

Supplementary Materials

Evaluation and Refinement of Chlorophyll-a Algorithms for High-Biomass Blooms in San Francisco Bay (USA)

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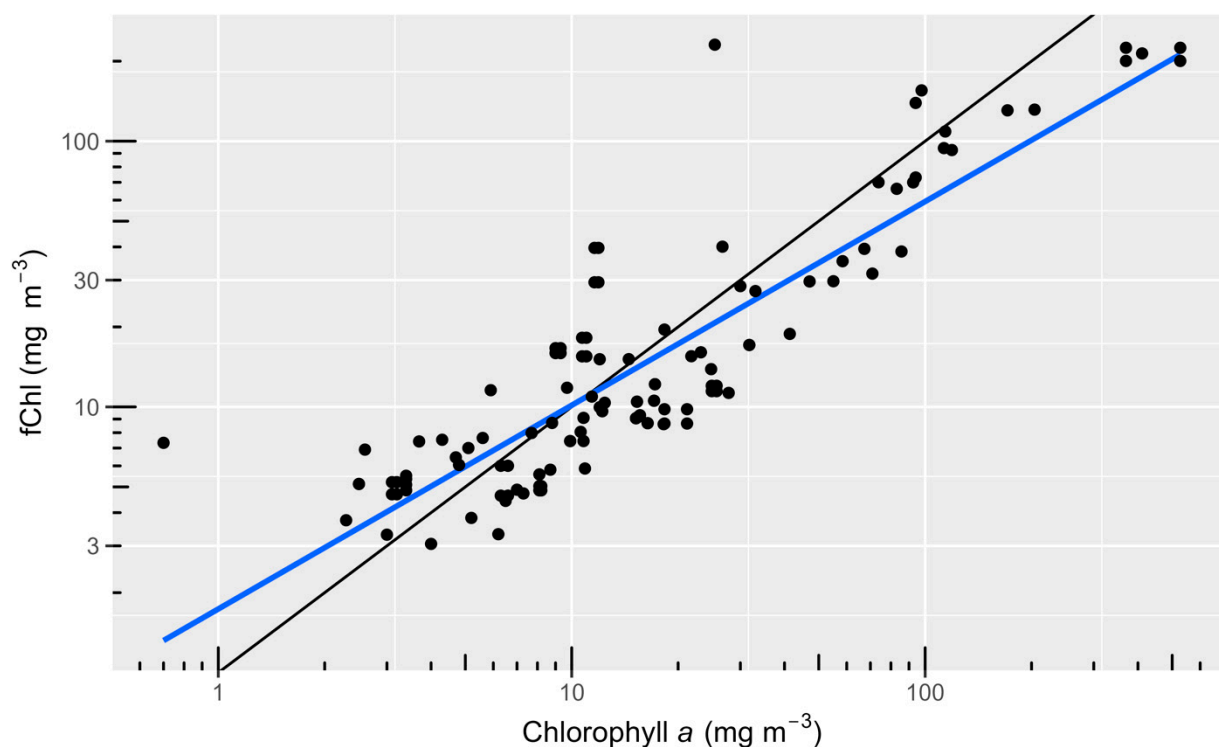


Figure S1. Comparison of discrete chlorophyll *a* concentrations (log10 scaled) compared with high resolution underway chlorophyll fluorescence (fChl) concentrations (log10 scaled) from a YSI EXO2 sonde. The average fChl concentration was calculated by averaging the fChl concentration \pm 2 minutes from the time of discrete sample collection. The 1:1 line is given in black, and the blue line shows a simple linear regression (slope = 0.767, intercept = 0.239, adj. r^2 = 0.77). The bias [30] was 0.914, meaning fChl concentrations are on average 8.6% below discrete concentrations.

