

NOV 2025

Lead Scientist Report

Agenda Item: 8, Presentation
Meeting Date: November 20, 2025
Page 1



**Delta
Stewardship
Council**

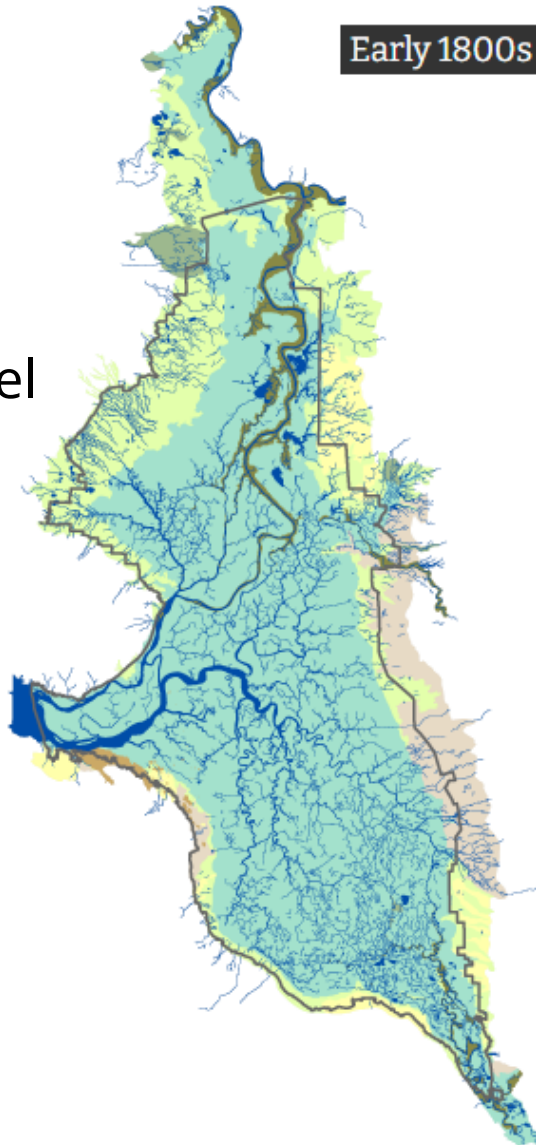
A CALIFORNIA STATE AGENCY

The effect of tidal marsh restoration on food webs

Pagliaro, M. D., De La Cruz, S. E. W., Woo, I., Sousa, J., Rich, N., Grimaldo, L., Colombano, D., & Ruhí, A. (2025). Does tidal marsh restoration lead to the recovery of trophic pathways that support estuarine fishes? *Ecological Applications*, 35(7), e70110. <https://doi.org/10.1002/eap.70110>

Xavier Mascarenas / California Department of Water Resources

Mostly wetland
Extensive and
complex channel
structure



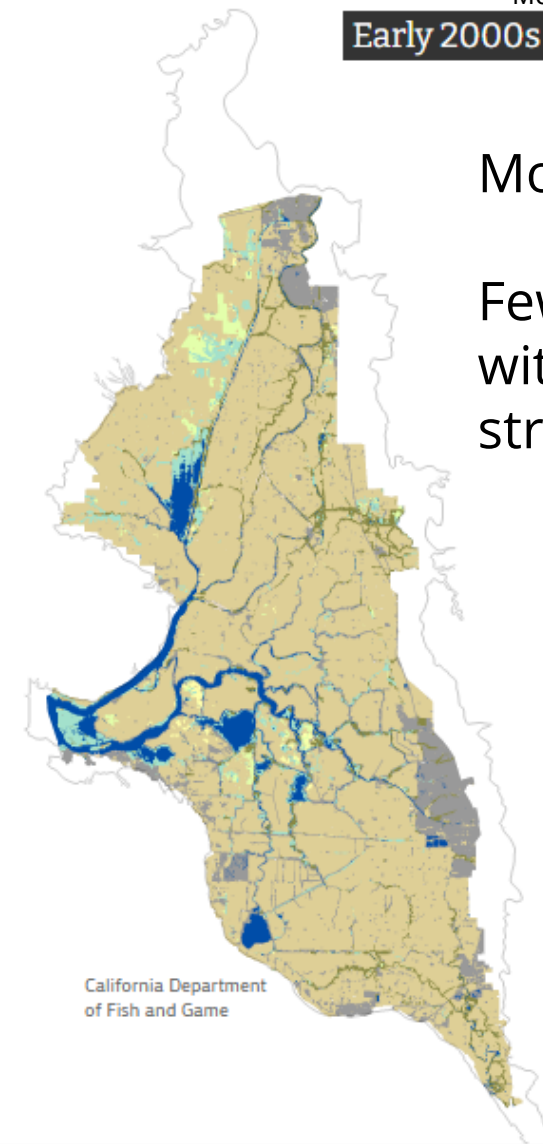
Compare the Delta Across Eras

Click on the habitat types below
to see how the Delta's waterways
and landscape have been
changed.



