

# Delta Cyanobacterial Harmful Algal Blooms Monitoring Strategy

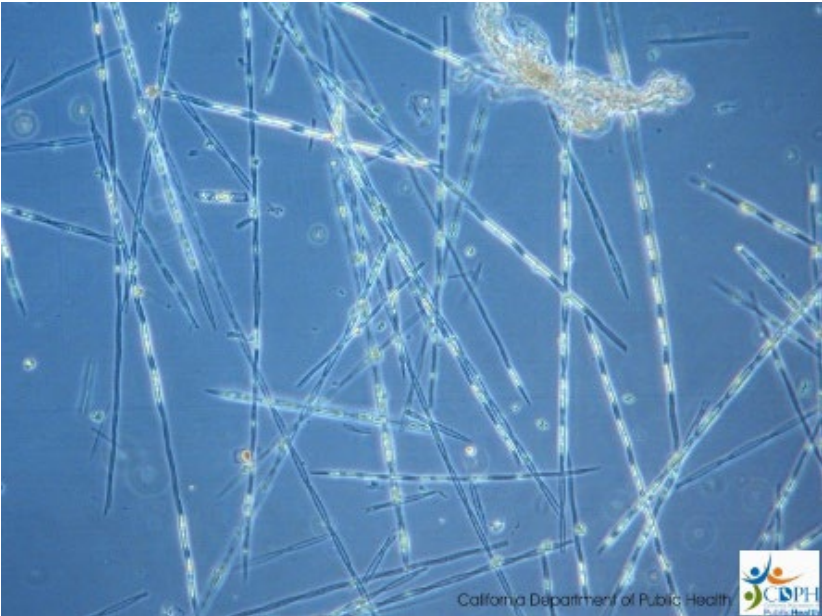


Delta  
Science  
Program

DELTA STEWARDSHIP COUNCIL

# What is a HAB?

## Coastal HABs



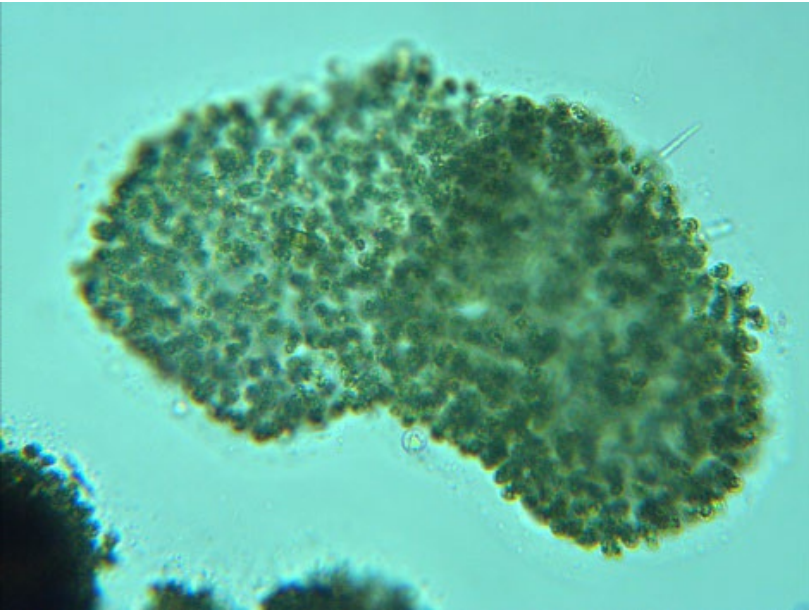
*Pseudonitzschia*. Photo: California Department of Public Health Marine Biotoxin Monitoring Program

## Bay HABs



*Heterosigma akashiwo*. Photo: Kudela lab, UC Santa Cruz

## Delta CHABs



*Microcystis* colony. Photo: Janis Cooke, Central Valley Regional Water Board



Marine (Pacific)

Brackish (Suisun and SF Bay)

Freshwater (Delta)

*The San Francisco Estuary faces many different threats from HABs across the saline gradient*



# Need for Delta Cyanobacterial HABs Monitoring Strategy

- Current Delta HAB data collection is **not adequately coordinated**
- Important variables are understood, including nutrients, temperature, residence time
- However, we **lack detailed information** about HAB status and trends and drivers