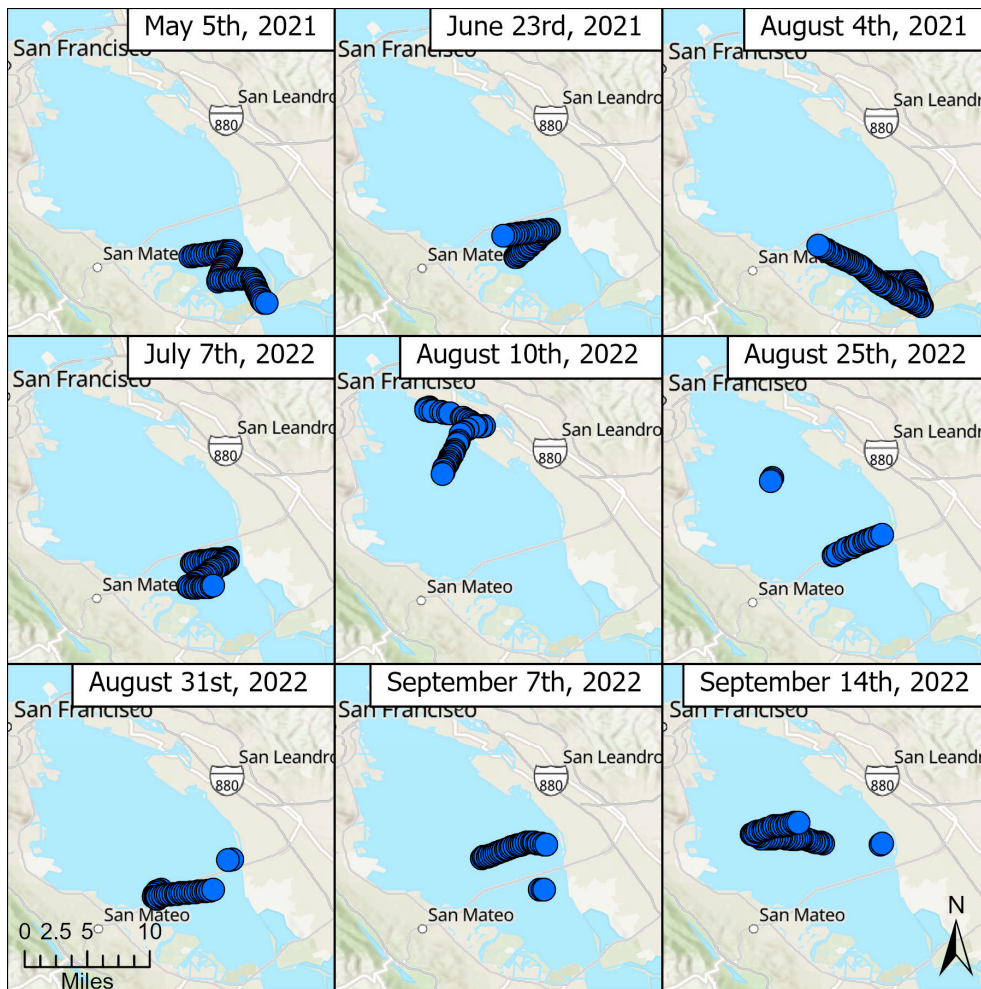


Figure S2. Map depicting the 426 underway mapping data points used as matchups for algorithm testing. Data are represented by blue circles and presented by date of collection.

Table S1. Satellite imagery used in the analysis. Data are publicly available at: <https://dataspace.copernicus.eu/>.

Filename
S3A_OL_1_EFR____20210505T183341_20210505T183641_20210506T230027_0179_071_241_2340_LN1_O_NT_002
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S3B_OL_1_EFR____20220914T180925_20220914T181225_20220915T090916_0179_070_255_2340_PS2_O_NT_003

Table S2. Discrete (DS) chlorophyll *a* (*chl**a*) and high resolution underway chlorophyll fluorescence (fChl) concentrations. fChl mean, max, and min are calculated from +/- 2 minutes from the time of discrete sample collection. NWIS = USGS National Water Information System [45].

