

US EPA ARCHIVE DOCUMENT

Managing Cyanobacteria in the East Bay Regional Park District



Hal MacLean, Water Management Supervisor, East Bay Regional Park District

Quick Overview

- **Blooms in the District**
- **District Bloom Response**
- **District Strategies to Manage Blooms**



EBRPD Bloom History

- Annual Blooms
- 2008 - 1st bloom testing at Anza
- 2010 - 2nd bloom testing at Anza = Test Kits
- 2014 – 1st toxin at Temescal



US EPA ARCHIVE DOCUMENT

ke Temescal - July 2014

ke Chabot - Sept 2014

14-15 - 4 dog deaths

rgan Territory

g death April 2015

arry Lakes – May 2015

ke Temescal - June 2015

ke Anza – Sept 2015

Break - October 2015

hol - Nov 2015 dog illness

l Valle – Dec 2015

arry Lakes – Feb 2016

nescal – May 2016

Break– July 2016

za – Aug 2016

ones– Aug 2016

nescal – Oct 2016

arry Lakes – Oct 2016

Del Valle – Dec 2016



HABs in District Waters Since 2014

US EPA ARCHIVE DOCUMENT

Lake Temescal - July 2014
 Lake Chabot - Sept 2014
 14-15 - 4 dog deaths
 Morgan Territory
 g death April 2015
 Larry Lakes - May 2015
 Lake Temescal - June 2015
 Lake Anza - Sept 2015
 Break - October 2015
 hol - Nov 2015 dog illness
 Valle - Dec 2015
 Larry Lakes - Feb 2016
 nescal - May 2016
 Break- July 2016
 za - Aug 2016
 ones- Aug 2016
 nescal - Oct 2016
 Larry Lakes - Oct 2016
 Del Valle - Dec 2016



Concerns & Fallout

- Health Concerns = No bodily contact
- Swimmers & Programs = No Fun
- Fish & Wildlife = Exposure
- Stigma



State Guidance

Table 1. CyanoHAB Trigger Levels for Human Health

	Caution Action Trigger	Warning TIER I	Danger TIER II
Primary Triggers ^a			
Total Microcystins ^b	0.8 µg/L	6 µg/L	20 µg/L
Anatoxin-a	Detection ^c	20 µg/L	90 µg/L
Cylindrospermopsin	1 µg/L	4 µg/L	17 µg/L
Secondary Triggers			
Cell Density (<i>Toxin Producers</i>)	4,000 cells/mL	--	--
Site Specific Indicators of Cyanobacteria	Blooms, scums, mats, ect.	--	--

Caution – No Dogs

Warning – No Swimming

Danger – Do Not Eat Fish



Recreational Fishery

- Transient/Put & Take
- Testing Fish Tissue



2017 HAB Monitoring Program

Table 1. CyanoHAB Trigger Levels for Human Health

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Secondary Triggers			
Cell Density (Toxin Producers)	4,000 cells/mL	--	--
Site Specific Indicators of Cyanobacteria	Blooms, scums,	--	--

CyanoHAB Trigger Levels for Human Health EBRPD*

	Caution Action Trigger	Closure Trigger
Primary Triggers		
Total Microcystins	0.8 ug/L	6 ug/L
Anatoxin-A	Detection	20 ug/L
Cylindrospermopsin	1 ug/L	4 ug/L
Secondary Triggers		
Site Specific Indicators	Blooms, Scums, Mats, ect.	

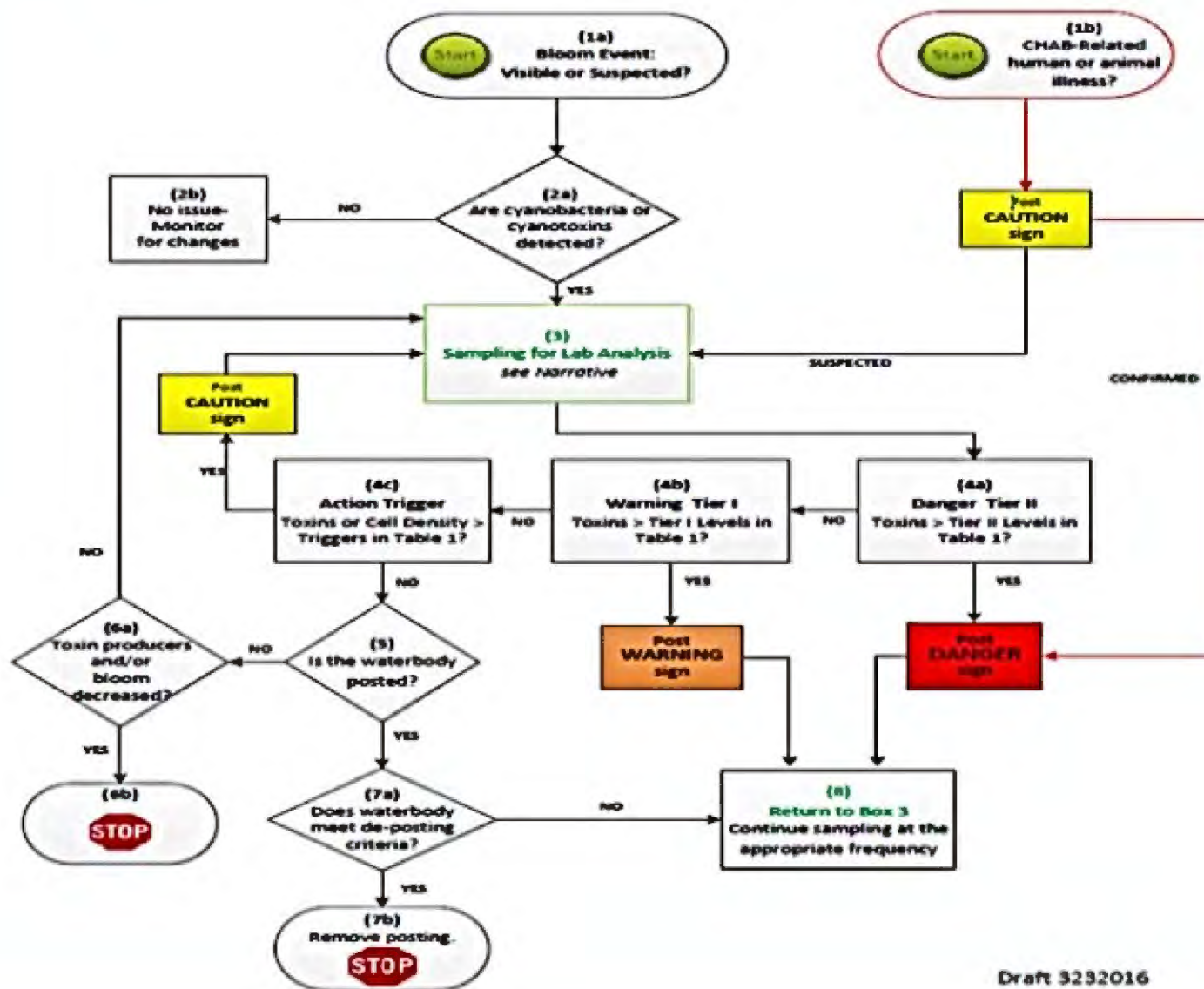
*Based on California Guidance

ug/L micrograms per liter is equivalent to parts per billion



2017 HAB Monitoring Program

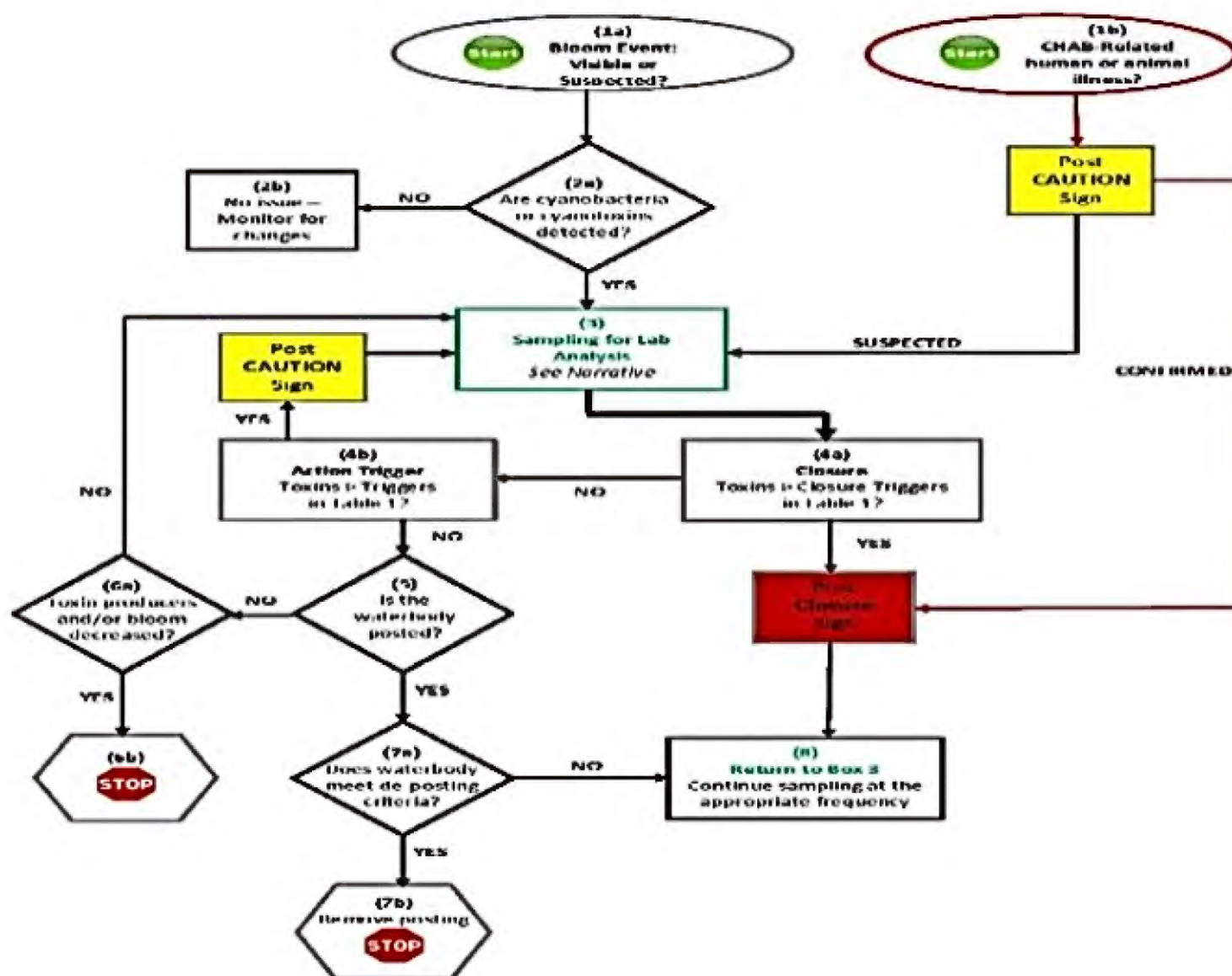
Figure 1. Decision Tree for Posting and De-posting Health Advisories for CyanoHABs
Proposed changes to consider for Voluntary CHAB Guidance



Draft 3/23/2016



2017 HAB Monitoring Program



HAB Monitoring Program

Weekly Visual During Recreation Sampling
(DV, SC, QL, Tem, Anza- major swim areas)

Park Staff Monitoring

Interns Monitor Trouble Spots and Strategic Areas

Abraxis Toxin Kit - Initial Evaluation

Certified Lab or CAAS - Confirmation

Staff and Health Dept. Coordination & Notifications

Public Notification, Education and Outreach

Remediation Actions

Strategic Planning



Typical EBRPD Monitoring

Visual ID

Cyanobacteria?



