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Technical Memorandum:

Toxic Cyanobacteria Results for Copco/Iron Gate Reservoirs: July 10-11th, 2007

To all concerned:

Recent phytoplankton cell count results for July 10th-11th were received from Aquatic Analysts (AA; see lab data sheets in Appendix I). Although additional stations and depths were sampled, Aquatic Analysts performed a “rush” analysis on surface samples from the blue-labeled stations in Figure 1. Reservoir data are from the standard open-water sites IR01 and CR01; as well as two shoreline locations in Copco Reservoir (Copco Cove and Mallard Cove recreational access points CRCC and CRMC; Figure 1), and three in Iron Gate Reservoir (IRJW, IRCC, and IRSH; Figure 1). Samples from the Klamath River upstream from Copco (KRAC), directly downstream from Iron Gate (KRBI), at Seiad Valley (SV), and Orleans (OR) were also analyzed (Figure 1). See Kann and Corum (2006; 2007) for additional methodological details. Samples for microcystin were also collected and sent to the EPA laboratory in Richmond, CA (results are pending).

Although cyanobacterial scums were still present at many locations (Figure 2), toxigenic *Microcystis aeruginosa* (MSAE) increased at some stations but decreased at others since the last sampling period of June 12-13 (Table 1). The open water station CR01 increased by 95.3x to 1,804,000 cells/ml on July 11th, while the shoreline station CRCC decreased by ~1/2 to 2,275,500 cells/ml. The value at CRCC exceeded the California posting guidance level for MSAE by 56.9x (Table 1). Levels of *Anabaena flos-aquae* (ABFA) also decreased at CRCC on 7/10 when no ABFA was detected (compared to 30,283 cells/ml on 6/26). MSAE at Mallard Cove (CRMC) increased by 36.7x to 1,726,049 cells/ml; exceeding the MSAE posting threshold by 43.2x (Table 1).

MSAE levels at IR01 decreased substantially (by 106x) to 36,315 cells/ml, while IRCC (not sampled on 6/26) showed a level of 1,474,969 cells/ml; exceeding the posting level by 36.9x (Table 1). MSAE was detected at shoreline stations IRJW and IRSH, although the levels of 38,828 and 27,253 cells/ml were below the California 40,000 cell/ml posting guideline. Photos of Iron Gate Reservoir near Jenny Creek and at the “narrows” (IRUS) also indicate that other areas not sampled on July 10-11 were experiencing dense cyanobacterial blooms (Figure 2). Although maximum values were somewhat lower on July 10-11, the median value of all reservoir stations was higher than the previous sample period (Figure 3).

No toxigenic cyanobacteria were detected at the upstream station KRAC (above Copco Reservoir); however 6,231 cells/ml were detected at KRBI below Iron Gate Dam (Table 1; Figure

3). MSAE was not detected further downstream at Seiad Valley or Orleans (SV and OR; Table 1).

Data from the July 10-11th, 2007 sample period continued to show that blooms of potentially toxic cyanobacteria are present in both reservoir systems, and that several stations exceeded (by greater than 10x; Figure 3) the California harmful algal bloom public notification guidance level of 40,000 cell/ml (see Appendix II). The World Health Organization (WHO 2003) considers cyanobacterial scum formation (see Figure 2) in areas where whole-body contact and/or risk of ingestion/aspiration can occur to pose a high probability of adverse health effects.

Please let me know if you have any questions. Thank you.

Sincerely,



Jacob Kann, Ph.D.
Aquatic Ecologist

Disclaimer

Due to the patchy nature of blue-green algal blooms it is possible for higher Microcystis aeruginosa densities (and therefore higher microcystin toxin concentrations) to have been present in locations not covered in this survey, particularly along shorelines or protected coves and backwaters during calm conditions of little to no wind. Recreational users should always avoid contact with water whenever noticeable surface concentrations of algae are evident. Moreover, because pets or other domestic animals are the most likely to ingest contaminated water, these animals should not be allowed access to areas of either noticeable surface concentrations of algae or when an obvious green to blue-green appearance is evident

Literature Cited

WHO 2003. Chapter 8: Algae and Cyanobacteria in Fresh Water. Pages 128-133 in: Volume 1: Coastal and Fresh Waters. World Health Organization, Geneva. (http://www.who.int/water_sanitation_health/bathing/srwe1/en/)

Kann, J. and S. Corum. 2006. Summary of 2005 Toxic *Microcystin aeruginosa* Trends in Copco and Iron Gate Reservoirs on the Klamath River, CA Technical Memorandum Prepared for the Karuk Tribe of California, March, 2006.

Kann, J. and S. Corum. 2007. Summary of 2006 Toxic *Microcystin aeruginosa* Trends in Copco and Iron Gate Reservoirs, CA Technical Memorandum Prepared for the Karuk Tribe of California, June, 2007.

