

Item 5 LATE ADDITION

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION**

**MEETING OF NOVEMBER 15-16, 2017
SOUTH LAKE TAHOE**

ITEM 5
EXECUTIVE OFFICER'S REPORT

*****Please insert the following enclosure to Item 5

ENCLOSURE	ITEM	Bates Number
26	Addition to October 2017 Executive Officer's Report	5-166

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ENCLOSURE 26

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ADDITION TO OCTOBER 2017 EXECUTIVE OFFICER'S REPORT

Incidence of Harmful Algal Blooms Increasing throughout the Lahontan Region

- Mary Fiore-Wagner

Cyanobacteria are naturally present in waterbodies. The cyanobacteria are an integral part of the ecosystem and food web and help maintain the health of most freshwater and marine ecosystems. However, the extended periods of drought and warming trends that have plagued California in recent years have created an excessive growth of cyanobacteria. Warmer air and water temperatures, high nutrient levels, and slow and stagnant water have caused cyanobacteria (also known as blue-green algae) to rapidly multiply into harmful algal blooms (HABs). HABs can consist of both toxic and non-toxic algae. Toxic HABs can produce excessive amounts of cyanotoxins (e.g., microcystins, Anatoxin-a) potent enough to threaten the safety of humans, wildlife, and pets sometimes to the point of causing serious illness or mortality. Non-toxic algal blooms have impacted beneficial uses of water by reducing the aesthetics, imparting unpleasant tastes and odors to water and fish, and by reducing dissolved oxygen levels.

California's Water Quality Monitoring Council created an online [HAB portal](#) to share cyanobacteria data, HAB maps, and guidance for public advisories. The HAB portal provides resources for staff and the public to allow a more efficient and coordinated approach for the monitoring, reporting, and management of HABs in California.

Our staff has increased its knowledge of HABs by attending workshops and trainings on HAB microscopy identification and sampling, and through participating in monthly freshwater HAB phone calls with representatives from the State Board and each Regional Water Board. The following photos show a typical field microscope used for cyanobacteria identification and some of the cyanobacteria found in samples collected from the Lahontan Region.

Photo 1: [VWL](#) staff observing cyanobacteria under a field scope, **Photos 2-4** show photomicrographs of dominant species of cyanobacteria found in samples collected from surface waters in the Lahontan Region.



Photo 1: Field Microscope



Photo 2: [Dolichospermum](#)

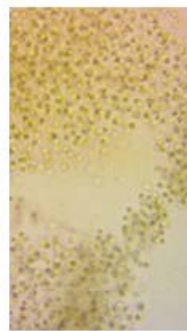


Photo 3: [Microcystis](#)



Photo 4: [Woronochinia](#)

Compared to 2016, we received more reports in 2017 of algal blooms throughout the Lahontan Region that have impacted surface waters and reservoirs at elevations ranging from 3200-7200 feet and located as far south as San Bernardino County and as far north as Lassen County. Staff's response and continued involvement has varied for each HAB event depending on the severity and duration of the algal bloom, and the level of exposure to recreational users, domestic pets, and livestock.

Staff response has included a combination of (1) site reconnaissance and field testing to confirm an algal bloom, (2) microscopic identification to confirm the presence of cyanobacteria cells followed by additional laboratory testing to determine the presence and concentration of toxins, (3) outreach to public health officials and affected water users, and (4) guidance to lake managers regarding the appropriate advisory level to post to protect the public. Staff recommended posting Caution, Warning, or Danger level advisories based on guidance provided on the HAB portal and consistent with [health trigger levels](#) established for the protection of human health by the Office of Environmental Health Hazard Assessment, California Department of Public Health, and the State Water Resources Control Board. Throughout each step, staff collaborated closely with State Board freshwater HAB staff.

HAB Affected Waters in our Southern Region. Starting as early as May 2017, the Lahontan Region experienced its first report of a HAB impacting Silverwood Lake in San Bernardino County. Similar to last year, routine sampling and analysis conducted by the Department of Water Resources (DWR) indicated levels of microcystins above the State's Water Board's recommended levels established to protect human health for recreational waters. To protect the public, California State Parks (State Parks), which manages recreation at Silverwood Lake, posted advisory signs and issued press releases to warn recreational users of the potential risk. Also similar to last season, DWR operated under its existing Lahontan Water Board issued prohibition exemption to apply the aquatic algaecide copper sulfate to treat the affected portions of the lake, so safe levels were maintained and recreational uses were restored.

Other lakes in the southern portion of our region that reported HAB events included Diaz Lake, Lake Gregory, and Green Valley Lake. Staff coordinated with Inyo County Environmental Health Department, San Bernardino Parks and Recreational Department and County Environmental Health Services, and Green Valley Lake staff to coordinate site visits, sampling, and posting of health advisories for each affected lake. Since analytical results for both Diaz Lake and Lake Gregory indicated low levels of cyanotoxins, staff recommended each lake be posted with a caution level advisory consistent health triggers. Though the laboratory results for Green Valley Lake were never provided to staff, a correspondence sent to Victorville staff from Green Valley Lake management indicated that the lake had been treated with an algaecide to control the algae. Staff is not aware that representatives from Green Valley Lake applied for an exemption to the pesticide prohibition to permit this reported discharge of an aquatic pesticide.