Typical EBRPD Monitoring

*Visual ID
Cyanobacteria?*

Got Toxins?

You need to test to know



Typical EBRPD Monitoring

- Collect & ID Samples



Bend Genetics, LLC
87 Scripps Drive, Ste. 108
Sacramento, CA 95825
Tel: (916) 550-1048

Project: East Bay Parks District
Analysis for Toxicogenic Cyanobacteria
Project #:
Reported: 4/12/2017 13:45:00 PM

MICROSCOPY RESULTS - IDENTIFICATION OF POTENTIALLY TOXIC (PTOX) CYANOBACTERIA

Sample ID	Dominant	Sub-dominant	Also present	Notes
DV-1	Aphanizomenon			This sample contained a relatively low density of Aphanizomenon flos-aquae colonies. No other cyanobacteria were observed. The photo was taken under 100X magnification.

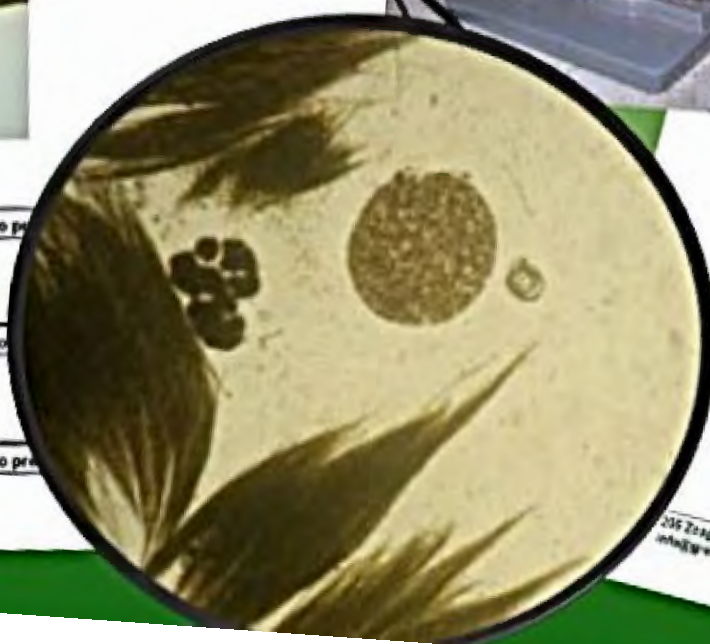


Aphanizomenon

Sample ID	Dominant	Sub-dominant	Also present
DV-2	NA		

Sample ID	Dominant	Sub-dominant	Also present
DV-3	NA		

Sample ID	Dominant	Sub-dominant	Also present
DV-4	NA		



GreenWater
laboratories

aquatic analysis ... research ...

Potentially Toxicogenic (PTOX) Cyanobacteria Screen East Bay Regional Park District

December 9, 2015
Location: GreenWater Laboratories

Site:
Del Valle Boat Launch

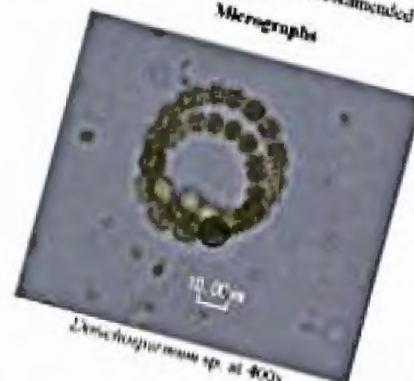
Collection Date:
12/7/15

Prepared of the bloom material and scanned at 100X for the presence of potentially toxicogenic (PTOX) cyanobacteria using a Nikon Eclipse TE1000 inverted microscope equipped with a 100X objective. Higher magnification was used as necessary for identification and micrographs.

Results

One potentially toxicogenic (PTOX) cyanobacterium observed was *Dolichospermum* sp. and *Microcystis*. Further analysis is currently recommended for microcystins, anatoxin-a, and saxitoxin.

Micrographs



Dolichospermum sp. at 400X

256 Ziegler Drive Suite 302 • Palmdale, CA 93550
info@greewaterlab.com • greewaterlab.com



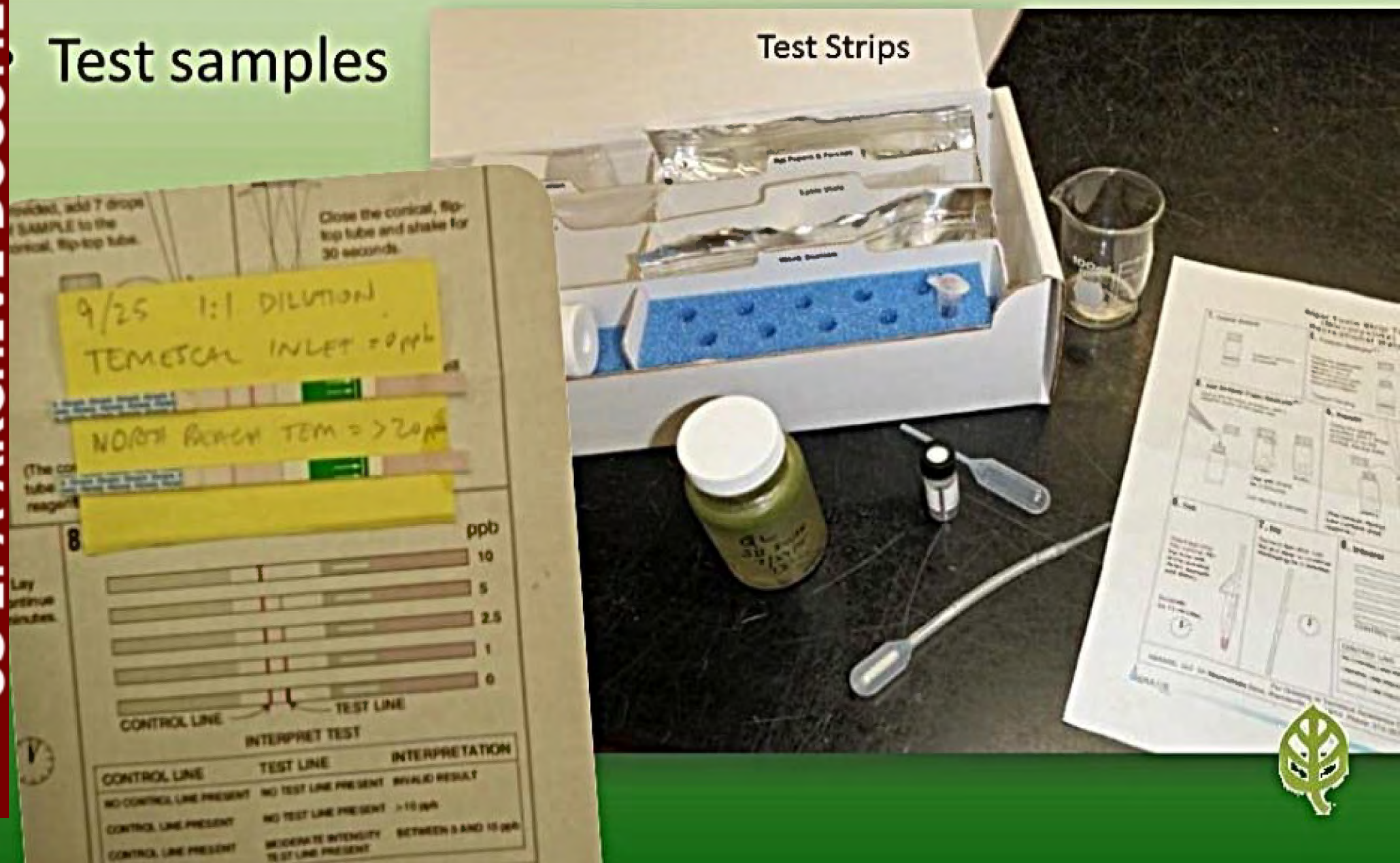
Cyanobacteria Genera		Hepatotoxins		Neurotoxins					Dermatoxins	
		CYN	MC	NOD	ATX	BMAA	NEO	SAX	LYN	LPS
abaena	★	x	x		x	x	x	x		x
lichospermum)										
abaenopsis			x							x
anizomenon	★	x	x		x	x	x	x		x
anocapsa			x							x
elosphaerium										
oronichinia)			x							
ndrospermopsis		x	x		x	x		x		x
eutrichia			x							
nothrix			x							
ngbya	★	x	x		x	x		x	x	
rocystis	★		x			x				x
dularia				x		x				x
stoc			x	x		x				
illatoria (Planktothrix)	★	x	x		x	x		x	x	x
ormidium			x		x	x				
nktolyngbya								x	x	
udanabaena			x		x					x
hidiopsis		x			x					x
echococcus			x			x				x
echocystis			x			x				x
Woronichinia			x		x					



