California Cyanobacteria Harmful Algal Bloom Network
March 9, 2020 (9 am – 12 pm) Meeting

Welcome/Introductions

Attendees (in person or remote participation): Christine Joab (WB R5), Sarah Ryan (Big Valley Band of Pomo Indians), Peggy Lehman (DWR), Keith Bouma-Gregson (State Board), Marissa Van Dyke (State Board), Eric (Fresh Water Trust), Beckye Stanton (OEHHA), Joe Westhouse (State Board), Alvina Mehinto (SCCWRP), Reggie Linville (OEHHA), Jayme Smith (SCCWRP), Carrie Austin (WB R2), Ali Dunn (State Board), Ashley (Internet of Water), Jeremy, Barbara (Restore the Delta), Steve (Limnotek), Rebekka Fine (Placer County Environmental Health), Damon Wyckoff (Calaveras Water District), Bev Anderson (State Board), Susan Fricke (Karuk Tribe), Jennifer Valu (Butte County), Hal MacLean (EBRPD), Carrieann Lopez (WB R1), Dave Caron (USC), Mary Fiore-Wagner (WB R6), Deborah (WB R8), Brad Wilkins, George Robertson, Jason Carter (WB DDW), Jerry Sipe, Josh Westfall, Katie Rian, Kelly Huck, Kelsey Moore, Kryssy Mache, Loreina Childress, Matt Smith, Rachel McNeal, Melanie Luis, Melissa Richard, Penelope Shibley, Steve Skripnik.

Announcements

- Nominations period closed with five candidates nominated, all of which declined. That in consideration, Sarah, Dave, and Beckye are willing to co-chair for another two years, however, if anyone has another person in mind to nominate, please do so but ensure the person is willing to accept. If willing nominees are brought forward, an election will be held. Otherwise, the co-chairs will remain the same for the next term.

Review of December Notes

- Christine inquiry RE logo request – are there any guidelines for stimulating designs? Contest? Incentivize with a contest prize? Maybe look into potential vendors?

Update on SCCWRP/SWRCB Freshwater Harmful Algal Blooms (FHAB) Ambient Monitoring Strategy Project, Jayme Smith, SCCWRP

- Develop a monitoring framework, research special studies, and implementation guidance
    - Monitoring framework = high level document that summarized CA's work on ambient HAB monitoring. Audience are California environmental managers
    - Research special studies = to fill in knowledge gaps.
    - Implementation guidance = programmatic document that can be used to apply the monitoring framework. Audience are waterbody managers and regional staff
- Consists of state programs, voluntary programs, and satellite/remote tools. State programs and voluntary programs have working drafts, lots of focus now on satellite/remote tools.
    - Statewide identification of overall extent and magnitude of FHABs in regions and state, what extent they are changing over time, which waterbodies are at risk, what environmental factors are commonly associated with water quality issues, and how enacting water quality improvement measures are reducing HAB occurrence. Focused on status, trends, and drivers.

