

JULY 2026

Lead Scientist Report



**Delta
Stewardship
Council**

A CALIFORNIA STATE AGENCY

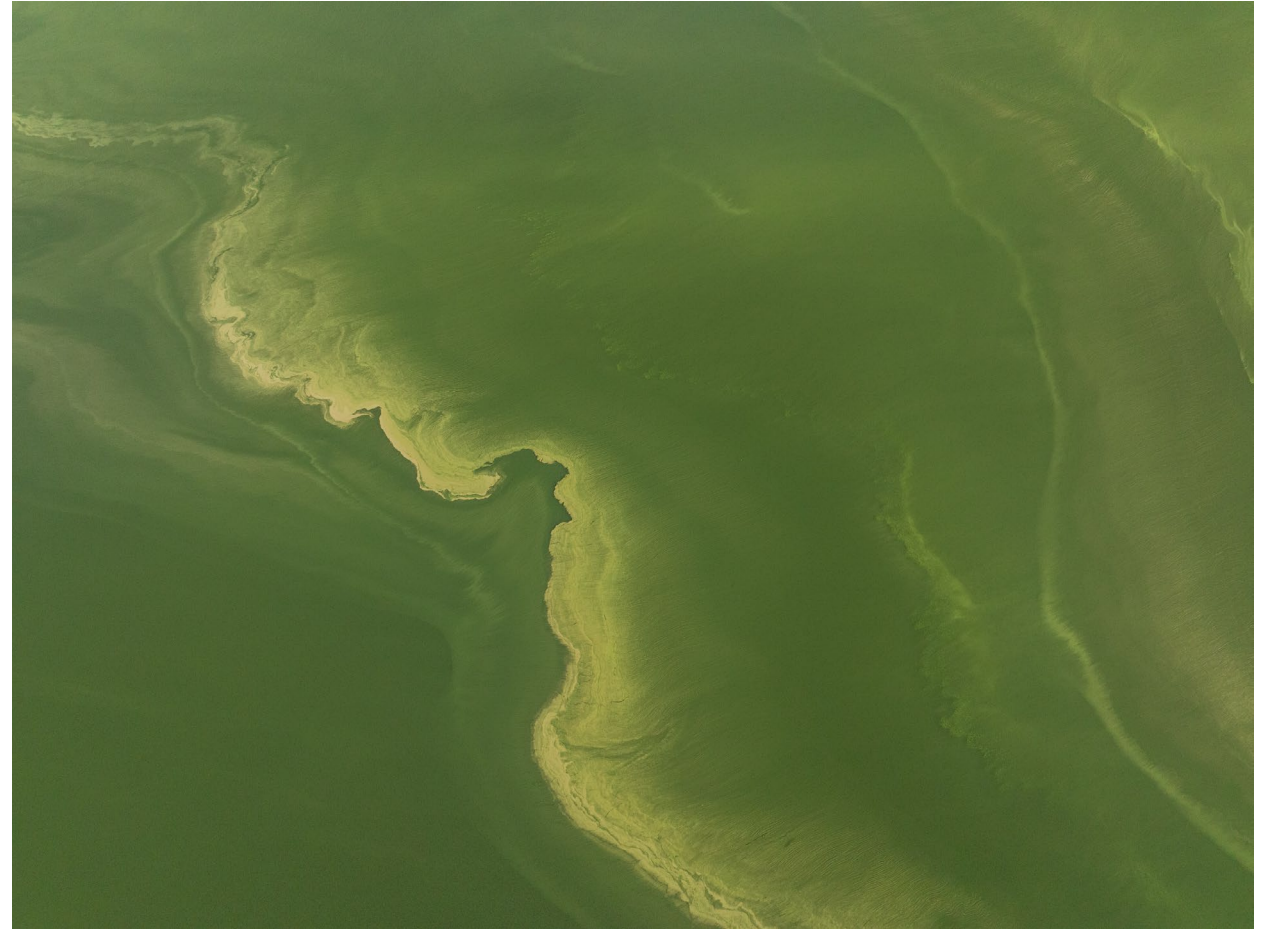
What are algal blooms?

