Los Angeles Regional Water Quality Board – AG/IG

VR Nutrient and Algae TMDL in FY2026-2027 - Reconsideration

Surfrider Foundation – Ventura County – Blue Water Task Force Surface Water Ambient Monitoring Program (SWAMP) Team

# Staff Request - Surface Water Ambient Monitoring Program (SWAMP) Data

July – September 2025

Submitted for Reconsideration of 2012 VR Nutrient and Algae TMDL

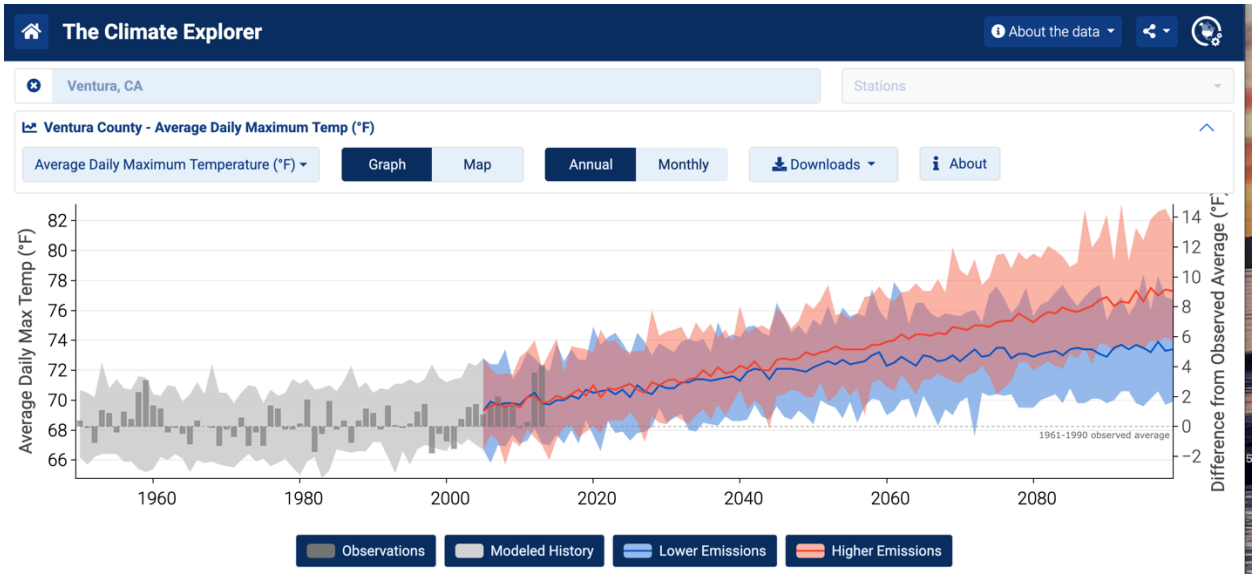
Since the 2012 Ventura River (VR) Nutrient and Algae Total Maximum Daily Load (TDML) was approved, our planet continues to warm, resulting in shifting environmental conditions across watersheds. Nearly 10 years ago, at the Paris COP21, almost every country committed to limiting global warming to 1.5 degrees Celsius, relative to pre-industrial times. Today, that goal is out of reach. (Fransen, 2025.)

In November 2024, the Environmental Protection Agency (EPA) issued new guidelines for “Climate Change Considerations When Prioritizing, Developing and Implementing Total Maximum Daily Loads,” which features climate-related effects on water quality, including:

- Elevated temperatures impact aquatic life, evapotranspiration rates and associated effects; releasing excess nutrients; promoting increased growth of algae and microbes; and influencing the bioavailability, mobility, and transformation of certain pollutants, which ultimately affects the toxicity of the pollutants to organisms.

- Elevated temperatures reduce dissolved oxygen levels, increasing the prevalence of pathogens and water-related illnesses, which can cause fish mortality both directly and through indirect impacts caused by internal phosphorus loading associated with Harmful Algal Blooms (HABs).

Coastal Ventura County has experienced eleven of its twenty warmest years during the last two decades (California Office of Environmental Health Hazard Assessment, 2019). Along with elevated temperatures, multiple moisture-laden atmospheric river storms have caused surface runoff which carries fertilizers, oils, pathogens, and other contaminants into the Ventura River and ocean, increasing chances of harmful algae blooms. Anderson et al. (2021) suggest that the frequency and intensity of HABs will increase yearly along the coastal waters of Southern California.




Specifically, Ventura County's average air temperatures have increased by four degrees with many years spiking above eighty-five degrees (Biasotti, 2023).

Future predictions of increased temperatures, along with changing precipitation patterns, and altered watershed hydrological processes associated with climate change, will affect pollutant transport in specific watershed settings (e.g., physiographic and hydro climatic setting, water management, and other human activities) (Coffey et al., 2019). Pollutant transport and higher surface water temperatures influence nutrient concentrations and bacterial pollution in our watershed.

Higher temperatures, pollution, and increased nutrient concentrations in rivers (nitrogen and phosphorus) create favorable conditions for freshwater HABs. These blooms can release toxins and significantly deplete dissolved oxygen, resulting in fish kills, ecosystem degradation, and potential health hazards for humans who come into contact with or consume contaminated water.

The 2012 Ventura River Nutrient and Algae TMDL notes that "the ecology of algae in the rivers is dependent on temperature and flow" which underscores the need for including climate change modeling and monitoring air and water temperature parameters in the Ventura River.

Southern California HAB History

From 2012 to 2025, California experienced large-scale HAB events related to climate change and changing weather patterns, in both marine and freshwater systems. Significant marine HAB events occurred in 2015, 2022, 2023, and 2024, leading to fisheries closures and mass morbidity and mortality in marine mammals (California Ocean Protection Council, 2025).

In 2025, one of the largest marine HABs, fueled by marine heatwaves, led to record breaking toxin levels and closure of the Dungeness crab and razor clam fisheries.