    - Voluntary groups could monitor status and trends, extent of magnitude of FHABs in waterbody or waterbodies, and how they are changing overtime. Focused on REC 1 exposure, shorelines of lakes reservoirs, and wadeable streams. To be implemented by trained volunteers.
    - Remote sensing, what is overall extent and magnitude of FHABs in individual waterbody across larger spatial scales? What extent are FHABs changing over time? Focused on status, trends and drivers. Remote sensing goal is to define how current application tools can be improved. Specifically, group has been assessing current status of the remote program (strengths and weaknesses), recommend refinements, and additions to improve utility of the program. Determine which specific components could strategically enhance field-based programs.
- List of key improvements were provided, initial consensus on feasibility and value of impairment options with tech feedback about strategies to implement, outreach with managers is taking place and they are in the writing phase.
- Priorities can be summarized into three main themes –
    - increase documentation
    - standard methods for analyzing data and quality assurance
    - accessibility and ease of use of data.
- Managers would be able to use the tool to use remote sensing as a secondary line of evidence for waterbody management. It would be used to support field samples as the primary line of evidence. Remote sensing data will be secondary line of evidence. Management supports expansion of the use and additional application of RS data.
- Component of the FHABs project is that they are looking to provide hardcopy CCHAB advisory signs (danger, caution, trigger, and general awareness; English and Spanish versions). Working now to fabricate ADA compliant signs for the upcoming season. Quantity unknown, however, once complete they would like to distribute to agencies and discuss their efficacy after the season. Working on developing a contact list so please contact Jayme Smith at JAYMES@SWCCRP.ORG to receive more information.
- QUESTIONS
    - Sarah: RE the signs being based on CA trigger levels – since waterbodies have signs up at some locations, will the potential signs Jayme is providing conflict with CCHAB signage?
        - A: Multiple languages will be the only difference between the signs.
    - Christine RE signs: Regional Board HAB coordinators have contacts with other agencies, is it ok to send this solicitation out to health departments and water managers?
        - A: The team would like to work specifically with the waterboards. Further communications will be distributed and the whole network will be tapped into at some point (including health depts and water managers).
    - Sarah RE ease of use of remote sensing tools: They are tied to CEDEN data which is not comprehensive. Is another data source being considered such as Water Quality Exchange (WQX), the federal database?
        - Yes, that is one of the key components of increasing the ease of use of the tool.

- Christine: The CYAN group has created an android app for remote sensing. How does that application move forward with the whole US partner into the satellite tool that you are developing. Concern is confusing public with potentially conflicting tools.
  - A: relationship between CA and US Govt/CYAN is becoming stronger so this is something being considered.
- Christine: Would like Chl-a to be more prioritized. Water Managers were experiencing issues where the tool is not IDing HAB activity. Would like to be able to toggle between not only cyanobacteria but also some type of phytoplankton as phytoplankton/Chl-a.

SCCWRP Cyanotoxin Ecotoxicology Review Project, Alvina Mehinto, SCCWRP

- Rationale: Ambient monitoring suggests an increase in HABs. REC guidance has been developed (values) to protect humans and animals. Little is known about aquatic organisms affected by cyanotoxins. They are exposed to prolonged toxin exposure.
- Landed to two questions which then led to goals to provide scientific basis for determining cyanotoxin thresholds protective of aquatic life. Objectives are to review ecotoxicity data for cyanotoxins, determine whether thresholds are protective of aquatic organisms, and provide research and management recommendations.
- Approach is to develop a Technical Advisory Group, conduct systemic review of ecotoxicity data of cyanotoxins in freshwater, compare available effect concentration data to existing human REC guidelines, and convene a workgroup of tech experts to ID key gaps in research recommendations.
- Workgroup consisted of Alvina Mehinto, Jayme Smith, Regina Linville (OEHHA), Bryan Brooks and Meredith Howard (CVWQCB)
- Systemic review: reviewed over 150 different articles, most were on microcystin (LR congener) and aquatic invertebrates. Selected a subset of studies for subsequent meta-analysis.
- Meta-analysis showed no mortality of aquatic organisms, however, biochemistry and behavior were affected even with the LOEC (lowest observable effect concentration)
- Next steps are to produce manuscript summarizing the results of systemic review and meta-analyses of concentration data, convene a TAC to ID key research needs and generate data for development of thresholds protective of aquatic life, and lastly to provide periodic updates to CCHAB.
  - QUESTIONS: Is avian data being considered?
    - No because the inclusions/exclusion criteria prevent that. Also, this is an exposure metric and since avian bioaccumulation data doesn't represent exposure, the data cannot be used.
  - Were the studies evaluated CA-specific, US-specific, or global? Question applies to organisms as well.
    - Most of the studies were in Europe. Some were environmentally relevant, however, most were lab-based studies.