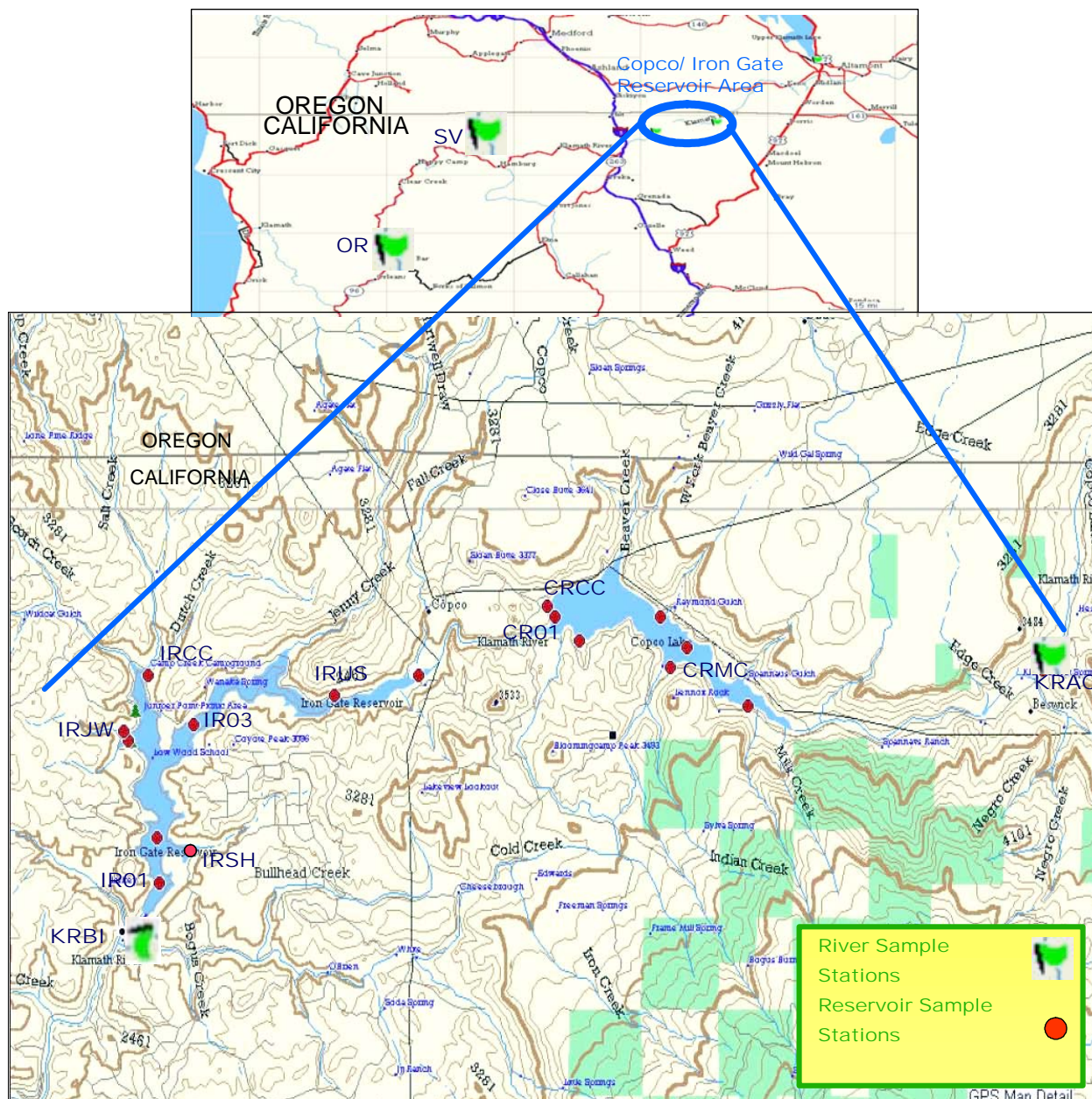


Figure 1. Location of Copco and Iron Gate Reservoir and Klamath River toxic cyanobacteria sampling stations, 7-10 and 7/11, 2007 (only labeled stations analyzed for this report).

Table 1. Cell density and risk exceedance for toxigenic cyanobacteria in Copco and Irongate Reservoirs and the Klamath River, 2007.