*Discovery Bay, July 16, 2021*

Photo Cred: Matt Krause

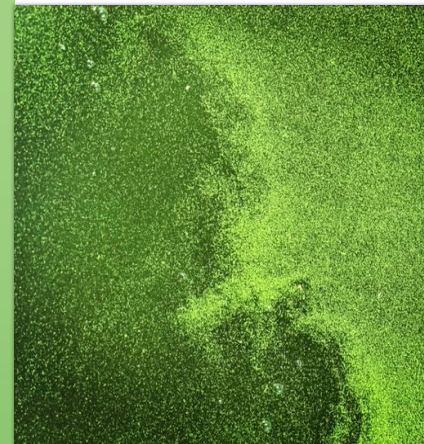
*The Delta science community recognized that a collaborative HABs monitoring effort is needed*



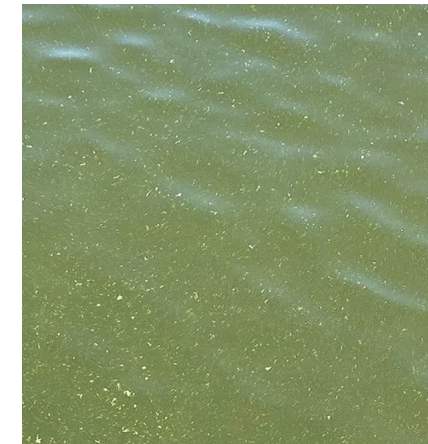
# Delta CHAB Conceptual Model



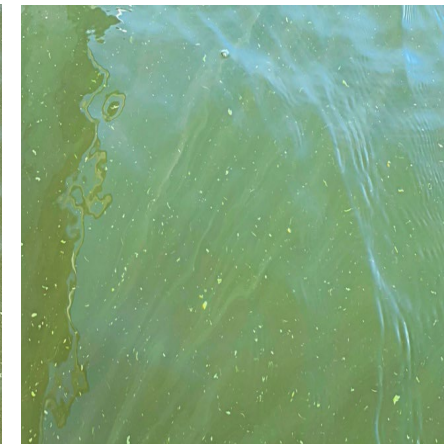
**A. Dense**



**B. Intermediate**



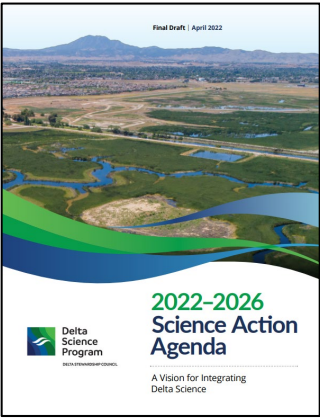
**C. Sparse**



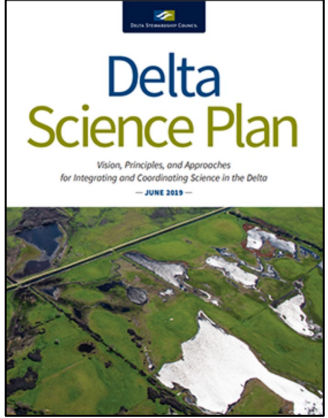
*The Delta has many different types of habitats for cyanobacteria. The ability for cyanobacteria to form blooms is influenced by these habitat characteristics.*

# Delta Science Program Core Functions

## Prioritize Research



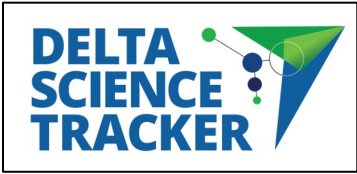
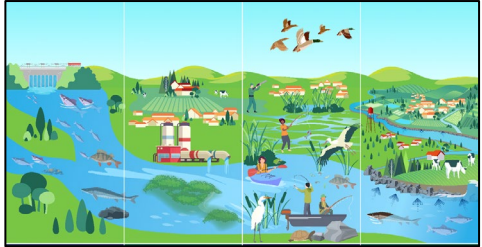
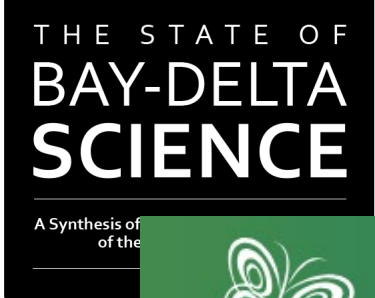
## Promote Collaboration