[BREAK]

Benthic HAB Signage Committee, Keith Bouma-Gregson, SWRCB

- Need for benthic signage is that there is a lack/minimal messaging for incidents when benthic cyanobacteria are present or suspected.
- Differences between benthic and planktonic have been discussed. Benthic = clear water, occur during fast or slow flows, can be attached, floating, stranded on shore, potentially invisible from shore, there are no numeric trigger levels for mats.
- Best measure of toxin is µg toxin/g of mat, whereas threshold are µg/L of water
- Work began in December – now in March 2020 they are here to present the signage in hopes for approval and posting of signage across the state. Then in the fall they will begin working on fact sheet and visual guide and distribute, then hope to get to analyses of signage efficacy and report out at the end of 2020.
- Process: Reviewed other signage from other states and countries, and how they are communicating planktonic blooms as well as benthic mats. New Zealand seemed to be the only entity that has benthic signage. Otherwise there weren't too many other places with signage. Other decisions were number of signs to designs, layout, colors, languages, advisories. Settled on two different types of signs – general awareness sign which can be posted for extended periods of time, other is a trigger level sign specifically connected to a trigger level and posted when level is hit/removed when toxin level reduces.
- Included images to assist public in IDing the mats, and provide info on practices to avoid exposure.
- Trigger for benthic mats is visual confirmation or detection of cyanotoxins within mat material, not overlying water. Can be de-posted when indicators are gone, and can be placed alongside general awareness signs
- Considerations were that children and dogs are most at risk, therefore focused on primary exposure route, avoided differentiation between toxigenic vs nontoxigenic to avoid public confusion, limited information on impacts of toxins, limited space was a factor for the considerations.
- QUESTIONS: How do you keep toxins between planktonic and benthic separate?
    - It is common to get non detects in water over benthic mats, however, during times when water does test positive, a review of the data shows that it does not reach CCHAB caution trigger levels
- CONCERNS: Mixing events can increase toxin levels in the water so swimming amid toxic mats is worrisome, language is not as universal as caution for non-English speaking people, different languages are needed in addition to Spanish, including an area where there is a date when sign is posted, as well as a space to write in a phone number for public to contact the local water agency. QR Codes maybe? CDPH did a two-cycle analysis of sign efficacy with the original CCHAB signs – Marissa Van Dyke will provide the detailed notes.
- Provide a link to conduct a survey to gather feedback on these signs to gather feedback to apply later. This first posting season will be a pilot run.

HAB Portal Incident Map Update

- Interactive map that shows where current advisories are. A new map is being proposed. Caters more to the general public rather than just water managers. Default for the map is program to just the current year, rather than all years shown at once. Dropdown menu options have been

reduced, and added the size of the bloom and how long since bloom last verified. Incident table has been more updates. Wider rows, larger font. Columns were organized by Regional Board in the past, they are now organized by county. WB name and advisory level are included, also verification. A "None" feature has been added. Blooms change over time so the timing information has been added to the current advisory color scheme. "See incident details" has also been added to add information that doesn't fit the field categories.

Mitigation Subcommittee Update

- Sites selected from HAB portal will be discussed next week at Mitigation Subcommittee
- Welcome Katie Fong to Committee

HAB Related Illness Workgroup

- Since December meeting, one dog death in region 7 occurred.
- Internal resources to help guide illness investigations have been developed
- Coordinate with California poison control system and exploring potential data use agreements with CDPH to share information on calls regarding human HAB exposure
- Provide outreach to HAB related illnesses. May create a 1-page fact sheet and provide clinician resources adapted from Ohio DOH.

Updates from Water Board Regional HAB Coordinators and Routine Monitoring program