DATE	STATION NAME	DEPTH	<i>Microcystis aeruginosa</i> (cells/ml)	<i>Planktothrix (Oscillatoria) sp.</i> (cells/ml)	<i>Anabaena sp.</i> (cells/ml)	Microcystin Total (µg/L)	Exceedance of SWRCB ¹ risk level of 40,000 cells/ml <i>Microcystis</i> or <i>Planktothrix</i> (x greater than 4 ⁵ cells/ml)	Exceedance of SWRCB ¹ risk level of 8 µg/L microcystin (x greater than 8 µg/L)	Exceedance of TDI of 0.04 µg/kg/day for a 40 lb (18kg) child ingesting 100 mls (x greater than TDI)
5/31/2007	IR01	0	12,528	0	863		0.3		
6/13/2007	KRAC	0	0	0	0		0.0		
6/12/2007	KRBI	0	0	0	0		0.0		
6/13/2007	CR01	0	0	0	2,747		0.0		
6/13/2007	CRCC	0	360,800	0	65,996		9.0		
6/13/2007	IR01	0	7,091	5,318	1,968		0.2		
6/27/2007	KRAC	0	0	0	0		0.0		
6/27/2007	CR01	0	18,910	0	0		0.5		
6/26/2007	CRCC	0	4,578,497	0	30,283		114.5		
6/27/2007	CRMC	0	46,979	0	542		1.2		
6/27/2007	IR01	0	3,856,736	0	11,808		96.4		
6/26/2007	IRJW	0	0	0	168		0.0		
6/26/2007	KRBI	0	0	0	0		0.0		
6/26/2007	SV	0	0	0	0		0.0		
6/26/2007	OR	0	0	0	0		0.0		
7/11/2007	KRAC	0	0	0	0		0.0		
7/11/2007	CR01	0	1,804,000	0	8,509		45.1		
7/10/2007	CRCC	0	2,275,500	0	0		56.9		
7/11/2007	CRMC	0	1,726,049	0	0		43.2		
7/11/2007	IR01	0	36,315	0	3,338		0.9		
7/10/2007	IRJW	0	38,828	0	1,882		1.0		
7/10/2007	IRCC	0	1,474,969	0	4,888		36.9		
7/11/2007	IRSH	0	27,253	0	1,793		0.7		
7/10/2007	KRBI	0	6,231	0	119		0.2		
7/10/2007	SV	0	0	0	0		0.0		
7/10/2007	OR	0	0	0	0		0.0		

¹From: Blue Green Algae Work Group of the State Water Resources Control Board and Office of Environmental Health and Hazard Assessment:

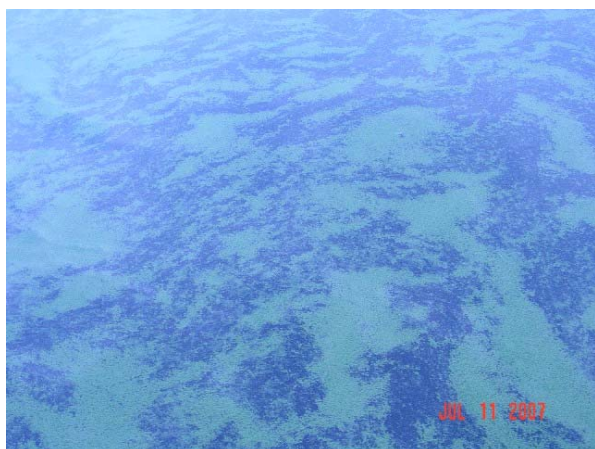
Cyanobacteria in California Recreational Water Bodies Providing Voluntary Guidance about Harmful Algal Blooms, Their Monitoring, and Public Notification (DRAFT June 2007)



CRCC



CRMC



CR01



Jenny Creek



IRCC



IRUS

Figure 2. Bloom conditions in Copco and Iron Gate Reservoirs, July 10-11th, 2007.

