

Florida Red Tide & Coastal Managers: *Commonly Asked Questions*



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This presentation is designed to give coastal managers an overview of the questions that they may get from the public and media about Florida red tide.

Of note, similar presentations are available about calls Poison Information Specialists receive at the Aquatic Toxins Hotline (toll free 24/7 x 365 days/yr at 1-888-232-8635) of the Florida Poison Information Center and the Florida Department of Health on Florida red tide as well as other presentations by Dr. Lora Fleming on “Florida Red Tide and the Healthcare Provider” and Mr. Andrew Reich on “Florida Red Tide and Harmful Algal Blooms: A State Health Department Perspective” at:

<http://www.med.miami.edu/poisoncontrol/x57.xml>

<http://www.med.miami.edu/poisoncontrol/documents/with%20notes%20Notated%20Fleming%20Florida%20Red%20Tide%20for%20Healthcare%20Providers.pdf>

<http://www.med.miami.edu/poisoncontrol/documents/note%20pages%20Reich%20Notated%20Distance%20Learning%20PCC%20Training.pdf>

<http://www.med.miami.edu/poisoncontrol/documents/with%20note%20pages%20NotatedCalls%20to%20Aquatic%20Tox%20Line.pdf>

The Front Lines

This presentation will provide answers to the most common questions asked of park and resource managers by the public during a red tide event in Florida.

Of note, these questions came from a focus group with coastal managers in Southwest Florida, and we are very grateful for their input.

“What is Florida red tide?”

- A massive “bloom” of a microorganism naturally present in FL waters
- *Karenia brevis*
- Produces brevetoxin
- Can kill fish, marine mammals, sea birds



K. brevis, Charlotte Harbor, Charlotte Sun Herald, Paul Schmidt

First, an introduction to Florida red tide organism: *Karenia brevis*. Shown in an electron micrograph, this organism is a dinoflagellate which is an unusual mixture of plant and animal: it receives energy from sunlight, but is able to move itself (mainly up and down) through the water. While usually present in Florida waters at low levels, occasionally this organism can reproduce rapidly, or “bloom,” and with currents and wind cause massive areas of discolored water off the coast. The water can actually turn red, or brown, as seen in the photo above. Fish that swim into this water can die, leading to large smelly fish kills that wash up on the beach. Marine mammals such as manatees and dolphins, which inhale the toxins as aerosols and/or eat fish and seaweed exposed to Florida red tide, can also die.

Not to be confused with...



http://crca.caloosahatchee.org/img/red_drift_algae_080721.jpg

Red drift algae is not a Florida red tide, but these “macro” algae can cause their own problems (www.mote.org/ and search for “red drift algae”). In addition to suffocating plants and sea creatures, they cover beaches and other coastal areas resulting in a major disposal issue. High nutrient levels can support an increase in the growth of algae once the water is clear enough. In addition, increased freshwater flow causes abnormal salinity fluctuations and hypoxic events (lack of oxygen available in the water column), which could reduce the number of benthic invertebrates (such as snails) which would normally feed on algae and keep it in check.

“Why does Florida red tide happen?”

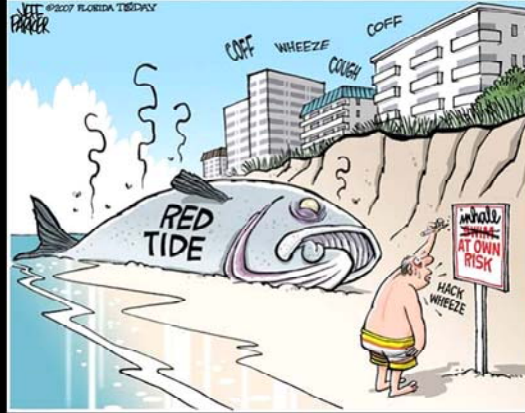
- Dates back to 1800s at least
- Conditions which encourage growth:
 - Nutrients?
 - Salinity
 - Temperature
- Recent research



Often people want to know “why” red tide occurs. This is an area currently under research. There is a long history of documented Florida red tides dating back to the mid-1800s prior to the human environmental impacts of industrialization and large coastal populations. It is believed that the *Karenia brevis* organism blooms when conditions such as (possibly) nutrients, temperature and salinity are favorable. There have been several important new theories put forward in recent years about why blooms seem to be occurring more frequently and lasting longer (sometimes up to a year). These theories include suggestions that increased nutrient runoff from agriculture and industry, even as far north as the Mississippi River, may be contributing to these blooms. Global warming may also lead to conditions which encourage *Karenia brevis* overgrowth.