*Note:
The outline on the map at left
indicates the mutually mapped
area. The outline on the map at
right indicates the boundary of the
SFEI-ASC study.*

Mostly agriculture
Fewer channels
with simpler
structure



Source: *Sacramento-San Joaquin Delta Historical Ecology Investigation: Exploring Patterns and Process*, by the [San Francisco Estuary Institute - Aquatic Science Center](#) (sources)
Interactive map by [KQED QUEST](#), the [San Francisco Estuary Institute - Aquatic Science Center](#), and the [Bill Lane Center for the American West](#), Stanford University
Credits: Lauren Sommer, Alison Whipple, and Geoff McGhee (full credits)

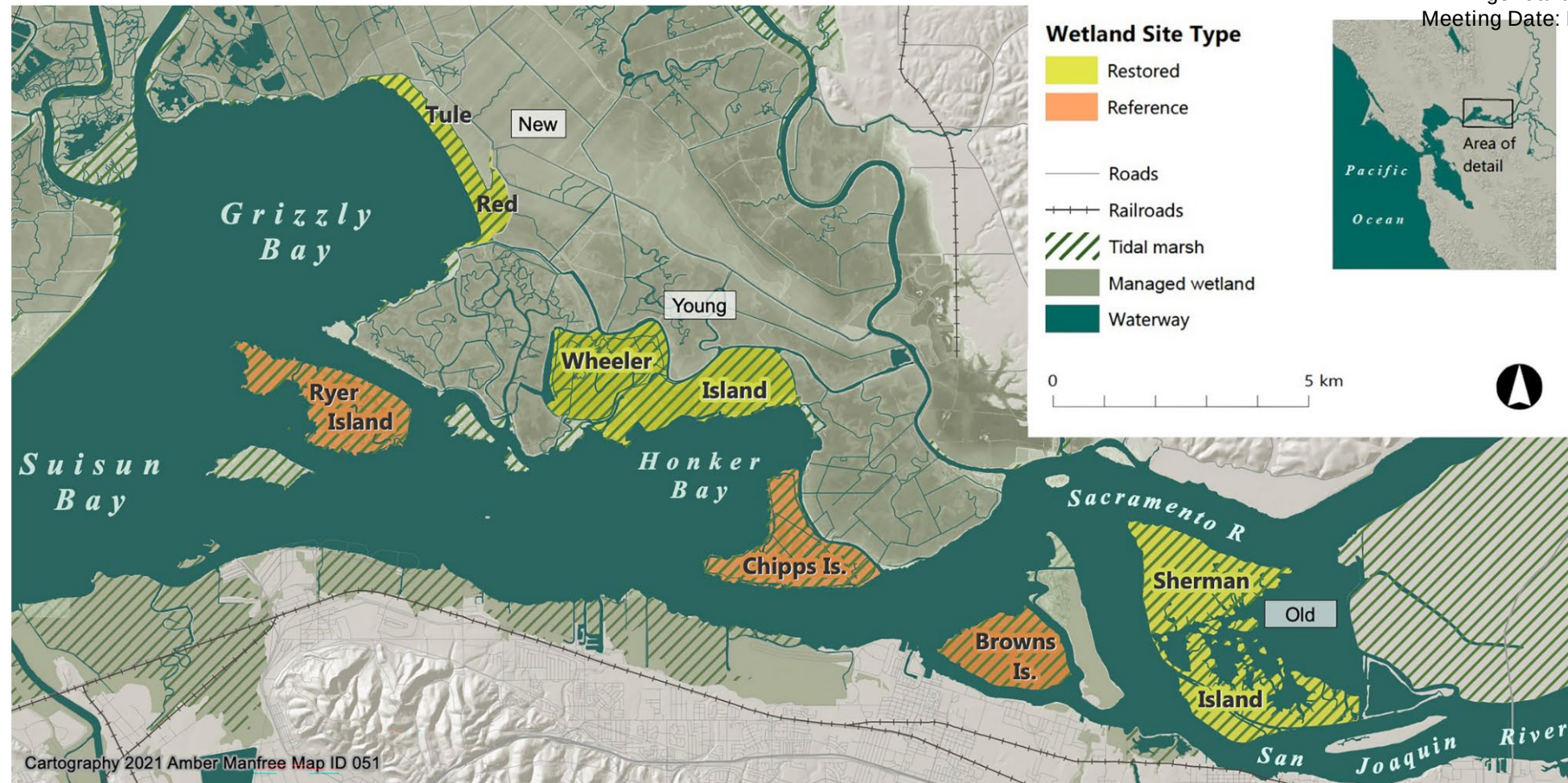
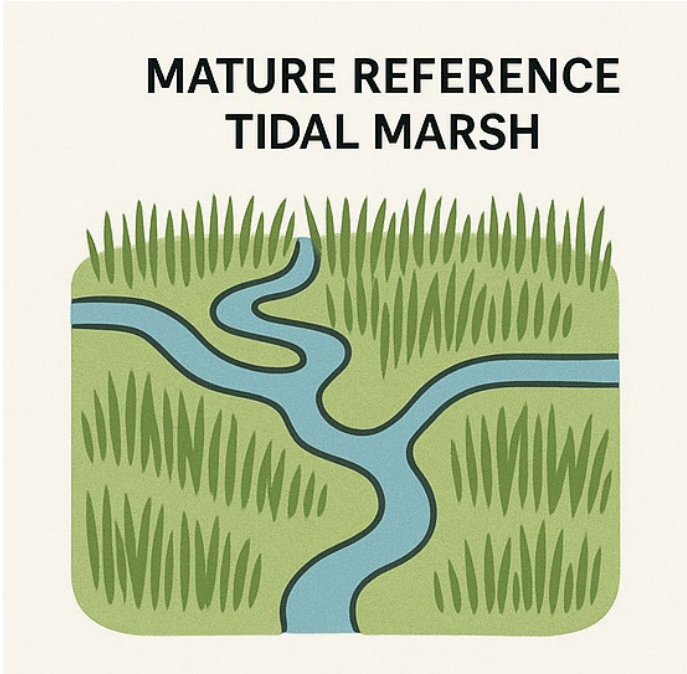
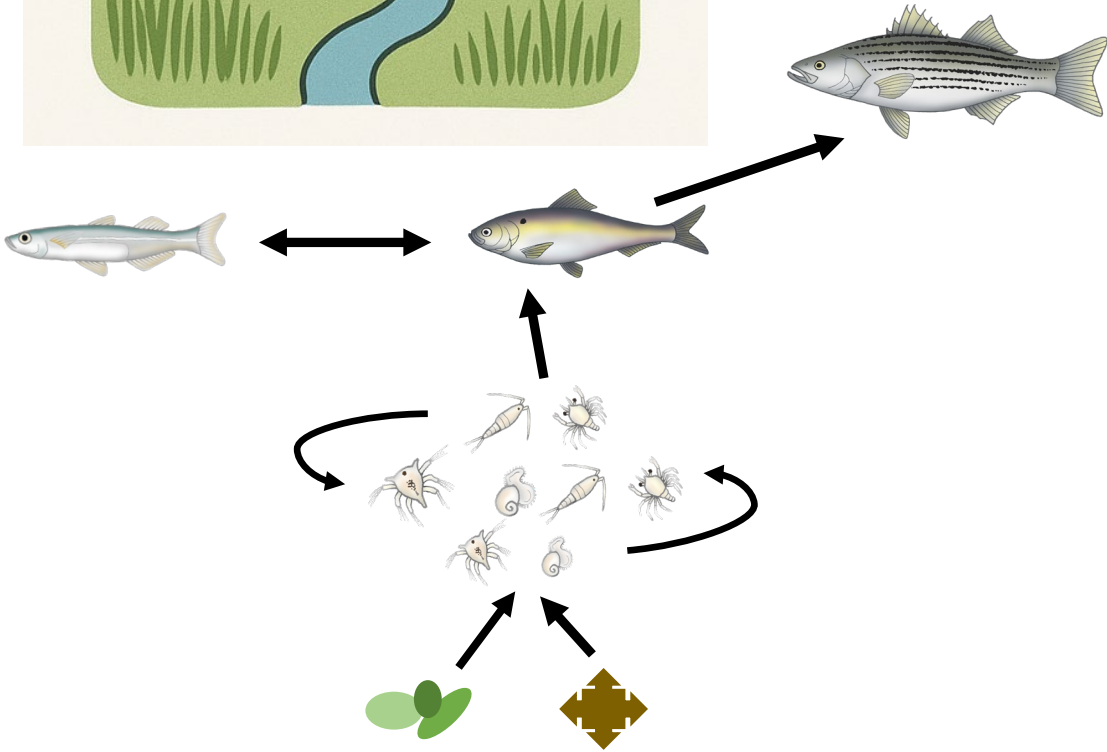