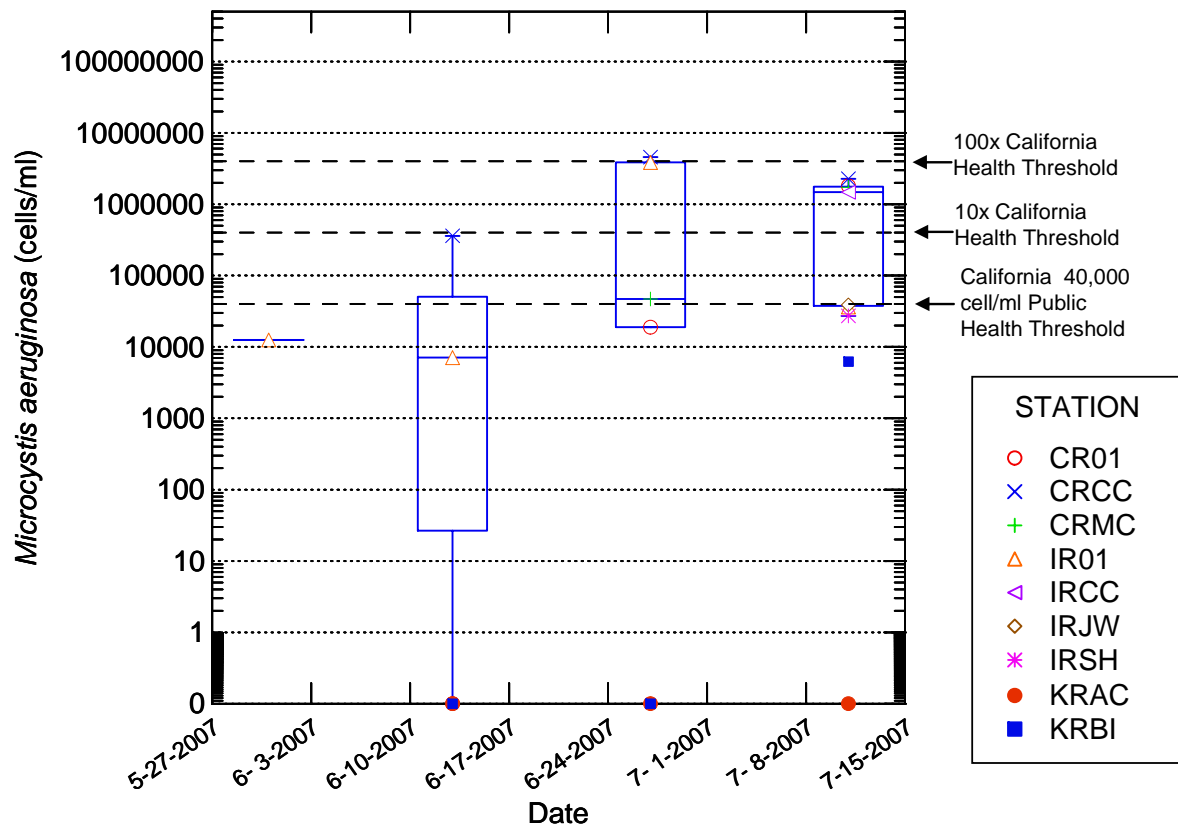


Figure 3. Time-series of MSAE cell density for Copco and Iron Gate Reservoir stations, 2007. The blue box is for the reservoir stations only; the river stations KRAC and KRBI are shown independently.

Appendix I: Aquatic Analysts Phytoplankton Lab Sheets

Phytoplankton Sample Analysis

Sample: Copco Res
Sample Station: CR01
Sample Depth: 0
Sample Date: 11-Jul-07

Total Density (#/mL): 19,572
Total Biovolume (um³/mL): 27,146,286
Trophic State Index: 73.7

Species	Density #/mL	Density Percent	Biovolume um ³ /mL	Biovolume Percent	Group
1 Aphanizomenon flos-aquae	14,466	73.9	11,847,685	43.6	bluegree
2 Microcystis aeruginosa	3,404	17.4	14,432,000	53.2	bluegree
3 Nitzschia palea	851	4.3	153,170	0.6	diatom
4 Chlamydomonas sp.	340	1.7	110,623	0.4	green
5 Anabaena flos-aquae	340	1.7	570,132	2.1	bluegree
6 Nitzschia amphibia	170	0.9	32,676	0.1	diatom

Aphanizomenon flos-aquae cells/mL = 188,058
 Aphanizomenon flos-aquae heterocysts/mL = 1,021

Microcystis aeruginosa cells/mL = 1,804,000

Anabaena flos-aquae cells/mL = 8,509

Phytoplankton Sample Analysis

Sample: Copco Res
Sample Station: CRCC
Sample Depth: SG
Sample Date: 10-Jul-07

Total Density (#/mL): 23,754
Total Biovolume (um³/mL): 24,648,810
Trophic State Index: 73.0

Species	Density #/mL	Density Percent	Biovolume um ³ /mL	Biovolume Percent	Group
1 Microcystis aeruginosa	8,786	37.0	18,204,000	73.9	bluegree
2 Aphanizomenon flos-aquae	6,833	28.8	4,305,000	17.5	bluegree
3 Rhodomonas sp.	1,627	6.8	32,540	0.1	cryptoph
4 Rhodomonas minuta	976	4.1	19,524	0.1	cryptoph
5 Nitzschia palea	976	4.1	175,714	0.7	diatom
6 Gomphonema ventricosum	976	4.1	1,078,690	4.4	diatom
7 Ankistrodesmus sp.	976	4.1	24,405	0.1	green
8 Navicula cryptocephala veneta	325	1.4	30,913	0.1	diatom
9 Chlamydomonas sp.	325	1.4	105,754	0.4	green
10 Gomphonema subclavatum	325	1.4	195,238	0.8	diatom
11 Nitzschia frustulum	325	1.4	39,048	0.2	diatom
12 Cocconeis placentula	325	1.4	149,683	0.6	diatom
13 Dinobryon sertularia	325	1.4	38,722	0.2	dinoflage
14 Rhoicosphenia curvata	325	1.4	38,071	0.2	diatom
15 Melosira varians	325	1.4	211,508	0.9	diatom

Aphanizomenon flos-aquae cells/mL = 68,333
 Aphanizomenon flos-aquae heterocysts/mL = 651

 Microcystis aeruginosa cells/mL = 2,275,500

Phytoplankton Sample Analysis

Sample: Copco Res
Sample Station: CRMC
Sample Depth: SG
Sample Date: 11-Jul-07

Total Density (#/mL): 8,445
Total Biovolume (um³/mL): 14,191,188
Trophic State Index: 69.0

Species	Density #/mL	Density Percent	Biovolume um ³ /mL	Biovolume Percent	Group
1 Microcystis aeruginosa	5,753	68.1	13,808,395	97.3	bluegree
2 Nitzschia frustulum	1,021	12.1	122,494	0.9	diatom
3 Rhodomonas minuta	835	9.9	16,704	0.1	cryptoph
4 Chlamydomonas sp.	464	5.5	150,797	1.1	green
5 Nitzschia palea	186	2.2	33,407	0.2	diatom
6 Gomphonema angustatum	93	1.1	16,704	0.1	diatom
7 Cocconeis placentula	93	1.1	42,687	0.3	diatom