Typical EBRPD Monitoring

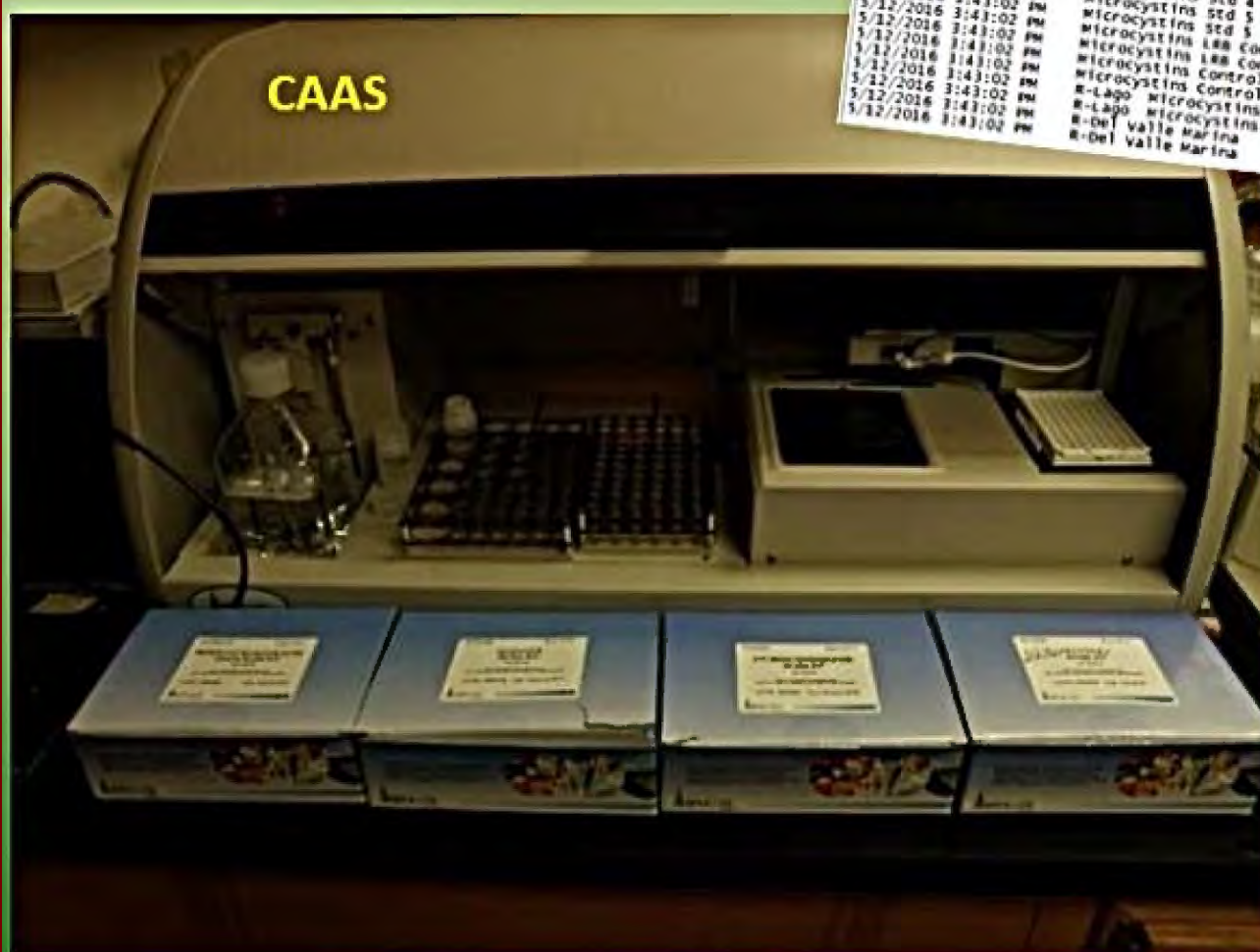
Test samples

Test Strips



Typical EBRPD Monitoring

Confirm samples



5-12-16 QL-Lago DV Marina - Notepad

Request Time	Name/ID	Test	Absorbance	Concentration	Interpretation	Reference
5/12/2016 3:43:02 PM	Microcystins Std 0	Microcystins	1.840	Abs	< 0.000	ppb
5/12/2016 3:43:02 PM	Microcystins Std 0	Microcystins-ADDA	1.801	Abs	0.019	ppb
5/12/2016 3:43:02 PM	Microcystins Std 1	Microcystins	1.606	Abs	0.125	ppb
5/12/2016 3:43:02 PM	Microcystins Std 1	Microcystins-ADDA	1.575	Abs	0.143	ppb
5/12/2016 3:43:02 PM	Microcystins Std 2	Microcystins	1.240	Abs	0.182	ppb
5/12/2016 3:43:02 PM	Microcystins Std 2	Microcystins-ADDA	1.125	Abs	0.498	ppb
5/12/2016 3:43:02 PM	Microcystins Std 3	Microcystins	0.838	Abs	0.971	ppb
5/12/2016 3:43:02 PM	Microcystins Std 3	Microcystins-ADDA	0.865	Abs	0.909	ppb
5/12/2016 3:43:02 PM	Microcystins Std 4	Microcystins	0.615	Abs	1.863	ppb
5/12/2016 3:43:02 PM	Microcystins Std 4	Microcystins-ADDA	0.573	Abs	2.184	ppb
5/12/2016 3:43:02 PM	Microcystins Std 5	Microcystins	0.415	Abs	> 5.000	ppb
5/12/2016 3:43:02 PM	Microcystins Std 5	Microcystins-ADDA	0.425	Abs	> 5.000	ppb
5/12/2016 3:43:02 PM	Microcystins LBB Control	Microcystins	1.939	Abs	< 0.000	ppb
5/12/2016 3:43:02 PM	Microcystins LBB Control	Microcystins-ADDA	1.623	Abs	0.116	ppb
5/12/2016 3:43:02 PM	Microcystins Control	Microcystins	0.941	Abs	0.718	ppb
5/12/2016 3:43:02 PM	Microcystins Control	Microcystins-ADDA	0.948	Abs	0.746	ppb
5/12/2016 3:43:02 PM	R-Lago Microcystins-ADDA	Microcystins-ADDA	1.269	Abs	[1.2410] (3.2 cv)	0.300 - 5.000
5/12/2016 3:43:02 PM	R-Lago Microcystins-ADDA	Microcystins-ADDA	1.213	Abs	0.407	ppb [0.382] (9.5 cv)
5/12/2016 3:43:02 PM	R-del valle Marina	Microcystins-ADDA	0.663	Abs	1.184	ppb
5/12/2016 3:43:02 PM	R-del valle Marina	Microcystins-ADDA	0.656	Abs	[0.6193] (0.8 cv)	1.620
5/12/2016 3:43:02 PM	R-del valle Marina	Microcystins-ADDA				0.300 - 5.000
5/12/2016 3:43:02 PM	R-del valle Marina	Microcystins-ADDA				ppb [1.602]



Certified Lab Confirmation

GreenWater Laboratories
205 Zeigler Drive
Suite 302
Palatka FL 32177
Ph: (386) 328-0682
Fax: (386) 328-9646

Contact:
rmarkaule@greewaterlab.com
amanda@greewaterlab.com

GreenWater
laboratories

Cyano
LAB



United States Environmental Protection Agency Region 9 Laboratory

1337 S. 46th Street, Building 201, Richmond, CA 94804
Phone: (510) 412-2300 Fax: (510) 412-2302

Project Manager: Susan Keydel

Project Number: R16W03

Project: FY2016 Cyanotoxins for California Lakes
Waters

Watersheds Section

75 Hawthorne Street

San Francisco, CA 94105

SDG: 16201A

Reported: 07/27/16 10:14

Sample Results

Sample ID	Extraction / Extract	Results	Qualifiers / Comments	Quant Lab
D: 1607045-01				
ID: Del Valle East Beach				
D: 1607045-02				
ID: Del Valle West Beach				
D: 1607045-03				
ID: Del Valle Bear Lomah				
D: 1607045-04				
ID: Del Valle Marian				
D: 1607045-05				
ID: Quarry Sabin Beach				
D: 1607045-06				
ID: Quarry Bear Lomah				



Bend Genetics, LLC
87 Scripps Drive, Ste. 108
Sacramento, CA 95828
Tel: (916) 550-1048

SAMPLE RESULTS

Sample ID	Method	Target Analyte	Result	± 95% CI	Detection Limit	Units	Notes
DV-1	ELISA	Anatoxin-a	NO		0.11	µg/L	U
DV-1	ELISA	Cylindrospermopsin	NO		0.04	µg/L	U
DV-1	ELISA	Microcystin/Lod	NO		0.10	µg/L	U
DV-1	ELISA	Saxitoxin	NO		0.02	µg/L	U
DV-2	ELISA	Anatoxin-a	NO		0.11	µg/L	U
DV-2	ELISA	Cylindrospermopsin	NO		0.04	µg/L	U
DV-2	ELISA	Microcystin/Lod	NO		0.10	µg/L	U
DV-2	ELISA	Saxitoxin	NO		0.02	µg/L	U
DV-3	ELISA	Anatoxin-a	NO		0.11	µg/L	U
DV-3	ELISA	Cylindrospermopsin	NO		0.04	µg/L	U
DV-3	ELISA	Microcystin/Lod	NO		0.10	µg/L	U
DV-3	ELISA	Saxitoxin	NO		0.02	µg/L	U

Lab Regional Park District CYANOSPHERICITY RESULTS

Final Dilution Factor	Raw CFU Recovery	Adj CFU Recovery	Final Concentration (µg/L)	Results (µg/L)
1	92%	NO	< 10	NO
1	92%	NO	< 10	NO
1	92%	NO	< 10	NO

Project: East Bay Parks District
Analysis for Toxigenic Cyanobacteria

Project #:
Reported: 4/12/2017 13:45:00 PM



Typical EBRPD Response

Notification/Posting

DANGER

Toxins from algae in this water can
harm

CyanoHAB Trigger Levels for Human Health in EBRPD*

	Caution Action Trigger	Closure Trigger
Primary Triggers		
Total Microcystins	0.8 ug/L	6 ug/L
Anatoxin-A	Detection	20 ug/L
Cylindrospermopsin	1 ug/L	4 ug/L
Secondary Triggers		
Site Specific Indicators	Blooms, Scums, Mats, ect.	

*Based on California Guidance

ug/L micrograms per liter is equivalent to parts per billion

Call your doctor or veterinarian

For more information, contact East Bay Regional Park District
(510) 544-2328 or visit the California Department of Public Health online
www.cdph.ca.gov/healthinfo/environmental/health/Pages/bluegreenalgae.aspx

For more information on harmful algae, go to
www.monitoring.council/cyanoHAB_network



Typical EBRPD Response

Weekly Emails

April 14th 2017 CyanoHAB (Cyanobacteria Harmful Algal Blooms)/Cyanobacteria/Blue-Green Algae (BGA) Update - Message (HTML)

File Message Adobe PDF

From: Hal MacLean
 To: Sunshine Townsend; Lyda Hakes; 'gdeal@zone7water.com'; Bruce Cabral; Lacy, Eric@Waterboards'; Hidas, Laura; 'O'Brien, Angela'; 'JCook@ValleyWater.org'; Tsang, Van@Waterboards'; Yim, Pony; 'Cynthia Ha'; Becky Tuden; Steve Castle
 Cc: 'Jim Scott'; 'adheung@valleywater.org'; 'Jinyu Xu'; 'Johanna Castro'; 'Lei Hong'; 'Peter Zhou'; 'Ryan Memencio'; 'Marty Grimes'; 'Teresa Alvarado'; 'Pacheco, Marco@Waterboards'; 'Susan Keydel'; 'Brian Kel (bkel@zone7water.com)'; 'Eri Suzuki'; 'Mona Koh'; 'Justin Hancock'; 'Shelly Miller'; 'Brienne.Sekata@water.ca.gov'; 'Yeldhuizen, Tanya@DWR'; 'Steve Twitchell (STwitchell@valleywater.org)'; 'Austin, Carrie@Waterboards (Carrie.Austin@waterboards.ca.gov)'; 'Anderson-Abbs, Bev@Waterboards'; 'Joab, Christine@Waterboards'; 'Doug.Chun@sacwd.com'; 'Reyes, Reynalou@DWR'; 'Chu, Anthony@DWR'; 'Benjamin, Dorothy@DWR'; 'Karie Holtermann'; 'Kabe Vigil'; 'Van Dyke, Marisa@Waterboards'; 'steven.im@sacwd.com'; 'Aaron Roth'; 'Alameda Creek Trails Operations'; 'Amanda Sanders'; 'Anna Fong'; 'AnzahlG'; 'Bob Nisbet'; 'Carol Johnson'; 'Casey Brierley'; 'Cat Taylor'; 'Christina Garcia';
 Subject: April 14th 2017 CyanoHAB (Cyanobacteria Harmful Algal Blooms)/Cyanobacteria/Blue-Green Algae (BGA) Update

Sent: Fri 4/14/2017 3:15 PM

April 14th 2017 CyanoHAB (Cyanobacteria Harmful Algal Blooms)/Cyanobacteria/Blue-Green Algae (BGA) Update (new look same quality info)

Quarry Lakes - **Cautious**
Lake Del Valle - **Caution**
Lake Chabot - **Caution**
Shadow Cliffs - **No visible BGA**
Lake Anza - **No visible BGA**
Lake Temescal - **No visible BGA**
Big Break - **No visible BGA**

Quarry Lakes is still experiencing a bloom by the boat launch. On Thursday the bloom was getting thicker and beginning to turn turquoise from the decaying cyanobacteria. We did not run any tests, but did have Microcystin toxins last week. The lake remains closed to body contact. We plan to monitor again next week.