id	Timestamp (PST) DS	fChl (µg/L) (EXO) HR	NWIS site_no	<i>Chla</i> (µg/L) DS	fChl mean	fChl max	fChl min
1	9/7/2022 9:30	9.626985	373642122120401	15.4	9.16941	9.776433	8.033294
2	9/14/2022 10:10	11.01298	373924122185901	24.9	12.01038	13.83221	11.01298
2	9/14/2022 10:11	11.16228	373924122185901	25.7	12.01038	13.83221	11.01298
3	9/14/2022 10:10	11.01298	373924122185901	24.9	11.46295	12.39348	10.97107
3	9/14/2022 10:11	11.16228	373924122185901	25.7	11.46295	12.39348	10.97107
4	9/14/2022 9:29	8.017126	373751122143601	15.3	10.46187	18.62455	7.076764
4	9/14/2022 9:29	8.017126	373751122143601	15.3	10.46187	18.62455	7.076764
5	9/14/2022 9:43	4.697324	373833122115901	7	4.88001	5.251291	4.581786
6	9/7/2022 10:42	15.1359	373847122095001	14.5	15.12321	17.66434	13.14596
7	9/14/2022 11:03	2.74072	374856122210301	6.2	3.319729	4.834621	2.693703
8	9/7/2022 12:50	4.611347	374856122210301	5.2	3.822175	4.816404	2.363278
9	9/7/2022 11:02	17.95217	373915122141501	55	29.71087	59.87423	17.95217
10	9/7/2022 9:13	9.934163	11162765	16.4	8.684366	10.96561	5.762269
10	9/7/2022 9:13	9.934163	11162765	16.4	8.684366	10.96561	5.762269
11	9/7/2022 11:37	12.63805	373924122185901	24.8	13.87086	20.06068	11.40478
12	9/7/2022 12:10	31.63133	374027122130401	30	28.48071	33.70915	25.24398
13	9/14/2022 7:44	7.665071	373203122080901	10.6	8.05547	8.99184	7.443698
14	9/7/2022 10:15	8.914204	373751122143601	18.3	9.803071	14.45646	7.781261
14	9/7/2022 10:16	8.477903	373751122143601	21.2	9.803071	14.45646	7.781261
15	9/7/2022 10:15	8.914204	373751122143601	18.3	8.658946	11.78766	7.781261
15	9/7/2022 10:16	8.477903	373751122143601	21.2	8.658946	11.78766	7.781261
16	8/25/2022 8:08	68.20057	373203122080901	73.8	70.03829	84.73086	57.46177
17	9/14/2022 9:58	9.113492	373920122155201	18.2	8.61105	10.30608	4.792858
18	9/7/2022 11:23	9.800205	373920122155201	21.8	15.51565	29.46187	8.73859
19	8/25/2022 11:00	162.6569	373640122170101	171	130.6213	220.4911	48.52581
20	9/14/2022 8:04	17.06514	373401122092201	23.2	16.05147	18.23747	9.53399
21	9/14/2022 8:27	18.06566	373540122094301	31.8	17.10041	19.25423	15.20821
21	9/14/2022 8:27	18.06566	373540122094301	31.8	17.10041	19.25423	15.20821
22	8/25/2022 8:29	69.05403	373158122102701	94	72.99636	102.5214	53.51374
23	8/25/2022 9:30	31.48992	373540122094301	47.1	29.65553	37.15883	23.37332
24	9/7/2022 8:26	10.11179	373401122092201	12.4	10.3661	11.84882	9.440953
25	8/25/2022 10:16	33.69404	373642122120401	67.3	39.33693	69.95744	29.70326
26	8/25/2022 11:18	98.60987	373751122143601	119	92.59497	110.4196	67.55761
27	8/25/2022 8:50	27.79889	373401122092201	33.1	27.28483	49.95581	21.23738
28	8/25/2022 9:07	60.69761	373336122122501	92.5	69.9638	109.9382	53.4205
29	9/7/2022 10:04	9.018913	373640122170101	17.1	10.54827	16.80017	8.944884
29	9/7/2022 10:04	9.018913	373640122170101	17.1	10.54827	16.80017	8.944884
30	8/31/2022 7:46	11.33953	373924122185901	9.7	11.80415	12.07018	11.33441
31	8/25/2022 13:30	33.45512	374856122210301	85.7	38.44591	45.16479	29.61711
32	8/31/2022 12:00	5.443788	373015122071000	3.4	5.507587	6.206013	5.102811
33	9/14/2022 8:51	9.151106	373642122120401	12	9.971612	13.34866	7.144815