In 2022, there were 372 freshwater HAB events according to the State Water Quality Board's Surface Water Ambient Monitoring Program reports.

Nutrients, Algae, and Toxins

Locally, excess nutrient loads and increased phytoplankton biomass can create optimal growth conditions for HABs in the Ventura River watershed and nearshore coastal waters. HABs impact aquatic life, marine life, ecosystem, and food web function, as well as, causing human illness and contaminated shellfish.

According to the Southern California Coastal Observing System (SCCOOS), Ventura County experienced the longest and most toxic marine HAB on record from December 2024 to May 2025, dominated by *Akashiwo* and *Prorocentrum species*, (Anderson & Kenitz, 2025).

State officials and SCCOOS reported that dense *Akashiwo* blooms in the Santa Barbara Channel are suspected to have caused potentially HAB-related illness in humans, including inhalation and skin irritation, following contact with marine waters in Ventura County.

In certain environmental conditions, freshwater HABs dominated by cyanobacteria can also produce a variety of toxins that can cause numerous health effects in humans and animals. Symptoms can range from stomach pain, nerve damage and in some circumstances, death (Surface Water Ambient Monitoring Program, 2025).

Cyanotoxin production from benthic algae is dependent on several environmental conditions, including nutrient concentration, light intensity, and temperature. Nutrient concentration levels influence the production of various toxins across multiple cyanobacterial genera (Holland and Kinnear, 2013). Examples include nitrogen-limited environments associated with elevated levels of cylindrospermopsin, microcystin, anatoxin-a, and nodularin, which are produced by nitrogen-fixing cyanobacteria (Kaebernick and Neilan, 2001; Griffiths and Saker, 2003). In conditions with high concentrations of nitrogen, toxin production occurs with non-nitrogen-fixing cyanobacteria such as *Microcystis* and *Planktothrix (*Kaebernick and Neilan, 2001; Sivonen and Jones, 1999). Phosphorus is also closely related to toxin production; however, whether a phosphorus-limited or phosphorus-rich environment is directly related to an increase or decrease in toxin production is complicated (Holland and Kinnear, 2013). Changing nutrient concentrations within a water body can shift the algae species composition and abundance (EPA, 2000).

Research by Dr. Al Leydecker focused on the overgrowth of algae attributed to the non-toxin producing species *Mougeotia* and *Cladophora* in the Ventura River between 2001 to 2013 (Lydecker, 2010). He suggests that concentrations of possible toxin-producing cyanobacteria are rarely high enough to impact freshwater in the Ventura watershed. However, indirect effects from algal photosynthesis may adversely impact river health by dropping oxygen levels below normal at night and driving them above normal during the day (Leydecker, 2010).

Recreational use and human safety are dependent on healthy river ecosystems. Below is the Conceptual Model for Rivers, which indicates the potential wildlife problems and aesthetic impacts to recreational users from potential algae growth (California Water Quality Control Board, 2013).

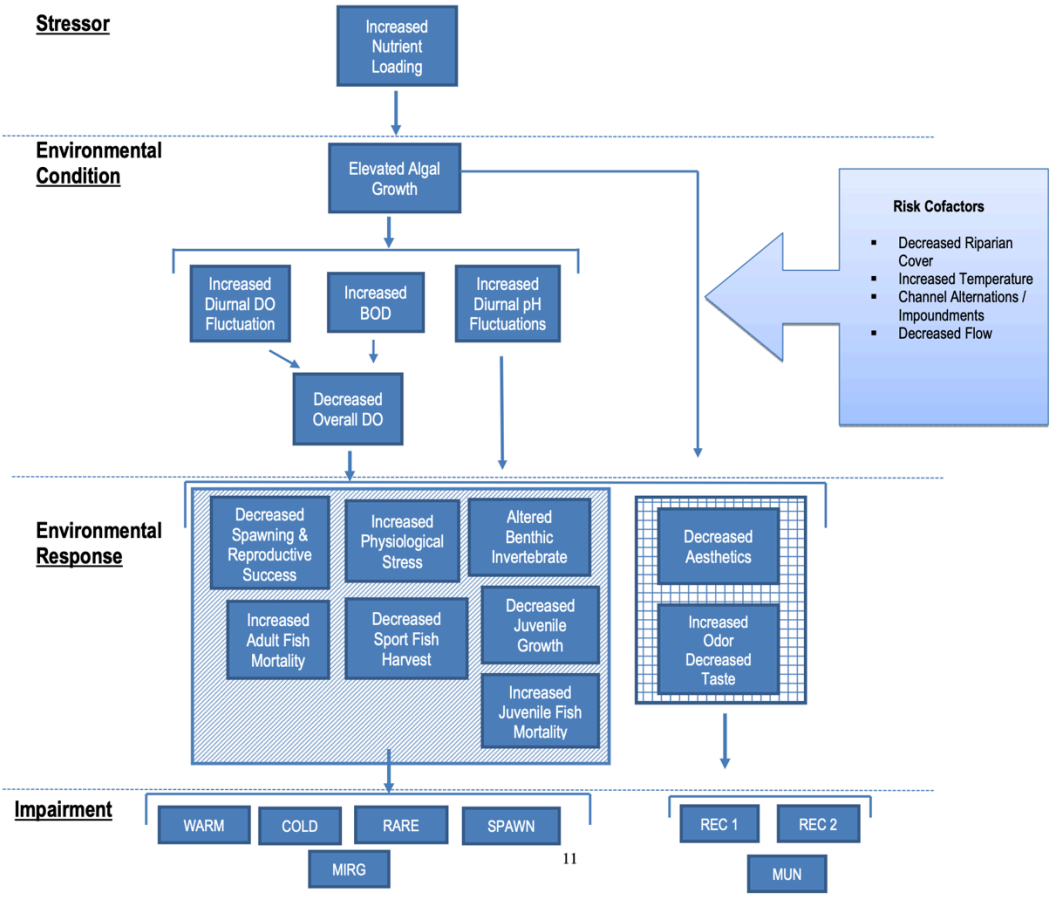



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**Figure 2-1 Conceptual Model for Rivers**

Cyanobacteria and the Ventura River

The presence of cyanobacteria in the Ventura River is no longer an unidentified alga. Some of our monitoring sites regularly exceed the SWAMP standard of 15 percent algae mat coverage. If increasing air temperatures and water temperatures continue the current trend, the risk of more freshwater and marine HABs may increase. It's been well-documented that higher water temperatures positively influence the growth of harmful algae, of which some produce harmful toxins. Adverse impacts from HABs include changing food web dynamics, depletion of oxygen levels, recreational closures, and harm to aquatic life and human health.

