

USING FORECASTING TO TRACK HARMFUL ALGAL BLOOMS

WHAT ARE HARMFUL ALGAL BLOOMS?

Harmful algal blooms, or HABs, occur when colonies of algae — simple plants that live in the sea and freshwater — grow out of control and produce toxic or harmful effects on people, animals or ecosystems. Florida experiences HABs like red tide (caused by *Karenia brevis* in coastal waters) and blue-green algal blooms (caused by different species of cyanobacteria).

HAB forming algae produce different types of toxins. Exposure to these toxins can result in different symptoms. Respiratory irritation, skin irritation and itchy eyes are potential symptoms of exposure to HAB toxins. Since HABs can be detrimental to the health of humans, pets, livestock and wildlife, it is important to stay aware of water conditions and avoid active bloom areas.

HOW ARE HAB FORECASTS PRODUCED?

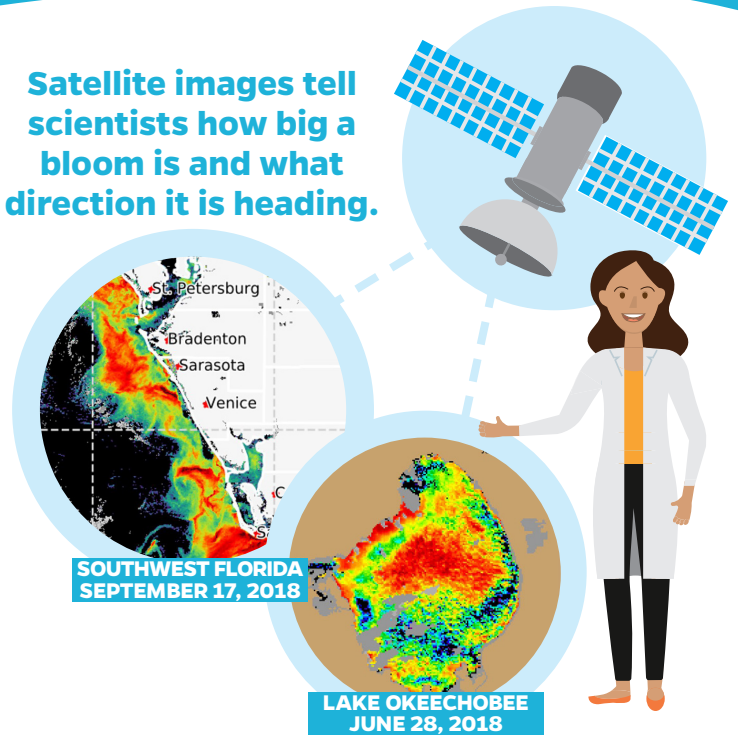
All algae require nutrients to grow. When nutrients are present in high concentrations algal blooms form. During blooms, color pigments contained in algae cells produce a visible change in water color which can be detected by satellites monitoring the Earth. Most ocean color imagery uses a color palette ranging from purple to red as algae concentration increases.

Satellite color data helps scientists locate and track HABs, providing an early warning to people. Satellites are able to cover much larger areas than a person could on the water. They are also more sensitive than the human eye, meaning they can detect changes in water color that scientists might otherwise miss.

However, there are limitations to satellite imaging. Satellite data does not identify what species of algae are responsible for the change in water conditions.



Satellite images tell scientists how big a bloom is and what direction it is heading.



To determine if an algal bloom is harmful, oceanographers must combine satellite images with field samples.

Along the Gulf Coast of Florida, *K. brevis* red tide respiratory forecasts are produced regularly by the Gulf of Mexico Coastal Ocean Observing System (GCOOS). The forecasts can be used the same way a weather forecast is used — to plan beach walks, waterfront dining and other outdoor activities. These forecasts are communicated to the public via the HABscope website (<https://habscope.gcoos.org>) in near real-time, projected over 24 hours and updated with the latest wind models every three hours.

Satellite imaging and forecasting not only helps scientists identify and monitor HABs, it allows citizens to make informed decisions while visiting bodies of water that are experiencing blooms.

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