

# Cyanobacteria Blooms A Multi-Agency Perspective

Presentation to Board of Supervisors July 25, 2017

# **Goals of Presentation**

- Review recent history of harmful cyanobacterial blooms (HABs) in Lake County
- Describe developments in how blooms are monitored in California and nationally
- Demonstrate how HABs have impacts in multiple sectors
- Propose formation of a comprehensive, multiagency coordinated approach to HAB management under unified leadership.
- Promote development of uniform education and messaging to the public and business community



# What are Cyanobacteria?

- Bacteria
  - Capable of photosynthesis
  - Produce oxygen
- Responsible for our oxygen atmosphere
  - Necessary for life as we know it
- Some produce toxins
  - Toxins are potent
  - Toxin production may be intermittent and cannot be predicted

# What is a Harmful Algal Bloom?

- When colonies of cyanobacteria grow out of control and form accumulations that are visible to the naked eye
- May produce toxins, but not always



# **Recent History in Lake County**

- 2009 Bloom, predominantly Lyngbya
- Each year is somewhat different



# Advisory Signs

- Early versions in 2011
- Posting based on visible blooms
- Temporary vs. permanent
- Public recreational access areas



High levels of blue-green algae have been observed in this area and can produce harmful toxins

AVOID WATER CONTACT IF THERE ARE VISIBLE SIGNS OF BLUE-GREEN ALGAE MATS

Do not use this water in this area for swimming, drinking, or cooking. Keep pets away from water in this area. Other parts of Clear Lake, that are not posted and show no signs of algae mats are open to swimming and boating.



Department of Environmental Health (707) 263-1164

# Dog Death – July 2013



• Elevated microcystin levels from water in area of exposure

- Highest levels to date
- Total microcystins 393 ppb (Danger level 20 ppb)

# **Tribal Monitoring Program**



# 2014 – Tribal Monitoring

- Shoreline testing during drought year showed unprecedented elevations of microcystins
- > 16,920 ppb total microcystins in one location

Current warning guidelines are 4-6 ppb; danger 20 ppb

# WARNING

### **TOXIC CYANOBACTERIA PRESENT**

MATTED MATERIAL ON SHORE LINE & LAKE WATER IN THIS AREA ARE UNSAFE FOR PEOPLE AND PETS

#### Until further notice:

- Do not swim or water ski No zade o przetigze el esquí zezático
- Do not drink lake water No tome of egus del lago
- Keep pate and Restock away Mantanga alejades ias massetas y el ganade
- Avoid areas of scum when boating Erite ins áreas oos espans o verdis coardo ando os landi



Call your doctor or veterinarian if you or your animals have sudden or unexplained sickness or signs of poisoning.



Lake County Environmental Health 707-263-1164

# Progress in Monitoring and Management

- Testing for cyanobacteria and toxins is getting less expensive
- Methods for managing blooms are under development/evaluation
- Information sharing among stakeholder agencies is robust
- Information is more available to the public

# State and National Multi-agency Efforts

 California Cyanobacteria and Harmful Algal Bloom (CCHAB) Network

 Multi-agency, Focus on long-term strategic planning, use and development of data, communication tools

Cyanobacteria Assessment Network (CyAN)
– An EPA, NASA, NOAA, and USGS Project

# **CCHAB** Network









California Water Quality Monitoring Council

My Water Quality

COLLABORATION BETWEEN THE CALIFORNIA ENVIRONMENTAL PROTECTION AND NATURAL RESOURCES AGENCIES



## California Cyanobacteria and Harmful Algal Bloom (CCHAB) Network

California HABs Portal | Background and Description | Subcommittees | Products | Membership | Meetings | More Information

**Report A Bloom** 

## Announcements

• SWAMP released a Statewide Freshwater Harmful Algal Bloom Assessment and Support Strategy that outlines actions and infrastructure being developed to support local response to HAB events.

## Mission

• To work towards the development and maintenance of a comprehensive, coordinated program to identify and address the causes and impacts of cyanobacteria and harmful algal blooms (HABs) in California.

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## **Background and Description**



### ore detailed information on freshwater HAB events



### <u>ake, entire shoreline of Jago Bay, Lower Arm, Lower Lake, CA</u>

st Observed: 6/18/2017 First Date Observed: 6/5/2017

sted: None Bloom Determined by: Both

: 38.949 Longitude: -122.7 Lake Regional Water Board: Region 5 - Central Valley

Vaterbody: Lake

dy Manager: Lake County Land Manager: Private property at this site

Description: UPDATE 06/22/2017: On June 18, 2017, a resident submitted an inciden nobacteria bloom in the Jago Bay area of the Lower Arm. The bloom extended throug Blvd in Jago Bay in Lower Lake, CA. The resident reported bright green water with nonia.

5/2017, the Elem Indian Colony and Big Valley Band of Pomo Indians conducted rout at 17 of their 18 sites. All sites were non-detect for Microcystin using Abraxis field ing site had a positive detection (1 ppb) using the Abraxis field test kits. Water sam using FLISA. Result was Non-Detect for Anatoxin-a.