Rapid, excessive growth of algae and cyanobacteria

Beneficial algal blooms (BABs) are an important food source for fish

Harmful algal blooms (HABs) can:

- Produce toxins
- Deplete oxygen
- Disrupt food webs
- Form scum
- Degrade water quality



Algal bloom in San Luis Reservoir, September 2024. (*Andrew Nixon / Department of Water Resources*)

HABs in the Delta

Most are cyanobacterial harmful algal blooms (CHABs)

Often dominated by *Microcystis*

Microcystis can produce liver toxins called microcystins

Toxicity is hard to infer from bloom appearance



State Water Board HABs advisory sign
(<https://mywaterquality.ca.gov/habs/resources/signage.html>)

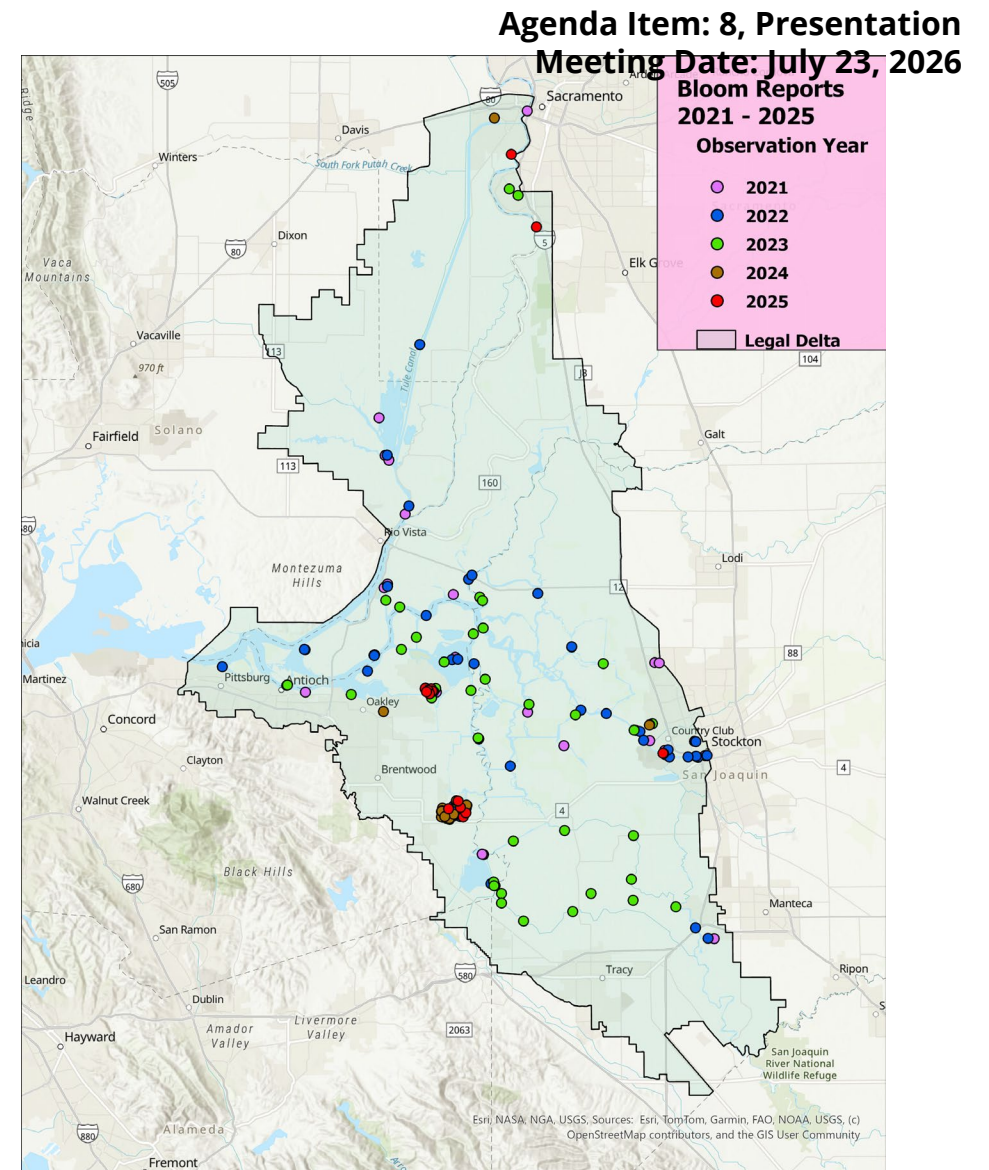
Where and when do HABs occur in the Delta?