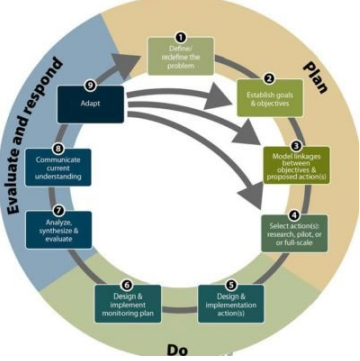
## Fund Research



## Synthesize and Communicate



## Support Adaptive Management



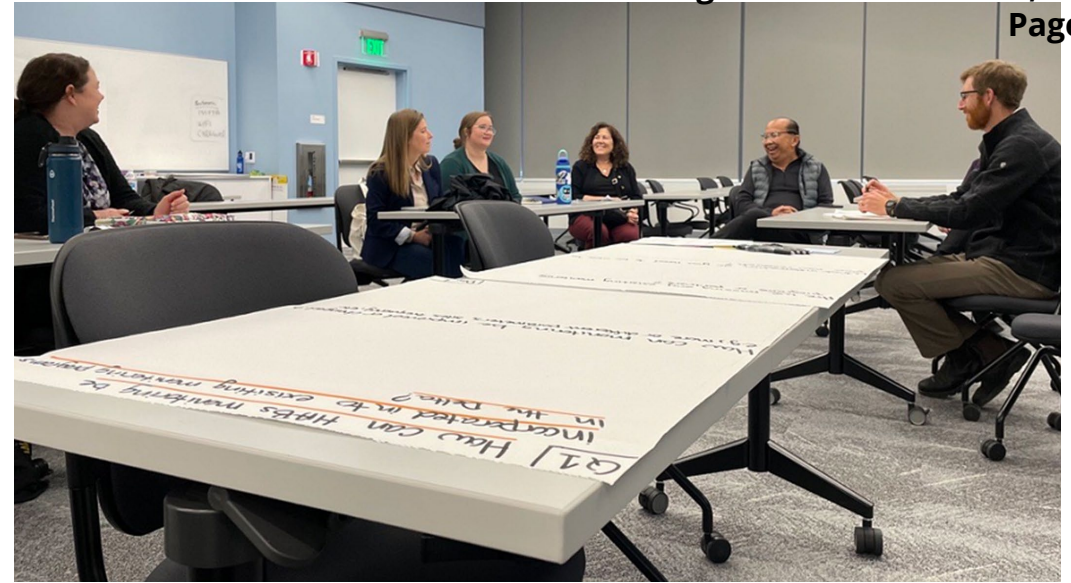
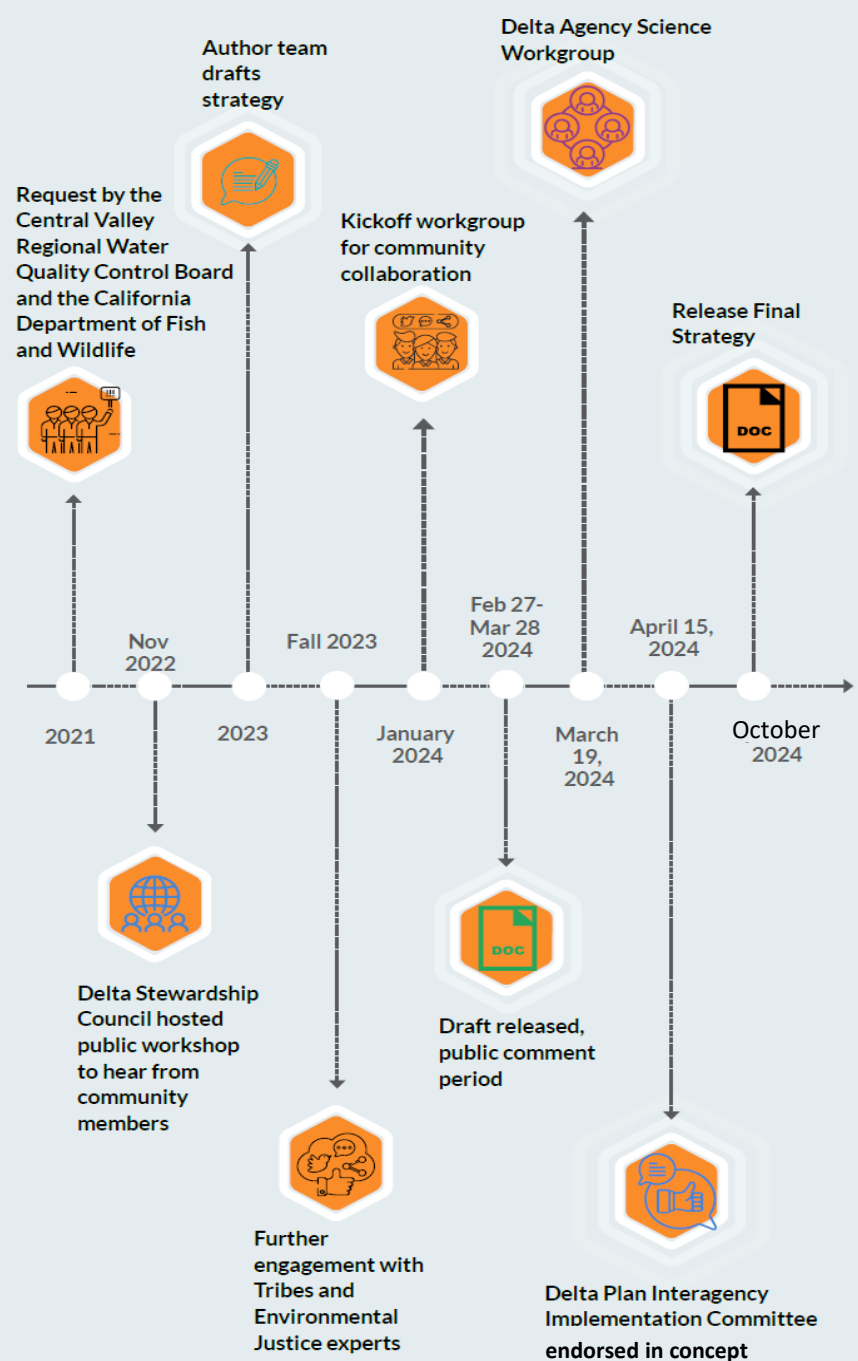
## Facilitate Independent Review