- Training and Collaboration
- Current Advisories
- Bulletins & Newsletters
- California CyanoHAB Networ

## **Questions Answered**

- What are harmful algal bloom
  - What are harmful algae?
  - Why are they important?
  - Where do they come from
  - Why should I be concerned
  - What are the impacts?
    - Swimming & recreation
    - Drinking water
    - Fish & shellfish harvesting
    - Domestic animals
    - Wildlife
- Where are harmful algal bloor occurring?
  - HABs event maps
    - Freshwaters
    - Marine waters

![](_page_15_Picture_0.jpeg)

# **Big Valley Band of Pomo Indians**

	HOME	ABOUT US	DEPARTMENTS	CAREERS/	VOLUNTEERS	BUSINESSES	CONTACT	
•			G	ALLERY	AUTHORS	BLOG	RESOURCES	ACTIVITY

## Quality Dashboard

![](_page_15_Figure_4.jpeg)

# June 4, 2017 Satellite Imagery

![](_page_16_Picture_1.jpeg)

# June 21, 2017

![](_page_17_Figure_1.jpeg)

# June 28, 2017

![](_page_18_Figure_1.jpeg)

# July 2, 2017

![](_page_19_Figure_1.jpeg)

# Do you see a HAB?

There's an app for that!

bloomWatch

# **BLOOMWATCH APP**

CROWDSOURCING TO FIND AND REPORT POTENTIAL CYANOBACTERIA BLOOMS

June 13, 2017	Cobbessee (ME)	44.564418792725	-69.661018371582	View
June 11, 2017	Zuma Beach (CA)	35.286720275879	-120.66500854492	View
May 23, 2017	Clear Lake (CA)	39.0028	-122.7977	View
September 10, 2016	Lake Champlain	44.850067138672	-73.282821655273	View
September 1, 2016	bloomWatch lake	41.48477895	-73.32497454	View
September 1, 2016	bloomWatch lake	41.48478685	-73.32516169	View
August 28, 2016	Lake Lillinonah	41.49150672	-73.32369806	View

# Cyanobacteria Task Force - 2014

- Leadership from two local Tribal Environmental Directors
- Multi-Agency
- Information sharing, mutual education
- Seeking standardized approaches to risk communication, public warnings
- Reconciling recommended action levels for recreational water (WHO vs. OEHHA & EPA)

**IMPACTS of HABs** Health Information Needs **Drinking Water Recreation and Tourism Community Development** Agriculture/Land Development Utilities **Economic Development** 

![](_page_25_Picture_0.jpeg)

![](_page_25_Picture_1.jpeg)

![](_page_25_Picture_2.jpeg)

# Health Impacts

# Surveillance of human and veterinary health

## Surveillance of Human and Veterinary Health Impacts

- Lack of clinical tests
- Education of medical and veterinary professionals
- Under-reporting
- Research ongoing

CLINICAL SIGNS, DIAGNOSIS and TREATMENT: See page 2. Limited funding may be available to cover physical examination of ill dogs with suspected poisoning (see page 3).

BIOSPECIMEN COLLECTION, HANDLING and SHIPPING: See pages 3 and 4. Limited funding may be available to collect and analyze some of the suggested canine specimens (see page 3).

REPORTING: Reporting confirmed or suspected cases will help prevent other animal and human exposures to blue-green algal toxins. Please complete the Illness Information Section on the Report Form available at https://drinc.ca.gov/cyanohab/. For questions call the State Water Resources Control Board at (844) 729-6466.

![](_page_26_Picture_8.jpeg)

From the California Cyanobacteria and Harmful Algal Blooms Network. For more information see: www.mywaterquality.ca.gov/habs/

Prepared by:

![](_page_26_Picture_11.jpeg)

![](_page_26_Picture_12.jpeg)

# Information Needs

General and specific information for local community and visitors to Lake County

# **Risk Communication**

- Finding the right balance
- Competing priorities of stakeholders
- Message is often complex
- Outrage factor
- Distortions from social media

## WARNING

# Toxins from algae in this water can harm people and kill animals

![](_page_28_Picture_8.jpeg)

![](_page_28_Picture_9.jpeg)

**Do not** let pets or other animals go into or drink the water, or go near the scum.

![](_page_28_Picture_11.jpeg)

**Do not** eat shellfish from this water.

For fish caught here, **throw away guts and clean fillets** with tap water or bottled water before cooking.

For people, the toxins can cause: • Skin rashes, eye irritation • Diarrhea, vomiting For animals, the toxins can cause: • Diarrhea, vomiting • Convulsions and death

Call your doctor or veterinarian if you or your pet get sick after going in the water. For information on harmful algae, go to mywaterquality.ca.gov/monitoring\_council/cyanohab\_network For local information, contact:

# **Public Messaging**

![](_page_29_Picture_1.jpeg)

Cyanobacteria (also known as blue-green algae) have existed for millions of years, live in all types of water, and are not new to Clear Lake. Water bodies worldwide are experiencing blooms caused by a variety of environmental conditions. Clear Lake is often susceptible to blooms due to its shallow depth, high nutrient levels, and warm temperatures. Blooms tend to grow rapidly in hot weather.