The Surfrider Foundation Ventura County Blue Water Task Force's (BWTF) main mission is to sample and test ocean water and publicly report water quality to keep recreational users from contracting waterborne illness. Considering the rise in Ventura County freshwater HABs and four consecutive years of domoic acid events, our community has been concerned with possible causes and drivers of algae growth and HABs as new recreational preserves are opening along the Ventura River. Waste water treatment plants and large-scale agriculture along the Ventura River may be contributing to the overloading of nutrients and subsequent algae growth in the watershed and its receiving waters in the Santa Barbara Channel. Community concerns range from reports of bad odor, deceased wildlife, large algal mats, and increased health advisories.

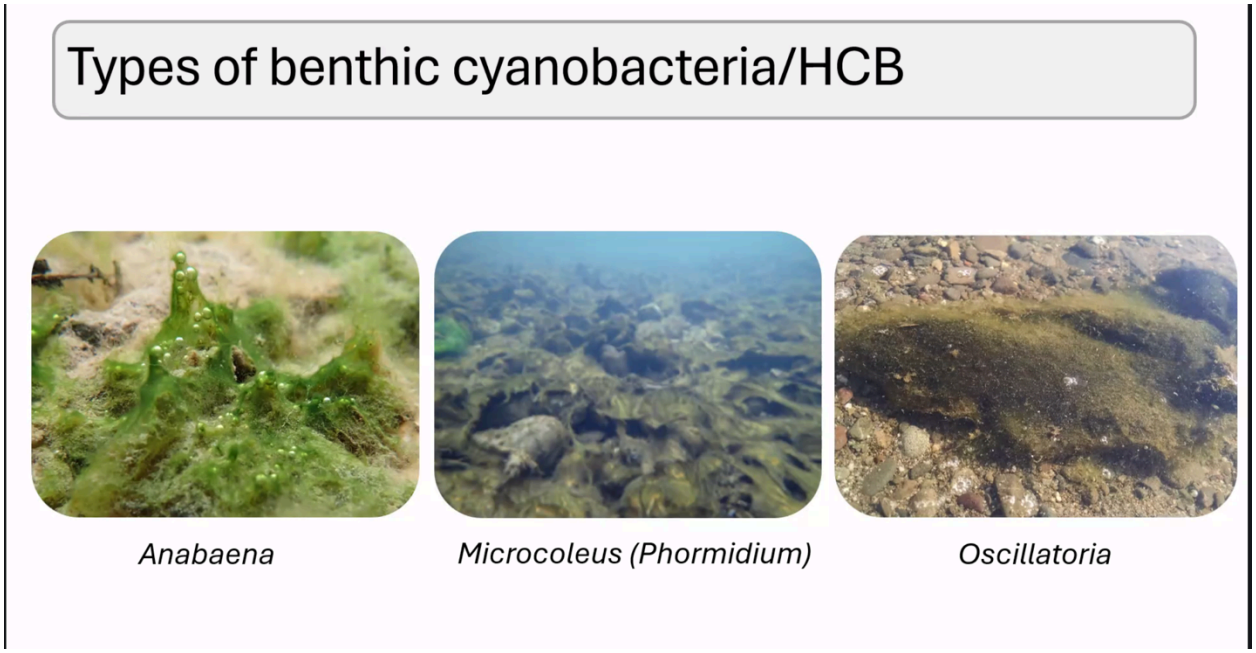
We responded to our community's concern about HABs in two ways:

1. 2012 VR Algae Nutrients TMDL Special Projects 7.4.3 provides that the results of special studies and monitoring may be used to revise numeric targets and allocations, if supported, when the TMDL is reconsidered.

   The BWTF joined the SWAMP program and monitored the presence or absence of algae mats for one year (2023 – 2024). In May 2025 BWTF members were trained to provide visual observations and perform microscopy identification of three species of concern per the new, revised February 2025 SWAMP protocol, July 2025 – September 2025.

2. In response to our community's concerns and questions about increasing HABs, the Surfrider Ventura County chapter invited Dr. Marcos Belmar Sandoval, a geophysicist from UCLA ATMOS, to present his 3-D climate change modeling research on HABs in the Santa Barbara Channel. Dr. Sandoval's presentation, titled "California's Toxic Spring," uses climate models to predict HAB occurrence off coastal Ventura County due to nutrient overloading from outfalls within the Ventura County watershed. https://youtu.be/aK3Kvm-aEnQ?si=JSmftoVKWhzKF1Ra

From visual observations, monitoring, and microscopy, the BWTF team identified three cyanobacteria SWAMP species of concern in the Ventura River at Big Rock Preserve (BRP) on July 7, 2025. The species *Anabaena, Microcoleus,* and *Oscillatoria* were present in samples and can be seen in the SWAMP training slide below. After follow-up conversations about these results, with the lead SWAMP scientist, Dr. Carly Nilson, we collected a composite algae sample, which was sent to the SWAMP lab in Sacramento, California.

