Big Valley Rancheria
Clear Lake Cyanotoxin Monitoring Program

The Big Valley Band of Pomo Indians began a cyanobacteria and cyanotoxin monitoring program on Clear Lake in 2014 with another shoreline Tribe, Elem Indian Colony. Together the two Tribes have collaborated with equipment, resources and time to test the water for toxins produced by cyanobacteria (AKA "Blue Green Algae"). These toxins can be neurotoxins, liver toxins and skin toxins. The Tribes began this program because despite the fact that Clear Lake had thick, noxious blooms covering its surface every summer since 2009, there was no regular and active monitoring of these blooms for the cyanotoxins that the California Office of Environmental Health Hazard Assessment had reviewed and suggested Action Levels for in 2012, and for which the World Health Organization provided guidance regarding exposure in the 1990's. https://www.waterboards.ca.gov/water_issues/programs/peer_review/docs/calif_cyanotoxins/cyanotoxins053112.pdf

After a fish kill and Clear Lake's waters turning milky turquoise blue during Labor Day 2014, Big Valley and Elem EPA staff followed the protocol in their surface water Quality Assurance Plans visited 8 shoreline sites on Clear Lake. Field measurements of the water quality were taken, and samples were collected for a regional lab which conducted cyanotoxin analysis. The lab results were astounding, with microcystin (a liver toxin) levels of almost 17,000 micrograms per liter at one site 100 feet from the intake of a major drinking water for Lake County residents. For reference, OEHHA has recommended caution at any levels above 0.8 micrograms per liter. The Tribes quickly convened a Clear Lake Cyanobacteria Task Force to meet with Tribal, Lake County, California and USEPA agency staff to discuss the results and formulate actions. This Task Force continues to meet, review and discuss data and trends, and develop proactive projects to protect the beneficial uses and all those who enjoy and utilize the many gifts of Clear Lake.

Since that time, the Tribes have increased their number of monitoring locations to 20 sites along the Clear Lake shoreline, and are now collaborating with the California Department of Water Resources to obtain samples in the center of each arm of the lake, providing an enhanced view of the cyanotoxin issues throughout the lake. Big Valley Rancheria also obtained 2 grants from CalEPA – one to add sampling locations that are important to all the Pomo Tribes, and to sample prior to traditional uses of the lake, to ensure that the Tribes receive toxin information so that they can make informed decisions about uses. The second grant is currently in process and is a study on whether Tribally important fish and shellfish contain cyanotoxins. Fish and shellfish have been collected from various locations and throughout different seasons to identify aquatic organisms that may have toxin levels that could impact Tribal subsistence consumption.

Big Valley and Elem EPA staff regularly post the cyanotoxin results and other lake monitoring details on a social media page which is shared with the whole Lake County community and has been an

important resource that is quoted by the Central Valley Regional Water Quality Control Board and the County to inform lake users. The posts about the current cyanotoxin levels reach thousands of viewers and generate discussion about health, watershed management and nutrient controls. A recent video of kayaking down one of the creeks and doing cyanotoxin monitoring had over 20,000 views. https://www.facebook.com/ClearLakeWaterQuality/

How Often Did Clear Lake Cyanotoxin Monitoring Sites Exceed the Microcystin Threshold for Potential Health Risks?

0.8 micrograms per Liter (µg/L) is the CCHAB recommendation for public notification of microcystin cyanotoxins at potential health risk levels http://www.mywaterquality.ca.gov/monitoring_council/cyanohab_network/docs/triggers.pdf

		PERCENTAGE OF TIMES EACH SITE EXCEEDED 0.8 µg/L EACH YEAR (PUBLIC NOTIFICATION THRESHOLD FOR MICROCYSTIN)				HIGHEST MICROCYSTIN LEVEL RECORDED AT EACH SITE EACH YEAR * *Red cell is highest value for Clear Lake each year*			
SAMPLING SITE ID	ARM OF LAKE	2014	2015	2016	2017	2014	2015	2016	2017
BVCL6	U	17%, n=6	0%, n=20	0%, n=9	0%, n=8	1.2	ND	0.14	0.21
CLV7	U	86%, n=7	0%, n=13	0%, n=9	13%, n=8	105	ND	0.34	3.5
M4	U	33%, n=6	0%, n=14	not sampled	not sampled	8.3	ND	not sampled	not sampled
LPTNT	U	83%, n=6	0%, n=12	0%, n=9	0%, n=8	877.6	ND	0.17	0.14
RODS	U	not sampled	0%, n=12	0%, n=9	0%, n=8	not sampled	ND	0.15	0.11
CP	U	not sampled	0%, n=11	0%, n=9	0%, n=9	not sampled	ND	0.16	ND
LS	U	not sampled	0%, n=11	0%, n=9	not sampled	not sampled	Trace	0.11	not sampled
LS2	U	not sampled	not sampled	not sampled	0%, n=3	not sampled	not sampled	not sampled	0.12
LUC01	U	67%, n=6	0%, n=13	0%, n=9	0%, n=8	13	ND	0.14	ND
HB	U	not sampled	0%, n=9	0%, n=8	0%, n=8	not sampled	Trace	0.12	0.35
KP01	U	not sampled	0%, n=12	0%, n=9	0%, n=8	not sampled	ND	0.15	0.34
ELEM01	O	50%, n=4	29%, n=14	not sampled	0%, n=7	4.4	18.7	not sampled	0.38
SBMMEL01	O	100%, n=7	20%, n=10	0%, n=9	25%, n=8	5,311.70	278	0.67	2.4
CLOAKS01	O	100%, n=7	31%, n=16	0%, n=9	13%, n=8	16,920	21	0.16	46.00
GH	O	not sampled	not sampled	not sampled	0%, n=6	not sampled	not sampled	not sampled	0.2
BP	L	not sampled	27%, n=11	0%, n=9	13%, n=8	not sampled	9.4	0.16	1.3
RP	L	not sampled	33%, n=10	0%, n=9	13%, n=8	not sampled	134	0.13	1.2
SHADY01	L	not sampled	40%, n=10	0%, n=9	0%, n=8	not sampled	36.1	0.34	0.39
RED01	L	not sampled	33%, n=12	0%, n=9	0%, n=8	not sampled	65.5	0.28	0.44
AP01	L	100%, n=9	41%, n=17	0%, n=9	0%, n=9	769.2	10,162	0.21	0.52
JB	L	not sampled	not sampled	0%, n=9	0%, n=8	not sampled	not sampled	0.19	0.34

n = number of times sampled

** = in µg/L*

Big Valley Rancheria EPA and Elem Indian Colony EPA 2014 to 2017 Health Threshold Exceedances

For more information, please contact Big Valley Rancheria Environmental Director Sarah Ryan sryan@big-valley.net or 707-263-3924 x132.