INFORMATION ITEM

Delta Cyanobacterial Harmful Algal Blooms (CHABs) Monitoring Strategy

Summary

Councilmembers will receive an update on the development and implementation of the Delta Cyanobacterial Harmful Algal Blooms (CHABs) Monitoring Strategy, including its history, goals, recent progress, and next steps. The item will highlight why coordinated monitoring of CHABs in the Delta is essential for protecting public health, supporting ecosystem resilience, and advancing Delta Plan objectives related to water quality and ecosystem health. The presentation will provide an overview of the Delta CHABs Monitoring Strategy and its implementation, and describe a Council-funded project to develop improved CHAB monitoring tools. This information will help raise awareness of ongoing efforts to monitor, understand, respond to, and reduce the harm from CHABs in the Delta.

Background

Harmful algal blooms (HABs) occur all over world, and they have become an increasingly important management challenge in the Sacramento–San Joaquin Delta. Most Delta HABs are caused by cyanobacteria and are known as cyanobacterial harmful algal blooms (CHABs). These blooms can produce cyanotoxins, a class of toxins that can pose risks to people, pets, wildlife, and water operations. Blooms now occur most summers in the Delta, especially in areas with dead-end waterways and slow-moving water such as Stockton and Discovery Bay. The Delta Plan, Delta Adapts, and Science Action Agenda all identify the need to monitor, understand, respond to, and reduce CHAB risk. The Council actively tracks HABs through Delta Plan performance measure 6.10, which measures how much of the Delta is covered by HABs. The accuracy of this measure depends on effective CHAB monitoring.

Current CHAB monitoring efforts in the Delta include discrete sampling, continuous sensors, visual observations, and satellite imagery. However, these efforts are

fragmented across agencies, and there is no unified monitoring effort focused explicitly on CHABs. This makes it difficult to fully capture the location, intensity, and frequency of CHABs, and limits scientists' ability to answer fundamental management questions about where blooms are occurring, if there are toxins, what environmental conditions precede them, or which management actions might mitigate them.

The Delta CHABs Monitoring Strategy

To address this need for coordination, the Cyanobacteria Harmful Algal Bloom Monitoring Strategy for the Sacramento–San Joaquin Delta (the Strategy) was collaboratively developed by state, federal, Tribal, academic, and community partners. This coordinated regional strategy was envisioned as supporting regulatory and management agencies in streamlining and enhancing regional monitoring. Such coordinated monitoring could:

- Encourage Delta-wide CHABs collaboration
- Help improve early bloom detection and the identification of hotspots
- Allow for earlier and more accurate public health advisories
- Structure data collection and sharing to improve trend analysis and modeling
- Help to clarify exactly what leads to bloom formation, enabling more effective forecasting and informing management decisions across the Delta

Strategy development

The Strategy (also referred to as the Delta CHABs Monitoring Strategy) was developed between 2021 and 2024. The Council's Delta Science Program was instrumental in convening and coordinating early development of the Strategy, including hosting a public workshop on CHABs in 2022. That workshop led to development of a collaborative interagency strategy document, released in 2024, which formalized the Strategy: *Cyanobacteria Harmful Algal Bloom Monitoring Strategy for the Sacramento–San Joaquin Delta* (https://deltacouncil.ca.gov/pdf/science-program/2024-10-21-final-delta-chabs-monitoring-strategy.pdf). Science Program staff continue to play a central role in further development and implementation. This aligns with Council responsibilities under the Delta Reform Act and supports multiple Delta Plan priorities related to water quality, ecosystem restoration, and coordinated science.

The Strategy establishes five overarching goals focused on collaboration, science and management needs, monitoring design, reporting protocols, and data sharing. With no dedicated funding or management framework for CHABs in the Delta, the Strategy leverages work done as part of existing environmental monitoring programs as much as possible. As an outcome of the Strategy, the Delta CHABs Monitoring Strategy Implementation Team was formed as a working group that includes representatives from agencies, Tribes, academia, water contractors, nonprofits, and other interested parties. It is part of the Interagency Ecological Program's Water Quality and Phytoplankton Project Work Team. Its purpose is to lead coordination and implementation of the Strategy and to ensure the Strategy's goals and objectives are met. The CHABs Implementation Team is currently co-chaired by staff from the Department of Water Resources, the State Water Resources Control Board, the US Geological Survey, and the Delta Stewardship Council. Small CHABs Implementation Team subcommittees convene as needed to advance specific Strategy goals and objectives.