HAB Affected Waters in our Northern Region. Though no HAB events associated with northern region surface waters were reported to the HAB portal during 2016, between June – September 2017, staff responded to six HAB related events in surface waters from Mono Lake to Rim Rock Lake located at 7000 feet in Lassen County's Caribou Wilderness area.

The visual observations and/or results from field toxin detection test kits, microscope identification, and laboratory analysis performed for Mono Lake (Mono County), Red Lake (Alpine County), Taylor Creek (El Dorado County), and Rim Rock Lake (Lassen County) did not indicate the presence of cyanobacteria, but instead appeared affected by a non-toxic, nuisance algal bloom, so no further investigation was recommended.

Tahoe Keys Lagoons. In August, complaints from concerned citizens who reported blue-green surface scum floating in the Tahoe Keys lagoons prompted staff to investigate several water front properties located in the Tahoe Keys (a manmade system comprised of over 700 acres of

waterways). The following pictures taken on site showed a spilled-paint look, which is a typical appearance of cyanobacteria when it is releasing toxins.



Field visits verified the presence of site indicators of cyanobacteria (blue-green color, floating scum, visible algal mats) throughout the Tahoe Keys West Lagoons. Additionally low levels of cyanotoxins (Anatoxin-a and microcystins) were confirmed by an independent genetics laboratory in samples collected by staff and the Tahoe Keys Property Owners Association (TKPOA). Based on these triggers, Water Board staff recommended the TKPOA advise people, who may be recreating in the impacted water, of the potential health risk. TKPOA posted caution signs throughout the Main Lagoon and also reached homeowners by email, social media, and the [TKPOA Weed Management website](#). The recommendation to post a Caution level advisory was consistent with [health triggers](#) for recreational lakes.

Throughout August and September, staff coordinated with TKPOA, State Board, and USEPA-Region 9 to continue monitoring the HAB event occurring throughout the Tahoe Keys Lagoons. Though toxins were continually detected, levels were never elevated above concentrations that required more than a caution level advisory. The toxin levels detected did not trigger restrictions of recreational activity in the Keys waters. However, the results indicated low levels of Anatoxin-a (a neurotoxin), so staff recommended TKPOA warn the public about the potential risk posed to domestic pets (dogs) because a pet's potential exposure is much greater than it is for a human. When a dog enters water impacted by the cyanobacteria, the dogs can be exposed to the toxins if the dog ingests the water, licks its fur (toxins remain on a saturated coat that then dogs lick), or swallows a glob of algae or scum.

Caution signs throughout the TKPOA community remain in place today. TKPOA staff collected samples on September 18, 2017 and analyzed the samples at a commercial laboratory and sent duplicate samples for analysis at a USEPA laboratory. Both sets of laboratory results indicate cyanotoxin levels continue to decrease throughout the Tahoe Keys Lagoons, as compared to samples collected and analyzed in late August 2017. The EPA laboratory results indicate non-

detectible levels of microcystins (toxins associated with cyanobacteria) in nine of the thirteen samples collected. The four of thirteen sites that had measureable levels of microcystins, had microcystin concentration levels below the Caution level health trigger.

The TKPOA will continue to monitor the HAB event. Since some of the environmental conditions that favor cyanobacteria growth are decreasing with the onset of colder temperatures this Fall and Winter, it is expected the algal bloom and any associated toxin levels will dissipate.

Harvey Place Reservoir. In September 2017, the South Tahoe Public Utility District (District) staff alerted Staff to a HAB incident. District staff observed algal scum, collected samples, and identified microcystis under a microscope in water collected from Harvey Place Reservoir. Located in Alpine County, Harvey Place Reservoir is a constructed storage reservoir that holds filtered secondary treatment wastewater from the District's treatment plant. Water from Harvey Place Reservoir is released into a conveyance system that provides recycled wastewater to downstream agricultural users.

Once the District reported the presence of microcystis cyanobacteria, staff recommended the District collect water samples to verify the presence, if any, of toxins and to advise downstream users of the potential risk to domestic pets and livestock that may come in contact with the affected water. Samples were collected from Harvey Place Reservoir and from two locations along the irrigation ditches. Results for the reservoir indicated high levels of microcystins that would prompt staff to recommend a danger level advisory if the Harvey Place Reservoir was used for water contact recreation. Since public access to Harvey Place Reservoir is restricted, and fencing and steep terrain prevent livestock access, advisories were not posted at the reservoir. Levels of cyanotoxins were detected in the irrigation ditches, and though concentrations were significantly lower than those measured in the reservoir, a caution level advisory for downstream users was recommended. The District is continuing to collect and analyze water samples to monitor the HAB incident and the concentration of toxins.

Next Steps. Under future climate scenarios, it is likely HABs may worsen since global temperatures are expected to warm providing optimal conditions for growth of cyanobacteria. Regional and State Board staff acknowledge that additional staff resources will be needed to respond to HAB events that are expected to increase in abundance and frequency. To meet this increasing need, the State Board is proposing a request for additional resources to improve response to HAB events at the regional and statewide level.

Additional information on harmful algal blooms can be found on these State Water Resources Control Board and Department of Public Health websites:

http://www.mywaterquality.ca.gov/monitoring_council/cyanoHab_network/index.html.

<http://www.mywaterquality.ca.gov/habs/index.html>

<http://www.cdph.ca.gov/healthinfo/vironhealth/water/Pages/Bluegreenalgae.aspx>