More than 40 volunteers joined the SBEP's Sarasota Bay Guardians for a work day at Quick Point Nature Preserve and Emma Wood Beach on Longboat Key.
Courtesy of Sarasota Bay Estuary Program

Red tide persists along Florida's Gulf coast, how you can help stop it

JESSI SMITH | TUESDAY, NOVEMBER 2, 2021

Red tide shows up in southwest and west central Florida waterways and news headlines more often than we care to see it. Even the scientific name for its main causative agent, the phytoplankton (microalgae) *Karenia Brevis*, carries household name notoriety in the Tampa Bay Area due to its roaming prevalence of late in the Gulf of Mexico.

Like inconsiderate houseguests, some red tides tend to linger. The harmful algae bloom (HAB) that first appeared last December currently persists in low to moderate patches along Florida's west coast, with high concentrations present near Pinellas and Sarasota as recently as late October.

Florida Fish and Wildlife Conservation Commission (FWC)'s Red Tide Current Status displays current tracking data. You can also call 866-300-9399 at any time from anywhere in Florida to hear a recording about red tide conditions. The recording is updated on Fridays at 5 p.m.

The good news? Scientists and environmental advocates now believe that by incorporating simple, eco-friendly practices at home, Florida residents can work alongside larger regional efforts to improve water quality -- and in doing so, encourage healthier waterways where HAB houseguests like *K. Brevis* won't feel welcome for such extended, high-concentration stays.

Here's what you should know.

Red tide stinks: Understanding our algae-imperiled blue economy

Folks who live near beaches from Hernando to Pinellas to Sarasota counties -- and as far as far north as Dixie and Taylor counties and as far south as Fort Myers -- are sick of smelling the intermittent fish kills caused by red tide

brevetoxins; that's not to mention the devastating impact on other wildlife like seabirds and manatees, human health concerns and the harm inflicted on Floridians' livelihoods.

Sarasota Bay Estuary Program (SBEP) Executive Director Dr. David Tomasko speaks to Sarasota Bay's blue economy -- its recreational, economic and environmental value threatened by red tides -- as representative of broader concerns in estuary systems across Florida.

"People spend time not just on the water, or next to it, but *in* the water. They want to stand in waist-deep water and see their feet, and they don't want to have rafts of macroalgae wrapping around them. Second, it's important to our economy. We have 20,000 jobs that are associated with bay-related activities: commercial fishermen in Cortez and fishing guides; the waiters and bartenders and restaurant owners, and the person who rents out jet skis. Also, proximity to the bay is associated with an uplift to property values of about three billion dollars -- which helps fund schools, police and fire departments, and even the NEP [National Estuary Program]," Tomasko says.

Sarasota County beachgoers may be familiar with this signage indicating the presence of and possible health hazards related to red tide.

"Finally," he adds, "water quality is important because of our wildlife. Sea turtles and manatees and dolphins and adult seatrout and redfish and snook all need a healthy bay -- as well as the bay serving as a nursery habitat for commercially important species, such as gag grouper. If we're not careful, we can have the bay's health slip away from us."

Tomasko cites the record-shattering manatee die-off in Indian River Lagoon as a "disaster scenario" from which west coast estuary systems may not be immune.

Not just a cough: red tide HABs can harm humans, too

Dr. Lisa Krimsky, Water Resources Regional Specialized Agent for UF/IFAS, led the Florida Sea Grant study, Developing a Communications for the Red Tide Plan in Florida, that identifies areas for opportunity in statewide communications on harmful algal blooms (HABs) -- particularly in relation to public health info accessibility for residents and visitors.

"Red tide is complicated -- and we don't have all the answers. There's a lot of uncertainty, and I think one of the big messages is that we can't get lost in the scientific complexity. We need to be very streamlined and focused so that our audience can make informed decisions for themselves about how to protect their health," Krimsky says.

Krimsky explains that Floridians typically rely on two trusted sources -- local news media and the state Fish and Wildlife Commission -- for information about red tide conditions in their area, but that some of the most persistent "big picture" info gaps around red tide are related to its health concerns.

Dr. Barbara Kirkpatrick specializes in respiratory health and environmental epidemiology. She currently serves as the Senior Advisor for the Gulf of Mexico Coastal Ocean Observation System (GCOOS) and has been studying red tide's health impacts over two-plus decades. Her NIH study on red tide's aerosolized toxins, published in 2005, helps us understand how brevetoxins affect asthmatics.