Del Valle will re-open tomorrow, April 15th. We are still seeing small specs of cyanobacteria around the boat launch and the marina. On Monday we sent four samples (DW intakes, raw water, clarifier, and distribution system) to Bend Genetics. All of the samples came back absent for all four types of toxins (Microcystin, Anatoxin-A, Cylindrospermopsin, and Saxitoxin). We also ran a sample from the boat launch using our in house ABRAXIS test strip kit, and no Microcystin toxins were detected. Today there was still some suspended bits of Aphanizomenon, but less than on Monday. We will monitor again next week.

Our Fisheries Department conducted a bass survey in Honker Bay at Lake Chabot on Tuesday. There were small clumps of cyanobacteria dispersed throughout the area, but no scums visible.

There was no visible cyanobacteria at Shadow Cliffs, Lake Anza, Lake Temescal, or Big Break. Lake Anza and Lake Temescal are scheduled to open on April 29th, but may open on April 22nd depending on the weather.

Fishing remains open at all facilities.
 Please report any suspicious algae, and let me know if anyone needs to be added to this distribution list.

For Reference:
 State recommendations are to close lakes to swimming with the detection of: 6 ppb of Microcystin toxins; 20 ppb of Anatoxin-A toxins or 4ppb of Cylindrospermopsin.

Have a great weekend,
 Hal



Typical EBRPD Response

Web Home Page
























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Employment

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Volunteer / Get Involved

Park Planning

Healthy Parks Healthy People

Notices

- > General Manager Responds to Questions about Vargas Plateau
- > East Bay Park District Board Approves Parking Project for Mission Peak
- > Newt Migration Closes So. Park Drive, Tilden: Nov 1
- > Quarry Lakes, Temescal, Lake Anza CLOSED to Swimming
- > Coyote Hills: Limited Running Water
- > Nike Base Road and Parking Closure
- > Reservations Department Phones Closures
- > Chabot Gun Club CLOSED: Sept. 5, 2016
- > Toxic Blue-Green Algae: Lake Closure Updates

Features

News

Calendar



Now Available for Mobile Devices!



Register or check availability now!



Sunol 2016 Hootenanny: Sat, Nov 5, Sunol



Trails Challenge 2016: Participation is FREE!



Fire Safety

Typical EBRPD Response

Web Toxic Algae Updates page

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Activities



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Kids



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News



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> [East Bay Regional Park District | Embrace Life!](#) > [Features](#) > Toxic Algae Update

Toxic Algae Update

Due to the drought and unusually warm weather conditions, toxic blooms of blue-green algae and other water-quality issues are occurring more frequently in the East Bay Regional Park District and elsewhere. We monitor our lakes and shorelines regularly, and post warnings and closures when appropriate. Here's a current update of which lakes and shorelines are affected:



- > Temescal beach at Lake Temescal is **CLOSED** to swimming and water contact due to toxins related to the blue green algae. Fishing is not currently affected and fishing access will remain open. Please keep your dogs out of the water for their safety.
- > Quarry Lakes is **CLOSED** to swimming and water contact due to toxins related to the blue green algae. Fishing is not currently affected and fishing access will remain open. Please keep your dogs out of the water for their safety.
- > Lake Anza contains toxic blue-green algae and is **CLOSED** to swimming. Avoid any contact with the water and keep dogs away from the water.
- > Big Break Regional Shoreline contains toxic blue-green algae. Avoid contact with the water and keep dogs away from the water.
- > Swimming is allowed, but keep dogs away from the water.
- > Lake Del Valle contains blue-green algae but toxin levels are very low. Swimming is allowed, but keep dogs away from the water.
- > Lake Chabot contains toxic blue-green algae and swimming is never permitted. Avoid any contact with the water and keep dogs away from the lake.
- > Shinn Pond contains toxic blue-green algae. Avoid contact with the water and keep dogs away from the water.



The Park District encourages visitors who wish to enjoy water activities to visit these other

Typical EBRPD Response

Web Parks Closures and Notices page

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Parks / Trails



Activities



Reservations / Registration



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Kids



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Volunteer / Get Involved



Park Planning



Stewardship / Resources



News



Public Meetings / Notices



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Park Closures and Notices

Fire Warnings and Weather Related Information

> [Fire Warning Information and Weather Related Information](#)

Park & Trail Closure Information - Listed by Facility

- | | |
|--|--|
| > Antioch/Oakley Regional Shoreline | > Las Trampas Regional Wilderness |
| > Alameda Creek Regional Trail | > Marsh Creek Regional Trail |
| > Alamo Canal Trail | > Martin Luther King Jr. Regional Shoreline Park |
| > Anthony Chabot Regional Park | > Martinez Regional Shoreline |
| > Big Break Regional Shoreline | > Miller/Knox Regional Shoreline |
| > Briones to Mt. Diablo Regional Trail | > Mission Peak Regional Preserve |
| > Briones Regional Park | > Morgan Territory Regional Preserve |
| > Black Diamond Mines Regional Park | > Old Moraga Ranch Trail |
| > Carquinez Strait Regional Shoreline | > Oyster Bay Regional Shoreline |
| > Castle Rock Regional Recreation Area | > Pleasanton Ridge Regional Park |
| > Contra Costa Canal Trail | > Point Isabel Regional Shoreline |
| > Claremont Canyon Regional Preserve | > Point Pinole Regional Shoreline |
| > Contra Loma Regional Park | > Quarry Lakes Regional Recreation Area |
| > Coyote Hills Regional Park | > Redwood Regional Park |



Typical EBRPD Response

Web Parks Pages

> [East Bay Regional Park District | Embrace Life!](#) > [Parks](#) > Quarry Lakes Regional Recreation Area

Quarry Lakes Regional Recreation Area

Watercraft Owners - Please Help Keep Invasive Mussels Out of Our Water.

> [Read more about mandatory watercraft inspections and the Invasive Mussel...](#)

- > About The Park
- > History
- > Park Features
- > Park Activities
- > Park Accessibility
- > To Reach The Park
- > Trail Map
- > Interpretative Panels



Notice

Quarry Lakes is now closed to swimming and water contact due to toxins related to the blue green algae. Fishing is not currently effected and fishing access will remain open. Please keep your dogs out of the water for their safety.

ACWD work along the Alameda Creek Flood Control Channel will have temporary impacts on recreation along the Alameda Creek Trail and at Quarry Lakes Regional Recreation Area. For

Select a Park or Trail...

Park Info

Address

[2100 Isherwood Way
Fremont, CA 94536](#)

Park Entrances

- > [Quarry Lakes Main Entrance](#)
- > [Niles Beach](#)
- > [Boat Launch](#)
- > [ADA Fishing Pier](#)

Phone Numbers

Toll Free: 888-EBPARKS (888-327-2757), option 3, extension 4552

Local Weather



AND DO!

[Parks / Trails](#)

[Parks / Trails](#)

[Parks / Trails](#)

[Park Rules & Regulations](#)

[Warning Information](#)

[Park Activities](#)

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[Visitor Centers](#)

[Accessibility](#)

[Activity Calendar](#)

[Park Finder](#)

[Ferry, Shuttle](#)

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[Park User Fees](#)

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Typical EBRPD Response

- Swim Beach Water Quality pages

DANGER

Toxins from algae in this water can harm people and animals



Stay out of the water until further notice.
Do not touch scum in the water or on shore.



DO NOT let pets go into or drink the water
or go near the scum



DO NOT drink this water or use it for cooking.
Boiling or filtering will not make the water safe



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

If you or your pet get sick after going in the water.

Del Valle Water Quality Status



Red Light: Beach is Closed. No Swimming, wading or wading contact. There is a Water Quality Hazard.
Yellow Light: Beach is Open. There is an increased health risk for swimming and wading. Bacteria results do NOT meet State Health Standards.
Green Light: Beach is Open. Low health risk for water contact. Bacteria results are within State Health Limits.

As indicated, there is a slight increase in bacteria levels. Beach water contact may result in illness. Do not swallow water. Shower and towel dry after water contact. Water quality conditions may change at any time.
Por ejemplo, existe un ligero aumento en los niveles de bacterias. El contacto con el agua puede resultar en enfermedad. No trague el agua. Duché y séquese con una toalla después de haber estado en contacto con el agua. La calidad del agua puede cambiar en cualquier momento.

Current Site Conditions*

EAST BEACH		NORTH		SOUTH	
Sample Date		E col		E col	
October 18 th		83		74	
October 1 st		110		111	
October 4 th		210		83	
September 27 th		110		110	
September 20 th		110		110	
30-Day Geometric Mean		87		81	

State Water Quality Sampling Station
30 Day Geometric Mean Maximum for E. coli 126
All results expressed as below: County of Santa Clara, California
FOR FURTHER INFORMATION CONTACT THE BAY AREA REGIONAL WATER TREATMENT
WATER MANAGEMENT DEPARTMENT AT (415) 644-3333

CAUTION

Harmful algae may be present in this water.
For your safety:
STAY AWAY FROM ALGAE AND SCUM
while swimming



DO NOT let pets go into or drink the water



DO NOT drink this water



Specific Site Monitoring



Lake Temescal Monitoring



DECONTAMINATION!

- Between Bodies of Water



Lake Anza Monitoring



DECONTAMINATION!