Microcystis aeruginosa cells/mL = 1,726,049

Phytoplankton Sample Analysis

Sample: Irongate Res
Sample Station: IR01
Sample Depth: 0
Sample Date: 11-Jul-07

Total Density (#/mL): 1,211
Total Biovolume (um³/mL): 2,017,741
Trophic State Index: 54.9

Species	Density #/mL	Density Percent	Biovolume um ³ /mL	Biovolume Percent	Group
1 Aphanizomenon flos-aquae	657	54.3	620,990	30.8	bluegree
2 Microcystis aeruginosa	363	30.0	290,521	14.4	bluegree
3 Anabaena flos-aquae	86	7.1	220,139	10.9	bluegree
4 Nitzschia palea	35	2.9	6,225	0.3	diatom
5 Fragilaria crotonensis	35	2.9	871,564	43.2	diatom
6 Cocconeis placentula	17	1.4	7,955	0.4	diatom
7 Rhodomonas minuta	17	1.4	346	0.0	cryptoph

Microcystis aeruginosa cells/mL = 36,315

Aphanizomenon flos-aquae cells/mL = 9,857

Aphanizomenon flos-aquae heterocysts/mL = 363

Anabaena flos-aquae cells/mL = 3,286

Anabaena flos-aquae heterocysts/mL = 52

Phytoplankton Sample Analysis

Sample: Irongate Res
Sample Station: IRCC
Sample Depth: SG
Sample Date: 10-Jul-07

Total Density (#/mL): 12,102
Total Biovolume (um³/mL): 15,225,845
Trophic State Index: 69.5

Species	Density #/mL	Density Percent	Biovolume um ³ /mL	Biovolume Percent	Group
1 Microcystis aeruginosa	2,836	23.4	11,799,748	77.5	bluegree
2 Fragilaria construens venter	2,647	21.9	127,074	0.8	diatom
3 Aphanizomenon flos-aquae	2,080	17.2	1,703,589	11.2	bluegree
4 Anabaena flos-aquae	851	7.0	245,157	1.6	bluegree
5 Nitzschia frustulum	851	7.0	102,113	0.7	diatom
6 Cocconeis placentula	662	5.5	304,449	2.0	diatom
7 Nitzschia palea	473	3.9	85,094	0.6	diatom
8 Fragilaria construens	378	3.1	165,196	1.1	diatom
9 Rhoicosphenia curvata	284	2.3	33,187	0.2	diatom
10 Gomphonema subclavatum	284	2.3	170,189	1.1	diatom
11 Trachelomonas volvocina	189	1.6	356,451	2.3	euglenoi
12 Nitzschia amphibia	189	1.6	18,153	0.1	diatom
13 Chlamydomonas sp.	95	0.8	30,729	0.2	green
14 Nitzschia paleacea	95	0.8	9,266	0.1	diatom
15 Fragilaria capucina mesolepta	95	0.8	48,220	0.3	diatom
16 Fragilaria vaucheria	95	0.8	27,230	0.2	diatom

Microcystis aeruginosa cells/mL = 1,474,969

Aphanizomenon flos-aquae cells/mL = 27,041

Aphanizomenon flos-aquae heterocysts/mL = 284

Anabaena flos-aquae cells/mL = 3,659

Anabaena flos-aquae heterocysts/mL = 1,229

Aquatic Analysts

Sample ID: KP75

Phytoplankton Sample Analysis

Sample: Irongate Res
Sample Station: IRJW
Sample Depth: SG
Sample Date: 10-Jul-07

Total Density (#/mL): 1,329
Total Biovolume (um³/mL): 1,363,991
Trophic State Index: 52.1

Species	Density #/mL	Density Percent	Biovolume um ³ /mL	Biovolume Percent	Group
1 Aphanizomenon flos-aquae	508	38.2	543,798	39.9	bluegree
2 Microcystis aeruginosa	388	29.2	310,623	22.8	bluegree
3 Cocconeis placentula	134	10.1	61,826	4.5	diatom
4 Fragilaria construens venter	75	5.6	19,354	1.4	diatom
5 Cryptomonas erosa	60	4.5	31,062	2.3	cryptoph
6 Chlamydomonas sp.	30	2.2	9,707	0.7	green
7 Anabaena sp.	30	2.2	20,310	1.5	bluegree
8 Fragilaria capucina mesolepta	15	1.1	228,487	16.8	diatom
9 Anabaena flos-aquae	15	1.1	120,068	8.8	bluegree
10 Navicula sp.	15	1.1	2,240	0.2	diatom
11 Nitzschia frustulum	15	1.1	1,792	0.1	diatom
12 Gomphonema subclavatum	15	1.1	8,960	0.7	diatom
13 Nitzschia paleacea	15	1.1	1,464	0.1	diatom
14 Fragilaria vaucheria	15	1.1	4,301	0.3	diatom

