



IFCB Algal Analysis Report - Full Assemblage

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PLEASE READ ALL INFORMATION BEFORE INTERPRETING DATA

IFCB Analysis Overview:

The Imaging FlowCytobot (IFCB, McLane Research Laboratories, Inc.) is an automated submersible imaging flow cytometer that generates high-resolution images of suspended particles in-flow. At PhycoTech, Inc. we use the IFCB as a bench instrument to provide a rapid, high-level picture of algal assemblage. The IFCB can trigger on image particulates between 2-250 µm, however, it most reliably tallies particulates 8-250 µm. The average overall algal GALD across all phytoplankton analyzed at PhycoTech (n>10K) is approximately 50 µm. IFCB captured images are classified using a random forest classifier model that we are constantly building and improving.

Important Analysis Information:

1. Live samples are tallied more accurately than preserved samples.
2. Unpreserved samples received more than 24 hours after sampling will provide unreliable results.
3. 'Unclassified' images (see below) are included in 'Total Algae' counts (1 NU as 1 cell per image).
4. Picoplankton may be entrained in 'Detritus'. These cells are not counted and biovolume is not calculated.
5. Although not included in the Taste and Odor (TO) functional group, some diatoms may cause taste and odor events.
6. Taste and Odor (TO) functional group taxa are not consistent toxin producers and are not included in the Total HAB Concentration.
7. IFCB data is semi-quantitative. Concentration and total biovolume have not yet been fully compared to manual measurements for validation or calibration for all systems and system types. The data produced has the most utility comparing dominant taxa groups, functional class and thresholds of critical water quality indicators.
8. The processing of your sample with the IFCB produces an abundant number of images, more than a manual counter would be able to see. Due to differences in counting methods, the data in this report cannot be directly compared to a manual count.
9. IFCB images for your samples are archived at PhycoTech, Inc., and are available via a 'box' link upon request (please allow 7 business days for delivery).

NOTE - Aphanizomenon taxa abbreviations:

<u>IFCB Taxa ID</u>	<u>Taxa included</u>	<u>Notes</u>
Aph. flos-aquae	Aphanizomenon flos-aquae	May produce saxitoxin.
Aph. gracile-Sphaero.-Chrys.	Aphanizomenon gracile, Sphaerospermopsis, & Chrysosporum	May produce microcystin, anatoxin A, and/or cylindrospermopsin.

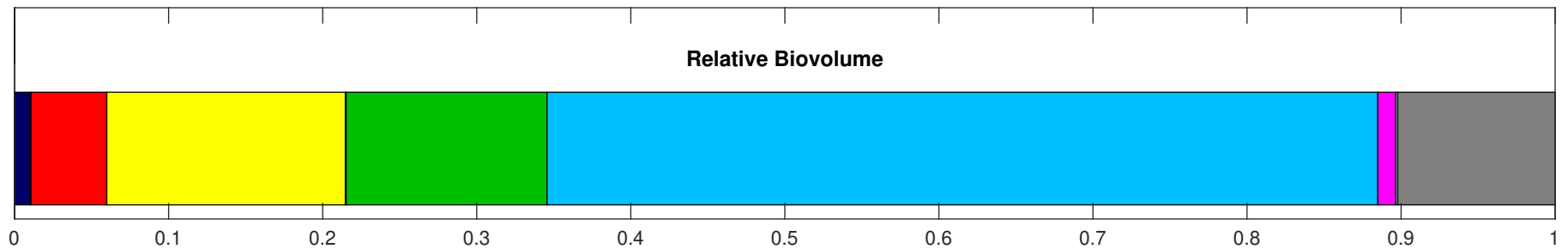
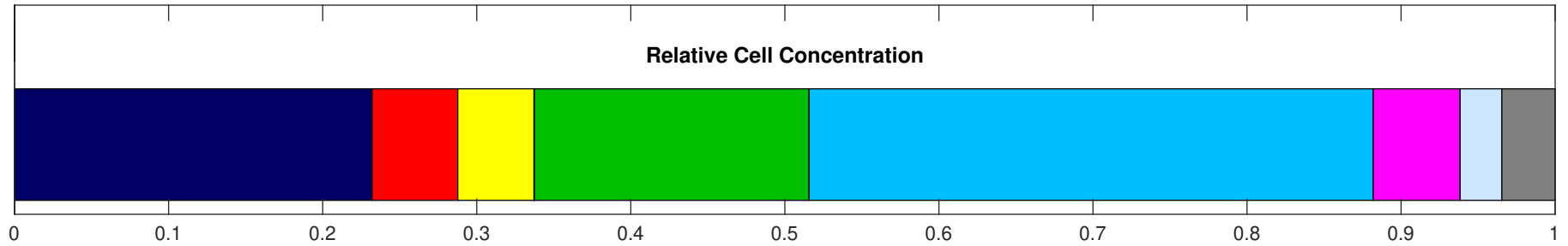
Algal Functional Group Classifications:

	Functional Group	What does it indicate?
BG	Non-harmful Cyanobacteria	Generally benign and indicative of good water quality.
CER	Ceratium	Often present in tannic/high organic content water bodies. Active migrator in the water column. May cause significant taste and odor at high densities.
CP	Cryptophytes & Dinoflagellates	Often dominate in spring, or in tannic/high organic content water bodies. Generally indicate good water quality.
DY	Chrysophytes, Haptophytes & Diatoms	Generally indicate good water quality. If high densities, can cause significant taste and odor.
E	Euglenophytes	Often present in high organic content water bodies. Co-occurs with Cryptophytes and non-coliform bacteria. High densities can be indicative of poor water quality.
G	Chlorophytes	Generally indicate good water quality. If very high densities, indicates high nitrate concentrations.
TO	Taste and Odor Producers	Algae that often produce taste and odor issues. Diatoms that can produce taste and odor problems, but do so less often, are not included in this group.
HAB	Harmful Cyanobacteria	May produce toxins, but not always producing. Toxins are generally detectable above 5000 cells/mL. Indicative of poor water quality often with high phosphate or low TN:TP ratios.
M	Miscellaneous	All other groups, generally neutral. Includes small Chlorophytes or Cyanobacteria less than 9um in diameter.
U	Unclassified	Images that the classifier cannot confidently identify. Includes small flagellates entrained in detritus, taxa not yet included in the classifier, partial images and images with multiple taxa.

Sample ID: D20240517T174029
Customer ID: 390
Tracking Code: 240005-390
Sample Info: CF1-CRLS-1

System: Indian Hills Lake
Site: Past Beach
Station: none
Level: Epi

Date Sampled: 5/15/2024
Date Received: 5/17/2024
Date Analyzed: 5/17/2024



Total Algal Concentration: 2719 cells/mL
HAB Concentration: 996 cells/mL
HAB Relative Concentration: 37%

Total Biovolume: 1601730 $\mu\text{m}^3/\text{mL}$
HAB Biovolume: 863801 $\mu\text{m}^3/\text{mL}$
HAB Relative Biovolume: 54%

Sample ID: D20240517T174029
Customer ID: 390
Tracking Code: 240005-390
Sample Info: CF1-CRLS-1