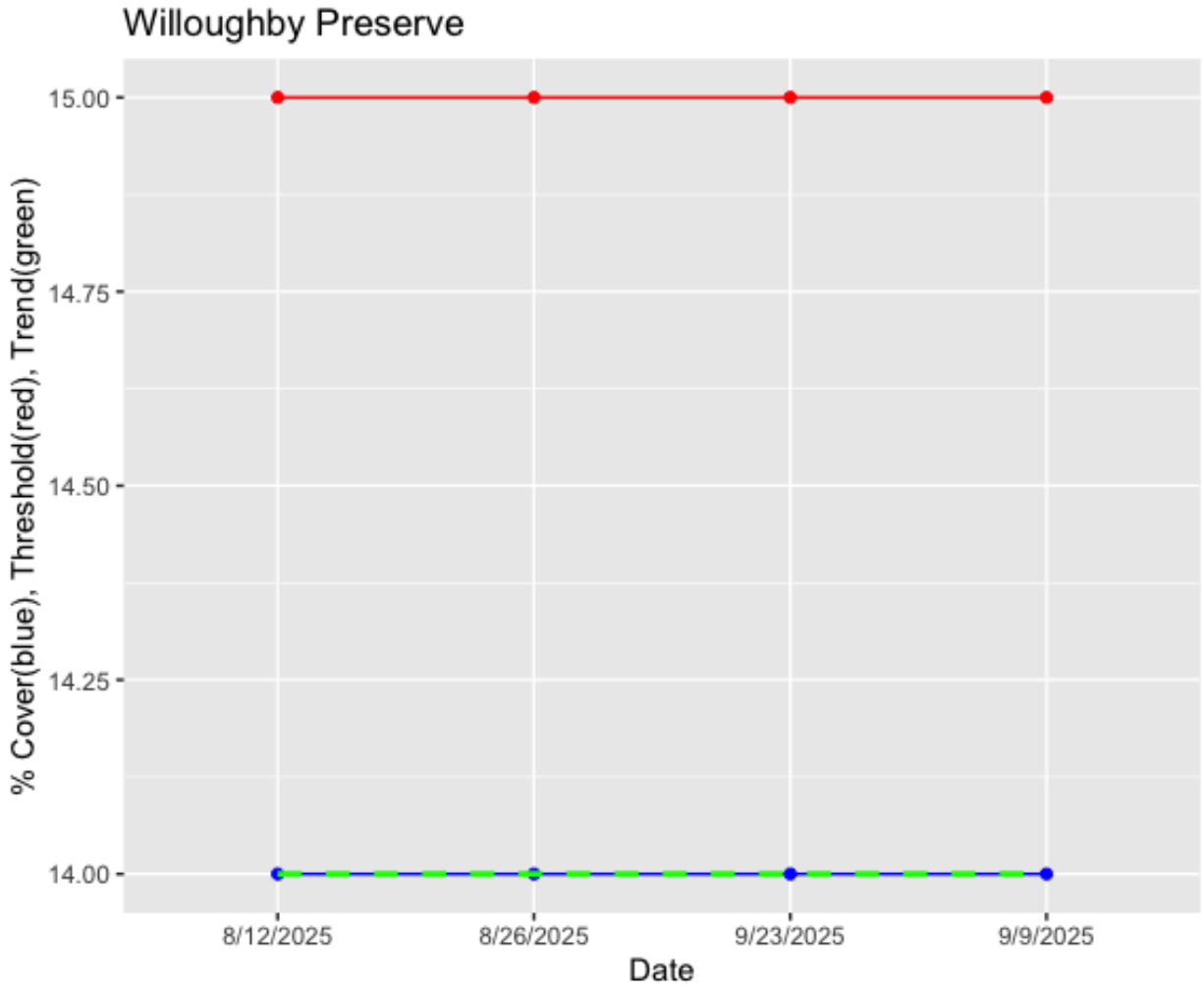



Our sample and subsequent data were provisional due to the heat of the sample container upon arrival at the Sacramento lab. However, the sample provided a snapshot of the presence of the Ventura River's cyanobacteria problem. The email from Dr. Carly Nilson citing the lab report can be found in **Attachment 1**, along with the lab report showing the presence of non-producing cyanotoxins.

While observation data and sampling may be limited, we observed that benthic algae mats containing the abundance of cyanotoxin, covered approximately 50 percent of the Ventura River. Recreational water usage near the Ventura Land Trust and two County park sites was high during observational months. In September 2025, the algal mats at some sites were disappearing, but reappeared after a small rain event in September.

SITE 1 – Ventura River – Willoughby Preserve

| Site | Willoughby Preserve | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Coordinates | 34.280824, -119.307519 | | | | | | | | | | | |
| Date | Time | Anabaena | Oscillatoria | Microcoleus | Total estimated cover | Water Temp (C) | Conductivity (uS) | Salinity (ppt) | pH | Total Suspended Solids (ppm) | Barometric pressure | Threshold 15% |
| 8/12 2025 | 8:55a | 0 | 0 | 1 | 14 | 22.5 | 2207 | 1.1 | 7.37 | 950 | 29.91 | 15 |
| 8/26 2025 | 9:10a | | | | 14 | 24.7 | 1535 | 0.7 | 7.4 | 1408 | 29.97 | 15 |
| 9/9 2025 | 8:50a | | | | 14 | 21.7 | 241 | 1.2 | 7.52 | 154 | 29.29 | 15 |
| 9/23 2025 | 9:46a | 0 | 1 | 1 | 14 | 22.6 | 240 | 1.21 | 7.57 | 172 | 29.87 | 15 |