Kirkpatrick's research influenced a shift in statewide messaging to advise that aerosolized brevetoxins can persist as far as a mile or more inland from beaches. She also helped oceanographical data scientist, Dr. Robert Currier, create the Visit Beaches Reporting System where anyone can report respiratory and eye irritation in real-time, and to conceptualize HABScope, a forecasting tool (also developed by Currier) that teams smartphone-equipped citizen scientists with deep learning A.I. to analyze water samples for concentrations of *K. Brevis*. (See how HABScope works in this WTSP 10 Tampa Bay video -- it's *very* cool.)

But Kirkpatrick says data on any health concerns beyond respiratory -- take gastrointestinal Neurotoxic Shellfish Poisoning (NSP), for example -- is limited, or anecdotal at best, and that public awareness suffers as a result. It is a

common misconception, for instance, that cooking or freezing seafood will eliminate red tide neurotoxins. Once contaminated, shellfish are unsafe to consume under any circumstances.

Commercial shellfish is always safe, Kirkpatrick explains, thanks to Florida Department of Agriculture and Consumer Services regulations -- but recreational shellfishers should tune in to FDACS Shellfish Harvesting Area Status Map for safe harvesting info. She says red tide neurotoxins can also affect fish, and advises recreational fishers to look out for unusual behavior when the fish they hook are fighting on the line -- an indicator of neurotoxic poisoning -- and to only consume filleted meat portions, because toxins accumulate and remain in the guts. In other words: Skip stews that use the whole fish if it was caught where red tide might be present.

"Fortunately for us, [NSP] has not lead to a mortality event, but it can lead to serious gastrointestinal issues, and in the literature at least, those individuals who go to the hospital with reported instances of neurotoxic shellfish poisoning are non-English-speaking harvesters -- so we know that we're not meeting that target audience; we're not effectively reaching out to them. We need to find a better way -- because not only the broadscale mass media, but also localized beach signage, is not effectively reaching non-English-speaking visitors and residents," Krimsky notes.

Navigating the informational spaghetti loop

If you've been clicking as you read, you may have noticed four handy but disparate red tide tracking resources in this article -- the FWC Red Tide Current Status, VisitBeaches.org, HABScope's Respiratory Forecast, and the FDACS Shellfish Map. Kirkpatrick describes the current process to access these resources as a "spaghetti loop" of information, and remarks, "it's no wonder people are confused."

That's why streamlining *all* red tide info for easy public access is one of the main recommendations from the Florida Sea Grant study. But amid the confusion, Krimsky says opportunities might exist to strengthen knowledge-sharing connections statewide.

"One of the biggest issues we have with red tide is that the information the public wants is very locally specific

HABscope is a citizen science device used for water sampling. A 3D-printed attachment connects a smartphone device to a microscope to get close-up video images of microscopic organisms in water samples.

information, and we don't have capacity. But these citizen science tools and technologies might be the way we get that local-specific information. It would have to be a very thoughtful, deliberate expansion of these programs, but I think there's an opportunity for [red tide monitoring programs] to partner not only with local residents, but with hospitality and tourism industries as a really proactive and thoughtful way to link some of these stakeholders together," Krimsky says.

Can we bid algal blooms adieu? Limiting nutrient access reduces red tide severity

When it comes to the notion of "eliminating" red tide, we must first accept that we won't. The FWC has been tracking Florida's near-annual red tides since the 1950s. Sporadic scientific records begin in 1844, but anecdotal documentation actually dates much further back to pre-colonial Indigenous societies.

"Red tide is part of the Gulf ecosystem and it's going to occur periodically. We're an urbanized state, at this point, so we definitely have some influence on what our water looks like and how we interact with the environment -- but it doesn't have to be this bad, especially if we do things to reduce our nutrient footprint and to live lightly on land to restore natural flows," says Maya Burke, Assistant Director for the Tampa Bay Estuary Program (TBEP).

The second thing to understand is that remedying the nutrient output and hydrology of an entire, urbanized state is a complex effort that requires commitment and care at every level -- from state legislators to operators of local wastewater treatment plants to leaders in private industries, and, even individual residents and visitors.