System: Indian Hills Lake
Site: Past Beach
Station: none
Level: Epi

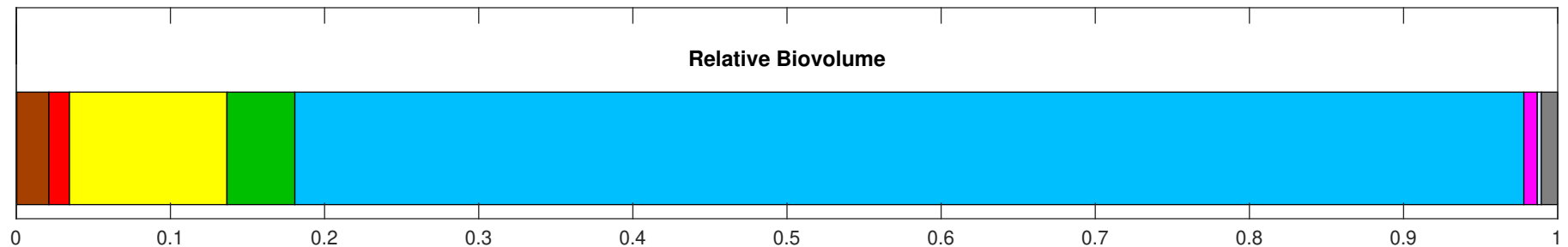
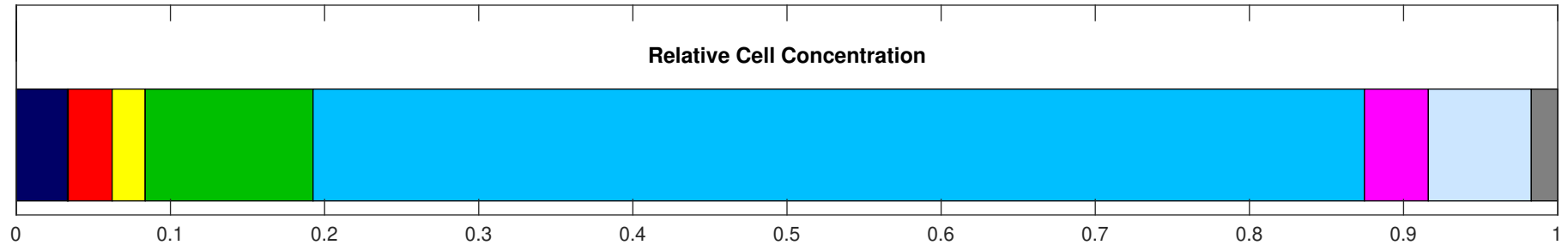
Date Sampled: 5/15/2024
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Taxa	Group	NU/mL	Cells/mL	Biovolume μm^3 /mL	Relative Biovolume %
Aphanocapsa-Aphanothece	BG	17	98	11633	0.73
Cyanophyta	BG	4	5	553	0.03
Merismopedia	BG	17	533	5408	0.34
Cryptomonas	CP	14	14	22332	1.39
Peridinales	CP	7	7	11155	0.7
Rhodomonas	CP	130	130	45357	2.83
Detritus	DET	3	0	0	0
Asterionella	DY	5	20	91075	5.69
Aulacoseira	DY	7	56	15927	0.99
Centrics	DY	4	4	2473	0.15
Chrysophyta	DY	6	35	6591	0.41
Mallomonas	DY	17	17	131286	8.2
Navicula-Nitzschia	DY	1	1	666	0.04
Trachelomonas	E	1	1	786	0.05
Protozoan	EXCLUDE	1	0	0	0
Chlorophytes	G	139	219	79970	4.99
Closterium	G	7	7	36942	2.31
Coelastrum	G	1	6	1904	0.12
Crucigenia-Crucigniella	G	4	12	1467	0.09
Desmodesmus-Scenedesmus	G	10	61	8198	0.51
Eudorina	G	1	17	4259	0.27
Monoraphidium	G	9	9	2800	0.17
Oocystis	G	12	29	13647	0.85
Pediastrum	G	3	46	41322	2.58
Quadrigula-Elakatothrix	G	1	1	273	0.02
Schroederia	G	77	77	18174	1.13
Aph. gracile-Chrys.	HAB	2	20	1699	0.11
Dolichospermum	HAB	1	10	71970	4.49
Microcystis	HAB	512	960	789579	49.3
Taxa below 9um	M	153	153	18640	1.16
Pseudanabaena	TO	9	74	1980	0.12
unclassified	U	94	94	163665	10.22

