.

2006 -- After a brief respite, red tide picks up again, causing state scientists to call the bloom that began in 2005 one of the two or three worst in Florida's history. The national Sierra Club says it will open a Sarasota office to "move red tide to the top of the agenda."

## Going global

1903 -- Red tide occurs for the first time in the North Sea, where the algae is thought to have been carried in on tankers from Japan and Australia.

1968 -- A red-tide bloom along the Northumberland coast of England causes deaths of sea birds.

1972 -- Red-tide algae invade New England for the first time, closing shellfish beds from Maine to Cape Cod.

1975 -- Hong Kong's first red tide prompts the protectorate government to begin recording episodes. By 2005, there will be 759 of them, most nontoxic.

1991 -- A bloom in Norway kills large numbers of farm-raised salmon.

1996 -- Red-tide blooms are recorded in Louisiana, Mississippi and Alabama, forcing the unprecedented closing of oyster beds.

2005 -- The worst toxic bloom in New England history shuts down fisheries from Maine to Martha's Vineyard. Scientists fear that the *Alexandrium fundyense* algae may have left behind massive colonies on the ocean floor that could bloom again under the right conditions.

## Causes and cures

1947 -- A widespread rumor blames the red-tide bloom on leftover World War II gases and chemicals thought to have been dumped into the Gulf by the U.S. military.

1953 -- A Florida scientist suggests blasting red tide with copper sulfate, a chemical commonly used to kill algae in reservoirs. When tried in 1957, the chemical kills all plant life.

1995 -- Korea announces that it has solved its red-tide problem by spraying algae blooms with a clay compound, thus reducing its fishing losses from \$100 million to \$1 million in a single year. American scientists warn that the clay's impact on other marine life is unknown.

1997 -- After a massive red-tide bloom in Indonesia, Australian scientists say that minerals in the smoke from island wildfires fed the bloom, which killed fish and coral for hundreds of miles.

2001 -- A scientific study commissioned by the U.S. Congress links the greater incidence and severity of algae blooms to global warming, not then yet officially recognized by the United States.

2002 -- University of South Florida researchers say that red tide may be caused by iron in clouds of dust blowing from the Sahara Desert to the Gulf.

## Research

1974 -- The first international conference on toxic dinoflagellate blooms -- aka red tide -- is held in Boston.

1984 -- Mote Marine Laboratory in Sarasota holds its first workshop for red-tide researchers and sets monitoring outbreaks as its priority.

1996 -- Congress allocates funds for the first time to study red tide. The \$1.5 million grant represents the first time red tide is viewed by policy makers as a national issue.

1997 -- NASA launches a red-tide detecting satellite.

1998 -- Florida makes its first serious investment in red-tide research with a million-dollar grant to Mote Marine and the state Fish and Wildlife Research Institute.

1999 -- Florida triples its investment in red-tide research to \$3 million.

2004 -- Acknowledging that red tide has a \$1 billion impact on the national economy, the National Oceanic and Atmospheric Association announces plans to step up its forecasting techniques and apparatus.

2005 -- Mote Marine concludes a five-year study of red tide by acknowledging that there may have been an increase in frequency and severity of algae blooms in the Gulf. Mote restates its emphasis on monitoring outbreaks, estimating that an adequate system could cost \$50 million to build and \$8 million a year to operate.

The Florida Legislature passes a \$5 million research package, which the governor approves.

The National Institute of Environmental Health Sciences concludes a five-year study with a warning that the human consequences of red-tide exposure are likely greater than previously reported, both in terms of mortality from consuming contaminated shellfish and in respiratory damage from repeated long-term exposure to even low levels of airborne toxins.

2006 -- The Sierra Club criticizes Mote Marine and the state Fish and Wildlife Research Institute for spending most of their money and time on monitoring and mitigation of blooms, and not enough on identifying root causes. Mote launches a submarine that will hunt for red-tide blooms and try to help figure out how and why they develop.

The case against runoff

1947 -- Scientist Bostwick Ketchum of the Woods Hole Oceanographic Institute studies the Florida red tide that followed record rains in 1947 and concludes that "the excessive nutrient content may be the result of terrigenous contamination or fertilization of the waters."

1953 -- Marine scientist Lawrence Slobodkin writes that "red tides may be coastal phenomena associated with heavy land drainage."

1956 -- Researchers at Manhattan's Haskins Laboratories report that freshwater runoff contributes to red-tide blooms by reducing the salinity of ocean water and boosting levels of various nutrients. As algae feed on the nutrients, said the scientists, they release a toxin. As fish begin to die from the toxin, bacteria attacking the carcasses further feed the algae, creating a "biological chain reaction."

1962 -- The U.S. Army Corps of Engineers reports that "red-tide blooms are correlated with years of high rainfall and heavy freshwater discharge from the western rivers of the Florida peninsula." This discharge, says the corps report, "seems to bring in some nutrient which leads to a bloom ... when other conditions are right."

1992 -- Scientists identify the so-called West Florida Plume, a converged stream of discharge from nutrient-rich northern Florida rivers that runs into the Gulf, feeding algae blooms.

1996 -- Saying there is no conclusive evidence of a relationship between land-based runoff of nutrients from fertilizers and industrial wastes, Mote Marine acknowledges that red-tide-producing algae may "exploit nutrients" that may contribute to longer and bigger blooms. Meanwhile, a senior researcher at the Woods Hole marine lab in Massachusetts says that mounting evidence is overwhelming that there is a link between such pollution and red-tide blooms.

1996 -- A federal panel meeting in Sarasota to discuss red-tide research recommends that governmental bodies seek to control and reduce industrial, municipal and agricultural wastes as a possible means of mitigating red tide.

2000 -- Environmental scientist Robert Howarth of Cornell University, who chaired a federal study recommending stricter policing of runoff for a variety of environmental reasons, says that human activities more than doubled the amount of nitrogen produced in the world between 1960 to 1990, and more than half of that increase is from fertilizers.

2003 -- Scientists in Oregon link human development, and the nutrient runoff it causes, to an increase in frequency and severity of red-tide blooms around Puget Sound.

2004 -- The Sierra Club says pollution is likely contributing to more and longer red-tide episodes in the Florida Gulf.

2005 -- Two Florida scientists, Larry Brand of the University of Miami and Brian Lapointe of Harbor Branch Oceanographic Institution, report that their seven-month research project shows strong evidence of a direct correlation between "nutrient" runoff and increased red-tide blooms. The study is financed principally by Lee County after the chairman of the local Chamber of Commerce said the algae were becoming an economic concern for their impact on fishing and tourism. While underscoring that research remains inconclusive, Mote Marine acknowledges that "human-derived pollutants may be intensifying and prolonging red tides along the coast." Mote urges cooperative action to reduce runoff. One of five states represented at a conference on the state of the Gulf's health, Mississippi urges further study of nutrient runoff as a culprit in red tide.

2006 -- The Sarasota County Commission considers a proposal to restrict the use of some fertilizers as a means of limiting runoff linked by many to red tide. The commission plans a series of public meetings to discuss the matter.