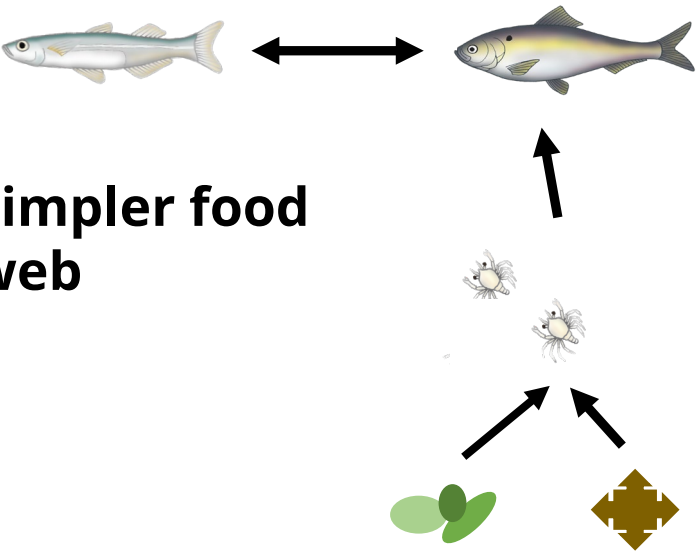
FIGURE 2 Study area. Study area in the San Francisco Bay-Delta (California, USA). Study sites include three restored tidal marshes (yellow) and three paired reference sites (orange) located between Grizzly Bay (seaward) and the Sacramento-San Joaquin confluence (landward). Tule Red and Ryer Island are the *New* restoration pair, Wheeler Island and Chipps Island are the *Young* restoration pair, and Sherman Island and Browns Island are the *Old* restoration pair. Map credit: Amber Manfree.



**More complex
food web**



**Simpler food
web**



Takeaways:

To restore food webs
we need:

- 1) Vegetation strategy,
channel development
- 2) Long-term monitoring
- 3) More targeted
research like this