## Support the Delta Independent Science Board







**Delta Science Program**

DELTA STEWARDSHIP COUNCIL



*This co-production process has taken 3 years*

**1**  
**DEFINE PROBLEM**

There is a need for a collaborative and cohesive Delta cyanobacteria harmful algal bloom (CHAB) monitoring strategy

**2**  
**IDENTIFY DATA AND COLLABORATION GAPS**

- Lack of routine monitoring
- Data only available for limited locations
- Need better understanding of drivers and interaction of drivers
- Collaboration gap among agencies
- No mechanism for collaboration
- Need standardized monitoring, easily accessible data, and training opportunities

**3**  
**DEFINE GOALS AND OBJECTIVES**

1. Enhance Delta CHAB collaboration
2. Identify management questions, monitoring goals and objectives
3. Develop a Delta CHAB monitoring program
4. Develop collaborative reporting protocols
5. Utilizae a data sharing platform



**4**  
**IMPLEMENT RECOMMENDATIONS**

- Leverage other projects and programs when possible
- Will need funding and partner buy-in to accomplish all recommendations
- 19 special studies are recommended that various groups could choose to lead

**5**  
**LEARN AND ADAPT**

As knowledge base increases, the proposed monitoring strategy structure can be iteratively applied to evaluate progress toward defined management goals and to inform adjustments to the strategy, as needed.



*Schematic showing the overall Delta CHAB strategy approach, including the 5 monitoring goals and plan for adaptive management.*

# Monitoring Strategy Goals



Goal 1: Enhance Delta CHAB Collaboration



Goal 2: Identify monitoring question, goals, and objectives



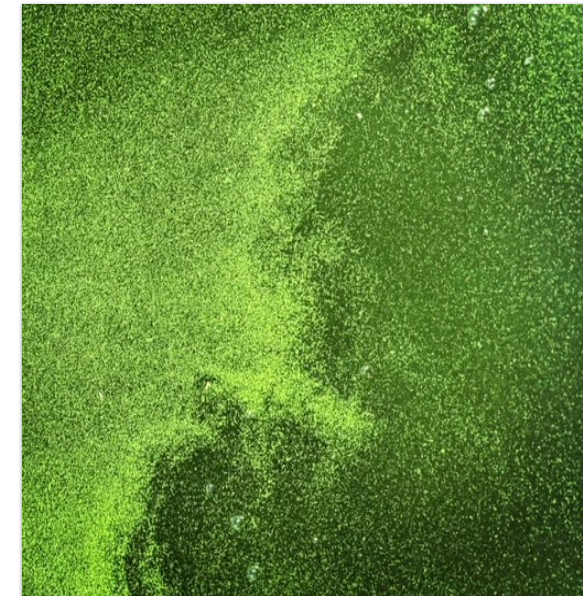
Goal 3: Develop a Delta CHAB monitoring program