34	8/25/2022 10:35	78.88358	373739122093101	83.1	66.18366	104.3358	45.85625
35	8/25/2022 9:48	105.8661	11162765	113	94.16951	115.6301	63.39152
36	8/31/2022 10:40	5.772859	373336122122501	4.8	6.047305	8.1367	5.177572
37	8/31/2022 8:55	10.08212	373640122170101	8.8	8.704876	10.27773	4.64775
38	8/31/2022 13:27	4.881522	374037122111101	3.4	4.856927	8.317021	3.649172
39	8/31/2022 7:16	5.736101	374027122130401	2.6	6.907082	13.03273	5.308771
40	9/14/2022 10:30	13.74177	374027122130401	12	15.11612	18.1157	13.00815
41	8/31/2022 8:22	8.046536	373847122095001	4.3	7.523143	8.69787	4.246253
42	8/25/2022 12:00	171.4154	373920122155201	97.7	155.2854	232.3521	69.36987
43	7/7/2022 8:20	4.720644	373924122185901	6.5	4.429919	4.988207	3.945638
44	9/14/2022 8:12	8.576747	373336122122501	10.8	9.094496	10.74986	8.067895
45	9/14/2022 9:17	10.86515	373640122170101	15.6	9.304603	11.01664	8.171092
46	9/14/2022 7:27	7.30118	373015122071000	0.7	7.325765	7.944568	6.85655
47	8/25/2022 7:28	132.5899	373015122071000	204	131.4455	159.3814	109.5215
48	7/7/2022 15:25	6.707525	374856122210301	8.7	5.803304	6.972251	4.890021
49	7/7/2022 12:36	4.719361	373015122071000	6.6	6.004341	17.69864	4.416507
49	7/7/2022 12:37	4.560987	373015122071000	6.3	6.004341	17.69864	4.416507
50	7/7/2022 12:36	4.719361	373015122071000	6.6	4.635014	4.885296	4.416507
50	7/7/2022 12:37	4.560987	373015122071000	6.3	4.635014	4.885296	4.416507
51	7/7/2022 11:25	5.479005	373336122122501	8.1	5.571491	6.070487	4.879152
52	7/7/2022 9:43	5.163889	373640122170101	8.2	4.852915	5.379167	3.470765
52	7/7/2022 9:44	4.959522	373640122170101	8.1	4.852915	5.379167	3.470765
53	7/7/2022 9:43	5.163889	373640122170101	8.2	5.034104	5.394979	4.468292
53	7/7/2022 9:44	4.959522	373640122170101	8.1	5.034104	5.394979	4.468292
54	7/7/2022 10:02	8.951517	373739122093101	11.4	10.93483	26.95732	8.921869
55	7/7/2022 12:08	7.16701	373158122102701	10.8	7.438119	8.637134	5.976632
56	7/7/2022 11:41	15.90726	373401122092201	9	15.94318	16.902	15.25229
56	7/7/2022 11:40	16.27786	373401122092201	9.3	15.94318	16.902	15.25229
57	7/7/2022 11:41	15.90726	373401122092201	9	16.64081	19.24843	15.39182
57	7/7/2022 11:40	16.27786	373401122092201	9.3	16.64081	19.24843	15.39182
58	7/7/2022 10:49	8.729254	373540122094301	15.2	9.06249	16.15366	8.028688
58	7/7/2022 10:49	8.729254	373540122094301	15.2	9.06249	16.15366	8.028688
59	7/7/2022 10:27	4.78805	11162765	7.3	4.724371	5.537162	3.925633
60	7/7/2022 10:13	11.04761	373642122120401	5.9	11.55783	16.46982	9.702572
61	8/31/2022 11:46	6.992431	373203122080901	5.1	7.002727	7.505891	6.284733
62	8/31/2022 10:55	6.300641	373401122092201	3.7	7.414585	9.138572	5.305515
63	8/31/2022 8:02	5.17085	373920122155201	3.4	5.357302	5.83681	4.940201
64	8/10/2022 10:40	18.81713	373924122185901	41.4	18.82738	20.38074	17.45951
65	8/25/2022 12:18	116.3317	373924122185901	94	139.2841	256.4666	94.94665
66	8/10/2022 9:55	200.2902	374614122181401	411	213.8788	438.2187	131.7449
67	8/31/2022 8:38	4.849075	373751122143601	2.5	5.128793	5.827134	4.753127
67	8/31/2022 8:38	4.849075	373751122143601	2.5	5.128793	5.827134	4.753127
68	7/7/2022 8:55	24.6774	373847122095001	11.6	29.44093	65.11927	21.11951
68	7/7/2022 8:54	33.35977	373847122095001	11.9	29.44093	65.11927	21.11951
69	7/7/2022 8:55	24.6774	373847122095001	11.6	39.65952	68.21735	21.45578
69	7/7/2022 8:54	33.35977	373847122095001	11.9	39.65952	68.21735	21.45578
70	7/7/2022 7:46	21.98154	374027122130401	10.7	15.49786	22.91898	5.502942