“How can I be exposed to Florida red tide?”

- Brevetoxins
- Contaminated seafood
 - Shellfish
 - Fish viscera?
- Contaminated water
- Aerosolized toxins in the air



The Florida red tide organism, *Karenia brevis*, produces very powerful natural toxins called brevetoxins which can affect the nervous system if consumed or inhaled. People can be exposed if they eat contaminated shellfish, resulting in an illness called Neurotoxic Shellfish Poisoning (NSP). It is controversial whether people can get sick from consuming fish during an active Florida red tide bloom (marine mammal deaths have been associated with consumption of brevetoxin contaminated fish); at this point, it is only advisable to eat the fillet or muscle of the fish caught during an active Florida red tide bloom, not the viscera where the toxins can be concentrated. If there are strong onshore winds, the *Karenia brevis* cells break and release brevetoxins into the air as an aerosol; brevetoxins have been measured up to 1 mile from the coast during an active Florida red tide bloom. These aerosolized brevetoxins cause respiratory, nasal and eye irritation, and may be particularly irritating for persons with asthma and other underlying respiratory diseases. People report skin rashes and irritation after swimming in the marine waters during an active Florida red tide, however no research has been performed to determine if these reactions are due to *Karenia brevis* and/or the brevetoxins or other causes.

“Can I eat the seafood?”

- Seafood is safe in restaurants
- Shellfish beds closed during a FL red tide
- Dead fish should not be collected from the beach
- No consumption of *organs* of locally caught fish



Seafood safety is an important topic and the Department of Agriculture operates a model program of monitoring and reporting which has prevented *any* documented cases of shellfish poisoning from harvests in approved, open beds. Recent cases of neurotoxic shellfish poisoning (NSP) (associated with consumption of shellfish contaminated with the Florida red tide toxins) have been linked to individuals digging and consuming shellfish from unapproved areas. Often these individuals are tourists or non-English speaking residents. Shellfish and seafood sold in stores and restaurants, even in Florida red tide areas and during active blooms, are safe to consume. Dead fish during an active Florida red tide should not be consumed; during an active Florida red tide, it is better to only consume the fillet (muscle) not the viscera (internal organs), of locally caught fish.

“Are my symptoms related to Florida red tide?”

- Sneezing
- Coughing
- Watery eyes and runny nose
- Swimmers may note skin irritation



Many people will ask the local lifeguard, park official or beach manager about symptoms they experience while at the beach on Florida red tide days. The most common symptoms that people report from exposure to Florida red tide toxins in the air are: sneezing, coughing, watery eyes, and runny nose. Some people who have asthma, a cold or other lung disease may experience more serious symptoms. Anyone who seems to be having trouble breathing should be urged leave the beach and to seek medical attention at once. People can sometimes report symptoms to Florida red tide that are not common or may be unrelated to Florida red tide exposure (i.e. headache, nausea); they can also report symptoms on days when Florida red tide organism cell counts are very low or when there is an off-shore breeze (which would usually prevent significant exposure). While some people are unusually sensitive to brevetoxins, most people experience relatively minor symptoms which resolve after they go indoors to an air conditioned area or after leaving the beach. People who choose to swim during a Florida red tide may develop a skin rash from the toxin, or stomach ache if they get water in their mouth, although it is not clear if this is a direct effect of exposure to brevetoxins.

For more information on Florida red tide and other Harmful Algal Blooms go to the Florida Department of Health Aquatic Toxins Program, or call the Aquatic Toxins Hotline 24/7 toll free at the Florida Poison Information Center (1-888-232-8635)

“How long are my symptoms going to last?”

- Usually resolve after leaving beach
- Colds, bronchitis may prolong symptoms
- Some people report long term effects



Most people will find that their symptoms go away after they leave the beach (at least a mile inland) or go into an air conditioned area. Symptoms of Florida red tide exposure vary depending on length of exposure, and individual sensitivity. At this time, there are no known long term effects in normal people, although people with underlying lung disease (like asthma) may experience symptoms that last several days, and possibly may be at an increased risk for developing pneumonia and bronchitis.

“Are there long term health effects?”