- Between Bodies of Water



Shadow Cliffs Monitoring

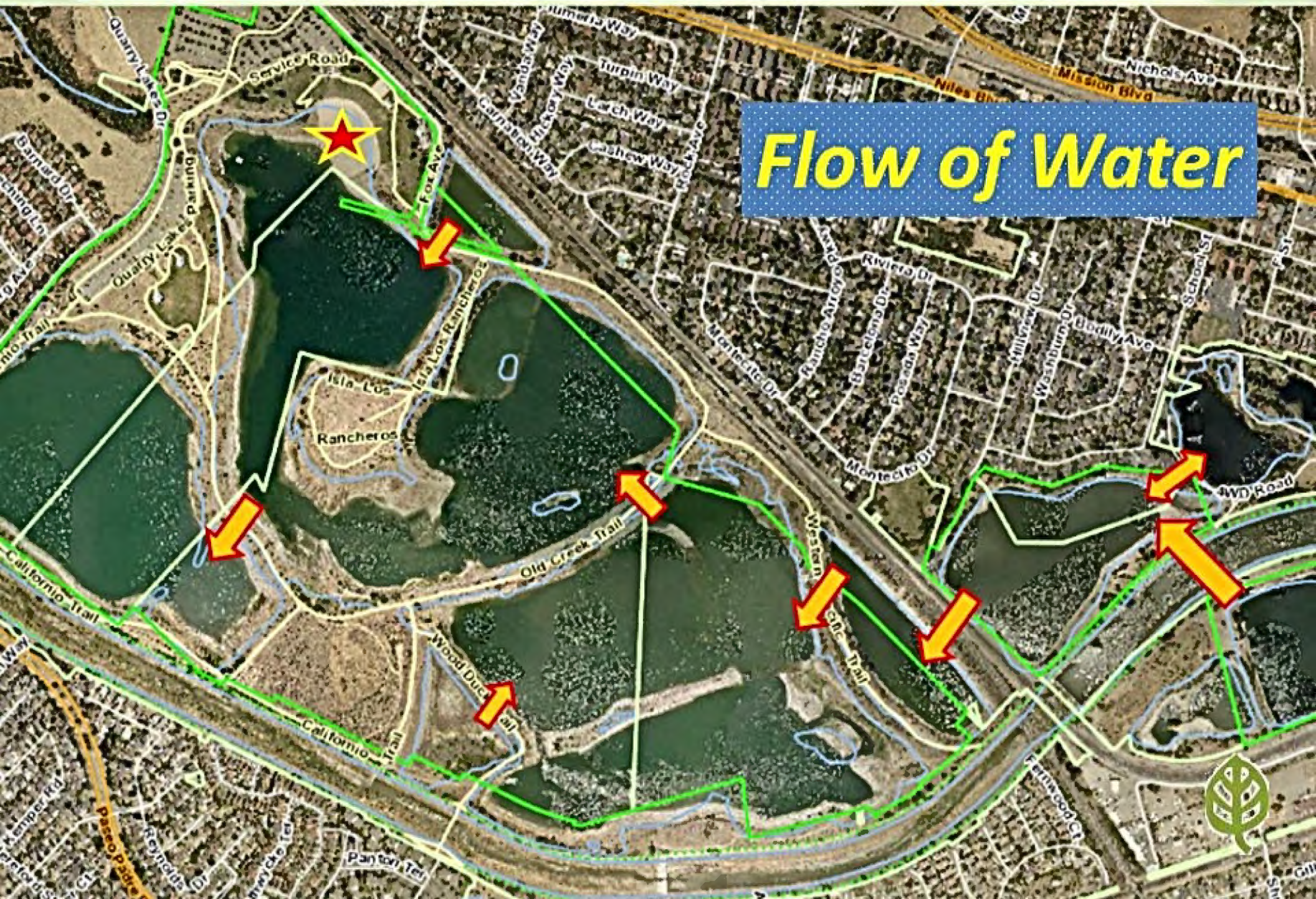


DECONTAMINATION!

- Between Bodies of Water

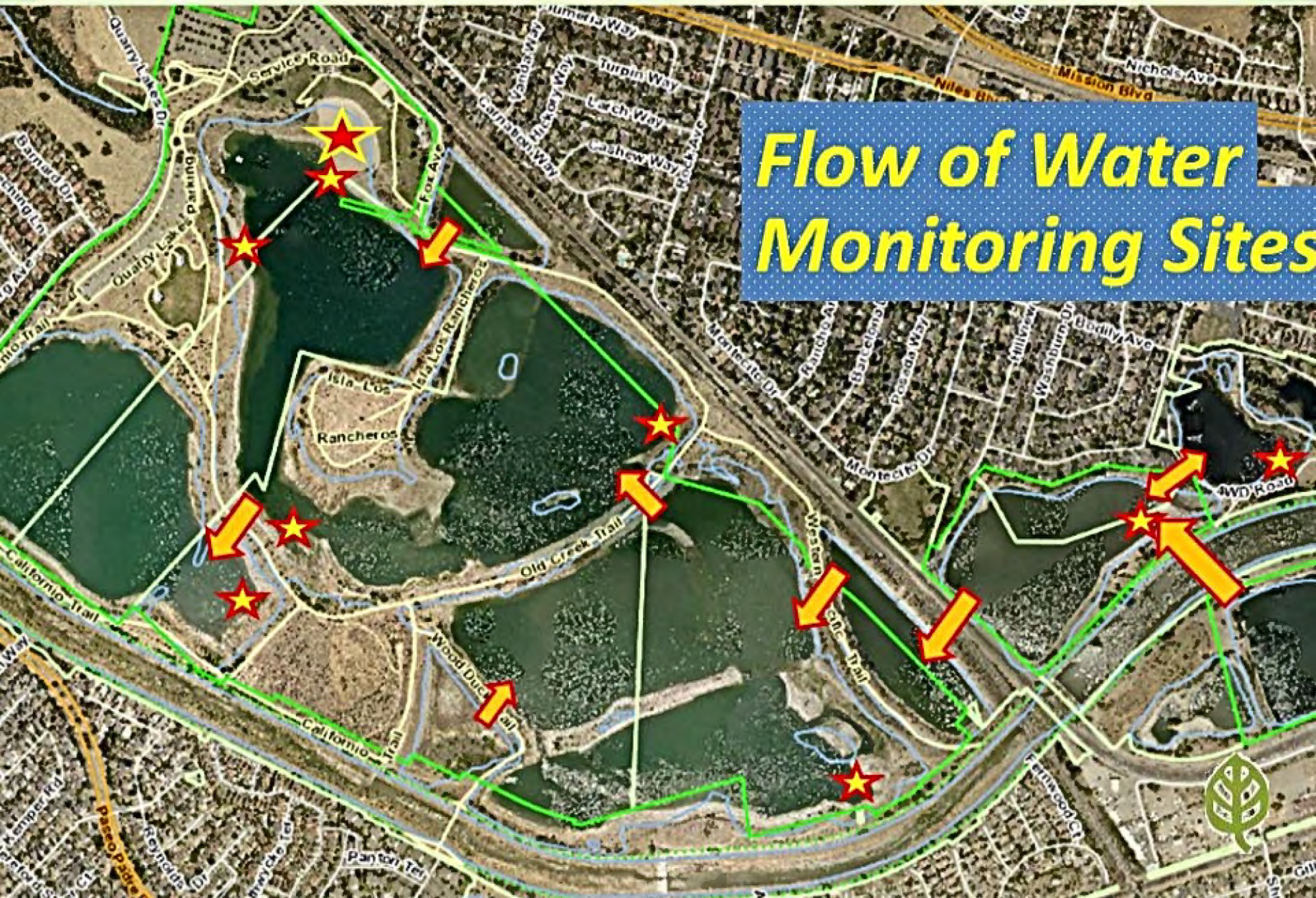


Quarry Lakes Monitoring Challenge



Flow of Water

Quarry Lakes Monitoring Challenge



Aerial Monitoring!

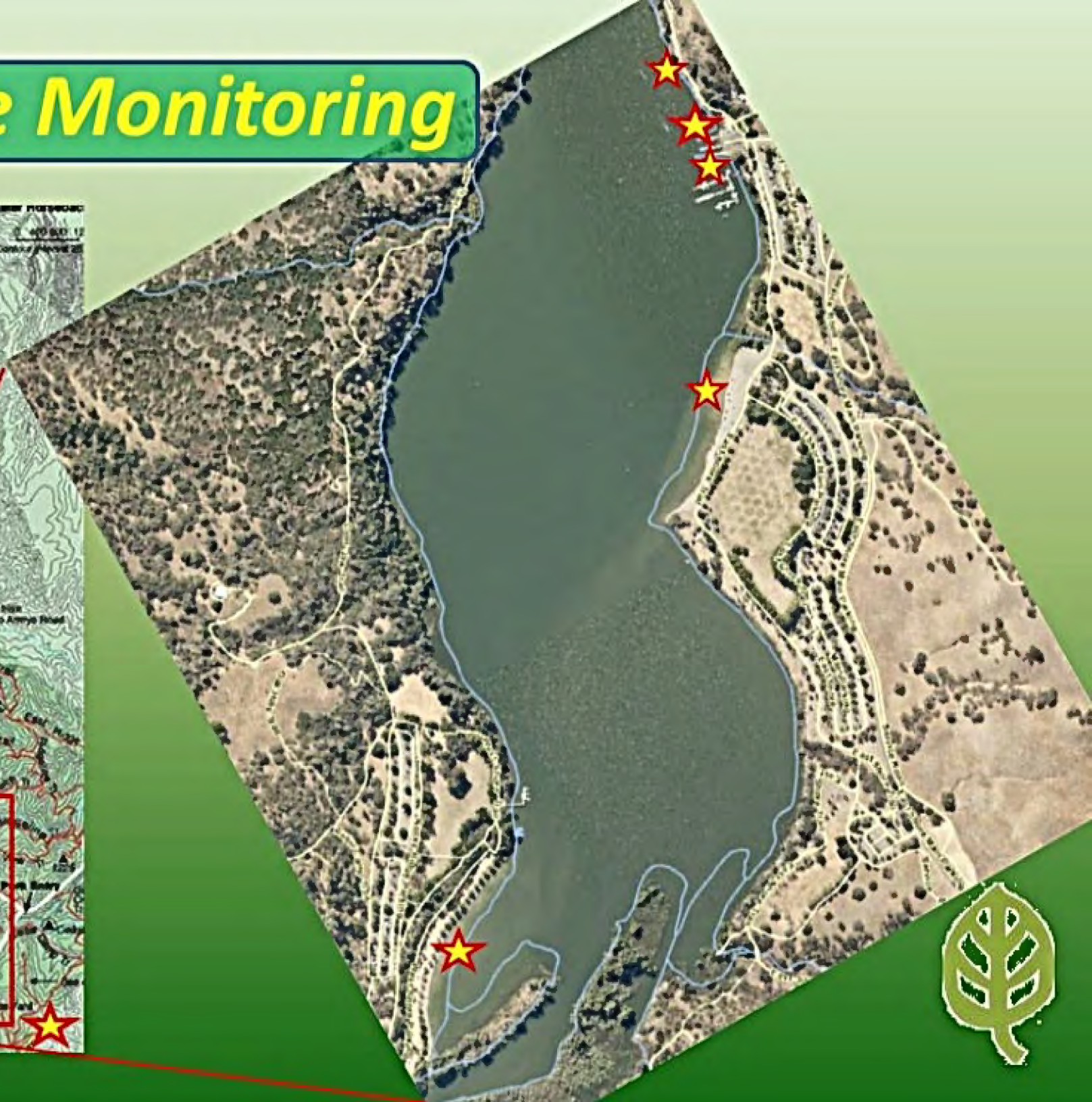


DECONTAMINATION!

- Between Bodies of Water

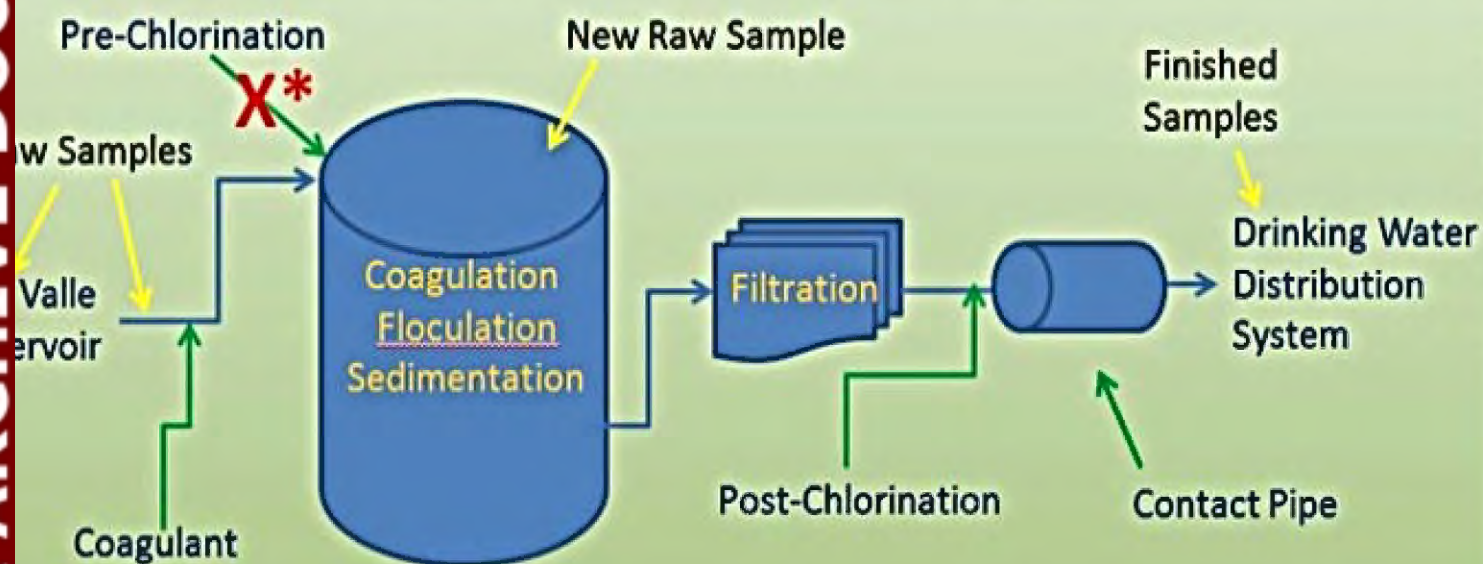


Del Valle Monitoring



Del Valle Monitoring

New Drinking Water Sampling with HAB



Test when making water and
Weekly random distribution testing



Aerial Monitoring!