We know that *K. Brevis* and other single-celled, photosynthetic organisms like *Pyrodinium bahamense* -- which Burke notes is the primary driver for recent seagrass loss in Old Tampa Bay -- have insatiable appetites for nutrients like nitrogen and phosphorus; sunshine, too. Complex factors both climatological and human-influenced create all-you-can-eat buffet conditions in the Gulf for these HABs and their blue-green algae cousin, the cyanobacteria *Trichodesmium*. This is especially true during the peak "red tide season" in late summer and early fall.

"The relationship we understand best is that nutrient loading is something that produces an algae response. If you reduce the nutrients that are entering Tampa Bay, then you reduce the amount of algae that grows in the water column and you create a more favorable light environment that supports things like seagrasses," Burke explains.

Learn about seagrasses' heroic role and imperiled status in Florida's ecosystem at: Florida Department of Environmental Protection: Florida Seagrasses.

Some recent findings on nutrient loading are surprising. Take, for instance, our developing understanding of how automobile exhaust contributes to a form of atmospheric pollution called wet deposition -- a nitrogenous nutrient source for red tide when it rains.

"We've done studies to look at how much nitrogen is coming from mobile sources like cars and [the findings suggest that] four times more nitrogen pollution to our watershed is coming from cars than from power plants. What that means is that our choices for how often we drive, the types of cars we drive -- these are all things that have a consequence for our water quality," Burke says.

How to make a difference: Eco-friendly strategies for Florida friendly homes

Understanding HABs' appetites helps us theorize connections between algal bloom severity and disaster events like the Piney Point wastewater leak, ocean and wind currents from tropical storms, and even the iron-rich Saharan dust plumes that are carried seasonally into the Gulf of Mexico on trade winds. While such factors may leave individuals feeling as if red tide mitigation is out of their control, local residents play a more powerful role in controlling nutrient

loads than they might realize. It starts at home in our yards, driveways, and pipes.

These are Tampa Bay and Sarasota Estuary Program-approved at-home tips:

- Bay Friendly Living in Your Yard: Plant Florida-friendly or native plants that require very little or no fertilizer and pesticides.
- Join TBEP's Be Floridian campaign and skip the summer fertilizing.
- Direct gutter downspouts into gardens or lawns rather than driveways to reduce stormwater run-off.
- Do not blow lawn clippings into the street or down storm drains. Leave 'em -- they're natural fertilizers!
- Scoop That Poop -- even in your own yard -- to prevent nitrogen run-off from the 125 tons of pet waste deposited *daily* in the Tampa Bay Area.
- Hire lawn services that are certified in Green Industry Best Management Practices.
- Pipe Up: Have a home built before 1975? Get a lateral sewer line inspection to ensure the pipe connecting your home to the public waste collection system isn't cracked or leaking.

Volunteers team up to keep Fort DeSoto beaches debris-free at a TBEP Give-A-Day for the Bay event.

It's also important for homeowners on private waterfront property to keep an eye out for fish kills and clean them up. This is a crucial resilience strategy because decaying fish create the nutrients that help red tide thrive, but volunteer and municipal cleanup efforts are legally restricted from accessing private property.

Finally, at home and around town: If you see something, say something. Better yet: Snap a picture of it and send it to state researchers using the FWC Reporting App, which geolocates and uploads the info to a state database. You can also submit a fish kill report online or call the FWC Fish Kill Hotline at 800-636-0511.

"Sometimes we may see dead fish before we know there's red tide in an area -- so it can help us more effectively respond," says FWC Research Scientist Dr. Kate Hubbard, who directs the Center for Red Tide Research and

coordinates with stakeholders in the Harmful Algae Bloom Task Force.

"It may not seem like you're doing a lot, but every time I go to the beach -- if I find something abnormal, I'll report it with our FWC reporter app. There have been a few times I've thought, 'I don't know what that is, but it's washed up. Should I turn this into an investigation?' It's a great tool," Hubbard says.

Darcy Young, SBEP Director of Planning and Communications, also notes the value of having a "see something, say something" mindset on the water.

"Many of us professionals working on water quality don't get to spend much time on the water ourselves. In order to do our jobs well, we need relationships with people who do spend a lot of time on the water -- fishing guides, ecotourism operators, and commercial fishers, to name a few. Folks who are really invested might join our Citizens Advisory Committee, while those who only have a little time can connect with us on social media or through phone or email," Young says.

Learn more about the Sarasota Bay Estuary Program's Citizen Advisory Committee.

"Yes, and…": Creating systems-level solutions requires sustained effort

When asked what more citizens can do, Burke half jokes: "Estuary programs are like, 'Yes, and…' " -- because there's always work ahead to improve water quality across Florida.