Goal 4: Develop collaborative reporting protocols



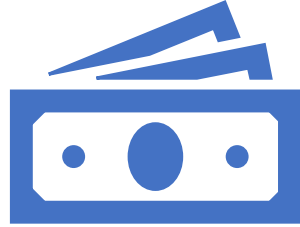
Goal 5: Utilize a data sharing platform





# Implementation

Given that there are broad interests in Delta CHABs and there is no ongoing, dedicated funding for CHAB monitoring, the success of the implementation of this Strategy falls to the ongoing coordination and collaboration of the Delta science community.



## Implementation

### No funding, but leveraging other ongoing efforts

- Co-chairs identified (Laura Twardochleb, SWRCB; Keith Bouma-Gregson, USGS; Ellen Preece, DWR; Tricia Lee, DSC) to lead coordination and implementation
  - Interagency Ecological Program Project Work Team identified as mechanism for keeping community informed
    - State Water Board funding USGS to develop monitoring design(s)
    - 19 special studies are recommended that various groups could choose to lead
    - Leverage NOAA Monitoring and Event Response (MERHAB) project

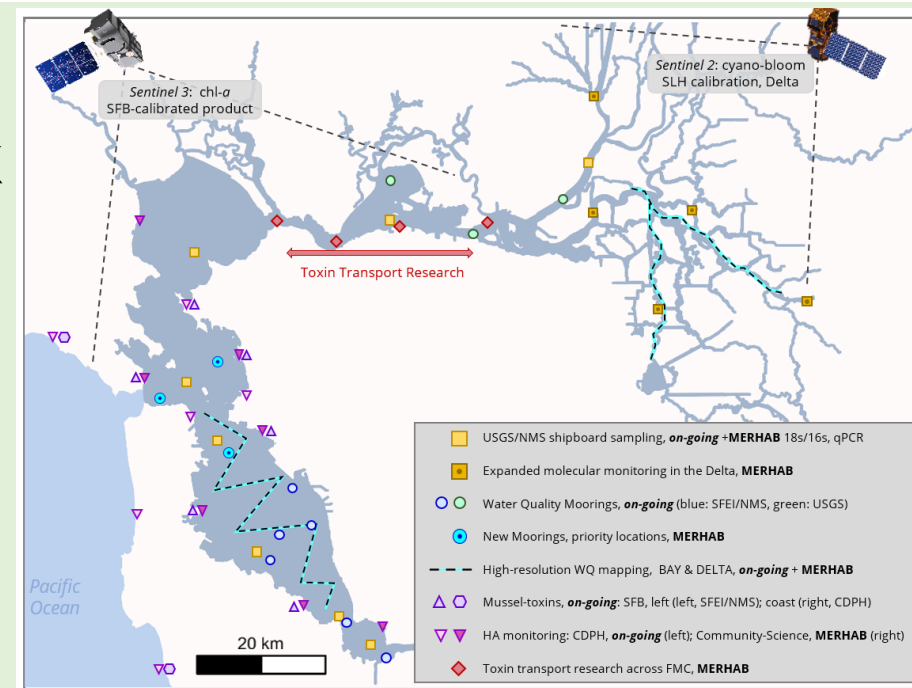


QR code links to <https://iep.ca.gov/Science-Synthesis-Service/Project-Work-Teams/Water-Quality-and-Phytoplankton>

Save the Date!  
First annual  
workshop –  
March 6, 2025

Final CHAB strategy is now available and interested parties can get involved at <https://iep.ca.gov/Science-Synthesis-Service/Project-Work-Teams/Water-Quality-and-Phytoplankton>

# New Technologies and a Coordination Framework for an Integrated HAB Detection and Monitoring System across the San Francisco Estuary