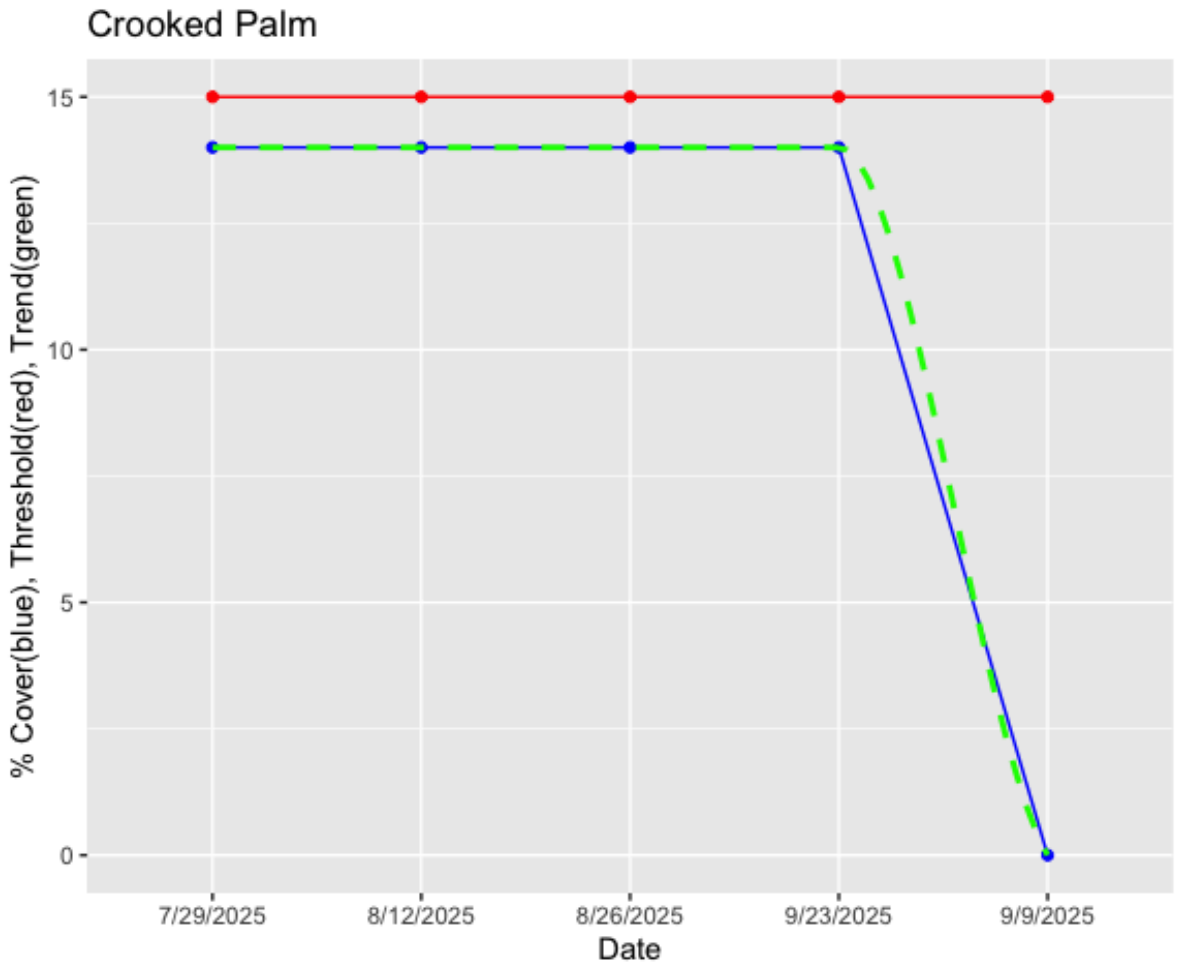
July 15, 2025

August 26, 2025

September 9, 2025

SITE 2- Ventura River – Crooked Palm Preserve (no public access)

| Site | Crooked Palm | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Coordinates | | 34.334515, -119.296382 | | | | | | | | | | |
| Date | Time | Anabaena | Oscillatoria | Microcoleus | Total estimated cover | Water Temp (C) | Conductivity (uS) | Salinity (ppt) | pH | Total Suspended Solids (ppm) | Barometric pressure | Threshold 15% |
| 7/29 2025 | 1:15p | 1 | 1 | 0 | 14 | 26.3 | 1170 | 0.58 | 8.35 | 831 | 30.09 | 15 |
| 8/12 2025 | 10:00a | 1 | 1 | 1 | 14 | 22.3 | 1025 | 0.062 | 7.7 | 881 | 29.91 | 15 |
| 8/26 2025 | 9:50a | 1 | 0 | 0 | 14 | 22.1 | 1170 | 0.58 | 7.82 | 828 | 29.92 | 15 |
| 9/9 2025 | 10:05a | 0 | 1 | 0 | 0 | 22.6 | 1203 | 0.6 | 7.67 | 856 | 29.29 | 15 |
| 9/23 2025 | 10:34a | 1 | 0 | 1 | 14 | 23.9 | 1169 | 0.6 | 7.86 | 859 | 28.86 | 15 |