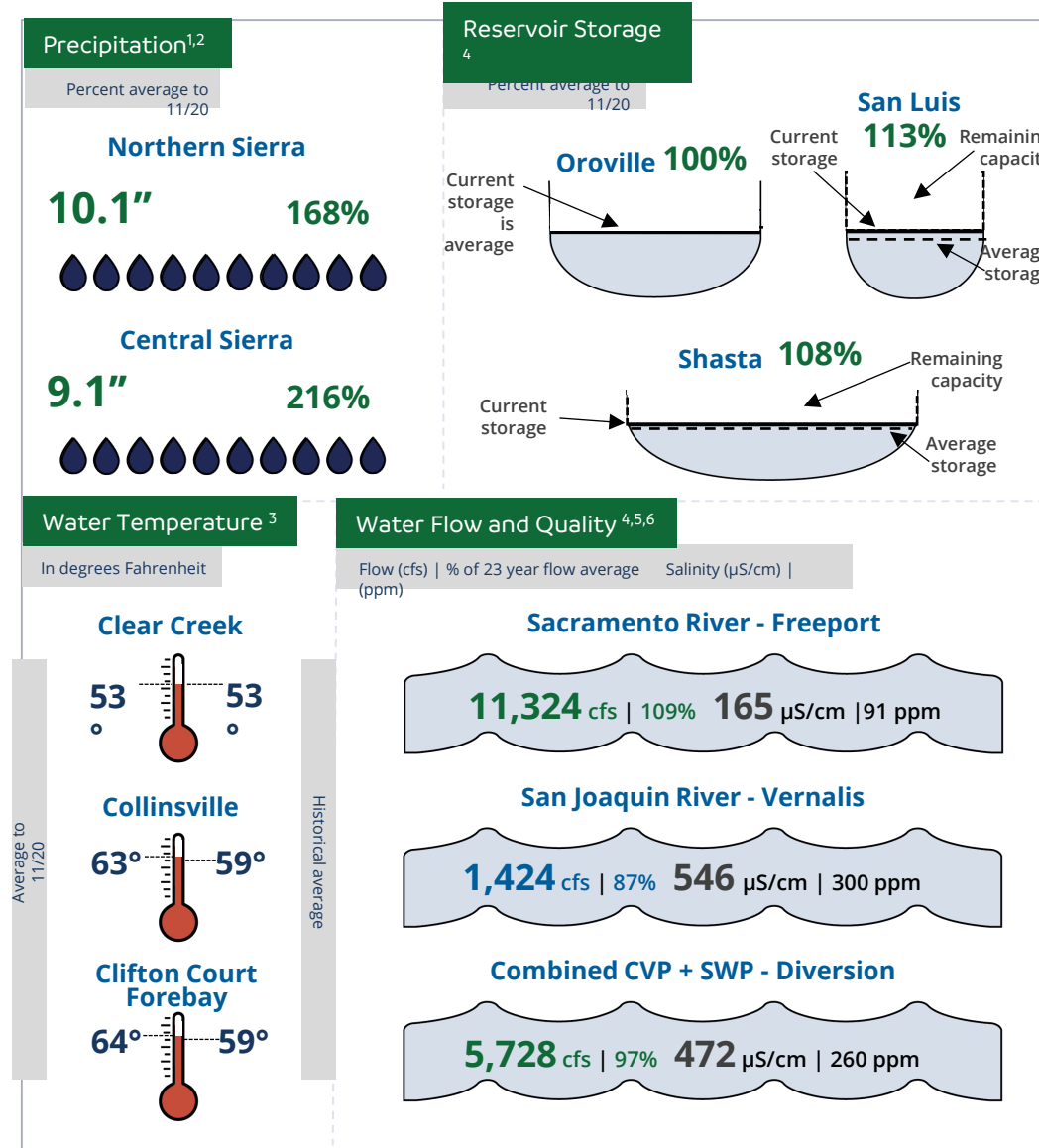
Marsh image generated by ChatGPT.

Delta Science Program Activities

- **Adaptive Management Forum** (Oct 14–15)
- **State of the Estuary Conference** (Oct 28–29)
- **North American Invasive Species Management Association Annual Conference** (Nov 3–6)

