Harmful Algal Blooms

A Fact Sheet from the Southern California Coastal Water Research Project

December 2012

What Is a Harmful Algal Bloom?

An algal "bloom" occurs when algae grow rapidly and form dense accumulations. Harmful algal blooms (HABs) are those that negatively affect the ecosystem, humans, and/or wildlife. HABs occur in both fresh and marine waters.


R. Kudela

Why Are HABs a Concern?

HABs have a wide range of harmful consequences, but the hazard most often associated with HABs is release of toxins. Algal toxins, if ingested via shellfish or water consumption, can be lethal to wildlife, domestic animals, and humans. The direct physical effects of excessive algal growth can also be harmful to the ecosystem.


P. Wallerstein

Physical Effects

Direct physical effects of HABs include:

- Oxygen depletion (as algae decompose)
- Water discoloration and odor creation
- Light reduction to aquatic plants
- Irritation and clogging of fish gills
- Hypothermia in seabirds covered by algal foam

Causes

Algal blooms occur when water conditions (e.g., light, temperature, circulation, and nutrient levels) are conducive to algal growth. For example, natural coastal upwelling of deep, nutrient-rich waters may help to fuel an algal bloom.

The indirect triggers for algal blooms are not fully understood, but recent research suggests human influences, such as reduced water circulation or excess nutrient loads from land-based sources, can contribute to increased bloom frequency and/or the severity of harmful effects.

Red Tides vs. HABs

Though often used interchangeably, these terms are not equivalent. "Red tides" occur when pigments in algae make the water appear red or brown, a common occurrence in southern California coastal marine waters. Not all red tides are harmful, and fewer than 10% of all southern California HAB species cause red tides.


P. Franks

SCCWRP actively engages in research related to HAB causal factors as well as collaborative statewide HAB monitoring and response networks.

Investigating HAB Causal Factors

SCCWRP studies how HABs form and move in relation to multiple natural and anthropogenic factors, including nutrient supplies and chemical forms of nutrients. Recent research evaluates nutrient availability on different spatial scales, including region-wide trends and specific HAB "hot spots."

Freshwater HABs

Freshwater HABs are not as well-studied as marine HABs, but can have similar ill effects. Freshwater HAB toxins are more likely to affect water supplies, domestic animals, and livestock, and can also reach marine environments via rivers and storm drains. In southern California, toxins produced by blue-green algae (cyanobacteria) have been detected in many freshwater systems. SCCWRP is conducting ongoing research to document toxin occurrence and improve understanding of triggers.

Developing Monitoring Technology

New monitoring technologies are being tested in southern California to characterize bloom events, track algal toxins, and investigate the water quality conditions associated with HABs. These include fixed environmental sensors and autonomous underwater vehicles deployed remotely to augment information from existing satellite data collection and ship-based water sampling. Passive sampling devices called SPATT (Solid Phase Adsorption Toxin Tracking) bags are another new technology being tested to detect and track toxins in the water.

Engaging in HAB Networks

To advance the application of scientific findings to HAB management efforts, SCCWRP coordinates and participates in several work groups and monitoring networks.

- In addition to establishing an ongoing statewide monitoring network, the **California Harmful Algal Bloom Monitoring and Alert Program (HABMAP)** facilitates information exchange among scientists, managers, and wildlife rescue centers. HABMAP seeks to determine how to respond to HAB events and mitigate their impacts.
- The **Blue-Green Algae Work Group**, made up of water quality managers, public health managers, and scientists, focuses on addressing HABs in California's fresh water bodies. The group is working to develop guidelines and toxicity action levels for local, state, and tribal regulators.

For more information on SCCWRP research, visit: **www.sccwrp.org**