Microcystis blooms have occurred most summers since 1999

Dead-end and low-energy waterways are particularly prone to blooms

Flows, temperature, light, salinity, and nutrients drive bloom formation

Climate change is expected to worsen blooms

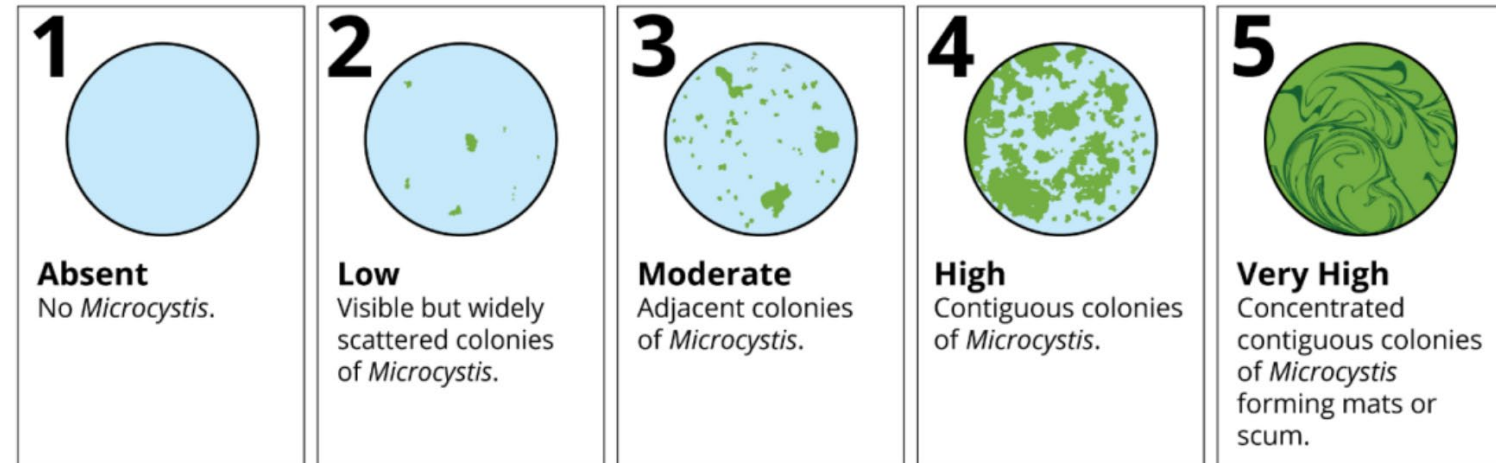


Delta bloom reports 2021–2025. (Data from <https://data.ca.gov/dataset/surface-water-freshwater-harmful-algal-blooms>)

There is no unified monitoring explicitly for HABs in the Delta

Currently a mix of:

- visual bloom report
- continuous water quality monitoring
- discrete sampling
- satellite imagery



The Council is supporting development of a unified Delta CHABs Monitoring Strategy