On Your Radar

- **December 4: Delta Invasive Species Symposium**



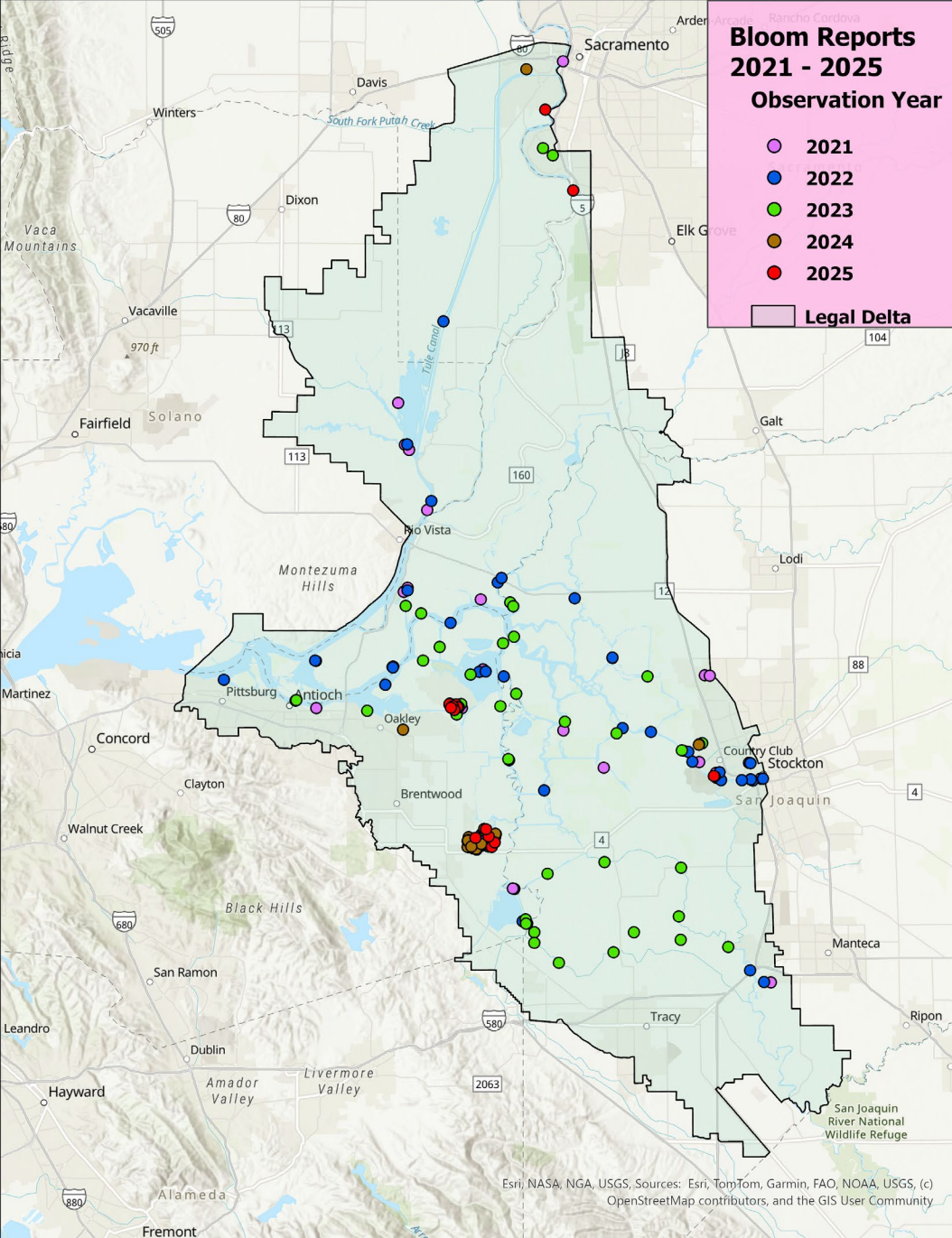
¹ <https://go.usa.gov/xQsUc> ³ <https://go.usa.gov/xURFU> ⁵ <https://go.usa.gov/xQsU2>
² <https://go.usa.gov/xQsUa> ⁴ <https://go.usa.gov/xQsUr> ⁶ <https://go.usa.gov/xQsUT>

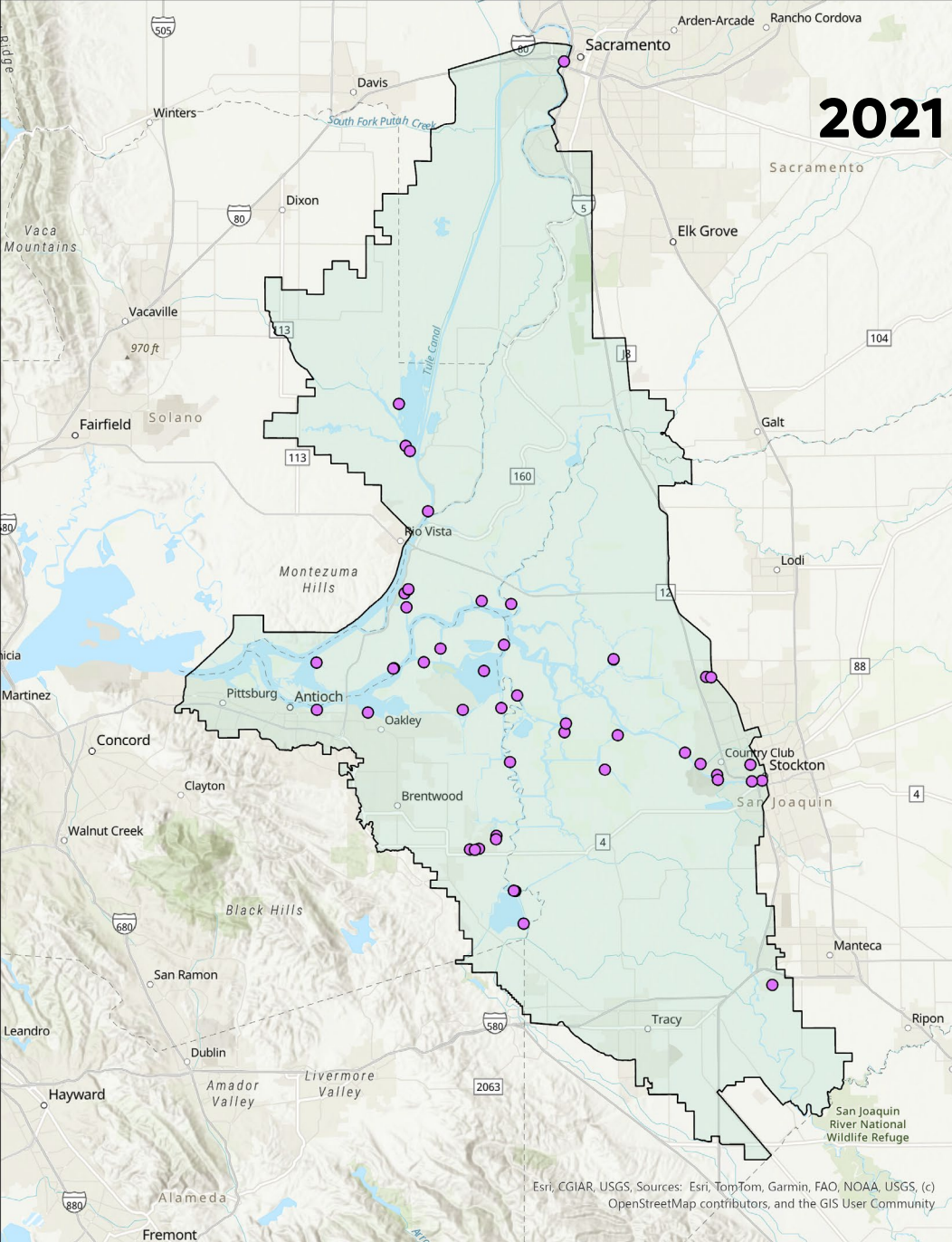
Where were Harmful Algal Blooms (HABs) reported 2021 – 2025?