Microcystis aeruginosa cells/mL = 38,828

Aphanizomenon flos-aquae cells/mL = 8,632

Aphanizomenon flos-aquae heterocysts/mL = 179

Anabaena sp. cells/mL = 299

Anabaena flos-aquae cells/mL = 1,792

Anabaena flos-aquae heterocysts/mL = 90

Phytoplankton Sample Analysis

Sample: Irongate Res
Sample Station: IRSH
Sample Depth: SG
Sample Date: 11-Jul-07

Total Density (#/mL): 800
Total Biovolume (um³/mL): 2,133,054
Trophic State Index: 55.3

Species	Density #/mL	Density Percent	Biovolume um ³ /mL	Biovolume Percent	Group
1 Microcystis aeruginosa	273	34.1	218,027	10.2	bluegree
2 Aphanizomenon flos-aquae	149	18.7	112,987	5.3	bluegree
3 Fragilaria construens venter	132	16.5	41,144	1.9	diatom
4 Fragilaria crotonensis	70	8.8	1,595,116	74.8	diatom
5 Anabaena flos-aquae	44	5.5	117,805	5.5	bluegree
6 Gomphonema subclavatum	35	4.4	21,099	1.0	diatom
7 Cocconeis placentula	26	3.3	12,132	0.6	diatom
8 Rhoicosphenia curvata	18	2.2	2,057	0.1	diatom
9 Asterionella formosa	9	1.1	1,934	0.1	diatom
10 Achnanthes lanceolata	9	1.1	1,582	0.1	diatom
11 Navicula sp.	9	1.1	1,319	0.1	diatom
12 Nitzschia frustulum	9	1.1	1,055	0.0	diatom
13 Chlamydomonas sp.	9	1.1	2,857	0.1	green
14 Fragilaria construens	9	1.1	3,939	0.2	diatom

Microcystis aeruginosa cells/mL = 27,253

Aphanizomenon flos-aquae cells/mL = 1,793

Aphanizomenon flos-aquae heterocysts/mL = 53

Anabaena flos-aquae cells/mL = 1,758

Anabaena flos-aquae heterocysts/mL = 35

Aquatic Analysts

Sample ID: KP77

Phytoplankton Sample Analysis

Sample: Klamath Basin
Sample Station: OR
Sample Depth: 0C
Sample Date: 10-Jul-07

Total Density (#/mL): 338
Total Biovolume ($\mu\text{m}^3/\text{mL}$): 148,288
Trophic State Index: 36.1

Species	Density #/mL	Density Percent	Biovolume $\mu\text{m}^3/\text{mL}$	Biovolume Percent	Group
1 Cocconeis placentula	162	47.9	74,473	50.2	diatom
2 Rhoicosphenia curvata	32	9.4	6,697	4.5	diatom
3 Nitzschia frustulum	32	9.4	3,816	2.6	diatom
4 Navicula cryptocephala	20	6.0	3,744	2.5	diatom
5 Navicula cryptocephala veneta	12	3.4	1,099	0.7	diatom
6 Scenedesmus quadricauda	12	3.4	3,758	2.5	green
7 Achnanthes minutissima	12	3.4	578	0.4	diatom
8 Synedra ulna	9	2.6	17,259	11.6	diatom
9 Cymbella sinuata	9	2.6	1,214	0.8	diatom
10 Achnanthes lanceolata	9	2.6	1,561	1.1	diatom
11 Nitzschia paleacea	6	1.7	567	0.4	diatom
12 Diatoma vulgare	6	1.7	11,333	7.6	diatom
13 Melosira varians	3	0.9	1,879	1.3	diatom
14 Epithemia turgida	3	0.9	12,287	8.3	diatom
15 Gomphonema tenellum	3	0.9	607	0.4	diatom
16 Cymbella affinis	3	0.9	5,204	3.5	diatom
17 Navicula menisculus upsaliensis	3	0.9	593	0.4	diatom
18 Diatoma tenue	3	0.9	838	0.6	diatom
19 Navicula pupula	3	0.9	781	0.5	diatom

Phytoplankton Sample Analysis

Sample: Klamath Basin
Sample Station: SV
Sample Depth: 0C
Sample Date: 10-Jul-07

Total Density (#/mL): 688
Total Biovolume ($\mu\text{m}^3/\text{mL}$): 273,825
Trophic State Index: 40.5