The *Microcystis* Visual Index (MVI) to visually assess *Microcystis* colony densities (*Flynn et al. 2022 via Preece et al. 2024*)

Predicting HABs

Predicting HABs requires more than environmental conditions

Large 2022 SF Bay bloom was preceded by unusual biological shifts

DNA data can help reveal such shifts to inform prediction

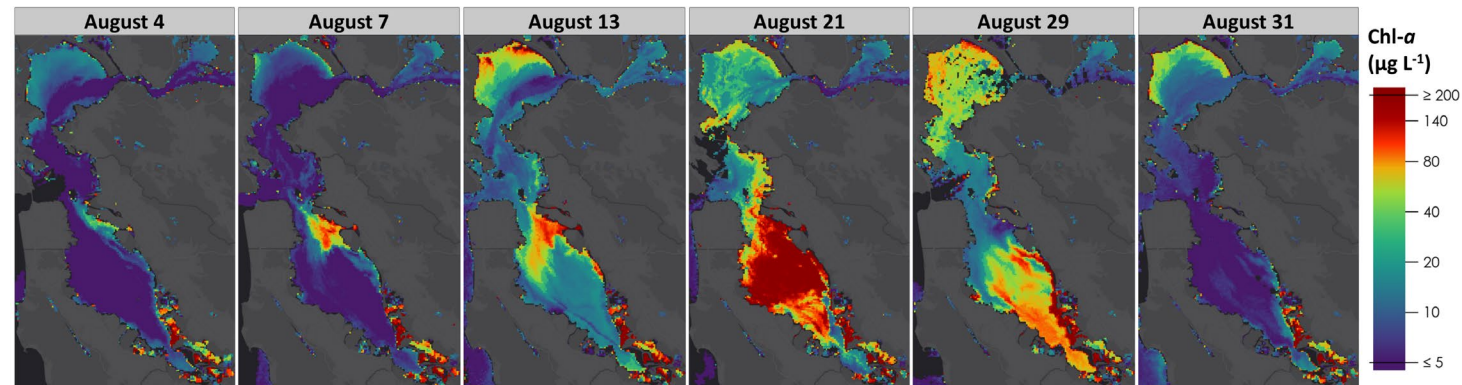
Estuaries and Coasts (2025) 49:39
<https://doi.org/10.1007/s12237-025-01629-7>

Assessing Environmental Drivers and Protist Community Dynamics that Shaped the Historic August 2022 *Heterosigma akashiwo* Bloom in San Francisco Bay, California

Schuyler C. Nardelli¹ · Keith Bouma-Gregson¹ · David B. Senn² · Daniel Killam² · Ariella Chelsky² · Erica Nejad¹ · Emily T. Richardson^{1,4} · Timothy G. Otten³ · Tamara E. C. Kraus¹ · Brian A. Bergamaschi¹



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Changing chlorophyll concentrations through the August 2022 HAB in SF Bay (Nardelli et al. 2026)