70	7/7/2022 7:47	20.50908	374027122130401	11	15.49786	22.91898	5.502942
71	7/7/2022 7:46	21.98154	374027122130401	10.7	18.20515	22.91898	5.517248
71	7/7/2022 7:47	20.50908	374027122130401	11	18.20515	22.91898	5.517248
72	7/7/2022 8:30	2.747135	373920122155201	4	3.05162	4.141319	2.386192
73	8/10/2022 9:30	9.737258	374614122211001	27.8	11.28993	28.82587	7.171127
74	8/10/2022 11:02	6.443922	374027122130401	10.9	5.864723	6.699636	4.540286
75	8/25/2022 12:40	203.3673	374027122130401	527	224.5958	317.8898	161.6104
75	8/25/2022 12:41	189.8661	374027122130401	370	224.5958	317.8898	161.6104
76	8/25/2022 12:40	203.3673	374027122130401	527	200.3778	263.2031	161.6104
76	8/25/2022 12:41	189.8661	374027122130401	370	200.3778	263.2031	161.6104
77	8/31/2022 14:17	7.61271	374856122210301	9.9	7.438604	7.806185	6.987359
77	8/31/2022 14:17	7.61271	374856122210301	9.9	7.438604	7.806185	6.987359
78	8/31/2022 11:25	6.155436	373158122102701	4.7	6.457762	8.377761	5.217554
79	8/31/2022 10:24	5.185142	373540122094301	3.4	5.092627	6.911083	4.428774
80	8/25/2022 11:35	171.9387	373847122095001	25.4	230.7153	289.5894	137.8803
81	7/7/2022 9:20	3.253522	373751122143601	3	3.30523	3.761244	2.918789
82	8/31/2022 9:58	8.11359	11162765	5.6	7.640471	8.176141	6.775696
83	8/31/2022 9:18	3.817858	373739122093101	2.3	3.745575	3.976335	3.499933
84	8/31/2022 9:32	5.231365	373642122120401	3.1	4.690105	5.83606	3.089033
84	8/31/2022 9:33	5.78798	373642122120401	3.2	4.690105	5.83606	3.089033
85	8/31/2022 9:32	5.231365	373642122120401	3.1	5.209844	5.83606	3.12306
85	8/31/2022 9:33	5.78798	373642122120401	3.2	5.209844	5.83606	3.12306
86	9/14/2022 7:54	8.810679	373158122102701	7.7	7.976931	9.770829	6.262377
87	9/7/2022 8:02	19.08487	373158122102701	18.3	19.54452	23.56006	17.68317
88	9/14/2022 8:38	9.396183	11162765	12.2	9.629542	12.69591	8.614329
89	8/10/2022 8:28	36.92773	374740122190601	58.4	35.34827	39.53316	32.32409
90	8/10/2022 8:45	117.5927	374735122164601	114	108.7634	163.5428	71.95716
91	7/7/2022 12:17	11.79922	373203122080901	17.2	12.17083	19.26993	7.328162
91	7/7/2022 12:17	11.79922	373203122080901	17.2	12.17083	19.26993	7.328162
92	8/10/2022 9:15	36.25364	374617122201101	70.9	31.74156	40.01049	20.83939
93	9/7/2022 7:24	39.45299	373015122071000	26.7	40.0865	40.90972	37.94054