- No *known* long term health effects
- Groups theoretically at risk
 - Those with lung disease
 - Beach workers



This is a common question, mostly coming from residents or “snowbirds” who own property in the area and spend several months a year in Florida red tide-prone areas. At this time, there are no known long term effects in healthy people, although people with underlying lung disease like asthma may experience symptoms that last several days and possibly may be at an increased risk for developing pneumonia and bronchitis. The science on this is rapidly advancing and scientists hope to have more complete information for the public in the next few years. The groups most likely to be affected by the toxin are those who are exposed as part of their work and can’t remove themselves from the affected area, for instance, construction workers or lifeguards.

“I’m pregnant. Am I at special risk?”

- Animal research models
- Avoid the beach as an extra precaution until we have more solid research on this topic.



Pregnant women should also be advised to stay away from the beach during Florida red tide periods, especially during an onshore breeze, as studies in animals have shown that the toxins can pass through the placenta to the fetus; however, these same studies have not shown any ill effects in the fetuses from this exposure. These results have not been demonstrated in humans, therefore these recommendations are given in an abundance of caution.

“What about my children or pets?”

- Limit exposure of children with asthma
 - Leave beach
 - Residents may need to adjust medications
- Prevent pets from eating dead fish, or swimming in water during red tide



Parents can have concerns about effects on children, particularly because children tend to spend more time outside than adults. Because of their small size, both pets and children can be disproportionately affected by Florida red tide toxins. In fact, dogs have reportedly been sickened and died after exposure on the beach to active Florida red tide blooms; their exposures may have been a mixture of ocean spray, ocean foam and licking their fur. If someone suffers from asthma, their medications may have to be adjusted for periods they will be in contact with Florida red tide. Monitoring a child’s “peak flow” will be especially important during red tide periods, if the child is living in a Florida red tide area.

Many people express fear about the dead fish and the smell. While it is unpleasant, beach managers can reassure the public that the smell of dead fish alone cannot make them sick. It is important, however, to keep pets from eating dead fish because marine mammals that have consumed large quantities of affected fish have been found dead. While we have not had any documented pet bird deaths from Florida red tide, owners of pet birds should be encouraged to bring them in during a Florida red tide. Sea birds are affected by the toxin, although it is currently assumed to be from eating large amounts of affected fish and/or breathing the brevetoxin aerosols.

“What can I do to feel better?”

- Leave the beach
- Go indoors
- Antihistamine use
- Use asthma Rx
- Masks may decrease (but not eliminate) effects



Beachgoers want to know how they can stop or prevent symptoms. For most people, avoiding the beach when there is a Florida red tide and an onshore breeze is enough to keep the symptoms to manageable levels. For uncomfortable symptoms which persist after the sufferer has left the beach and/or entered an air conditioned environment, we generally suggest the use of an over the counter antihistamine product. Used correctly, these products minimize eye and nose itching, sneezing and cough. In addition, if the person is asthmatic, careful use of asthma medications (such as inhalers) following medical guidelines may also relieve the symptoms of cough, chest tightness and wheezing; of note, if these symptoms do not rapidly go away in asthmatics after medicine use, it would be important to not take more medication but to seek medical care.

Many people want to know if they can go to the beach or exercise if they wear a surgical-type mask over their mouth and nose. Although this approach may decrease some of the inhaled toxins, it does not eliminate the eye irritation, and it also may encourage the person to spend more time outdoors. No mask has clinically proven to protect against brevetoxins, so removing oneself from exposure is the best practice particularly if you have underlying lung disease. Mask use is also not practical for areas that experience Florida red tides over many months. People who seem to be very uncomfortable from the Florida red tide should consult their doctors about possible underlying asthma.

“Where is the red tide?”

- Current location information
 - Beach Conditions Reports
 - FWC Reporting
 - NOAA HAB Bulletin
- Predictions about future blooms & location still not possible



Coastal managers are frequently asked about the location of the Florida red tide. Thanks to the Beach Conditions Reporting System available for Southwest Florida and the Panhandle with updates twice daily; the Florida Fish and Wildlife monitoring and reporting system; and also to the NOAA HAB Bulletin which provides cell count and satellite data for coastal areas in the Gulf, information about current conditions is readily available. For the east coast of Florida, however, no real time system is operating yet, so it is up to local agencies to issue alerts about affected areas.