Species	Density #/mL	Density Percent	Biovolume $\mu\text{m}^3/\text{mL}$	Biovolume Percent	Group
1 Cocconeis placentula	288	41.8	132,256	48.3	diatom
2 Nitzschia frustulum	68	9.8	8,118	3.0	diatom
3 Navicula cryptocephala	51	7.4	9,386	3.4	diatom
4 Achnanthes minutissima	34	4.9	1,691	0.6	diatom
5 Navicula cryptocephala veneta	34	4.9	3,213	1.2	diatom
6 Cryptomonas erosa	28	4.1	14,658	5.4	cryptoph
7 Scenedesmus quadricauda	23	3.3	5,863	2.1	green
8 Glenodinium sp.	17	2.5	11,839	4.3	dinoflage
9 Rhoicosphenia curvata	17	2.5	1,979	0.7	diatom
10 Navicula tripunctata	17	2.5	18,942	6.9	diatom
11 Chlamydomonas sp.	17	2.5	5,497	2.0	green
12 Cymbella sinuata	11	1.6	1,579	0.6	diatom
13 Diatoma vulgare	11	1.6	22,099	8.1	diatom
14 Navicula sp.	11	1.6	1,691	0.6	diatom
15 Cymbella minuta	11	1.6	4,172	1.5	diatom
16 Gomphonema truncatum	6	0.8	23,001	8.4	diatom
17 Gomphonema olivaceum	6	0.8	1,268	0.5	diatom
18 Gomphonema angustatum	6	0.8	1,015	0.4	diatom
19 Achnanthes linearis	6	0.8	744	0.3	diatom
20 Oocystis pusilla	6	0.8	609	0.2	green
21 Amphora perpusilla	6	0.8	936	0.3	diatom
22 Cyclotella meneghiniana	6	0.8	2,142	0.8	diatom
23 Rhodomonas minuta	6	0.8	113	0.0	cryptoph
24 Scenedesmus denticulatus	6	0.8	1,015	0.4	green

Aquatic Analysts

Sample ID: KP79

Phytoplankton Sample Analysis

Sample: Klamath River
Sample Station: KRBI
Sample Depth: 0C
Sample Date: 10-Jul-07

Total Density (#/mL): 306
Total Biovolume (um³/mL): 359,791
Trophic State Index: 42.5

Species	Density #/mL	Density Percent	Biovolume um ³ /mL	Biovolume Percent	Group
1 Microcystis aeruginosa	62	20.4	49,847	13.9	bluegree
2 Nitzschia frustulum	30	9.7	7,121	2.0	diatom
3 Cocconeis placentula	27	8.7	12,284	3.4	diatom
4 Melosira granulata	24	7.8	77,026	21.4	diatom
5 Aphanizomenon flos-aquae	21	6.8	20,936	5.8	bluegree
6 Rhodomonas minuta	18	5.8	356	0.1	cryptoph
7 Ankistrodesmus falcatus	15	4.9	371	0.1	green
8 Cryptomonas erosa	15	4.9	7,714	2.1	cryptoph
9 Fragilaria crotonensis	12	3.9	159,512	44.3	diatom
10 Rhoicosphenia curvata	12	3.9	1,389	0.4	diatom
11 Nitzschia palea	12	3.9	2,136	0.6	diatom
12 Nitzschia microcephala	9	2.9	890	0.2	diatom
13 Navicula cryptocephala veneta	9	2.9	846	0.2	diatom
14 Nitzschia paleacea	6	1.9	582	0.2	diatom
15 Stephanodiscus hantzschii	6	1.9	712	0.2	diatom
16 Anabaena flos-aquae	6	1.9	7,952	2.2	bluegree
17 Scenedesmus quadricauda	3	1.0	771	0.2	green
18 Stephanodiscus astraea minutula	3	1.0	1,038	0.3	diatom
19 Gomphonema subclavatum	3	1.0	1,780	0.5	diatom
20 Schroderia sp.	3	1.0	134	0.0	green
21 Diatoma tenue	3	1.0	860	0.2	diatom
22 Gomphonema angustatum	3	1.0	534	0.1	diatom
23 Chlamydomonas sp.	3	1.0	964	0.3	green
24 Gomphonema truncatum	3	1.0	4,035	1.1	diatom

Microcystis aeruginosa cells/mL = 6,231

Aphanizomenon flos-aquae cells/mL = 332

Anabaena flos-aquae cells/mL = 119

Aquatic Analysts

Sample ID: KP80

Phytoplankton Sample Analysis

Sample: Klamath River
Sample Station: KRAC
Sample Depth: 0C
Sample Date: 11-Jul-07

Total Density (#/mL): 396
Total Biovolume ($\mu\text{m}^3/\text{mL}$): 158,895
Trophic State Index: 36.6