Table S3. High resolution in-water 300 m median binned matchup chlorophyll fluorescence (fChl) data used for this analysis [28].

Date	Latitude (°N)	Longitude (°E)	fChl (µg/L)
5/5/21	37.560	-122.207	10.138
5/5/21	37.560	-122.204	9.678
5/5/21	37.561	-122.202	10.654
5/5/21	37.561	-122.199	9.580
5/5/21	37.561	-122.196	10.268
5/5/21	37.562	-122.193	10.765
5/5/21	37.562	-122.190	10.181
5/5/21	37.563	-122.187	12.447
5/5/21	37.563	-122.184	14.584
5/5/21	37.563	-122.181	15.893
5/5/21	37.564	-122.178	16.993
5/5/21	37.564	-122.175	18.232
5/5/21	37.565	-122.173	18.671
5/5/21	37.565	-122.170	17.589
5/5/21	37.566	-122.167	18.997
5/5/21	37.566	-122.164	20.288
5/5/21	37.566	-122.161	21.103
5/5/21	37.566	-122.160	25.599
5/5/21	37.564	-122.161	25.982
5/5/21	37.562	-122.162	23.119
5/5/21	37.559	-122.163	22.752
5/5/21	37.557	-122.164	22.776
5/5/21	37.555	-122.165	22.067
5/5/21	37.553	-122.166	20.840
5/5/21	37.551	-122.167	22.406
5/5/21	37.549	-122.168	21.831
5/5/21	37.546	-122.169	21.729
5/5/21	37.544	-122.170	19.792
5/5/21	37.542	-122.171	17.662
5/5/21	37.540	-122.172	16.298
5/5/21	37.538	-122.173	13.168
5/5/21	37.535	-122.174	11.928
5/5/21	37.533	-122.174	11.328
5/5/21	37.532	-122.175	12.853
5/5/21	37.531	-122.175	13.343
5/5/21	37.533	-122.174	12.635
5/5/21	37.533	-122.171	10.051
5/5/21	37.533	-122.168	11.190

