



# Harmful Algal Blooms (HABs) in the San Francisco Bay-Delta Estuary

Harmful Algal Blooms are proliferating in freshwater systems internationally, nationally, statewide, and locally here in the San Francisco Bay-Delta estuary. Stockton, the Delta's environmental justice and rural communities are ground zero for risk from health impacts associated with Harmful Algal blooms.

## What are HABs?

An algal bloom is the overgrowth of microscopic algae or algae-like bacteria found in waterways. Normal algal blooms are critical to aquatic food webs. Algae grow through photosynthesis. Not all algal blooms are toxic.



However, a growing number are. A harmful algal bloom, or **HAB**, is a bloom that produces toxins that are dangerous to humans and potentially other organisms. Often, they are blue-green in appearance.

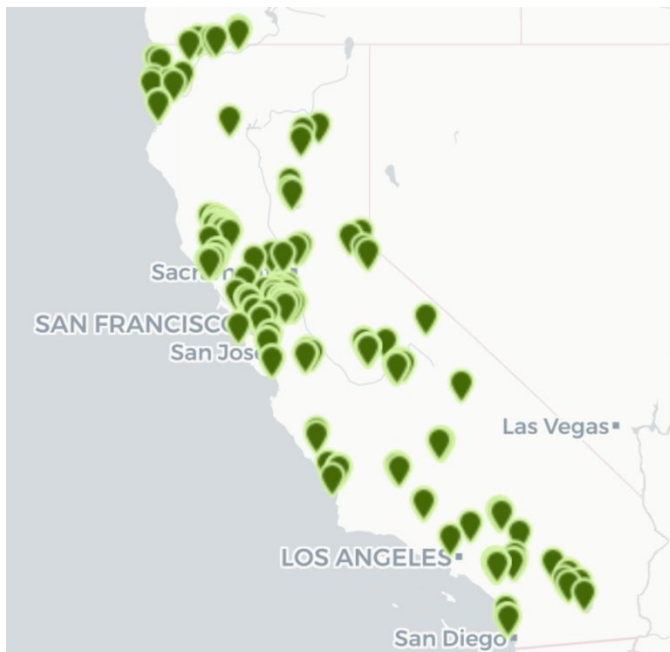


Figure 2 NRDC HAB Map for California, 2019. Courtesy of Natural Resources Defense Council

While HABs are increasing throughout the state of California, there is a pattern of algal bloom proliferation happening in the San Francisco Bay-Delta Estuary with Stockton and San Joaquin County right in the middle of the outbreaks. That is because close to half of the state's waters drain through the estuary, bringing loads of nutrients from various forms of discharge into the

estuary. Upstream discharge from industry, municipal water systems, agriculture, along with discharge from local environmental challenges, create extreme conditions for HABs. Reduced freshwater flows due to state management of rivers and streams in the Delta also contributes to the proliferation of HABs – there is not enough cold freshwater water moving through our waterways in the summer and fall.

## What causes HABs?

These conditions can cause Harmful Algal Blooms:

1. Nutrient loads from discharge
2. Warm water
3. Still water
4. Bright sunlight
5. And HABs are aggravated by glyphosates (Roundup – which is used to eliminate other invasive species)
6. Reduced freshwater flows in our streams

In the Delta, there are warmer waters from climate change, still waters due to decreases in runoff from climate change and extreme water diversions from excessive water pumping for water exports to other parts of the state. There are nutrient load problems from industry, agriculture, homeless encampments on rivers, dated wastewater treatment facilities, marinas out of compliance, and boaters who do not discharge using proper discharge facilities.

At Restore the Delta, we do not blame one sector, one industry, the state, local government, water exporters, or one group of people. The only way to eliminate these contributing factors is to make it a societal/cultural/economic goal to collectively work on cleaning up our waterways. This can be done by reducing nutrient loads, updating wastewater systems (with residents contributing through fees), reducing water exports so more freshwater is flowing, addressing climate change so that our waters do not continue to warm up, and addressing water circulation problems.

*Please see other side.*

**Why should policy makers, government officials, social justice and public health advocates, the business community, and foundations, join in our concern and advocacy?**

Restore the Delta is very concerned about how the state of California is not looking at the HABs issue during Delta water planning processes – like the Voluntary Settlement Agreements. The VAs, as they are called, are a process where big ag and urban water districts throughout California are re-deciding how much freshwater flow we will see in the Delta from the San Joaquin and Sacramento Rivers – even though the State Water Resources Control Board set better, though not perfect, standards for the San Joaquin River at the end of 2018, and was ready to tackle the standards for the Sacramento River.

**State agencies and large water districts forget that cyanotoxins in HABs are a public health threat because:**

1. People can be exposed to HAB toxins by swallowing or swimming in affected waters, eating poisoned fish or shellfish (even when food is cooked, algal toxins remain), or they can become ill by inhaling airborne droplets of affected water. Some toxins can become dry and airborne. Depending on the level of exposure and the type of algal toxin, health consequences may range from mild to severe. Some levels of exposure can be fatal. HABs can damage the central nervous system, liver, and lead to respiratory distress.
2. There are 40,000 individuals who fish for sustenance in the region – so the threat of eating contaminated fish is very real. We have hundreds of homeless individuals using area waterways for basic sanitation. Some groups seek to blame the homeless for contaminating waterways. We see it differently. The homeless are the most likely to be harmed by cyanotoxins due to proximity to the water. They are the most vulnerable of people and may not know what is making them ill. Part of helping the homeless heal (and to be safe from this threat) is tied to relocating them away from our waterways. If our waterways weren't suffering from reduced flows and greater concentrations of pollution, the algal blooms wouldn't be forming.
3. There is no way to post signage on 1,100 miles of Delta waterways. Under public trust laws of California, residents have a right to recreate in waterways – HAB proliferation interferes with safe recreation opportunities and those related economies promised to us as a part of our public trust heritage, particularly in Stockton environmental justice areas.

4. Toxins from HABs have killed dogs and wildlife in increasing numbers in recent years.
5. Our farms cannot irrigate with water that has been contaminated by HABs because the toxins enter the plants grown with contaminated water.

Many young people in the Delta area, even those with access to recreational boating, will often tell you that they do not want contact with the water – especially youth in central and south Stockton. They can see the degradation of our rivers and sloughs for themselves. They see our degraded waterways as a representation of how the world at large does not value them – and there is a great body of research that shows the link between degraded environmental conditions and an increase in the school to prison pipeline.



Figure 3 Photo of water contaminated by a harmful algal bloom in Discovery Bay, Summer 2019

**How do we protect our waterways from HABs?**

While drinking-water treatment can typically remove algal toxins, if water treatment facilities are not maintained and newer, the bacteria can remain in the water, threaten public health, and shut down treatment plants. In 2014, 500,000 Ohio residents lost water supplies for 3 days, and over 100 residents were sickened by cyanobacteria in their drinking water.

Harmful Algal Blooms are now costing the American economy \$14.6 billion per year.

In other words, the condition of our rivers and waterways reflects our social, environmental, economic and spiritual health in our community.

**To learn more about HABs and their effects on the San Francisco Bay-Delta Estuary,** please visit our website at [www.restorethedelta.org](http://www.restorethedelta.org).