SCCWRP's fact sheet series

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Commission Meeting

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Background

- We're continuing to receive positive feedback on our 2-page fact sheets
  - We've published 5 so far
  - Everyone recognizes how impactful these collaborative publications are
- We're expanding our review process for these fact sheets
  - You requested this expanded review last quarter

Rapid beach testing methods

Water-quality modeling

SCCWRP's management value

eDNA monitoring

Regional monitoring

Expanded fact sheet review process

- We are sending draft fact sheets to CASA and CASQA after CTAG review
  - It's delaying publication by one quarter
- CASA and CASQA see value in reviewing each fact sheet for us
  - The interactions are strengthening SCCWRP's relationship with these groups
  - They're helping us improve accuracy and clarity

Expanded review process for fact sheets

Quarter 1

- **2 weeks before CTAG meeting**: Draft shared
- **CTAG meeting**: CTAG reviews/signs off
- **After CTAG sign-off**: Draft shared with CASA/CASQA

Quarter 2

- **CTAG meeting**: CTAG reviews/signs off on CASA/CASQA revisions
- **Commission meeting**: Commission reviews/approves for publication

HABs fact sheet

- We piloted the expanded fact sheet review process with the HABs fact sheet
  - Both CASA and CASQA provided helpful suggestions
  - We made minor edits in response
- The HABs fact sheet is ready for your final approval today
  - You received the final version in your agenda packet

HABs fact sheet (draft)

SCCWRP FACT SHEET

DRAFT for Commission review/final approval

Protecting ecosystems and humans from harmful algal blooms

Environmental managers are developing strategies, monitoring programs and modeling tools to gain the upper hand on managing HABs, especially those that produce toxins

Harmful algal blooms (HABs) are overgrowths of algae and cyanobacteria that reduce water quality and harm ecosystems. Although algae and cyanobacteria are part of a balanced ecosystem, too much algal growth can block sunlight and reduce oxygen levels, causing events like mass fish deaths. A major consequence of HABs is the potent toxins HABs can produce; these toxins can sicken and kill animals, contaminate food webs, and cause illness in humans who drink or swim in contaminated waters. In California, both freshwater and coastal marine waters are being affected by HABs. Researchers are working to help environmental managers understand:

- When, where and why toxin-producing HABs are occurring
- How to more accurately forecast when and where HABs will produce toxins

A field crew collects samples during a HAB event in the San Dieguito River in northern San Diego County. HABs can turn water vibrant shades of green, blue and red.

How HAB toxins manifest in Southern California

HABs often pose a seasonal threat, forming in late spring or early summer and dissipating by fall. However, blooms can occur year-round, and HAB toxins can persist in water bodies for months after the blooms have disappeared. The most common types of toxin-producing HABs in Southern California are:

Marine environments

- ***Pseudo-nitzschia* blooms**: The diatom *Pseudo-nitzschia* can produce a neurotoxin known as domoic acid that can trigger mass strandings and deaths of sea lions and other marine mammals and birds. When humans consume contaminated seafood, domoic acid can cause gastrointestinal illness and short-term memory loss. Domoic acid can persist in seafloor sediments and sediment-dwelling organisms for months to years after a bloom, extending the time it can affect both wildlife and humans.

A rescue team tends to a sea lion believed to have been poisoned by domoic acid.

- **Red tides**: Some species of dinoflagellates and raphidophytes turn marine and estuarine waters shades of red or brown during events known as red tides; some red tides are bioluminescent. While some red tides are benign, others produce toxins that cause widespread fish kills and contaminate shellfish consumed by humans.

Red tide at a La Jolla beach in San Diego County

Freshwater environments

- **CyanoHABs**: Blooms of cyanobacteria in lakes, streams and other freshwater and estuarine environments are known as cyanoHABs. They form thick mats along the surface or bottom of water bodies, and can produce cyanotoxins that harm wildlife, dogs and humans. Cyanotoxins can travel to coastal marine waters via streams and runoff, extending their impact across the land-sea interface.

Cyanobacteria bloom in a Southern California lake

HAB monitoring programs in California

Three statewide HAB monitoring programs are helping managers to better understand bloom dynamics, enable early detection and forecasting, and inform management responses:

- *California HAB Monitoring and Alert Program (HABMAP)*: Founded in the mid-2000s, HABMAP provides weekly HAB monitoring at 10 coastal marine stations statewide.
- *California Freshwater and Estuarine HAB (FHAB) Program*: The FHAB program was formalized by the Water Boards in 2020 to coordinate monitoring and assessment of inland HABs statewide.
- *Shellfish Biotoxin Monitoring*: Launched in the 1990s, biotoxin monitoring is California's longest-running HAB monitoring program. It focuses on protecting humans from HAB toxins when they consume coastal shellfish and other seafood.