- Reports of algal blooms
- Investigated by the State Water Board
- Not necessarily all confirmed as blooms
- Data probably does not capture all blooms

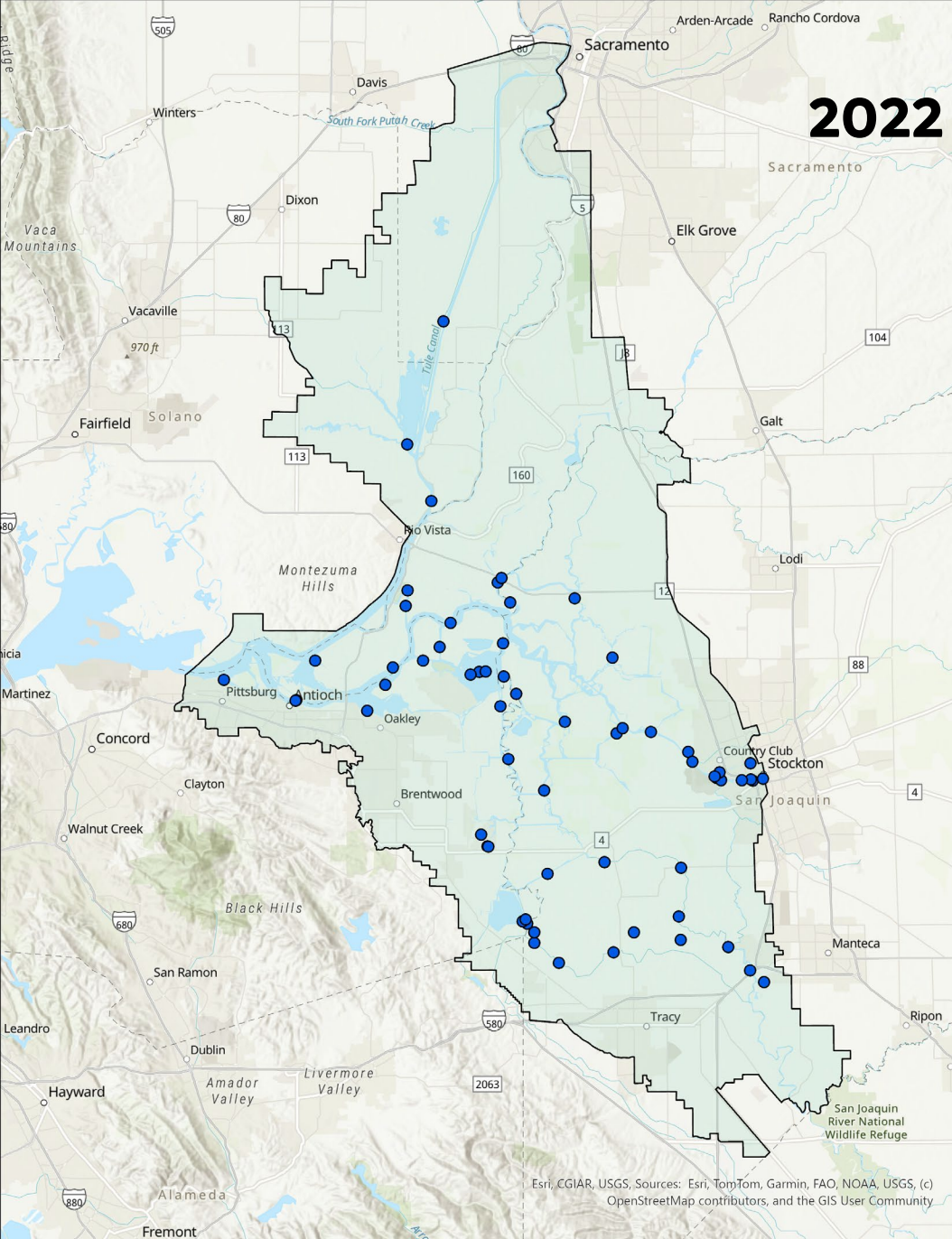
Data source:

<https://data.ca.gov/dataset/surface-water-freshwater-harmful-algal-blooms/resource/c6a36b91-ad38-4611-8750-87ee99e497dd>