5/5/21	37.533	-122.165	11.562
5/5/21	37.533	-122.162	11.686
5/5/21	37.533	-122.160	12.741
5/5/21	37.534	-122.157	15.811
5/5/21	37.534	-122.154	17.805
5/5/21	37.534	-122.151	18.211
5/5/21	37.534	-122.148	19.324
5/5/21	37.534	-122.145	20.145
5/5/21	37.534	-122.142	21.194
5/5/21	37.534	-122.139	21.479
5/5/21	37.534	-122.136	30.490
5/5/21	37.532	-122.135	28.763
5/5/21	37.530	-122.134	26.556
5/5/21	37.528	-122.133	22.136
5/5/21	37.526	-122.132	20.926
5/5/21	37.524	-122.131	18.977
5/5/21	37.521	-122.130	15.628
5/5/21	37.519	-122.129	16.092
5/5/21	37.517	-122.128	18.109
5/5/21	37.515	-122.127	21.610
5/5/21	37.513	-122.126	20.519
5/5/21	37.510	-122.125	18.518
5/5/21	37.508	-122.124	18.408
5/5/21	37.506	-122.122	17.462
5/5/21	37.506	-122.119	19.404
6/23/21	37.560	-122.205	11.467
6/23/21	37.560	-122.207	11.711
6/23/21	37.560	-122.206	12.442
6/23/21	37.562	-122.204	11.827
6/23/21	37.563	-122.202	11.666
6/23/21	37.565	-122.200	11.779
6/23/21	37.567	-122.198	12.099
6/23/21	37.568	-122.196	12.323
6/23/21	37.570	-122.194	12.318
6/23/21	37.572	-122.192	12.188
6/23/21	37.573	-122.190	12.094
6/23/21	37.575	-122.188	12.976
6/23/21	37.577	-122.186	13.200
6/23/21	37.579	-122.184	13.361
6/23/21	37.580	-122.182	13.385
6/23/21	37.582	-122.180	13.669
6/23/21	37.584	-122.178	15.726
6/23/21	37.586	-122.176	16.253
6/23/21	37.587	-122.174	16.327

6/23/21	37.589	-122.172	16.477
6/23/21	37.591	-122.170	17.402
6/23/21	37.592	-122.168	19.295
6/23/21	37.592	-122.169	19.589
6/23/21	37.591	-122.172	19.219
6/23/21	37.591	-122.174	19.358
6/23/21	37.590	-122.177	18.668
6/23/21	37.590	-122.180	18.482
6/23/21	37.590	-122.183	18.247
6/23/21	37.589	-122.186	18.010
6/23/21	37.589	-122.189	17.525
6/23/21	37.588	-122.192	17.190
6/23/21	37.588	-122.195	16.662
6/23/21	37.588	-122.198	16.559
6/23/21	37.587	-122.201	16.642
6/23/21	37.587	-122.204	17.103
6/23/21	37.586	-122.206	17.493
6/23/21	37.586	-122.209	17.742
6/23/21	37.586	-122.212	17.737
6/23/21	37.585	-122.215	17.894
6/23/21	37.585	-122.218	18.046
6/23/21	37.585	-122.221	18.067
8/4/21	37.534	-122.159	7.928
8/4/21	37.534	-122.153	7.521
8/4/21	37.534	-122.150	7.299
8/4/21	37.534	-122.147	6.642
8/4/21	37.534	-122.144	7.116
8/4/21	37.534	-122.141	7.843
8/4/21	37.534	-122.138	7.007
8/4/21	37.535	-122.135	6.429
8/4/21	37.535	-122.132	6.027
8/4/21	37.534	-122.131	5.947
8/4/21	37.532	-122.130	5.854
8/4/21	37.530	-122.129	5.578
8/4/21	37.528	-122.128	5.532
8/4/21	37.526	-122.127	5.621
8/4/21	37.524	-122.126	5.581
8/4/21	37.521	-122.126	5.565
8/4/21	37.519	-122.125	5.409
8/4/21	37.517	-122.124	5.498
8/4/21	37.515	-122.123	5.474
8/4/21	37.513	-122.122	5.385
8/4/21	37.510	-122.121	5.211
8/4/21	37.508	-122.120	5.223