Sample ID: D20240517T182642
Customer ID: 390
Tracking Code: 240006-390
Sample Info: CF2-CRLS-2

System: Indian Hills Lake
Site: Cove 5
Station: Center Cove
Level: Epi

Date Sampled: 5/15/2024
Date Received: 5/17/2024
Date Analyzed: 5/17/2024



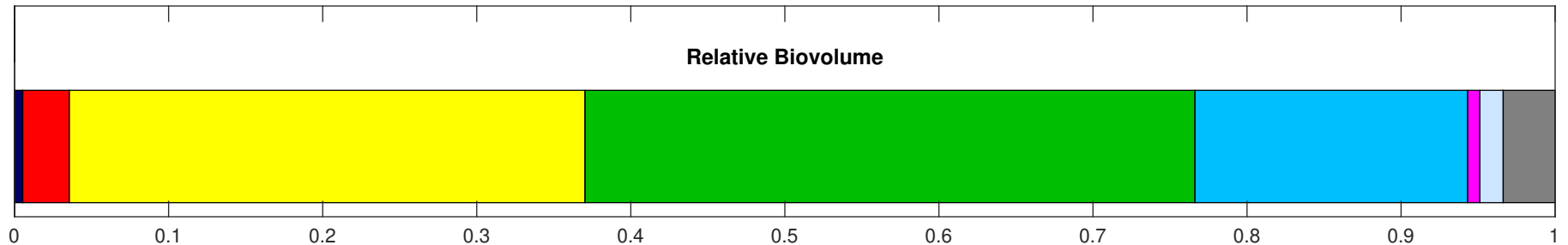
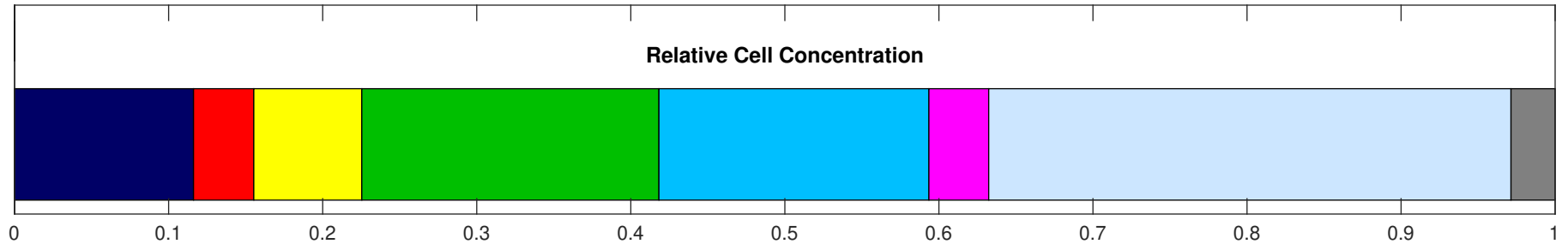
Total Algal Concentration: 3459 cells/mL
HAB Concentration: 2359 cells/mL
HAB Relative Concentration: 68%

Total Biovolume: 2604892 $\mu\text{m}^3/\text{mL}$
HAB Biovolume: 2076964 $\mu\text{m}^3/\text{mL}$
HAB Relative Biovolume: 80%

Sample ID: D20240517T193422
Customer ID: 390
Tracking Code: 240007-390
Sample Info: CF3-CRLS-3

System: Indian Hills Lake
Site: Cove 2
Station: Mouth of Cove
Level: Epi

Date Sampled: 5/15/2024
Date Received: 5/17/2024
Date Analyzed: 5/17/2024



Total Algal Concentration: 1260 cells/mL
HAB Concentration: 221 cells/mL
HAB Relative Concentration: 18%

Total Biovolume: 802546 $\mu\text{m}^3/\text{mL}$
HAB Biovolume: 142051 $\mu\text{m}^3/\text{mL}$
HAB Relative Biovolume: 18%