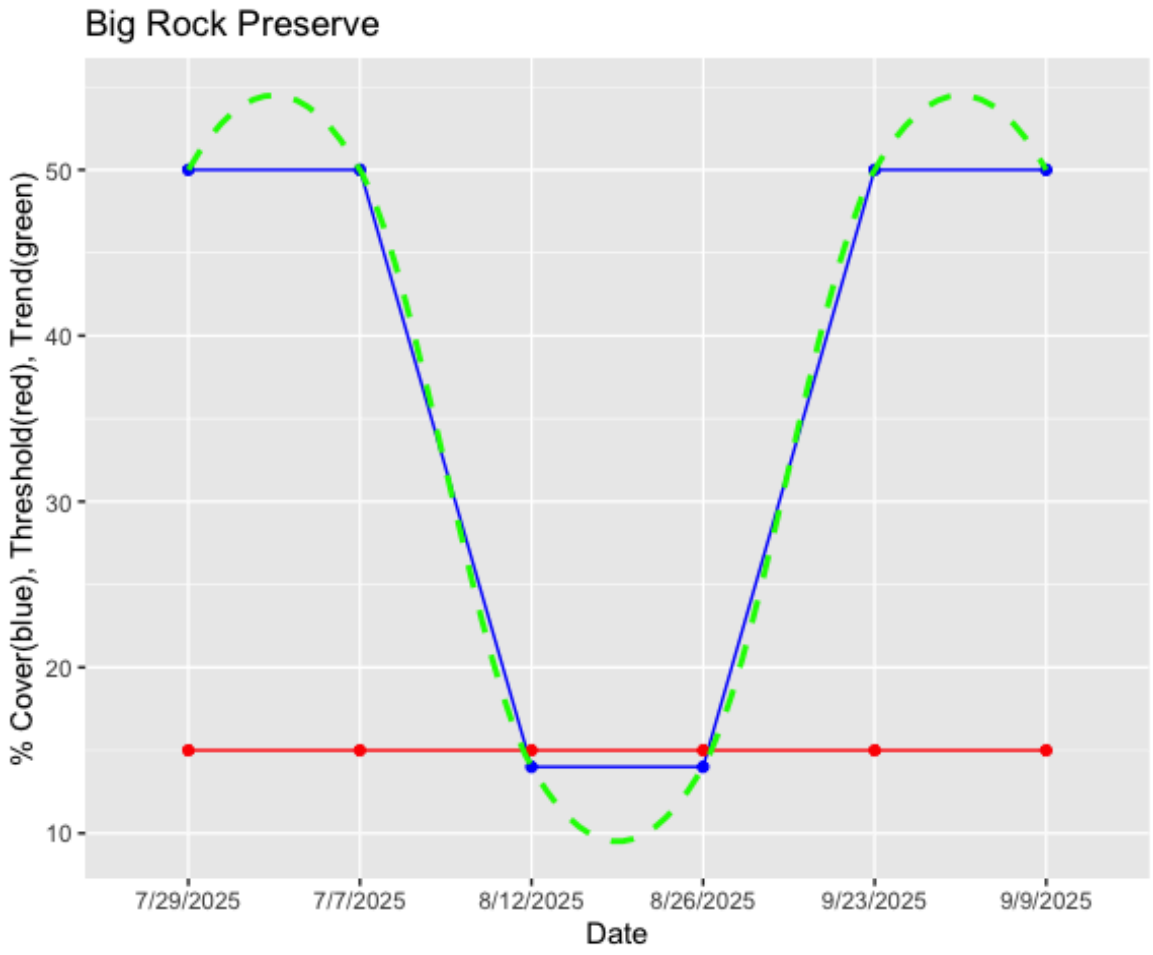
July 15, 2025

August 26, 2025

September 9, 2025

SITE 3 – Ventura River – Big Rock Preserve

| Site | Big Rock Preserve | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Coordinates | 34.350601, -119.304369 | | | | | | | | | | | |
| Date | Time | Anabaena | Oscillatoria | Microcoleus | Total estimated cover | Water Temp (C) | Conductivity (uS) | Salinity (ppt) | pH | Total Suspended Solids (ppm) | Barometric pressure | Threshold 15% |
| 7/7 2025 | 9:57a | 1 | 0 | 1 | 50 | 20 | 829 | | | 390 | 29.96 | 15 |
| 7/29 2025 | 9:40a | 1 | 1 | 1 | 50 | 22.8 | 1013 | 0.51 | 7.68 | 722 | 30.069 | 15 |
| 8/12 2025 | 10:40a | 0 | 1 | 1 | 14 | 23.1 | 1081 | 0.53 | 7.43 | 752 | 29.91 | 15 |
| 8/26 2025 | 10:10a | 1 | 1 | 1 | 14 | 23.5 | 962 | 0.48 | 7.64 | 686 | 29.92 | 15 |
| 9/9 2025 | 10:20a | 0 | 1 | 0 | 50 | 23.6 | 995 | 0.49 | 7.52 | 707 | 29.29 | 15 |
| 9/23 2025 | 11:19a | 0 | 1 | 1 | 50 | 24.7 | 980 | 0.49 | 7.46 | 691 | 29.85 | 15 |



July 7, 2025

July 15, 2025

August 26, 2025

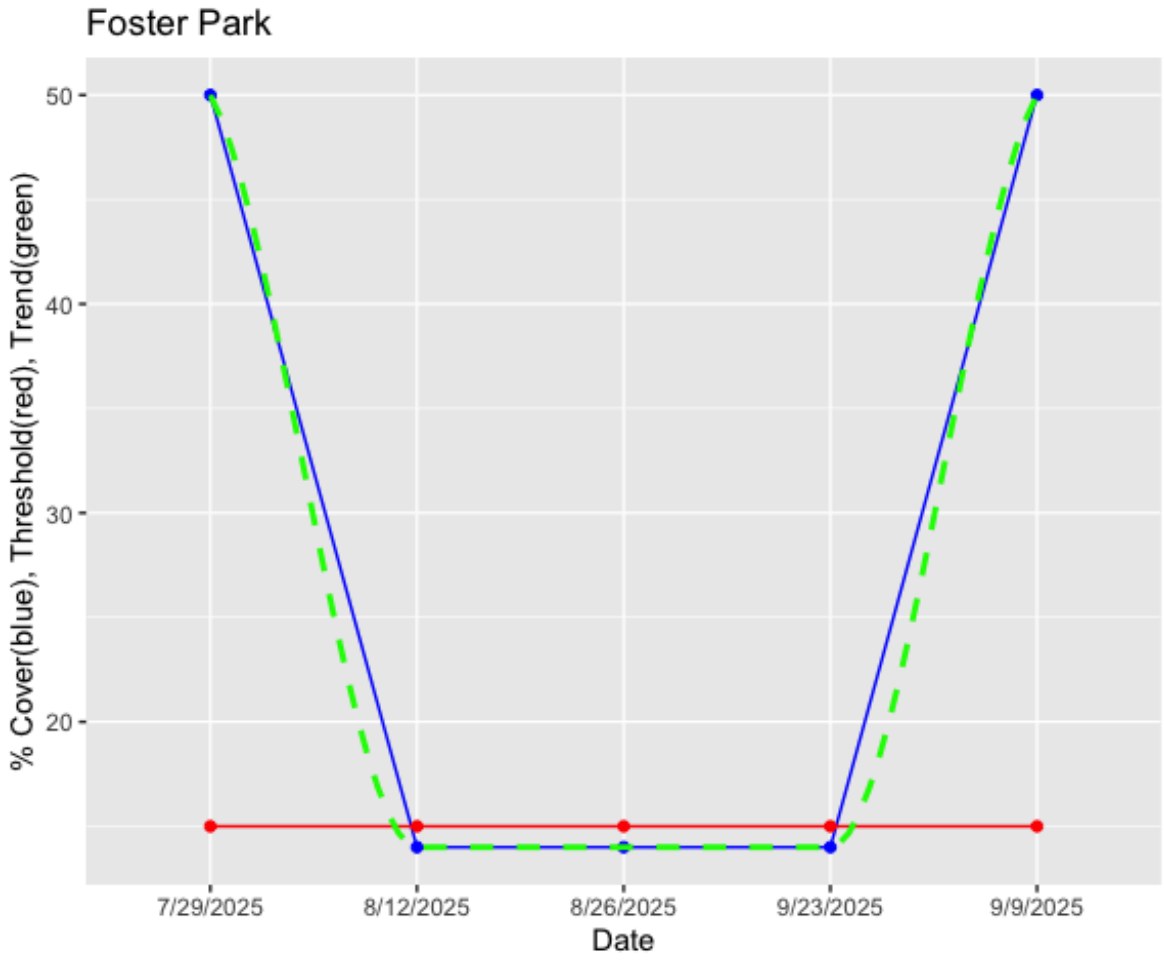
SITE 4 – Canada Larga Creek (River not in flow) – Hayward Preserve