10/20/16, 10:42 AM

LAT/LONGS
-- G
SPEED
112 MPH
ELEVATION
-- FT
GRADE
0%
DISTANCE
40.0 MI
COURSE
150°

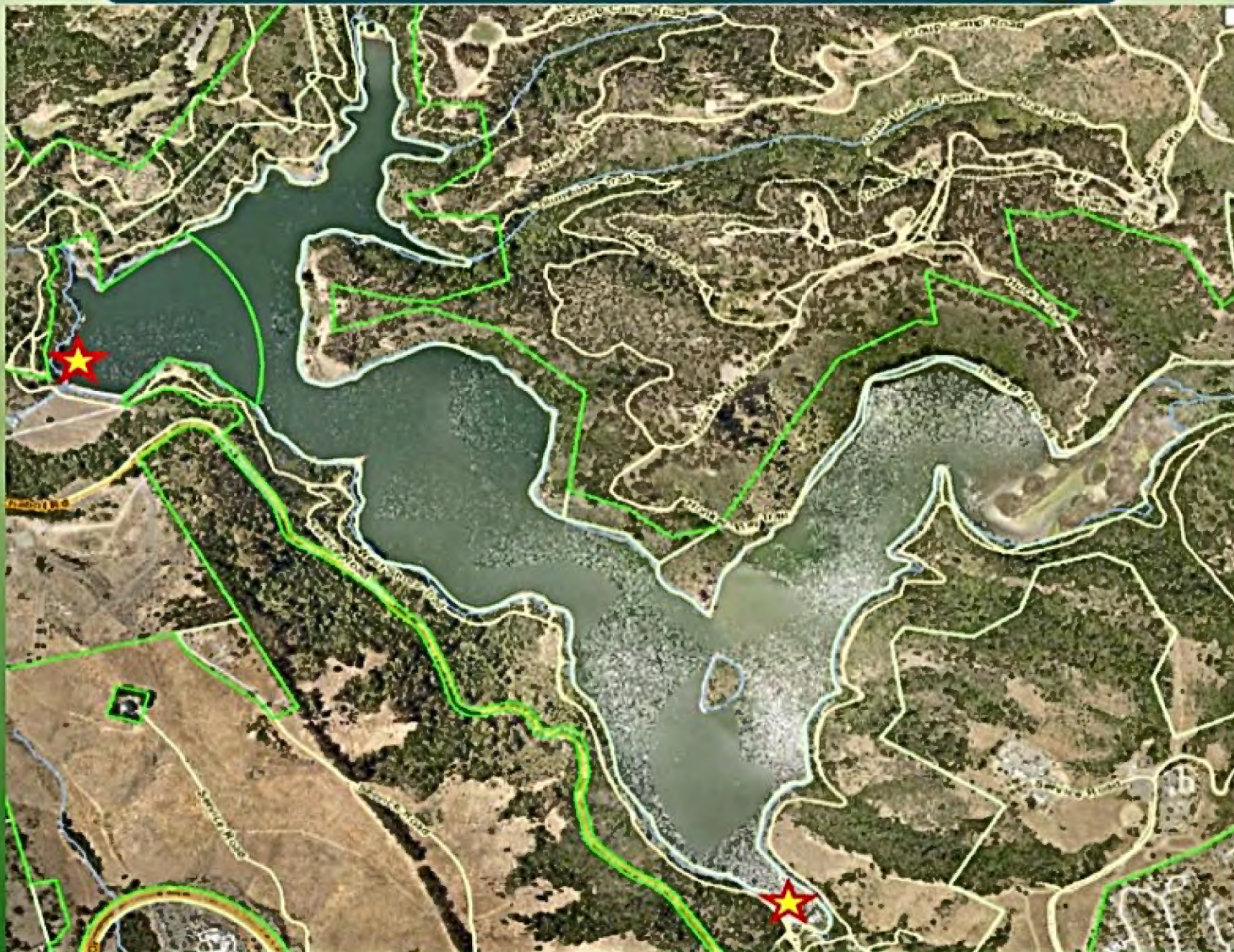


DECONTAMINATION!

- Between Bodies of Water



Lake Chabot Monitoring



DECONTAMINATION!

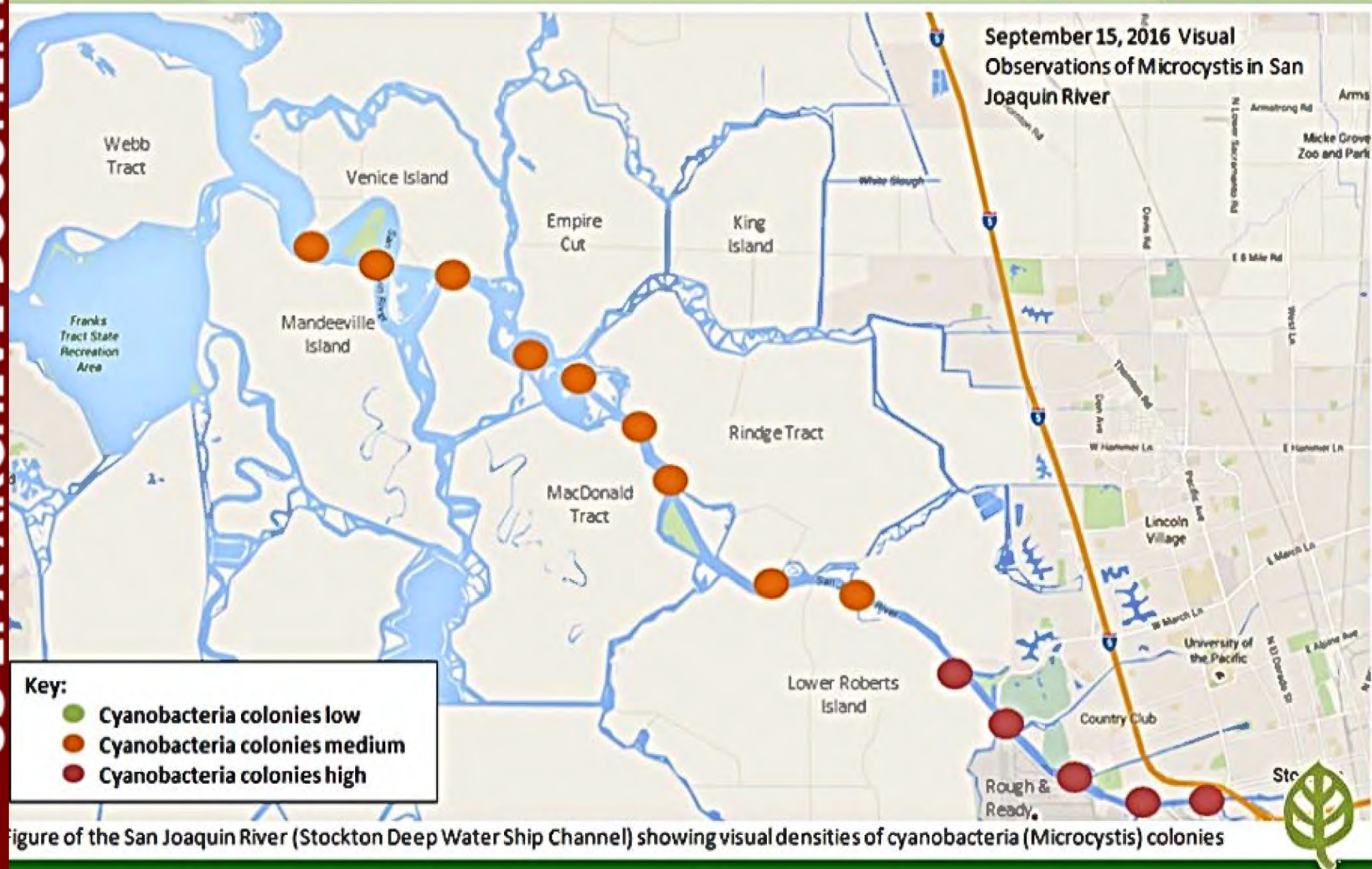
- Between Bodies of Water



Big Break Monitoring



Big Break Monitoring



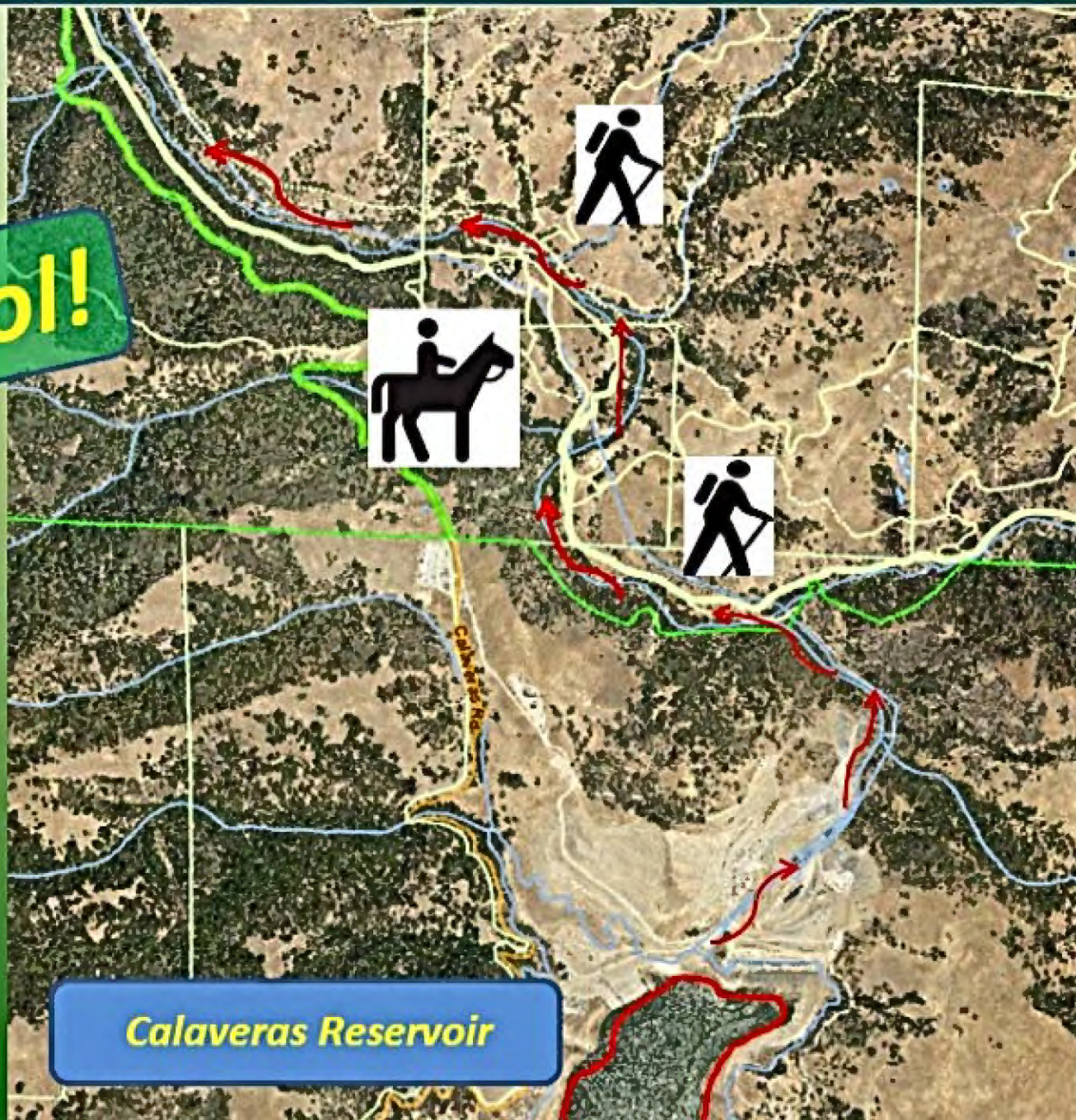
DECONTAMINATION!