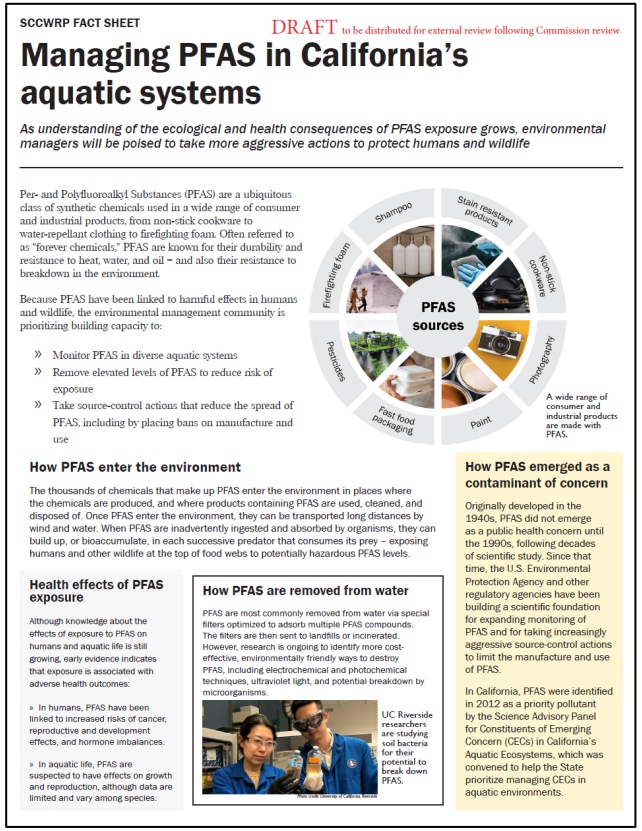
HAB studies via Bight regional monitoring

Since 2008, the Southern California Bight Regional Monitoring Program has been conducting foundational regional studies illuminating where, when and why algal blooms are occurring. In 2018, Bight '18 found that HAB toxins were detected in 54% of all seafloor sediment in the Southern California Bight. For Bight '23, the program is documenting the degree to which HAB toxins and other contaminants may have contaminated local shellfish that humans consume.

PFAS fact sheet

- The next fact sheet is on PFAS
  - You received a copy in your agenda packet
  - CTAG reviewed it last month
- The next step is to send out the PFAS fact sheet for external review
  - You will be asked to approve it next quarter

PFAS fact sheet (draft)



SCCWRP FACT SHEET

DRAFT to be distributed for external review following Commission review

Managing PFAS in California's aquatic systems

As understanding of the ecological and health consequences of PFAS exposure grows, environmental managers will be poised to take more aggressive actions to protect humans and wildlife

Per- and Polyfluoroalkyl Substances (PFAS) are a ubiquitous class of synthetic chemicals used in a wide range of consumer and industrial products, from non-stick cookware to water-repellant clothing to firefighting foam. Often referred to as "forever chemicals," PFAS are known for their durability and resistance to heat, water, and oil – and also their resistance to breakdown in the environment.

Because PFAS have been linked to harmful effects in humans and wildlife, the environmental management community is prioritizing building capacity to:

- Monitor PFAS in diverse aquatic systems
- Remove elevated levels of PFAS to reduce risk of exposure
- Take source-control actions that reduce the spread of PFAS, including by placing bans on manufacture and use

A wide range of consumer and industrial products are made with PFAS.

How PFAS enter the environment

The thousands of chemicals that make up PFAS enter the environment in places where the chemicals are produced, and where products containing PFAS are used, cleaned, and disposed of. Once PFAS enter the environment, they can be transported long distances by wind and water. When PFAS are inadvertently ingested and absorbed by organisms, they can build up, or bioaccumulate, in each successive predator that consumes its prey – exposing humans and other wildlife at the top of food webs to potentially hazardous PFAS levels.

Health effects of PFAS exposure

Although knowledge about the effects of exposure to PFAS on humans and aquatic life is still growing, early evidence indicates that exposure is associated with adverse health outcomes:

- In humans, PFAS have been linked to increased risks of cancer, reproductive and development effects, and hormone imbalances.
- In aquatic life, PFAS are suspected to have effects on growth and reproduction, although data are limited and vary among species.

How PFAS are removed from water

PFAS are most commonly removed from water via special filters optimized to adsorb multiple PFAS compounds. The filters are then sent to landfills or incinerated. However, research is ongoing to identify more cost-effective, environmentally friendly ways to destroy PFAS, including electrochemical and photochemical techniques, ultraviolet light, and potential breakdown by microorganisms.

UC Riverside researchers are studying soil bacteria for their potential to break down PFAS.

How PFAS emerged as a contaminant of concern

Originally developed in the 1940s, PFAS did not emerge as a public health concern until the 1990s, following decades of scientific study. Since that time, the U.S. Environmental Protection Agency and other regulatory agencies have been building a scientific foundation for expanding monitoring of PFAS and for taking increasingly aggressive source-control actions to limit the manufacture and use of PFAS.

In California, PFAS were identified in 2012 as a priority pollutant by the Science Advisory Panel for Constituents of Emerging Concern (CECs) in California's Aquatic Ecosystems, which was convened to help the State prioritize managing CECs in aquatic environments.

Summary

- Approve the HABs fact sheet for publication
- Affirm the PFAS fact sheet is ready for external review
  - Affirm our expanded review process is working

Prioritized topics for future fact sheets

1. ~~Regional monitoring~~
2. Harmful algal blooms
3. PFAS
4. Microplastics
5. HF183
6. Ocean acidification and hypoxia