The Florida Poison Information Centers are currently pilot testing a system which would alert local health departments when calls come into the system from a county not identified as a current Florida red tide location. This early alert could allow for more rapid detection and public notification than currently exists. As for yet, no one has been able to develop a system for predicting when, where and how severe the next red tide bloom will occur. It is not yet possible to make recommendations about what specific beach will be clear or even what months of the year are less like to have a red tide. This can be frustrating for tourists and local residents who would like to be able to plan to avoid the red tide.

“Why aren’t they testing this beach every day?”

- Limited resources
- Department of Agriculture
 - Shellfish beds
- Healthy Beaches
 - Micro-organisms



There are a number of excellent monitoring programs in place for beaches around Florida. Because of limited resources, these monitoring programs are focused on the most serious risks to public health. In addition to the systems mentioned in the previous slide, the Department of Agriculture has an extensive monitoring system at all of the legal shellfish harvesting beds around the state. These beds are closed immediately if enough Florida red tide organism cells are found to contaminate shellfish.

The Department of Health operates the Healthy Beaches Program which regularly monitors recreational beaches for microorganisms (i.e. bacteria) that could indicate a sewage spill or other unsafe condition for swimmers (<http://esetappsdo.h.doh.state.fl.us/irm00beachwater/default.aspx>). In some areas, these programs are collaborating with the Florida red tide monitoring programs for sampling nearby waters.

Since most people experience only mild symptoms from Florida red tide, there has not been a large need for beach by beach monitoring. In the meantime, research studies are ongoing at various beaches in red tide-prone areas to learn more about the organism and its effects on people.

NOAA HAB Bulletin

Forecast

Gulf of Mexico Harmful Algal Bloom Bulletin
 5 January 2006
 NOAA Ocean Service
 NOAA Satellite and Information Service
 Last Bulletin: January 3, 2006

Observations Report
 A new algal bloom has been identified in Monroe County. Patchy low impacts are possible for the outside Lower Keys today and Sunday, with low to moderate impacts possible Friday and Saturday. No impacts are expected elsewhere in SW Florida through Sunday. Dead fish have been reported between Key West and Marathon in the past few days. Dead fish smell, white unpleasant, does not produce the same respiratory irritation as red tide.

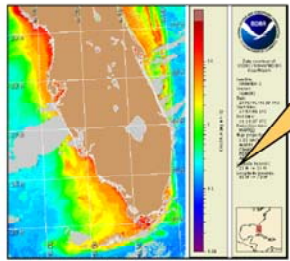
Analysis
 The bloom near the Lower Keys remains present. Chlorophyll levels are continually elevated north and south of the Lower Keys, with levels highest north and southeast of Big Mullett Key (24°35'N, 81°54'W and 24°34'N, 81°53'W), inside the Marquesas Keys, and northeast of the Horseshoe Keys (24°48'N, 81°16'W). Elevated chlorophyll extends along the east side of the Lower Keys, out to approximately 7 miles from shore. No recent samples are available for this area. A fish kill was reported on I/O at Egret Lane west of Marathon. Sampling is highly recommended throughout this area. Continued transport around the Lower Keys is possible throughout the weekend. Also, a slight possibility exists for the transport of additional *K. brevis* through the Lower Keys on Friday and Saturday with the appearance of northeasterly winds.

Observations indicate the bloom is no longer present at the SW side of the Lower Keys, although background levels remain patchy in bay and cove areas near Sarasota and Pinellas County (FWRI 1/5). Elevated chlorophyll features remain offshore Collier and Monroe Counties near 25°36'N, 82°13'W, and offshore Lee and Collier Counties at 26°16'N, 82°27'W. Sampling, if possible, is recommended. Overall movement has been minimal; the features will likely remain offshore and continue southward migration.

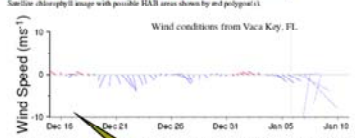
Fisher, Bronder

Please see the following restrictions on all NOAA imagery derived from CoastWatch:
 1. Data are restricted to civil marine applications only, i.e., federal, state, and local government use/distribution is permitted.
 2. Image products may be published in newspapers. Any other publishing arrangements must receive Outreach approval via the CoastWatch Program.

Infrared Satellite Imagery (Chlorophyll a)



Detailed Analysis



Wind Speed Graph

In 2004, NOAA unveiled the NOAA Harmful Algal Bloom (HAB) Bulletin, which is an early warning system to monitor and forecast red tide activity and effects based on combination of satellite imagery, buoy data, and sample data from Florida Fish and Wildlife Commission as well as other sources. Bulletins are posted on http://coastwatch.noaa.gov/hab/bulletins_ns.htm.