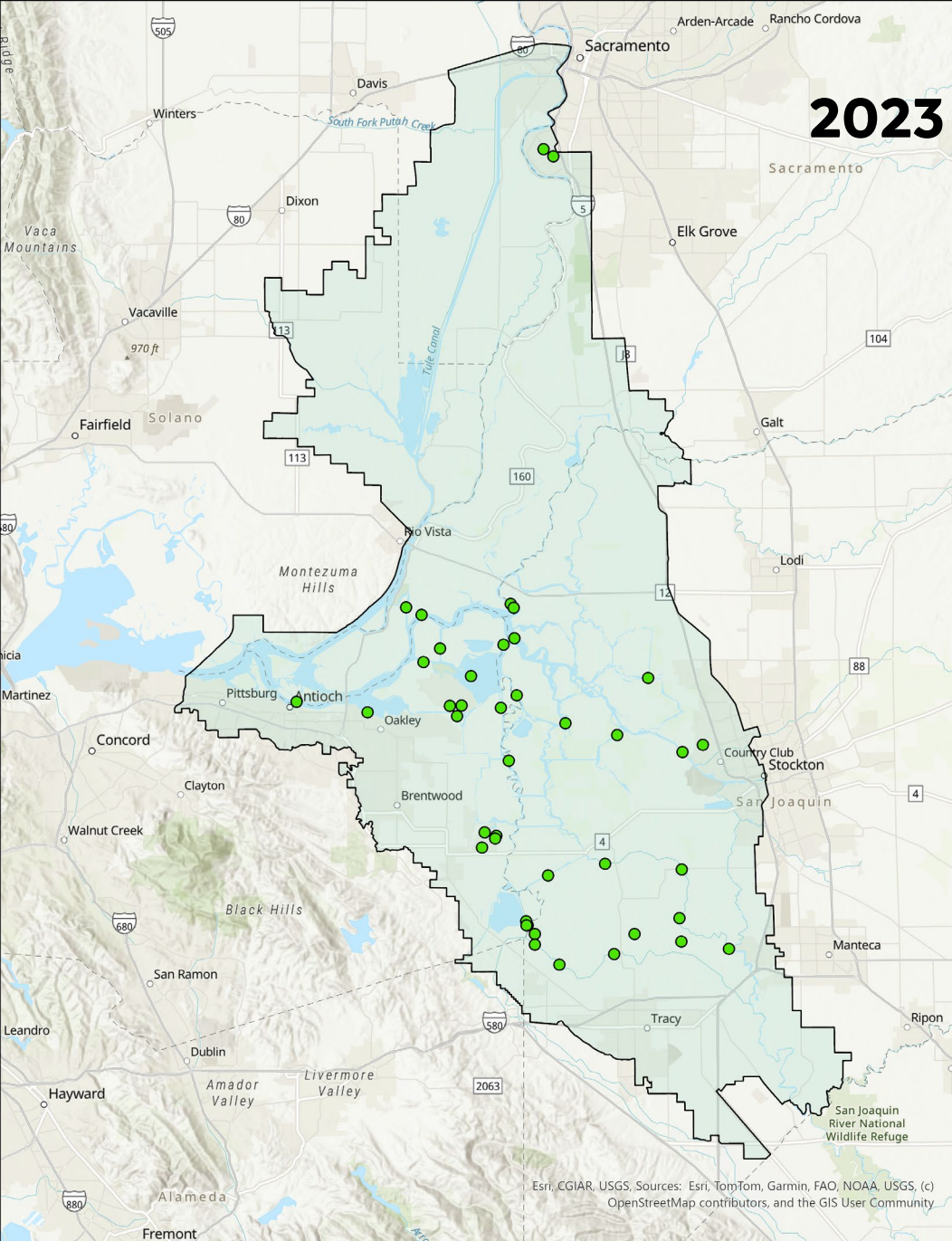




- Similar report locations each year
- Range 16–67 reports per year
- Fewer reports 2024 & 2025
 - 2025 data stops at September 9
- HAB formation is variable & sensitive to environmental conditions, e.g.
 - Temperature
 - Flow rate
 - Mixing
 - Sediment
 - Nutrients
 - Light
 - Grazing