Sample ID: D20240517T193422
Customer ID: 390
Tracking Code: 240007-390
Sample Info: CF3-CRLS-3

System: Indian Hills Lake
Site: Cove 2
Station: Mouth of Cove
Level: Epi

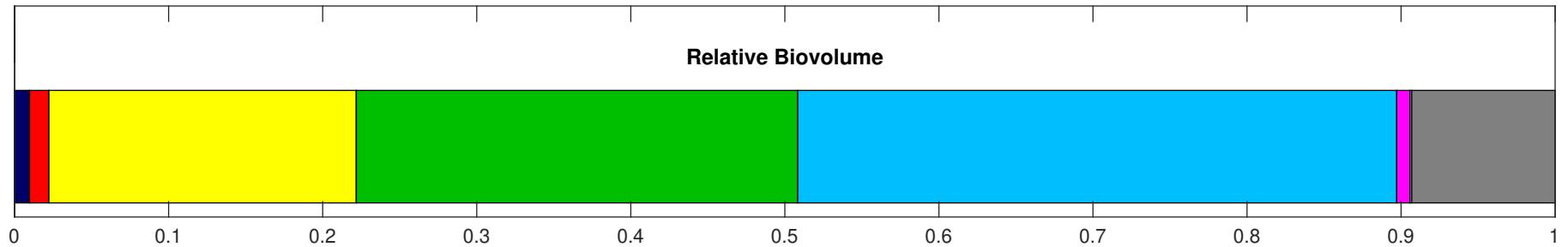
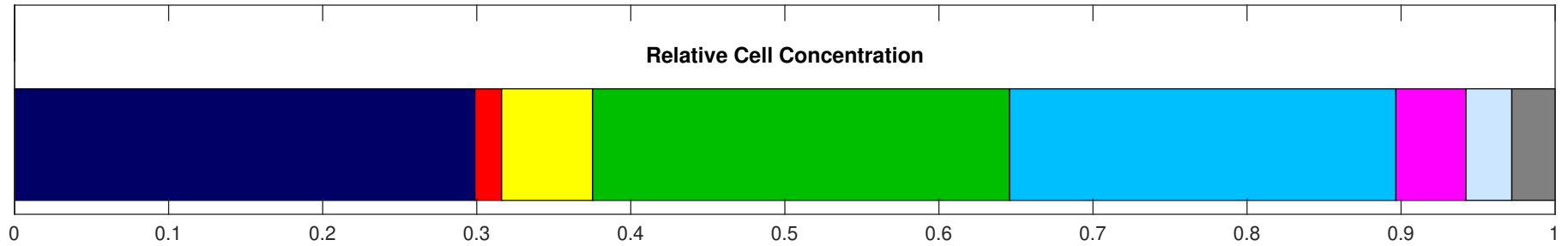
Date Sampled: 5/15/2024
Date Received: 5/17/2024
Date Analyzed: 5/17/2024

Taxa	Group	NU/mL	Cells/mL	Biovolume μm^3 /mL	Relative Biovolume %
Aphanocapsa-Aphanothece	BG	10	34	3252	0.41
Cyanogranis-Cyanocatena	BG	0	0	40	0
Cyanophyta	BG	1	2	273	0.03
Merismopedia	BG	3	112	982	0.12
Cryptomonas	CP	5	5	5975	0.74
Peridinales	CP	2	2	4471	0.56
Rhodomonas	CP	42	42	13819	1.72
Detritus	DET	3	0	0	0
Asterionella	DY	4	16	72905	9.08
Aulacoseira	DY	2	18	5516	0.69
Centrics	DY	1	1	1047	0.13
Chrysophyta	DY	7	25	3161	0.39
Mallomonas	DY	27	27	185734	23.14
Navicula-Nitzschia	DY	0	0	98	0.01
Pennate Diatoms	DY	0	0	234	0.03
Protozoan	EXCLUDE	3	0	0	0
Chlorophytes	G	61	97	42154	5.25
Closterium	G	3	3	19559	2.44
Crucigenia-Crucigniella	G	2	6	911	0.11
Desmodesmus-Scenedesmus	G	2	14	1245	0.16
Micractinium	G	0	2	1117	0.14
Monoraphidium	G	3	3	606	0.08
Oocystis	G	7	17	8914	1.11
Pediastrum	G	1	19	217269	27.07
Quadrigula-Elakatothrix	G	0	2	315	0.04
Schroederia	G	80	80	19531	2.43
Staurastrum	G	0	0	6099	0.76
Aphanizomenon (Aph.)	HAB	5	41	3580	0.45
Dolichospermum	HAB	2	107	87627	10.92
Microcystis	HAB	12	37	21654	2.7
Woronchinia	HAB	6	34	28917	3.6
Taxa below 9um	M	49	49	6343	0.79
Pseudanabaena	TO	53	427	12143	1.51
unclassified	U	36	36	27056	3.37