- Between Bodies of Water



Alameda Creek Monitoring

Sunol!



Calaveras Reservoir



Alameda Creek Monitoring



Hetch Hetchy
Regional Water System
Division of the San Francisco Public Utilities Commission

Calaveras Reservoir August 29, 2016

Natural Resources and
Lands Management Division
Department of Biological Resources



Summary: The HOS is on with the rate increased to 50 cfm per line on August 17, 2016. Dissolved oxygen concentrations are above saturation in the relatively warm epilimnion and have slightly increased at the thermocline, but remain less than 2 mg/L near the bottom. The total plankton concentration has increased by 191% (from 5,791,000 to 16,877,000 NU/m³) since the previous August 16, 2016 survey, exceeding both Level I (weekly monitoring) and Level II (treatment) action triggers. The phytoplankton community is dominated by the blue-green alga *Lyngbya* (50% of the total) with high numbers of the diatom *Fragilaria* and the blue-green alga *Anabaena* (30% and 12% of the total, respectively). pH is elevated in the upper 15 feet of the water column. Turbidity is elevated at the surface and likely due to floating algae. The next survey will be conducted during the week of September 5th.

Gauge Height (ft): 701.8

Secchi (ft): 3.8

Sonde: EXO2

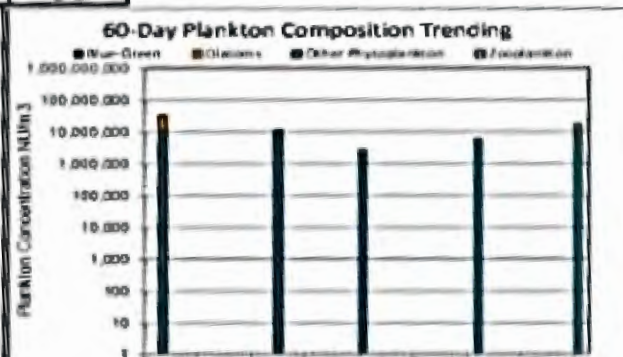
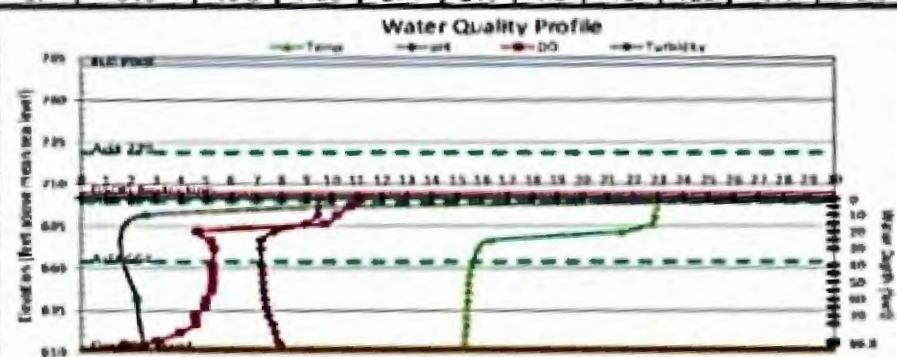
Conditions: clear and calm

Biologist(s): A. Ions (assisted by K. Ritchie)

Starlins Folder#:

Depth feet	Elevation ft AMSL	Temp °C	pH pH units	Cond µS/cm	TDS mg/L	DO mg/L	DO % sat.	ORP mV	Chl-a Rel. Units	Phyco. Rel. Units	Turbidity NTU
1	701	23.1	9.46	285	192	11.2	131	121	0.8	0.3	52.4
5	697	23.0	9.44	285	193	10.7	125	122	0.9	0.1	
10	692	22.9	9.44	285	193	10.2	119	121	0.9	0.1	2.6
15	687	22.7	8.95	286	194	9.7	113	116	0.8	-0.3	
20	682	21.5	7.69	295	205	4.7	53	127	0.0	-0.5	
25	677	16.3	7.17	289	210	5.2	53	159	0.0	-0.5	
30	672	15.8	7.16	265	209	5.3	54	159	0.0	-0.5	
40	662	15.6	7.20	262	208	5.2	53	157	0.0	-0.5	
45	657	15.5	7.23	261	208	5.3	53	158	-0.1	-0.5	
50	652	15.4	7.25	261	208	5.3	53	157	0.0	-0.5	
55	647	15.4	7.28	261	207	5.2	52	156	-0.1	-0.5	
60	642	15.4	7.32	260	207	5.0	50	155	0.0	-0.5	2.3
65	637	15.4	7.39	260	207	4.9	49	155	-0.1	-0.5	
70	632	15.4	7.47	260	207	4.6	46	152	0.0	-0.5	
75	627	15.4	7.63	260	207	4.6	46	149	0.0	-0.5	
80	622	15.3	7.75	260	207	4.0	40	145	-0.1	-0.5	
85	617	15.3	7.83	258	206	3.0	30	140	-0.1	-0.5	
87	615	15.3	7.95	274	219	1.8	18	129	-0.1	-0.5	2.5

Phytoplankton	Natural Unit/m ³
<i>Lyngbya</i>	8,400,000
<i>Fragilaria</i>	5,000,000
<i>Anabaena</i>	2,000,000
<i>Aphanizomenon</i>	650,000
<i>Ceratium</i>	350,000
<i>Staurastrum</i>	260,000
<i>Microcystis</i>	130,000
Phytoplankton Total	16,790,000
Zooplankton Total	87,000
Plankton Grand Total	16,877,000



Blue-Green Algae and Total Plankton 13-Month Trendline



DECONTAMINATION!

- Between Bodies of Water



Cattle Ponds and Water Troughs



Remediation

- Dredging is the best long term option
- Wetlands
- Aeration
- Short Term Solutions
 - Sedimentation Ponds
 - Alum/Phoslock
 - Pak 27



Progress

Continued Dredging Sedimentation Ponds at
Temescal



Progress

Pak 27 Treatments

- Temescal (2014-16)
- Lake Chabot Marina (2015-16)