Council HABs efforts

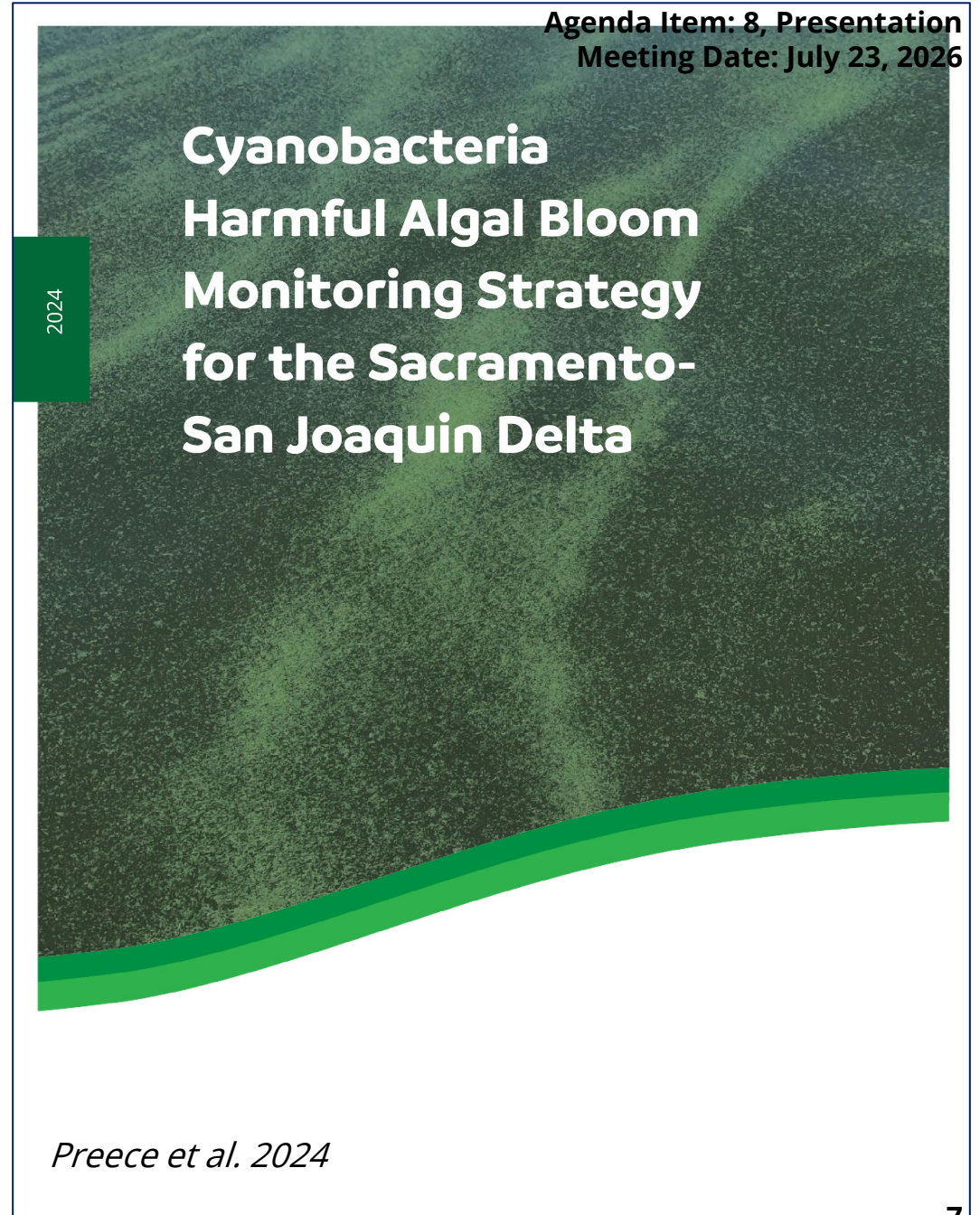
Delta CHABs Monitoring Strategy*

Delta Research Awards*

Delta Modeling Collaboratory

NCEAS Synthesis Working Group

Delta ISB HABs review



Summary

HABs:

- Affect people, ecosystems, and water operations
- Are difficult to predict
- Need coordinated monitoring, collaboration, and data sharing