She notes that Florida residents are already joining nutrient load mitigation efforts at home, and getting their hands dirty in red tide response cleanups, and volunteering on habitat restoration projects with local estuary programs. Some are joining citizen science efforts like HABScope, or helping FWC scientists monitor red tides. Others are raising their voices, asking questions, and sharing knowledge. They're talking to their neighbors and elected officials. Scientists, policymakers, and conservationists all say: Keep it up.

"It can be very impactful to exercise citizenship by speaking at commission meetings, writing letters to the editor, and attending public meetings about projects and budgets. Water quality is intertwined with so many other important issues, like development, public health, and equity. It's up to those of us who care deeply about coastal environments to contextualize them for decision-makers. Want a thriving coastal economy? Better make sure you're invested in a healthy bay," says Young.

Burke notes that an important component of the "yes, and..." is public demand. She notes, "the reason we have estuary programs in Florida is because citizens demanded better for their water."

Thanks in no small part to citizens who demand better, TBEP has been running the Tampa Bay Nitrogen Management Consortium since 1996 -- a coalition of government (think your local wastewater treatment plant) and private (fertilizer companies, power-generating facilities) entities who have a permanent nitrogen discharge to Tampa Bay.

"They've made a voluntary commitment to hold the line on nitrogen pollution, so they all continually invest in water quality improvement projects that offset some of the growth going on in the region -- whether that's a restoration project for stormwater before it enters the bay, or an upgrade to a wastewater treatment plant facility, or a best management practice to reduce loss of fertilizer materials," Burke says.

Tampa Bay Regional Planning Council Environmental Planner Alana Todd coordinates red tide information-sharing and resilience efforts among officials in Hernando, Pasco, Hillsborough, Pinellas, Manatee, Sarasota, and neighboring municipalities, with participation from scientists from FWC and NOAA.

"We have a lot of momentum right now because we had [recent] fish kills and it's great to harness that. Our elected officials realize that red tide is a big issue and that the health of our bay is of paramount importance to our region and our economy. We're starting to understand, with new science, the connection between the bay and the nutrient pollution, red tide and other harmful algal blooms, and our seagrass loss. We're looking at how we can come together to pass policy and do the projects that help in mitigating all of these issues together?" Todd says.

Volunteers used 30 tons of oyster shells donated by Manatee County restaurants to build oyster reef substrate in Perico Bayou in Bradenton, Fla. during an SBEP work day.

Respiratory researcher Dr. Kirkpatrick notes that sustained interest and pressure from the public might be key -- not only to develop stronger regulations, infrastructure, and red tide resilience strategies -- but also in pushing the needle on funding critical research.

She says that without public input, big unanswered human health questions related to bacterial loads from red tide's dead and decaying fish, NSP, and brevetoxins' topical (dermatological) dangers will likely remain un-funded and under-researched -- or not studied at all.

"We've been under challenging budget times due to COVID and lack of tourism -- so it really is to the state's credit that they have kept an eye on the funding on the [red tide] issue. I think that maybe we're getting the word out that it's a sustained effort that's going to be successful, but that you can't just do things in two- and three-year increments and expect an answer to a really complicated question," Kirkpatrick says.

Prior to and even since the last major red tide event in 2018, Kirkpatrick notes, "funding has been reactionary -- it's when we have dead fish on the beach," but she hopes that will change as Florida residents raise their concerns -- even when marine carcasses are absent from local shores.

Florida Sea Grant Researcher Dr. Krimsky underscores the challenge and value of facilitating ongoing communication between the public and: environmental and medical scientists, nonprofit water quality stewards, private industry stakeholders and regulators, and policymakers at every level of local and state government:

"Anyone who's in the red tide world -- whether you're a communicator, a public health person, or a researcher --

knows it's one of the issues like hurricanes that becomes 'out of sight, out of mind.' So there is an annual need for re-education and investment. It's almost like every year you're starting over again. Hopefully there are more thoughtful communication strategies that can maintain this sort of baseline level of messaging so that next year when the bloom comes, we don't have to start from zero again," Krimsky says.

In the meantime, Maya Burke says her "yes, and..." is optimistic:

"All the work we've done showed that we can have something really horrible happen -- like doubling the nutrient load to lower Tampa Bay over a 10-day period with Piney Point -- but because of all the reductions we've put in place, we've added in capacity and resilience to the system. It's never good to have a spill like that, but we've built in more ability for our bay to respond and bounce back from these kinds of events," Burke says.