Species	Density #/mL	Density Percent	Biovolume $\mu\text{m}^3/\text{mL}$	Biovolume Percent	Group
1 Nitzschia frustulum	94	23.7	12,356	7.8	diatom
2 Rhoicosphenia curvata	64	16.1	8,214	5.2	diatom
3 Navicula cryptocephala veneta	55	14.0	5,255	3.3	diatom
4 Cocconeis placentula	51	12.9	23,486	14.8	diatom
5 Gomphonema angustatum	17	4.3	3,063	1.9	diatom
6 Diatoma vulgare	17	4.3	50,035	31.5	diatom
7 Fragilaria vaucheria	9	2.2	3,676	2.3	diatom
8 Navicula tripunctata	9	2.2	9,531	6.0	diatom
9 Nitzschia paleacea	9	2.2	834	0.5	diatom
10 Nitzschia palea	9	2.2	1,532	1.0	diatom
11 Gomphonema subclavatum	4	1.1	2,553	1.6	diatom
12 Fragilaria construens venter	4	1.1	408	0.3	diatom
13 Pandorina morum	4	1.1	11,913	7.5	green
14 Nitzschia amphibia	4	1.1	408	0.3	diatom
15 Nitzschia dissipata	4	1.1	1,145	0.7	diatom
16 Selenastrum minutum	4	1.1	85	0.1	green
17 Stephanodiscus hantzschii	4	1.1	511	0.3	diatom
18 Cymbella affinis	4	1.1	7,658	4.8	diatom
19 Navicula cryptocephala	4	1.1	787	0.5	diatom
20 Achnanthes lanceolata	4	1.1	766	0.5	diatom
21 Synedra ulna	4	1.1	8,467	5.3	diatom
22 Scenedesmus quadricauda	4	1.1	553	0.3	green
23 Achnanthes minutissima	4	1.1	213	0.1	diatom
24 Scenedesmus denticulatus	4	1.1	766	0.5	green
25 Melosira granulata	4	1.1	4,680	2.9	diatom

Aquatic Analysts

Sample ID: KP81

Appendix II

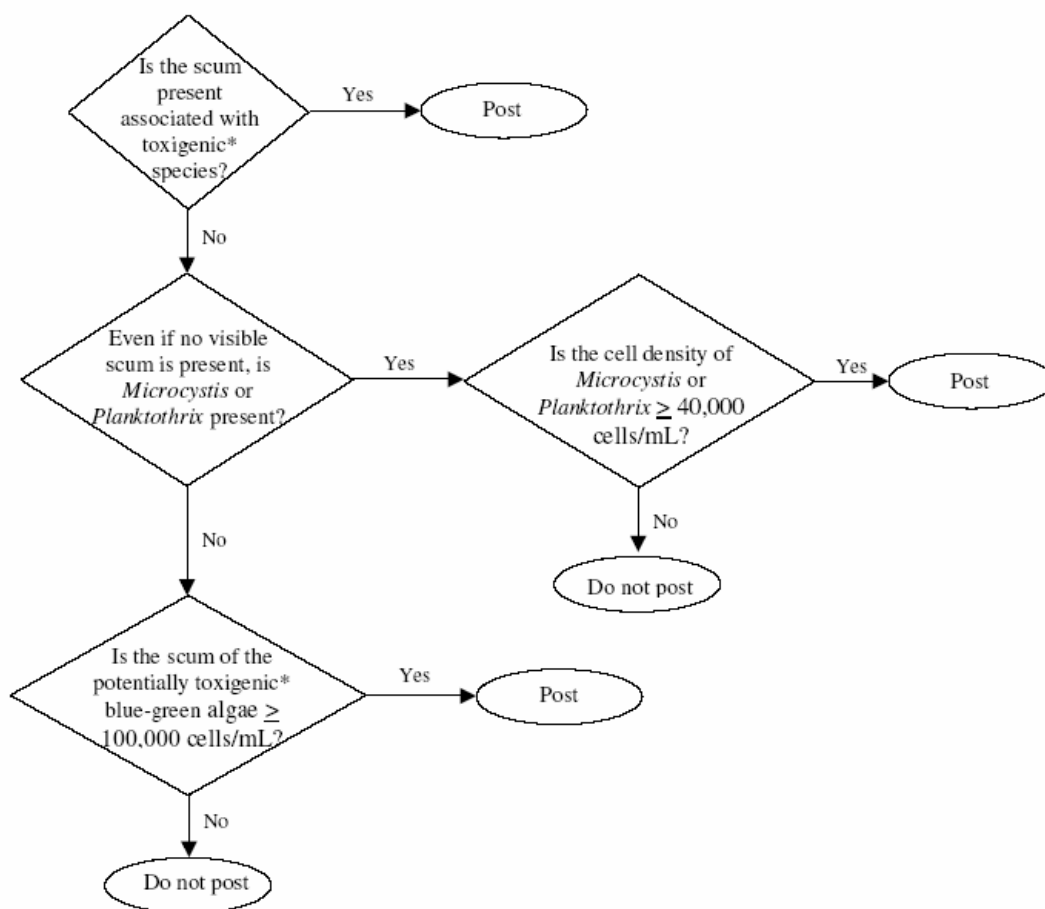
From: Blue Green Algae Work Group of the State Water Resources Control Board and Office of Environmental Health and Hazard Assessment

Cyanobacteria in California Recreational Water Bodies Providing Voluntary Guidance about Harmful Algal Blooms, Their Monitoring, and Public Notification (DRAFT June 2007)

<http://www.waterboards.ca.gov/bluegreenalgae/index.html>

Posting Decisions:

- If visible scum is present: Post warning signs and distribute informational brochures.
- When sampling with microbial identification is available, the following decision chart is recommended:



*Potentially toxic blue-green algae that have been detected in California include those of the genera *Anabaena*, *Microcystis*, *Aphanizomenon*, and *Gloeotrichia*. Additional blue-green algae that are known to be potentially toxic may be added to this list.