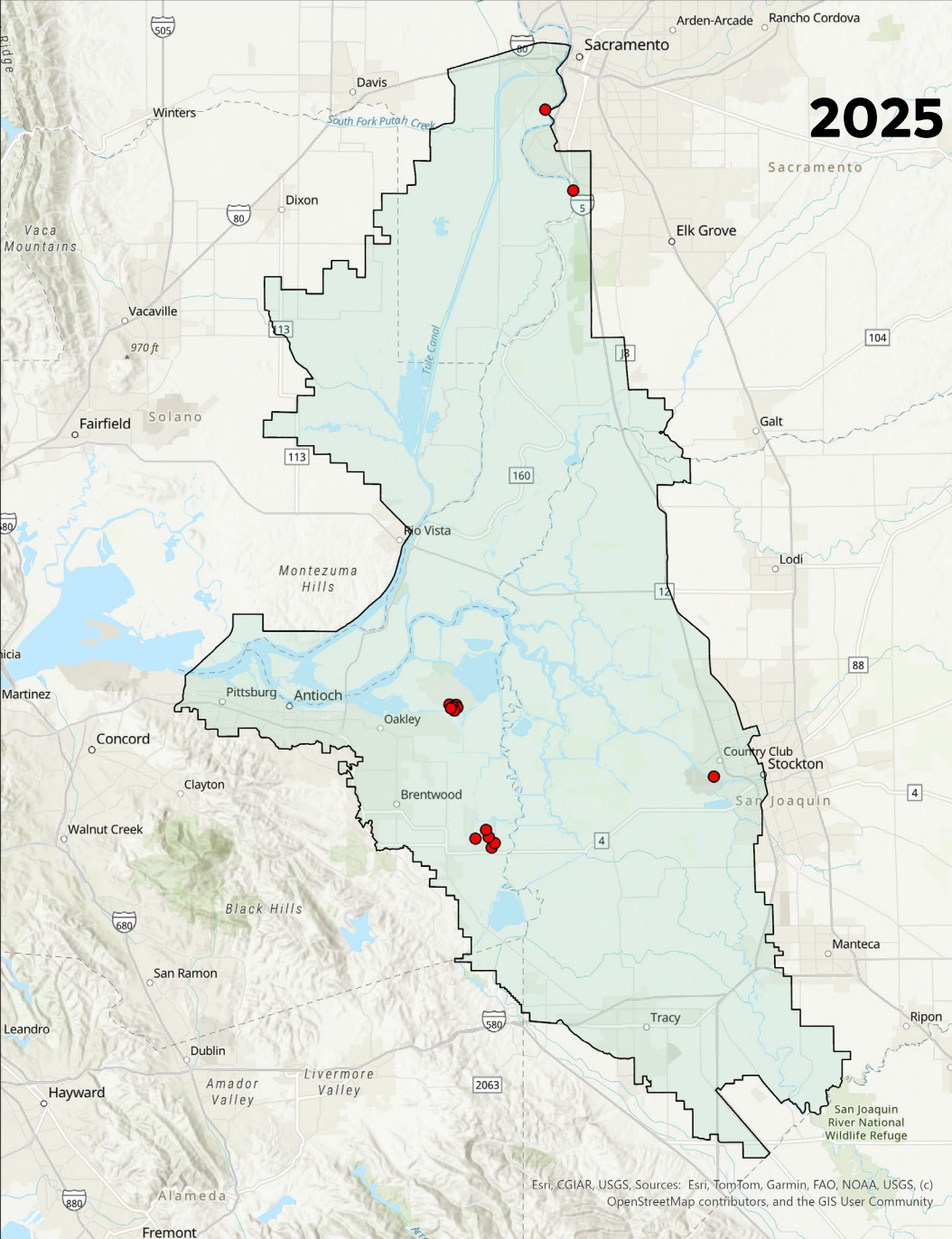


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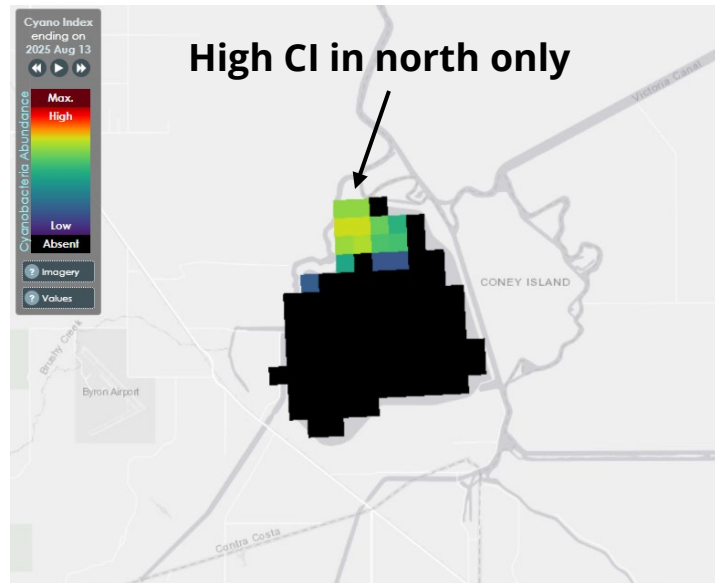
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When and how intense were HABs in the Delta in 2025?

Cyano Index (CI) is a satellite-derived estimate of cyanobacteria abundance

- Unreliable for shoreline conditions & small channels
- Says nothing about toxicity
- CI 15.8 = Council Performance Measures metric

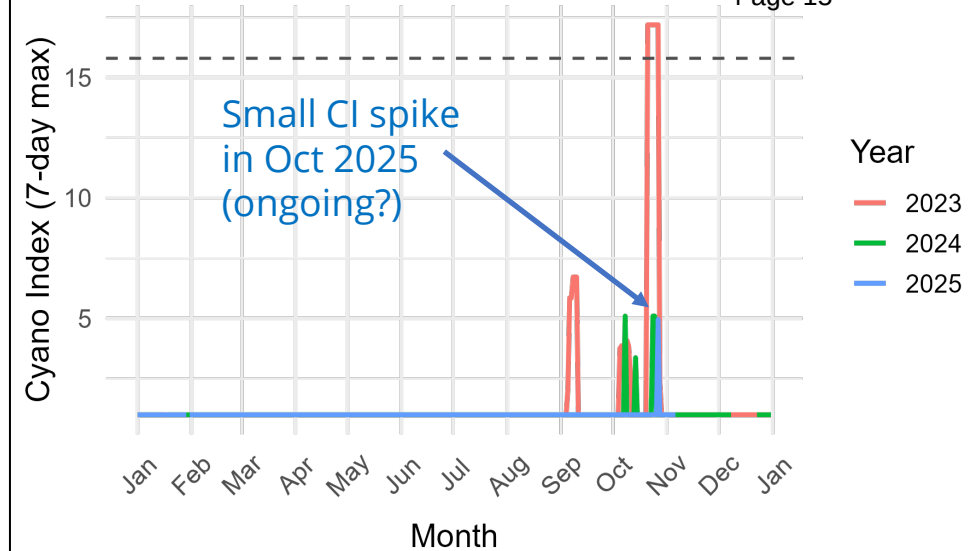
Clifton Court Forebay spike



Data source for slide:
<https://fhab.sfei.org/?p=cyano&c=7daymax&d=20251016>

Highest daily Cyano Index (Frank's Tract)

Meeting Date: November 20, 2025
Dashed line = 15.8 CI threshold
Page 15



Highest daily Cyano Index (Clifton Court Forebay)

Dashed line = 15.8 CI threshold