“Why didn’t someone tell me?”

- FL Red Tide is not predictable
- Changing wind conditions greatly influence effects
- Local Health Departments and the media cover blooms, but long blooms cease to be “news”



Many people, especially tourists, express frustration that no one told them about Florida red tide. The lack of a clear “season” and the alternate problem that the Florida red tide can last for up to a year, mean that visitors can arrive to find that their beach vacation is unexpectedly effected. Notifying tourists is also problematic since Florida red tide can go away or not be a problem if the winds are blowing offshore. Again, thanks to the Beach Conditions Reporting System available for Southwest Florida and the Panhandle; the Florida Fish and Wildlife monitoring and reporting system; and also to the NOAA HAB Bulletin which provides cell count and satellite data for coastal areas in the Gulf, information about current conditions is readily available.

Because the tourism industry in Florida is very important, there have been recent efforts to provide hotel guests with information and numbers to call for questions or assistance, by, for example, the grassroots group, START. The Department of Health is taking steps to educate local health officials, parks and beach patrol officers and local healthcare providers about Florida red tide and its effects to make accurate information more readily available. The Florida Poison Information Center-Miami in collaboration with the Florida Department of Health, CDC and the University of Miami maintains the Aquatic Toxins Hotline, a toll free 24/7 number (888 232 8635) to provide information on exposure and health effects from harmful algal blooms (HABs) to patients, healthcare providers and the general public as well as the opportunity to speak directly with a trained poison information specialist (see enclosed evaluation); these data are also incorporated into public health surveillance, and they have also developed training materials in some of the harmful algal bloom disease targeted at healthcare providers and others.

“Where can I get more information?”

- Florida Fish & Wildlife Conservation Commission
- Aquatic Toxins Program, Florida Dept of Health



Please see our list of RESOURCES at the end of this presentation. The Florida Department of Health, Aquatic Toxins Program, the Florida Fish and Wildlife Conservation Commission and START have excellent websites.

Aquatic Toxins Hotline

- 1-888-232-8635
- Speak with a poison specialist, or
- Recorded information
 - Florida Red Tide
 - Ciguatera
 - Blue green algae (cyanobacteria)
 - Shellfish poisoning



The Aquatic Toxins Hotline, originally called the Florida Red Tide Health Hotline, was developed in 2005. The Florida Poison Information Center- Miami in collaboration with the Florida Department of Health, CDC and the University of Miami maintains the Aquatic Toxins Hotline, a toll free 24/7 number (888 232 8635) to provide information on exposure and health effects from harmful algal blooms (HABs) to patients, healthcare providers and the general public as well as the opportunity to speak directly with a trained poison information specialist (see enclosed evaluation); these data are also incorporated into public health surveillance, and they have also developed training materials in some of the harmful algal bloom disease targeted at healthcare providers and others. While Florida red tide remains the most sought after topic during periods with active Florida red tide events, information on other harmful algal bloom topics are offered to callers as well in English and Spanish. The website for the Aquatic Toxins Hotline is www.miamipoison.org, under the “Plants and Animals” section.

Additional Resources

- Florida Dept of Health Aquatic Toxins (<http://www.myfloridaeh.com/medicine/aquatic/index.html>)
- Aquatic Toxins Hotline (tel: 888 232 8635) (www.miamipoison.org under the “Plants and Animals”)
- National HAB Website <http://www.whoi.edu/redtide/>)
- Beach Conditions Reporting System (<http://coolgate.mote.org/beachconditions/>) and tel: 941 BEACHES (941 232-2437)
- Solutions to Avoid Red Tide (START) (www.start1.com)

Additional Resources

- Florida Fish and Wildlife Conservation Commission (www.floridamarine.org)
- NOAA HAB Bulletins (http://coastwatch.noaa.gov/hab/bulletins_ns.htm)
- Florida Dept. of Agriculture Shellfish Harvesting beds around the state (http://www.floridaaquaculture.com/SEAS/SEAS_intro.htm)
- Healthy Beaches Program (<http://esetappsdo.h.doh.state.fl.us/irm00beachwater/default.aspx>)

Additional Resources

- FWCC Marine Fish Kill Hotline (1-800-636-0511) or fish kill web page (<http://research.myfwc.com/fishkill/submit.asp>)
- FWCC Sick birds, sea turtles or sea mammals (1 888 404 FWCC)

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