"Our governments have a responsibility to take care of nutrient pollution, our private industries have a responsibility to reduce nutrient pollution, and we as individuals -- we have a nutrient footprint, too -- and there are things we can do. That's the lever. That's the one that we have."

Bookmark these links to stay informed and get involved

Escape the red tide information "spaghetti loop." Bookmark these links to stay up to date on red tide conditions and how you can contribute in a hands-on capacity to improve water quality, protect wildlife, and strengthen red tide resilience in your community.

- FWC Red Tide Current Status
- Visit Beaches Beach Reporting Conditions
- GCOOS HABs Respiratory Forecast
- FDACS Shellfish Harvesting Area Maps

General info and education resources

1. Tampa Bay Regional Planning Council: Red Tide Resource Hub
2. Mote Marine: Florida Red Tide FAQs

3. Gulf Coast Community Foundation: Playbook for Healthy Waterways
4. Florida Sea Grant Red Tide Plan (See the final report from the 2021 study here.)
5. GCOOS Info Hub for Gulf Coast Residents

How to get involved

1. Volunteer with Tampa Bay Estuary Program
2. Volunteer with Sarasota Bay Estuary Program or Join the Citizen Advisory Committee
3. Get the FWC Reporter App to report fish kills
4. Check for citizen science opportunities with the FWC Volunteer Monitoring Program
5. Interact with TBEP and SBEP on social media
6. Be a Floridian: follow TBEP tips at home for a Florida Friendly yard

Read more articles by Jessi Smith.

Jessi Smith (she/they) is a freelance writer who is passionate about sustainability, community building, and the power of the arts and transformative storytelling. A fourth-generation Floridian, Jessi received her B.A. in Art History and English from Florida International University and began reporting for 83 Degrees in 2009. When she isn't writing, Jessi enjoys taking her deaf rescue dog on outdoors adventures, unearthing treasures in backroads antiques and thrift shops, D.I.Y. upcycling projects, and Florida-friendly gardening.

5 TIPS FOR STAYING HEALTHY WHEN RED TIDE IS PRESENT

1. Have a respiratory condition? Send a friend to "breathe the beach" before you go. Dr. Barbara Kirkpatrick, an expert in respiratory health and environmental epidemiology, advises asthmatics and others with respiratory conditions to send a friend or family member to do "beach surveillance" and check to see: Do they get a tickle in their throat? Can they hear other beachgoers or lifeguards coughing? Everybody coughs when they breathe red tide particles, Kirkpatrick says, so folks with healthy lungs who experience mild irritation can advise their loved

ones with more vulnerable respiratory systems on what they observed, so they can make the best decision for their health.

2. Live near the beach? Close windows, run the A/C, don't forget to clean the filter.
While scientists' understanding of just how far red tide particles can travel is still developing, Mote Marine Laboratory studies have shown that airborne red tide toxins can travel up to one mile inland depending on factors like wind direction. Keep windows closed and clean air circulating by running air conditioners with well-maintained filters.

3. Do masks help? Masking up will help you steer clear of K. Brevis particles. Yes, that might be the last advice you want to read right now -- but Dr. Kirkpatrick says, "These are particles, so a particle filter mask will help limit your exposure. I've had calls during this bloom from people who live on barrier islands and have a lung condition, and I'll say: 'When you're going from your condo to your car, put on that mask.' … We all have masks, now, right? It's a pretty simple thing you can do if you're concerned about your health."

4. What do avoid? Keep kids and pets away from sea foam and dead sea life. Beauty, curiosity, art, recreation, lunch -- it's all in the eye of the beholder. Keep an eye on curious toddlers and pups who might perceive marine debris in a more sentimental light.

5. What is safe to eat? Don't eat distressed fish, avoid wild-caught shellfish. Follow FDACS guidelines for harvesting. Fishers and shellfishers should be cautious to avoid consuming fish or shellfish that have been exposed to red tide neurotoxins. Fish that do not fight normally on the line or appear distressed are not fit for consumption. If fish act normally on the line and appear healthy, clean and rinse fillets with bottled or tap water and discard all guts. The Florida Department of Agriculture and Consumer Services (FDACS) monitors shellfish hatcheries closely to ensure the safety of all commercial shellfish.

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