Sample ID: D20240517T205544
Customer ID: 390
Tracking Code: 240008-390
Sample Info: CF4-CRLS-4

System: Indian Hills Lake
Site: Dam
Station: Center of Lake
Level: Epi

Date Sampled: 5/15/2024
Date Received: 5/17/2024
Date Analyzed: 5/17/2024



Total Algal Concentration: 798 cells/mL
HAB Concentration: 200 cells/mL
HAB Relative Concentration: 25%

Total Biovolume: 557383 $\mu\text{m}^3/\text{mL}$
HAB Biovolume: 216740 $\mu\text{m}^3/\text{mL}$
HAB Relative Biovolume: 39%

Sample ID: D20240517T205544
Customer ID: 390
Tracking Code: 240008-390
Sample Info: CF4-CRLS-4

System: Indian Hills Lake
Site: Dam
Station: Center of Lake
Level: Epi

Date Sampled: 5/15/2024
Date Received: 5/17/2024
Date Analyzed: 5/17/2024

Taxa	Group	NU/mL	Cells/mL	Biovolume μm^3 /mL	Relative Biovolume %
Aphanocapsa-Aphanothece	BG	9	34	3370	0.6
Cyanogranis-Cyanocatena	BG	0	0	29	0.01
Merismopedia	BG	6	204	2010	0.36
Cryptomonas	CP	2	2	1890	0.34
Peridinales	CP	1	1	1861	0.33
Rhodomonas	CP	11	11	3258	0.58
Detritus	DET	4	0	0	0
Asterionella	DY	3	11	42313	7.59
Aulacoseira	DY	1	7	1627	0.29
Centrics	DY	1	1	4161	0.75
Chrysophyta	DY	5	18	2403	0.43
Mallomonas	DY	10	10	59893	10.75
Navicula-Nitzschia	DY	1	1	550	0.1
Pennate Diatoms	DY	0	0	288	0.05
Protozoan	EXCLUDE	3	0	0	0
Chlorophytes	G	37	66	20055	3.6
Closterium	G	5	5	30291	5.43
Crucigenia-Crucigniella	G	3	10	1327	0.24
Desmodesmus-Scenedesmus	G	1	8	737	0.13
Monoraphidium	G	1	1	274	0.05
Oocystis	G	10	28	20537	3.68
Pediastrum	G	2	25	67617	12.13
Schroederia	G	72	72	15620	2.8
Staurastrum	G	0	0	3085	0.55
Tetraedon	G	0	0	143	0.03
Aph. gracile-Chrys.	HAB	1	13	940	0.17
Aphanizomenon (Aph.)	HAB	0	1	43	0.01
Dolichospermum	HAB	1	29	36010	6.46
Microcystis	HAB	22	121	132847	23.83
Woronchinia	HAB	1	37	46899	8.41
Taxa below 9um	M	36	36	4818	0.86
Pseudanabaena	TO	3	24	614	0.11
unclassified	U	22	22	51873	9.31