Progress to date

Significant progress has been made since the Strategy's release, including:

- **Collaborative governance and annual workshops:** CHABs Implementation Team structure has been developed and various working groups meet regularly (*Strategy Recommendations 1.1–1.4*). A Delta CHABs workshop took place in 2025 and 2026 to promote and enhance regional collaboration, and will recur annually (*Recommendation 1.5*).
- **Management questions:** Specific management questions have been developed that the Delta CHABs monitoring program should answer (*Recommendations 2.1–2.4*). These questions address multiple issues, including how CHABs are changing over time, the risk to humans and domestic animals, effective public communicaton, prevention and mitigation measures, and so on. A final management questions report is currently being developed to inform monitoring goals and objectives (*Recommendation 2.5).*
- **Monitoring design:** The US Geological Survey, with support from the State Water Resources Control Board, led development of a monitoring designs report that lays out key components and considerations for implementing a CHABs monitoring program in the Delta (*Recommendations 3.1–3.3*).

- **Special studies:** Several research and other projects are underway to help address data gaps and answer technical questions (*Recommendation 3.6*). This includes *Special Study 3.6.7, Improve use of visual index data.* This project is presented in more detail in the final section of this staff report.

Next steps

- **Release the final management questions report**
- **Establish an adaptive implementation subcommittee** to define how progress toward Strategy goals will be measured and how goals will be refined in response to changes in science, the environment, or socio-political context
- **Develop a system to track Delta CHABs projects** and how they contribute toward answering management questions, and to identify persistent knowledge gaps
- **Establish a data collaboration subcommittee** to develop protocols for data collection, standardization, sharing, and insight communication

Emerging science to support CHABS monitoring: Optimizing monitoring tools for Delta CHABs

A research project funded by the Council's Delta Science Program through the 2025 Delta Research Awards is offering a new tool to support CHABs monitoring. Specifically called for in the Strategy document, this project aims to extend application of the *Microcystis* Visual Index (MVI), a common field method for assessing the severity of an algal bloom. *Microcystis* is the most common CHAB-forming alga (singular of algae) in the Delta and can form dense colonies on surface waters. The MVI is a way to make a rapid visual assessment of the density of *Microcystis* colonies and therefore estimate bloom severity.

However, while MVI is a commonly used bloom assessment across the Delta, it relies on visual observations and is inherently subjective. Inconsistency between observers makes it difficult to compare between different blooms, to interpret small changes or long-term trends, or to calculate uncertainty. The index is also qualitative and does not quantify, for example, the actual biomass of *Microcystis* present.

This project will develop a model that calculates MVI from digital photographs of CHABs, making bloom assessments more consistent and less dependent on individual observation. The researchers will combine these more objective scores with water sample data to explore how MVI relates to the biomass of *Microcystis* forming the bloom. The team will also explore relationships between bloom biomass and bloom toxicity. Ultimately, the research team hopes to develop a phone app that the public can use with their camera to calculate a standardized MVI score for any blooms they see, along with a mechanism to share observations to support bloom monitoring across the Delta.

Today's presentation

The Council will hear from staff from the US Geological Survey, State Water Resources Control Board, Department of Water Resources, and Delta Stewardship Council about:

- The need for a coordinated Delta CHABs monitoring strategy and why that is important for CHABs management in the Delta
- The history of how the Strategy was developed and who was involved
- How the different entities moving the Strategy forward are structured
- Strategy goals, objectives, and recommendations
- Progress to date on the Strategy, and the most important next steps

The Council will also hear about a project to improve monitoring of CHABs in the Delta that was funded through the 2025 Delta Research Awards. This project was called for by the Delta CHABs Monitoring Strategy and will make it easier to report CHAB severity more accurately.

Fiscal Information

The Council provided $772,992 in funding through a contract with the University of California San Diego to support the MVI optimization project as part of the 2025 Delta Research Awards.

List of Attachments

Attachment 1: Cyanobacteria Harmful Algal Bloom Monitoring Strategy for the Sacramento–San Joaquin Delta: https://deltacouncil.ca.gov/pdf/science-program/2024-10-21-final-delta-chabs-monitoring-strategy.pdf

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A recording of the presentation will be available on the Delta Council's YouTube page at https://www.youtube.com/@DeltaCouncil.