**Co-Lead PIs:** D Senn (SFEI), K Bouma-Gregson (USGS), E Preece (DWR)

**PIs:** R Kudela (UCSC), A Chelsky (SFEI), T Otten (Bend Genetics), M Howard (CVRWQCB), K Lunde (SFBRWQCB)

**Partners:** SF Baykeeper, Restore the Delta, Cal State Maritime Academy, CA Department of Public Health

**Timeline:** 5 years | **Funding:** \$3 million



Link between  
Delta CHAB  
strategy and  
NOAA MERHAB  
project



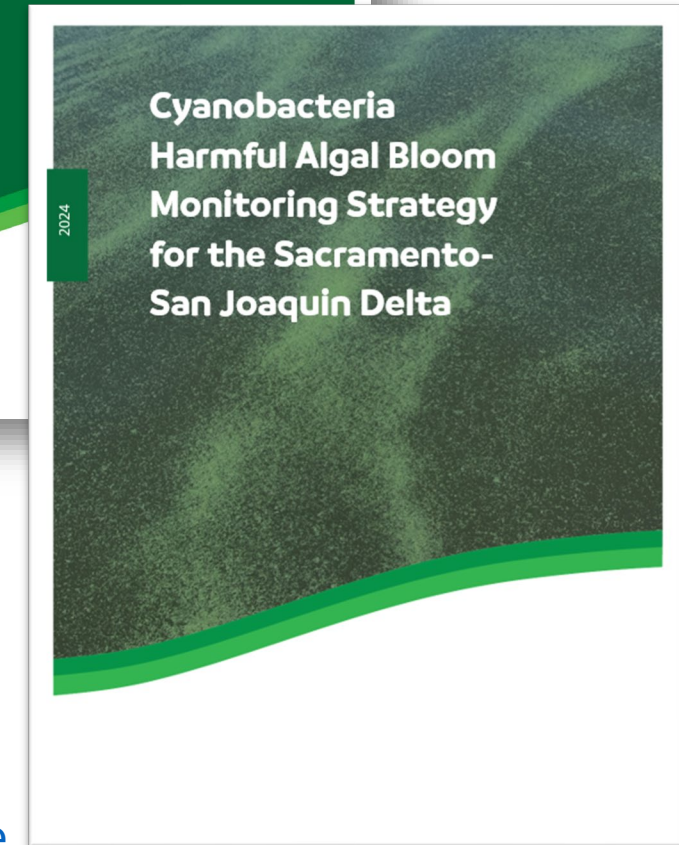
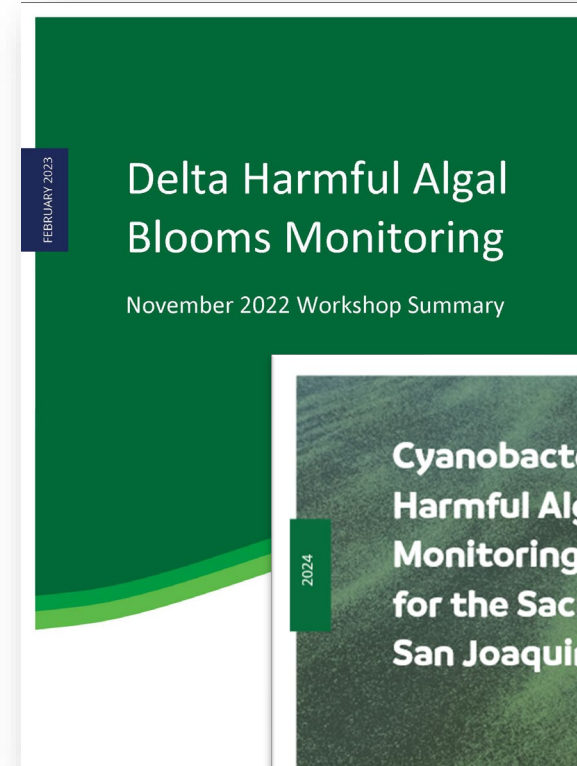
## Materials Available

- Final Monitoring Strategy
- Workshop Summary Released

Contact us:

Ellen Preece [ellen.preece@water.ca.gov](mailto:ellen.preece@water.ca.gov)

Tricia Lee [tricia.lee@deltacouncil.ca.gov](mailto:tricia.lee@deltacouncil.ca.gov)