July 15, 2025

July 15, 2025

SITE 5 – Ventura River – Foster County Park

| Site | Foster Park | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Coordinates | 34.21841, -119.183923 | | | | | | | | | | | |
| Date | Time | Anabaena | Oscillatoria | Microcoleus | Total estimated cover | Water Temp (C) | Conductivity (uS) | Salinity (ppt) | pH | Total Suspended Solids (ppm) | Barometric pressure | Threshold 15% |
| 7/29 2025 | 11:30a | 1 | 1 | 0 | 50 | 24.1 | 1003 | 0.51 | 7.5 | | 30.069 | 15 |
| 8/12 2025 | 11:10a | 0 | 1 | 1 | 14 | 24.5 | 984 | 0.49 | 7.18 | 978 | 29.91 | 15 |
| 8/26 2025 | 10:40a | 0 | 1 | 1 | 14 | 22.9 | 928 | 0.46 | 7.23 | 659 | 29.6 | 15 |
| 9/9 2025 | 11:55a | 0 | 1 | 0 | 50 | 23.1 | 967 | 0.49 | 7.26 | 682 | 29.32 | 15 |
| 9/23 2025 | 11:41a | 0 | 1 | 0 | 14 | 24.8 | 935 | 0.47 | 7.2 | 666 | 29.86 | 15 |