What should you look for? A paint-like scum or thick mat on the surface of the water, various-sized white, green, blue, red, brown, or black floating masses or matter along the shoreline (not to be confused with normally-occurring aquatic plants, below) 🛲

What effects does it have? The first thing you may notice is an unpleasant smell and an objectionable appearance on the water. Some blooms are benign, but others may produce toxins which can be harmful if ingested, inhaled, or, in some cases, if contacted. Its health risks are little understood by scientists and cannot be predicted for any particular bloom. On the back are some safety tips...

![](_page_29_Picture_5.jpeg)

## WHAT SHOULD I DO?

You can enjoy Clear Lake and keep your family, friends, and pets safe and healthy!

#### DO

- be informed—learn to identify cyanobacteria blooms (see photos on website) use common sense: if the water looks inviting, enjoy! If you're suspicious, be cautious
- keep pets from playing in blooms, and wash them immediately if they've been in contact
- make sure that any guests using your lakefront property are informed
- follow safety recommendations on website if your water source comes from the lake · call for bloom reports, or if you have any questions or concerns

### DO NOT

- allow children or friends to swim, wade, waterski, or tube in or near an active bloom
- allow pets to swim or play catch in or near a bloom, or let them lick their fur after contact
- inhale aerosolized water (spray caused by motor boats, for example) near a bloom
- · use fertilizers or detergents containing phosphates near the lake, as they increase. cyanobacteria growth
- drink untreated lake water (bailing is NOT adequate!)

### **OTHER IMPORTANT THINGS TO KNOW**

- not all blooms are taxic, but contact with taxins can cause illness
- you cannot tell if a bloom is toxic by looking at it
- blooms can occur any time of year, but are most active in hot weather
- · blooms may have an unpleasant odor as they die aff, but not always
- dogs can have more serious symptoms than people
- swallowing water containing cyano-toxins may cause serious illness

### FOR MORE INFORMATION

- call Lake County Environmental Health at (707) 263-1164
- find more info at www.co.lake.ca.us/Cyano or at
- www.cdph.co.gov/HEALTHINFO/ENVIRONHEALTH/WATER/Pages/Bluegreenalgoe.ospx

### Lakefront property owners should access more details at the contact info above

![](_page_30_Picture_0.jpeg)

# **Drinking Water**

# Education and Technical Assistance for Public and Private Drinking Water Systems

# **Toledo and Toxic Water - the** Intersection of Climate Change and Water Quality

August 04, 2014 **Rob Moore** 

Toledo, Ohio shut off drinking water service to 500,000 people because of the presence of microcystin, a powerful neurotoxin excreted by blue-green algae, also known as cyanobacteria. Once again cyanobacteria have taken over much of Western Lake Erie, the source of the city's drinking water, which could be a recurring problem exacerbated by climate change. The cyanobacteria are a troubling indicator of a variety of problems now manifesting themselves in Lake Erie and also in other parts of the country that stem from the relationship between climate change and water quality.

# Drinking Water Production 2014

## Konocti County Water District to declare emergency, implement water rationing

ELIZABETH LARSON POSTED ON TUESDAY, 24 JUNE 2014 03:08 f y G+ in 24 JUNE 2014

CLEARLAKE, Calif. – Clear Lake's very low water levels combined with demand that's outstripping the water supply is leading the Konocti County Water District to prepare to implement water rationing and a districtwide emergency.

GLENDA ANDERSON THE PRESS DEMOCRAT | July 6, 2014

![](_page_32_Picture_5.jpeg)

A small water agency that pumps water from Clear Lake expects to declare a water shortage emergency as early as this week, not because it's running out of water but because thick algae growth is putting a strain on its purification system.

![](_page_33_Picture_0.jpeg)

# **Recreation and Tourism**

Recreational Water Safety Fish Consumption

![](_page_34_Picture_0.jpeg)

# **Community Development**

How much development? What locations to develop?

![](_page_35_Picture_0.jpeg)

# Agriculture/Land Development

Management of nutrient run-off Strategic Planning and Projects (e.g., Middle Creek Restoration)

### Water Treatment processes

![](_page_36_Picture_1.jpeg)

### Layout of Sewage Treatment Plant

![](_page_36_Figure_3.jpeg)

# Utilities

Consolidation of Sewer/Septic Water Systems

![](_page_37_Picture_0.jpeg)

![](_page_37_Picture_1.jpeg)

![](_page_37_Picture_2.jpeg)

# Economic Development

Prevention/Management of HABS Research Opportunities

![](_page_38_Picture_0.jpeg)

# What's Needed

- Lake County's most valuable asset is the natural beauty of the lakes and surrounding landscape
- Addressing the challenges of HABs requires coordination of all stakeholders
- Uniform, educational, fact-based communication to the public

# Recommendations

 Establish a coordinated county-wide body to oversee the management of all aspects of cyanobacteria issues

 Develop a system for regular, factual and consistent messaging to businesses and the general public on HAB-related issues

# Questions?

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