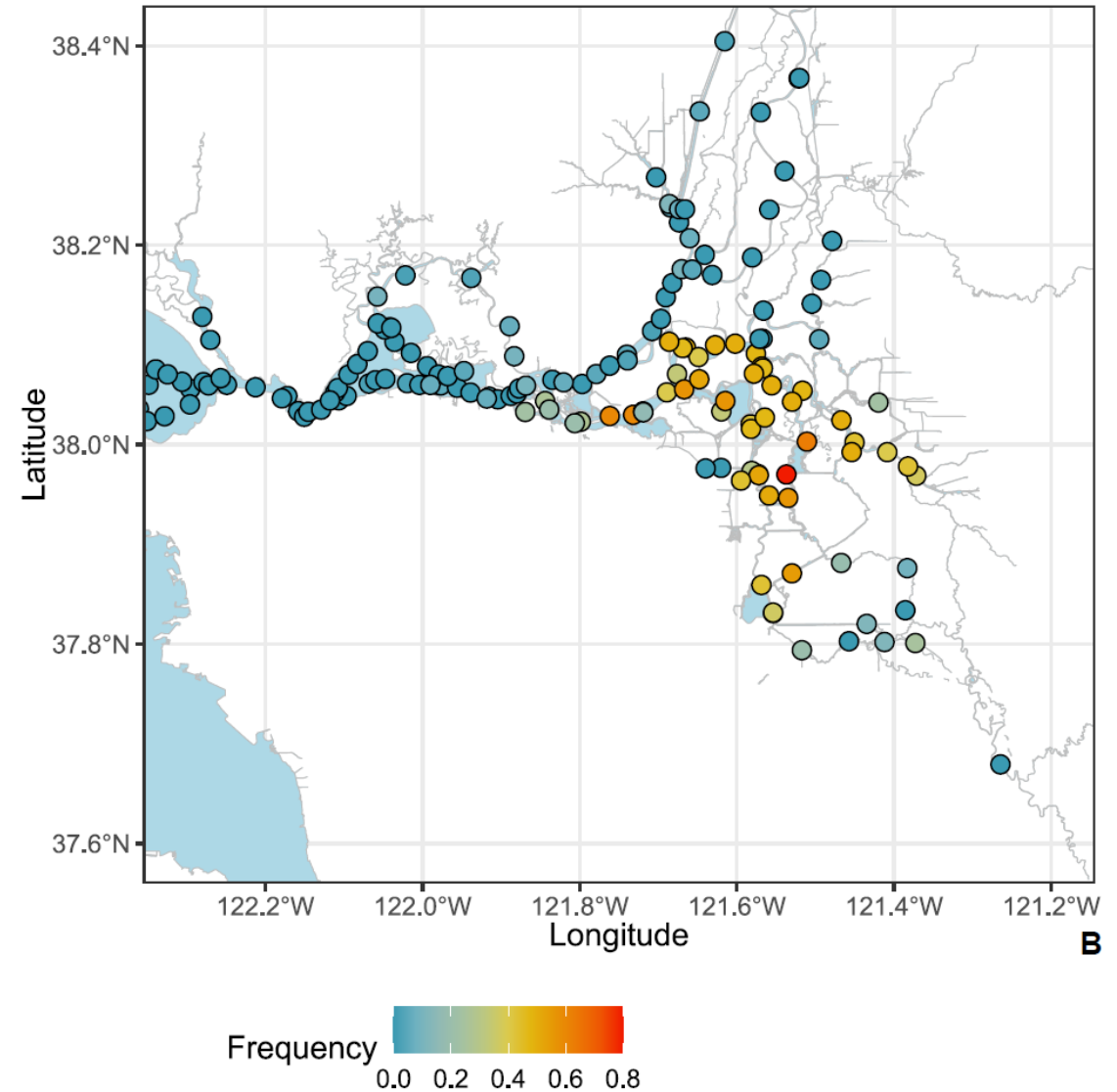
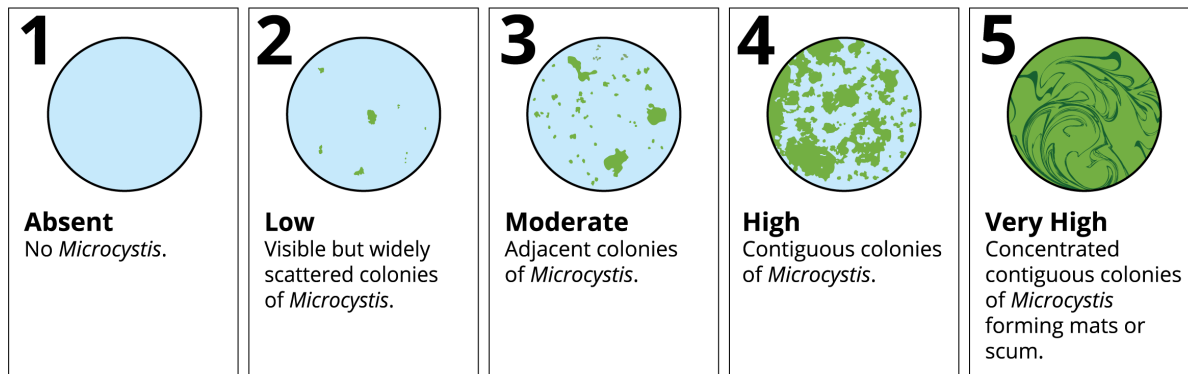
[bit.ly/DSPResearchGate](https://bit.ly/DSPResearchGate)