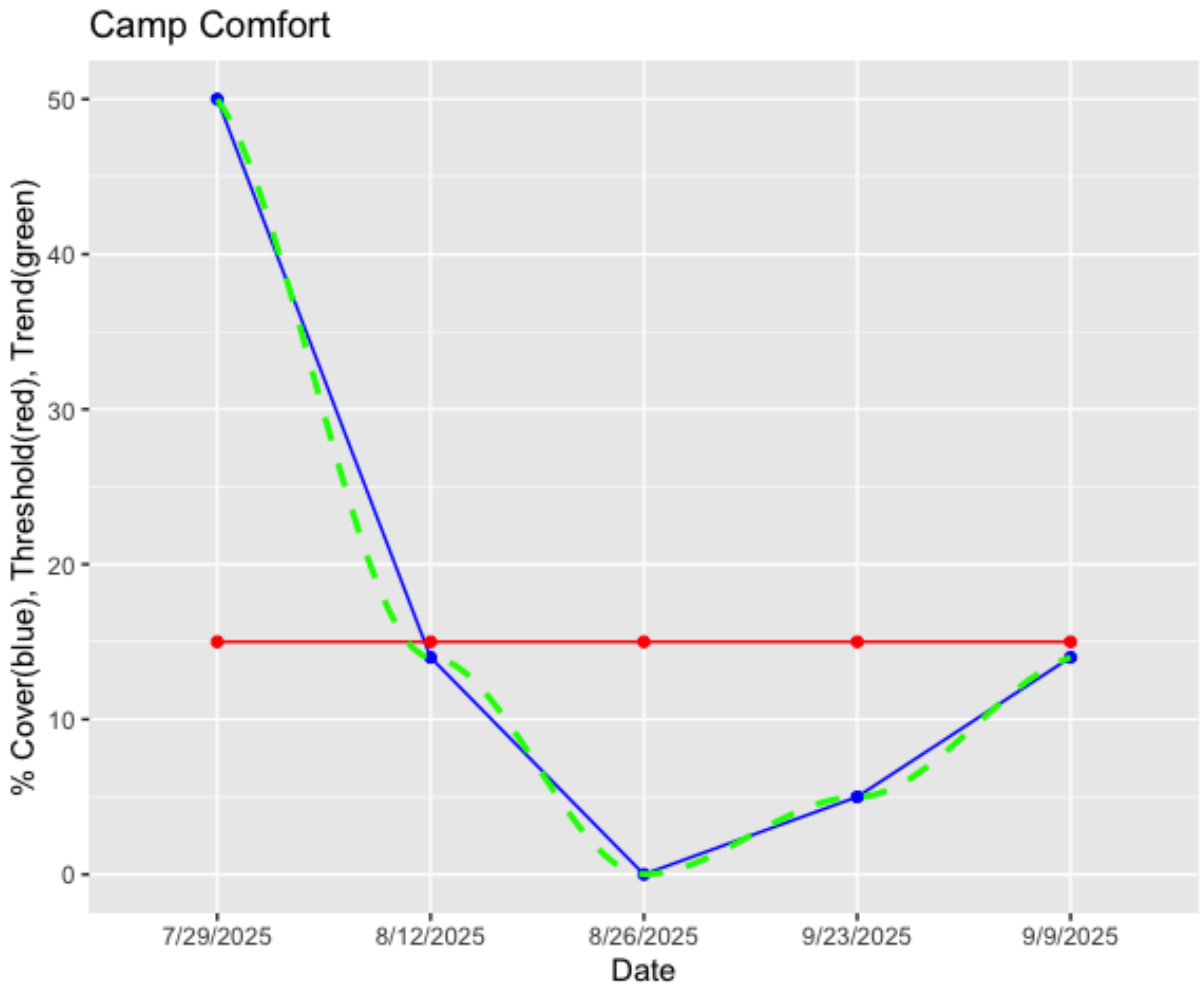

July 15, 2025


August 26, 2025


September 9, 2025

SITE 6 – San Antonio Creek – Camp Comfort County Park

| Site | Camp Comfort Park | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Coordinates | 34.4262298, -119.2595389 | | | | | | | | | | | |
| Date | Time | Anabaena | Oscillatoria | Microcoleus | Total estimated cover | Water Temp (C) | Conductivity (uS) | Salinity (ppt) | pH | Total Suspended Solids (ppm) | Barometric pressure | Threshold 15% |
| 7/29 2025 | 12:05p | 1 | 1 | 0 | 50 | 25.6 | 1284 | 0.565 | 7.6 | | 30.069 | 15 |
| 8/12 2025 | 11:52a | 0 | 1 | 1 | 14 | 26.1 | 1304 | 0.65 | 7.56 | 922 | 29.91 | 15 |
| 8/26 2025 | 11:20a | 0 | 0 | 0 | 0 | 27.7 | 1210 | 0.66 | 7.45 | 865 | 29.6 | 15 |
| 9/9 2025 | 11:55a | 0 | 1 | 1 | 14 | 24.5 | 1219 | 0.61 | 7.51 | 862 | 29.32 | 15 |
| 9/23 2025 | 12:20p | 0 | 1 | 1 | 5 | 24 | 1208 | 0.6 | 7.44 | 856 | 29.85 | 15 |



July 15, 2025

July 29, 2025

September 9, 2025

In reference to the 2012 VR Nutrient and Algae TMDL reconsideration by the staff at the LA Regional Water Quality Board, we respectfully recommend that staff consider these actions:

1. Add cyanobacteria identification monitoring and regular monitoring with an identified timeline per the 2012 VR Nutrient and Algae TMDL Section Receiving Waters Section 7.4.1 (noting that the prior TMDL did not differentiate between the taxa of algae that are non-toxin producing and toxin producing, nor established regular cyanobacteria monitoring timeframes).

2. Decrease nutrient nitrogen and phosphorus thresholds allowed per air, water surface temperatures.

3. Evaluate flux data vs. flow data. (Lydecker, 2013) which would test the per-pound status of stormwater runoff nutrients, integrating climate change models into TMDL data collection per the new EPA guidelines for more reliable predictions. The insertion of a climate change model might help to determine whether different nitrate concentrations influence algae growth under warmer temperatures.

4. Add more flow sites below the Ojai Valley Sanitation District to increase a range of data in the Ventura River.

5. Deploy SPATT technology below Foster Park, the Ojai Valley Sanitation District, to determine when present cyanobacteria have produced toxins.

6. Reporting by trained Ventura Land Trust and other community volunteers to log and assess algae mats in the SWAMP portal to create trending data. https://mywaterquality.ca.gov/habs/

7. Reduce DO/pH baseline to reflect 2025 Working Group data.

8. Maintaining a baseline of algae mat coverage not to exceed the 15 percent threshold established by the SWAMP SOP.

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APPENDIX A

Attachment 1- Email

Joy Downing Riley

Blue Water Task Force Coordinator | Surfrider Foundation Ventura County Chapter

bwtf@ventura.surfrider.org | http://ventura.surfrider.org

On Mon, Jul 14, 2025 at 3:12 PM Nilson, Carly@Waterboards <carly.nilson@waterboards.ca.gov> wrote:

Joy,

You reached out at just the right time. We just received the results this afternoon. I do want to highlight that the samples arrived at 18C and for lab processing, temperatures should be below 10C upon arrival. So, we consider this provisional data. So, make sure to pack those samples with lots and lots of ice packs. It gets warm going up to Sacramento.

Under microscopy, the sample contained a low amount of Microcoleus sp., Kamptonema sp., and Pseudanabaena sp., and a very low amount of Oscillatoria sp. If you want to learn more about what toxins these cyanobacteria can produce, I attached our cheat sheet chart for your reference. With qPCR (measures the gene copies of those genes that are capable of producing toxins [not all cyanobacteria produce toxins]), there were gene copies of anatoxin-a and saxitoxin, both known neurotoxins. But, the good news, no toxins were detected in the sample. So, although the cyanobacteria had genes capable of producing toxins, based on the sample results, they are not currently producing toxins.

So, for signage, I recommend you either keep up the current “toxic algae alert” signage to be conservative or replace it with “Check for Algae.” Let me know what you decide so I can make sure our HAB web map matches what is on the ground. Please reach out with any questions in terms of interpreting this data. I know it can be confusing.

Keep us updated as to anything you see tomorrow. And a huge thanks for your eyes on the ground in the Ventura watershed!

**Carly Nilson** (she/her)
Freshwater and Estuarine Harmful Algal Bloom Program Manager

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SURFRIDER FOUNDATION VENTURA CHAPTER

Blue Water Task Force Surface Water Ambient Monitoring Program (SWAMP) Team

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Meghan Woodbury, Environmental Science Graduate Student, Oregon State University

Mark Mueller, Field Research, Data Analytics, Strategic Communications

Chuck Carter, Field Research, Board Member Channel Islands Neighborhood Council