

Red Tides

Red tide, a common name for algal blooms, is nothing new to Florida: there are anecdotal reports of it in the Gulf of Mexico dating back to the 1530s, as documented by the Spanish explorer Cabza de Vaca. Red tides are also known as harmful algal blooms (HABs), the preferred scientific term.

HABs are caused by *Karenia*, a genus of 12 species found in marine environments that consist of unicellular, photosynthetic, planktonic organisms. When these organisms are present in high concentrations the water color turns reddish or pink.

They produce toxins which may cause significant ecological and economic damage. The ecological harm may include paralysis or death to marine life, including fish, sharks, marine mammals (dolphins, sea turtles, manatees), and birds and dogs.

- One species, *Karenia brevis* (*K. brevis*), is known to cause respiratory distress and neurotoxic shellfish poisoning in humans. It may also cause respiratory, eye, and skin irritation to people on or close to impacted areas.
 - Florida's 2015-16 cost for treatment of respiratory illness in Sarasota County alone averaged \$0.5 to \$4 million.*
 - On average, \$22 million are lost annually for medical expenses and lost wages during HAB events.***
 - Algal cells release toxins when they rupture, and these toxins may stay in the ocean or be released into the air.
 - Neurotoxic shellfish poisoning from eating shellfish tainted by *K. brevis* may cause nausea, vomiting, and a variety of neurological symptoms, including loss of motor control, numb or achy extremities, and respiratory paralysis.
 - Toxin particles in the air may make it difficult to breathe, particularly for people with respiratory conditions like asthma, emphysema, or COPD.
- Ecological damage, aside from impacting the marine food chain, includes harm to scleractinian coral — stony or hard coral.
 - Red tide's toxins affect the respiration rate of coral and the development of coral larvae, threatening the coral's survival.
 - Oxygen in the water is depleted when large amounts of algae die and decompose. This may cause marine life to leave the area for a better environment or to die.
- HABs are a national concern because they impact local and regional economies, particularly from loss of revenue from tourism, the primary source of revenue in many communities. There is also loss of revenue from fish and shellfish markets.
 - Tourism costs
 - It is estimated that red tides cause more than \$20 million in tourism-related losses in Florida annually.*
 - Seafood industry costs
 - States closely monitor shellfish and may close harvesting to protect the public.
 - Florida's 2015-16 red tide lead to \$1.33 million in lost sales in the hard clam aquaculture industry,* and had a negative economic impact on the state economy of \$3.25 million, a tax loss of about \$90,000, and loss of

30 jobs across hatcheries, growers, seafood dealers and retailers, restaurants, and others.**

- The annual impact on commercial fisheries is \$13-\$25 million, with an average impact of \$18 million.***
- HABs occur off coastal waters globally and their occurrence may be on the rise.
 - Algae, including *K. brevis*, depend on environmental factors like water temperature, salinity, light, nutrients and compounds found in the water in order for algae to thrive.
 - Nutrients brought up from the ocean floor after major storms stimulate the occurrence of algal blooms.
- Algae blooms are closely monitored by states, including Florida, and the National Oceanic and Atmospheric Administration (NOAA).
 - NOAA scientists have been studying these blooms for years in order to detect and forecast them. The goal is to provide communities with advance warnings so that they can plan for and deal with the environmental and health effects of HABs.
 - NOAA monitors conditions daily and issues forecasts twice a week for HABs in the Gulf of Mexico and east coast of Florida, helpful in finding unaffected beaches.
- Organizations which research and offer information on red tides include:
 - Mote Marine Laboratory, <https://mote.org>
 - Institute of Food and Agricultural Science at the University of Florida, <https://ifas.ufl.edu/>
 - The Florida Aquarium, www.flaquarium.org
 - Florida Fish and Wildlife Conservation Commission, <https://myfwc.com> and the FWC Fish and Wildlife Research Institute, <https://myfwc.com/research/>

Sources

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<https://myfwc.com/research/redtide/>
https://en.m.wikipedia.org/wiki/Red_tide
https://en.m.wikipedia.org/wiki/Karenia_brevis

Data and Statistics

<https://myfwc.com/media/17572/6-redtide-presentation.pdf>

* blog.ifas.ufl.edu/extension/2018/12/04/understanding-the-florida-red-tide

** shellfish.ifas.ufl.edu/news/red-tide-causes-economic-losses-sw-florida-industry

*** [www.floridahealth.gov/environmental-health/aquatic-toxins/ documents/economic-impacts.pdf](http://www.floridahealth.gov/environmental-health/aquatic-toxins/documents/economic-impacts.pdf)

Publications, data and statistics for HAB associated illness, <https://www.cdc.gov/habs/publications.html>