# EXTRA SLIDES

# Microcystis Visual Index (MVI) Data

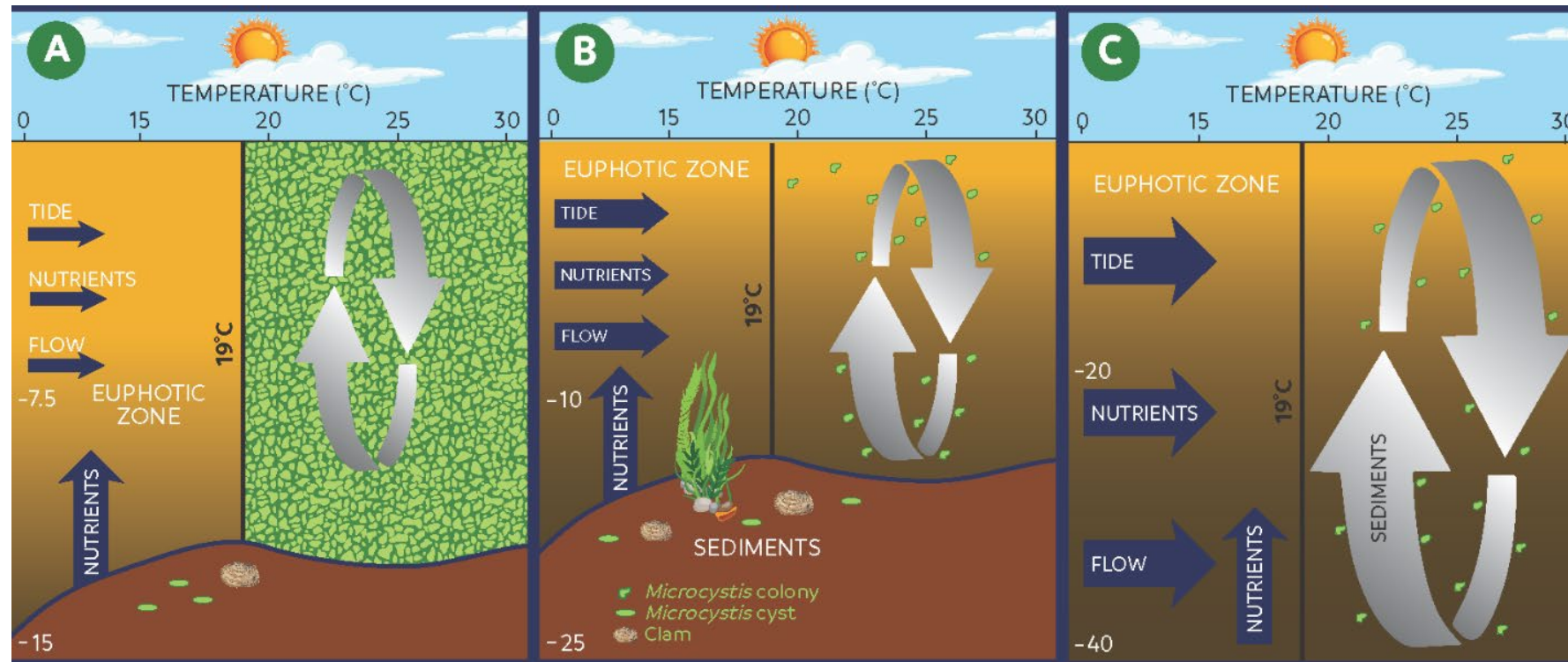
- Frequency of occurrence of MVI levels 3+4+5, for the summer season (June–September) from 2017–2022



Visual index data shows *Microcystis* is common in the central and southern Delta.



# Delta CHAB Conceptual Model



*The Delta has many different types of habitats for cyanobacteria. The ability for cyanobacteria to form blooms is influenced by these habitat characteristics.*