Progress

Removal

- Temescal Inlet
- Lake Chabot Marina



Progress

Consultants

- Wayne Carmichael

Contractors

- Terry McNabb
- Stephen McCord
- Alex Horne

Networking

- CCHAB
- CALMS



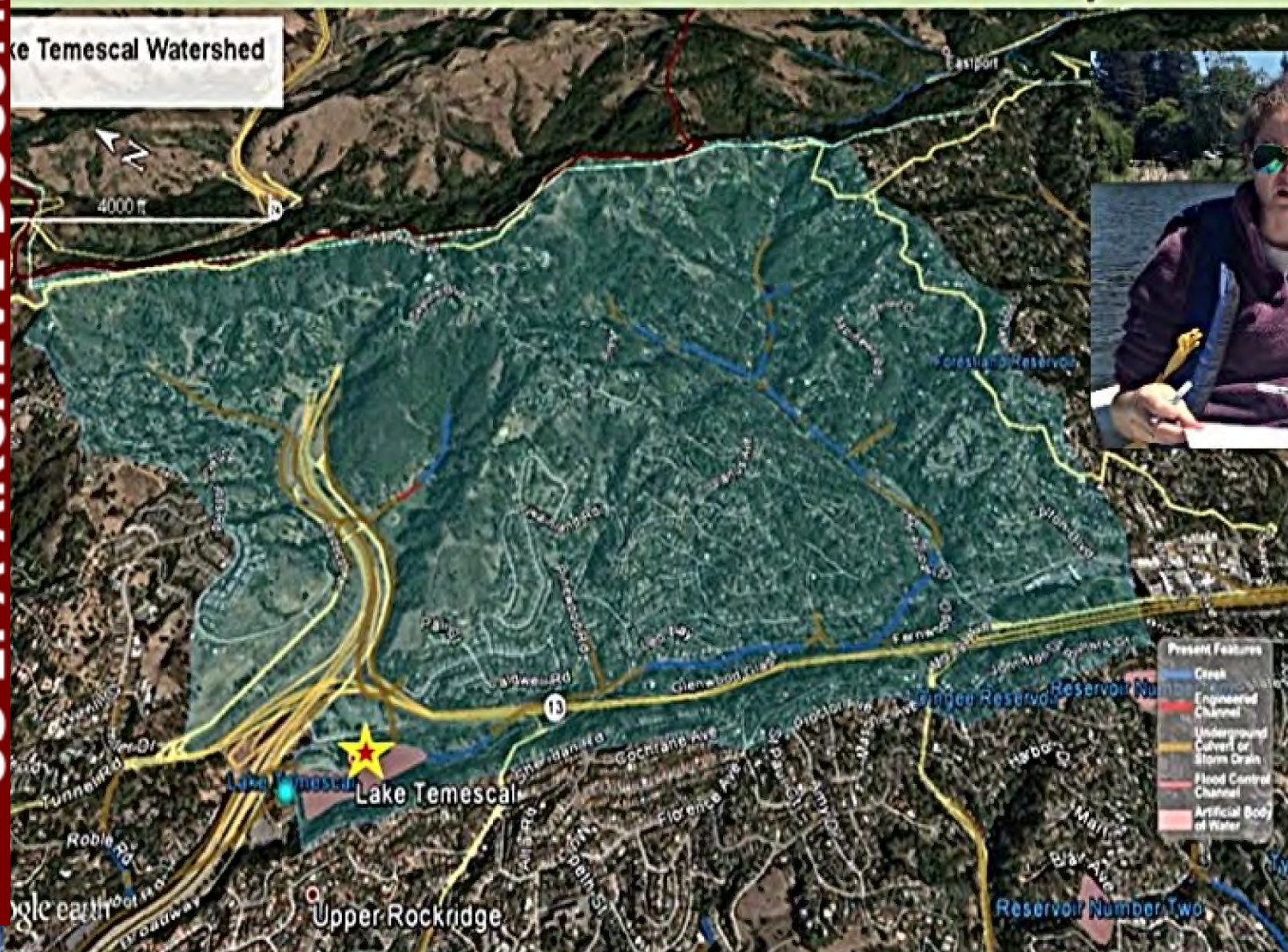
Progress

Phoslock Application



Progress

CSUEB and Nutrient Source Study



Progress

Swim Beach Maintenance & Spot Treatments

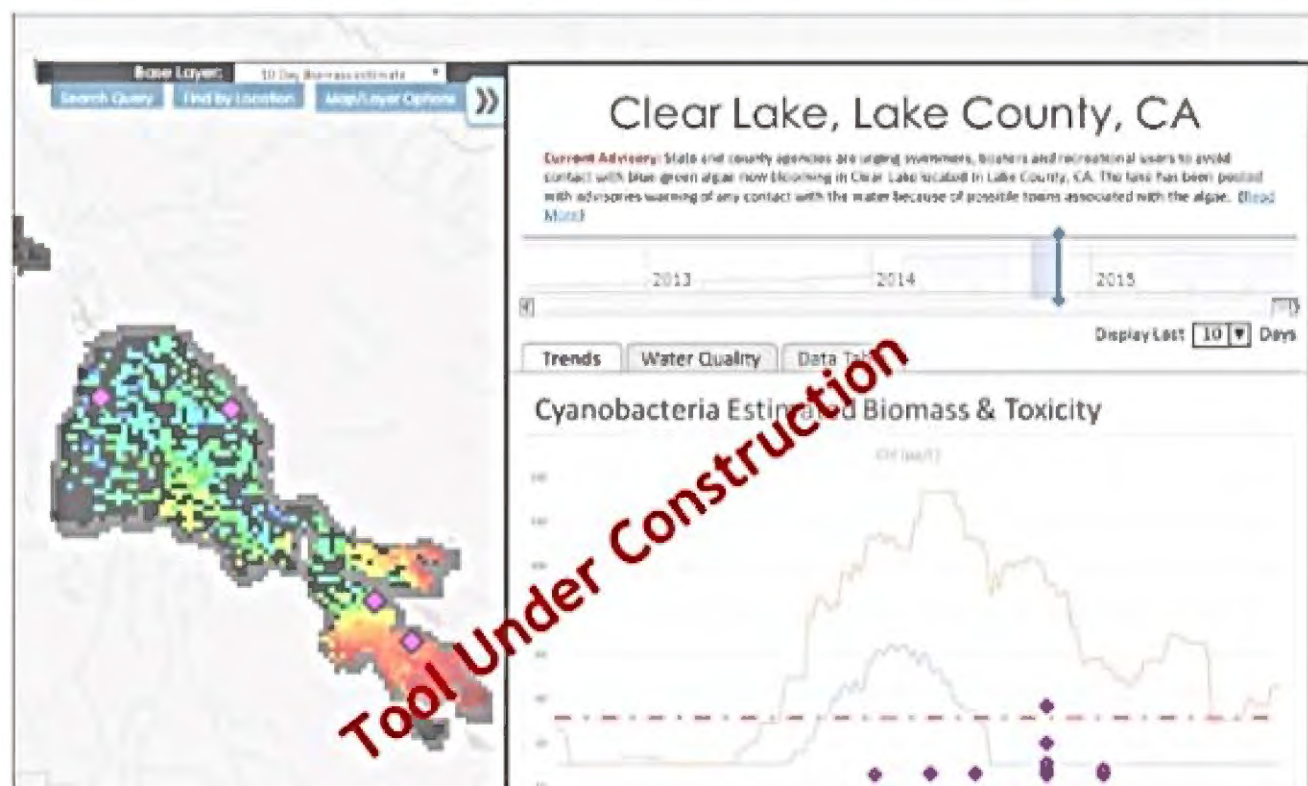


Future Tools

Satellite Imagery



What do satellite images tell us about harmful algal blooms?



Future Plans

Document our Plans

DRAFT - EBRPD's Water Management Blue-Green Algae Program
or
EBRPD's Water Management Procedures to Managing Blue-Green Algae

Contents

- I. Background
- II. State Guidance
- III. Monitoring Strategy
- IV. Posting
- V. De-Posting

Appendices

- A. Collecting Samples
- B. Identifying Cyanobacteria
- C. Processing Samples
- D. Test Strip Kits
- E. Running the CAAS
- F. Certified Lab Contacts & COCs
- G. Signage
- H. Contacts
- I. CAAS Species and associated Toxins
- J. Emergency Contacts

East Bay
Regional Park District

2017

Blue Green Algae Response Plan Park Operation



Future Plans

Continued Commitment with CSUEB
and Build upon Nutrient Source Study



Future Plans

Continued Networking,
Communication,
Coordination and
Outreach & HAB
Brochure



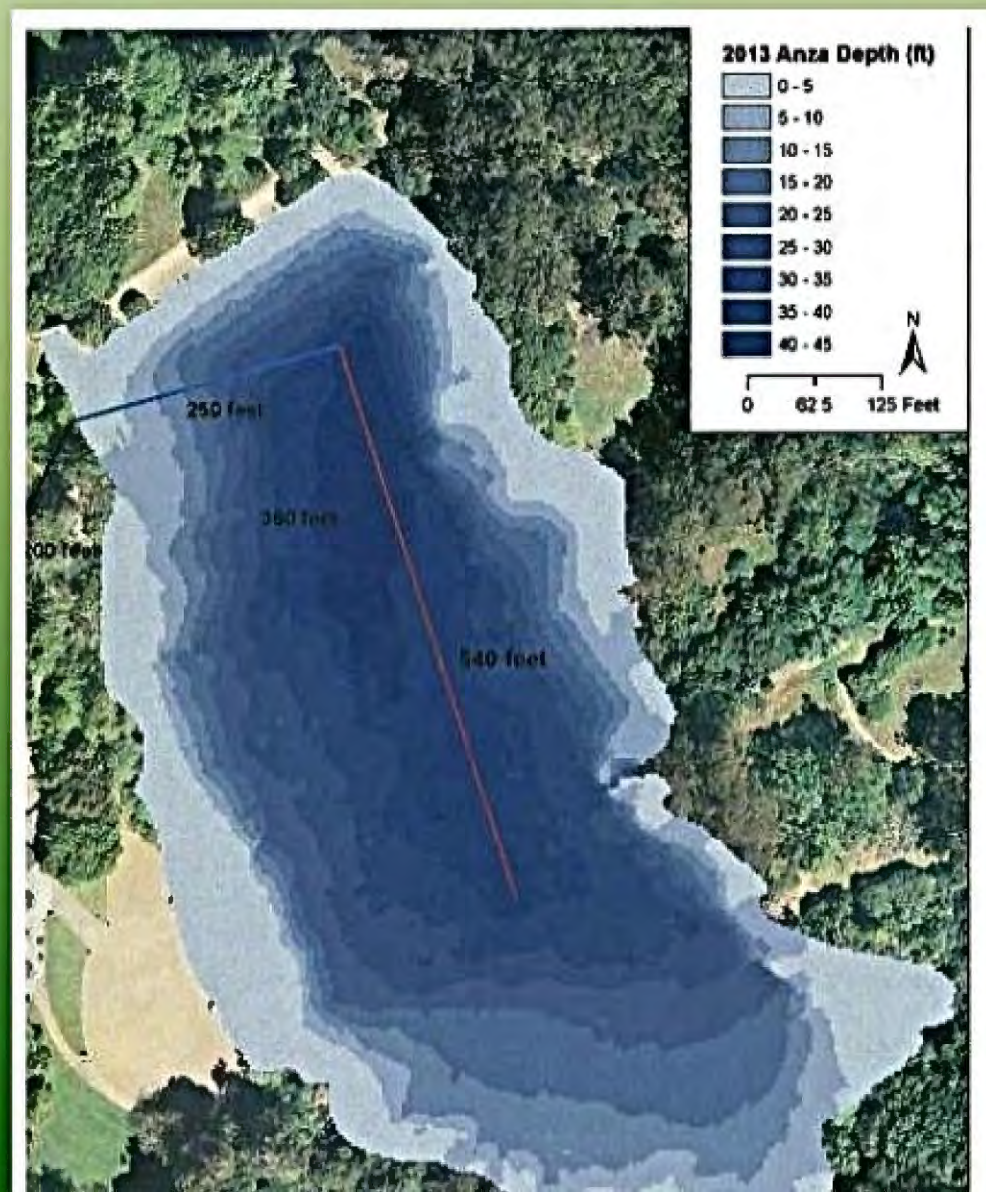
Future Plans

Alum Treatment and Floating Island for Temescal



Future Plans

Aeration System for System Lake Anza



Future Plans

- Continue to strategize solutions for larger lakes



Future Plans

Dredging smaller lakes?



The Tribulation Continues...

- Weather
- Timing
- Location



- Communication
- Outreach
- Coordination
- Networking

Blue Green Algae Concerns in East Bay Regional Parks

What are blue green algae? Blue green algae (or cyanobacteria) are a common native algal species often found in water or wet areas.

What is a blue green algae bloom? When conditions are right, algae can rapidly build up or "bloom" on the surface of reservoirs, rivers, creeks, lagoons, lakes and ponds. The bloom can be green, blue green, white or brown, and may look like a floating layer of scum or paint and may have an unpleasant odor.

What causes blooms? Warm, slow-moving waters that are rich in nutrients can cause algae growth. Blooms can occur at any time, but are most common in late summer or early fall.

How do I know if a bloom is toxic? Only a few types of blue green algae are known to produce poisons. The presence of blue-green algae in a water body does not necessarily mean toxins are always present. However, identifying the presence of toxins is an expensive and difficult process and one that may involve many days to weeks before results are available. Therefore, it is prudent for recreational users to adhere to the following precautions with regard to blue-green algae blooms East Bay Regional Park District water bodies.

Always look for the signs of an algae bloom before you enter the water, or before you let your children or pets enter the water.

How dangerous is toxic algae? If toxic algae touches your skin, or you accidentally inhale or swallow water containing the toxin during recreation, you could get a rash or an allergic reaction, or develop gastrointestinal problems. The long-term effects of these exposures are not well known, but children and pets are at greatest risk. Dogs can be exposed to particularly high levels of toxins by licking blue green algae off their fur after a swim.

What should I do if I see a bloom?

- Stay out of areas where the water has foam, scum, or mats of algae. Keep children and pets out of such areas at all times. If you or your pets swim or wade in water with algae, rinse off with fresh water as soon as possible.
- If no algal scums or mats are visible, you should still carefully watch young children and warn them not to swallow the water.
- Do not drink or cook with this water. Even if you boil or filter it, the toxins can persist.
- Do not let dogs swim in or drink from areas where you see foam, scum, or mats.
- Get medical treatment right away if you think that you or your pet might have been poisoned by blue green algae toxins.
- If you accidentally swallow water from the following...



Thanks to

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CDFW: Daniel Orr and Stella McMillin

CONTRACT LABS: Bend Labs, GreenWater Labs, and UCD CAHFS Labs

CAAS, TEST KITS & ADVICE: Abraxis



Questions?



Thank You