Better models may be able to identify bloom-prone conditions earlier



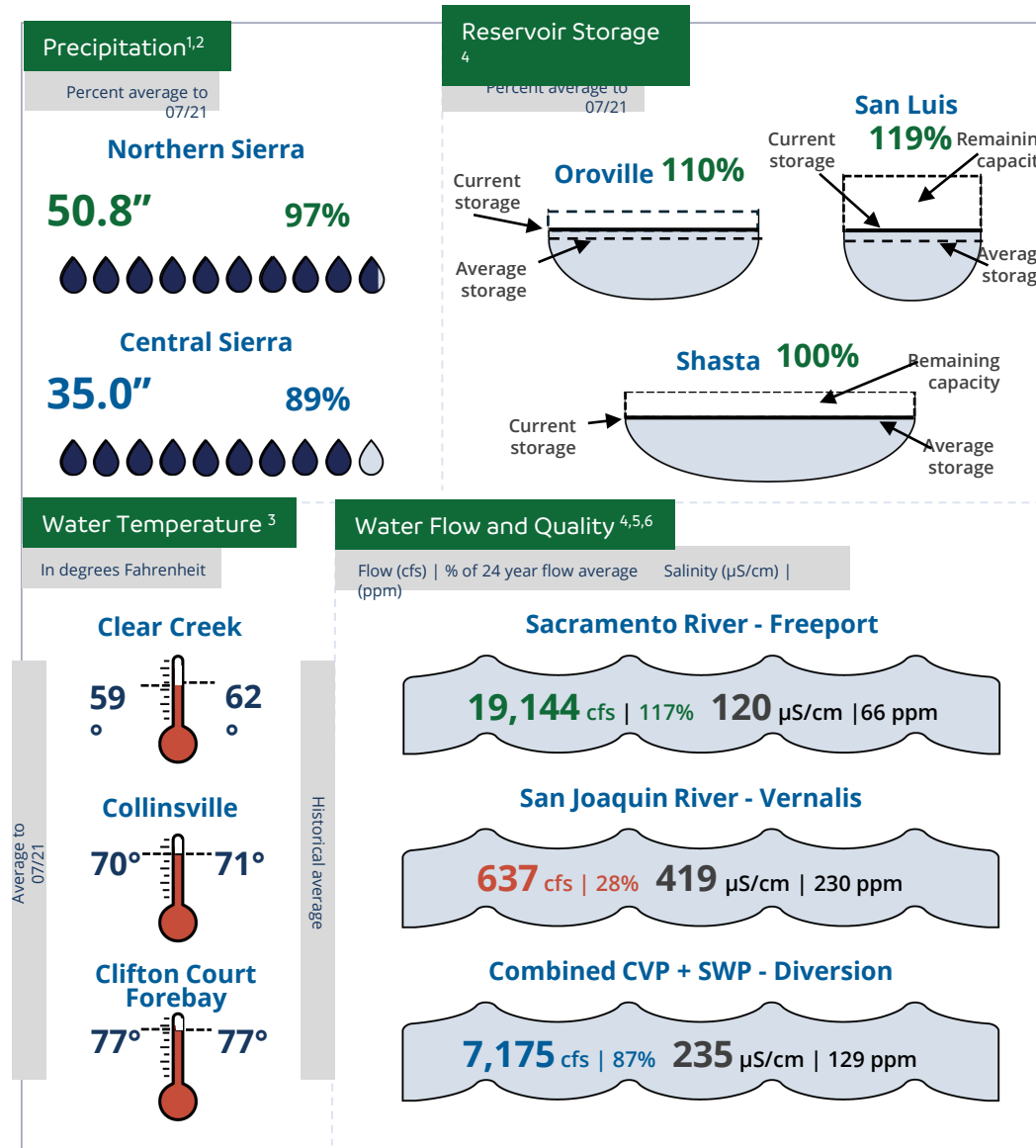
Conceptual representation of CHAB monitoring in the Delta. (*ChatGPT*)

DSP activities

NCEAS cohort 3 training is complete
Bay-Delta Science Conference early-bird registration is open
Traditional Knowledge Roundtable #1 and #2 took place
Delta Climate Adaptation Team kick-off took place

On your radar





¹ <https://go.usa.gov/xQsUc> ³ <https://go.usa.gov/xURFU> ⁵ <https://go.usa.gov/xQsU2>
² <https://go.usa.gov/xQsUa> ⁴ <https://go.usa.gov/xQsUr> ⁶ <https://go.usa.gov/xQsUT>

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