- REGION 1: There have been no cyano activities in our Region since our last meeting. We have had a few satellite hits, but field inspections have shown that ice has formed on the lakes in question and provided us with false positives.
- REGION 2: recent cooler weather may help limit bloom activity
- EAST BAY REGIONAL PARKS:
    - Still doing weekly updates, appreciate proposed updates incident map
    - Quarry lakes have toxins – last 2 weeks have been better, bloom at lake Anza with high toxin levels confirmed with strips but lab samples had non detects, Lake Chabot bloom is turning blue and white, oxygenation system installed this spring; phosphorus levels are rising across the board, proposing Lake Temescal have alum treatment this summer; question regarding kayaking risk assessment for Big Break,
    - Lake Del Valle bloom activity near dog areas and drinking water intakes. Seeing Aphanizomenon however no toxins.
- REGION 3: Not much activity, gearing up for spring monitoring
- REGION 5
    - Clear Lake: monthly monitoring, next event this coming week; switch to more frequent in May; qPCR for toxin genes; UCD study also occurring
    - Region 5: Not much activity. Fresno staff went to Hensley and HV Easton lake where Microcystis and woronochinia were detected. Army Corps has posted signage, no toxin analysis.
    - Lake Isabella and Lake Webb monitoring by Kern County, some detects of anatoxin-a and cylindrospermopsin. Lake Berryessa had some areas with scum/mat at shoreline with aphanizomenon and benthic (Phormidium/oscillatoria).
    - Folsom Lake – plankton tow by WB, filaments of dolichospermum

    - Hosting 2 workshops for HABs – 2 day events with first day being focused on efforts and working being done
- DWR
    - As for an update on DWR State Water Project HAB monitoring, we are in the off-season for our monitoring program so there is not much to report. We plan to resume routine monitoring in April at some sites important to water delivery (pumping plants, reservoir outlets) and at recreation areas in May, prior to Memorial Day Weekend.
    - Lake Gregory had Danger trigger level of toxins
- REGION 6: San Bernardino and Red Lake investigations; laminar flow for aquatic weeds at Tahoe Keys
    - Working with Alpine watershed group on how they developed their HAB monitoring program
- REGION 7: EcoAnalyst conducting taxonomy for Imperial Wildlife Area Wister Unit monitoring; also plan temporal and spatial trends study at constructed wetlands that also receive Colorado River water following ag drainage
- REGION 8: Generally no activity. Monitoring Satellite Imagery. Big Bear shows warning from satellite but it was due to ice. Lake Elsinore still at Danger level, bloom throughout winter; TMDL program will add cyanotoxins this spring
- REGION 9:
    - All 2019 bloom reports were resolved, except for one. Lindo Lake is a small (non-contact) lake in a San Diego County Park, which gets a lot of visitors who fish and walk around the lake with their dogs. It's shallow due to sedimentation, is always a pea soup color and has a history of high levels of microcystins. They have information about cyanotoxins on their website and permanent signs posted advising people not to swim, bathe, drink or cook with the water, and not to let pets go into or drink the water. For fishing, it states not to eat fish intestines and to rinse filets with clean water prior to cooking. The lake is scheduled undergo restoration this year (completed in summer 2021).
    - We followed up on two satellite bloom notifications this year so far.
    - Lake Henshaw turned out to be experiencing a *Planktothrix* bloom when we visited in early February, which was tricky to see since it's faint in color, but was found in the locations illuminated by the satellite. The southwestern shoreline was above the Caution level for Microcystins, and Vista Irrigation District posted signs. The Irrigation District conducted follow-up sampling, which was analyzed by Bend Genetics. The values dropped to below Caution levels, and they were able to remove the signs the first week of March. We will be keeping a watch on the lake for bloom activity.
    - We received bloom notifications for both Diamond Valley Lake and Lake Skinner in mid- to late February, which are connected via the San Diego Aqueduct (transports water from Diamond Valley Lake to Lake Skinner) and managed by Metropolitan Water District. Riverside County Regional Park staff offered to give us a boat ride to the portion of Lake Skinner that was showing bloom activity on the satellite (at the aqueduct discharge point). Although the imagery still showed a bloom, the water was clear when we visited on 2/28. We then learned from the park staff that Metropolitan Water District had filled Lake Skinner two weeks prior, closed the aqueduct for cleaning

and had recently started releasing the water back into the lake. We must have just missed the bloom that was flushed out by the cleaning activities. We did receive a bloom notification the following week, but the pixels in the image all look to be black/no bloom.

- Morena Reservoir - follow up on satellite notification next week