8/4/21	37.506	-122.119	6.210
8/4/21	37.506	-122.120	6.278
8/4/21	37.508	-122.122	6.296
8/4/21	37.509	-122.125	6.480
8/4/21	37.510	-122.127	7.349
8/4/21	37.512	-122.129	8.865
8/4/21	37.513	-122.132	8.881
8/4/21	37.514	-122.134	8.815
8/4/21	37.515	-122.137	8.704
8/4/21	37.516	-122.139	8.828
8/4/21	37.518	-122.142	9.103
8/4/21	37.519	-122.144	9.274
8/4/21	37.520	-122.147	9.543
8/4/21	37.522	-122.149	9.954
8/4/21	37.523	-122.151	9.960
8/4/21	37.525	-122.153	9.633
8/4/21	37.526	-122.156	9.461
8/4/21	37.528	-122.158	9.351
8/4/21	37.529	-122.161	9.403
8/4/21	37.530	-122.163	9.041
8/4/21	37.531	-122.165	8.659
8/4/21	37.533	-122.168	8.277
8/4/21	37.534	-122.170	8.389
8/4/21	37.536	-122.172	8.447
8/4/21	37.538	-122.174	8.053
8/4/21	37.539	-122.176	7.792
8/4/21	37.541	-122.178	7.664
8/4/21	37.543	-122.180	7.684
8/4/21	37.544	-122.182	7.574
8/4/21	37.546	-122.184	7.275
8/4/21	37.548	-122.186	7.248
8/4/21	37.550	-122.188	7.123
8/4/21	37.552	-122.190	7.129
8/4/21	37.553	-122.192	7.513
8/4/21	37.554	-122.194	9.175
8/4/21	37.555	-122.197	10.846
8/4/21	37.557	-122.200	11.422
8/4/21	37.558	-122.202	11.927
8/4/21	37.559	-122.205	12.199
8/4/21	37.560	-122.207	11.811
8/4/21	37.561	-122.210	11.405
8/4/21	37.562	-122.212	11.189
8/4/21	37.563	-122.215	10.960
8/4/21	37.564	-122.217	10.845

8/4/21	37.565	-122.220	10.820
8/4/21	37.567	-122.222	10.921
8/4/21	37.568	-122.225	11.058
8/4/21	37.569	-122.227	11.014
8/4/21	37.571	-122.229	11.142
8/4/21	37.572	-122.232	11.488
8/4/21	37.573	-122.234	11.713
8/4/21	37.575	-122.236	12.270
8/4/21	37.576	-122.239	12.273
8/4/21	37.576	-122.239	12.273
7/7/22	37.588	-122.205	8.102
7/7/22	37.588	-122.203	7.553
7/7/22	37.589	-122.200	6.500
7/7/22	37.589	-122.197	5.377
7/7/22	37.590	-122.194	5.205
7/7/22	37.590	-122.191	4.877
7/7/22	37.590	-122.188	4.282
7/7/22	37.591	-122.185	4.210
7/7/22	37.591	-122.183	4.036
7/7/22	37.592	-122.180	3.986
7/7/22	37.592	-122.177	4.230
7/7/22	37.592	-122.174	4.815
7/7/22	37.592	-122.171	4.580
7/7/22	37.592	-122.168	4.505
7/7/22	37.593	-122.165	4.480
7/7/22	37.594	-122.163	4.552
7/7/22	37.593	-122.163	4.355
7/7/22	37.591	-122.163	4.110
7/7/22	37.589	-122.166	4.121
7/7/22	37.588	-122.168	4.063
7/7/22	37.586	-122.170	4.195
7/7/22	37.585	-122.172	4.406
7/7/22	37.583	-122.175	4.552
7/7/22	37.582	-122.177	4.837
7/7/22	37.581	-122.179	5.015
7/7/22	37.580	-122.182	5.073
7/7/22	37.578	-122.183	5.247
7/7/22	37.576	-122.185	5.661
7/7/22	37.574	-122.187	5.887
7/7/22	37.573	-122.189	5.901
7/7/22	37.572	-122.192	5.967
7/7/22	37.570	-122.194	5.849
7/7/22	37.569	-122.196	5.739
7/7/22	37.567	-122.198	5.427

7/7/22	37.566	-122.200	5.095
7/7/22	37.564	-122.203	5.713
7/7/22	37.563	-122.205	10.766
7/7/22	37.561	-122.206	16.314
7/7/22	37.561	-122.208	17.703
7/7/22	37.561	-122.209	17.177
7/7/22	37.560	-122.207	16.274
7/7/22	37.559	-122.204	15.890
7/7/22	37.559	-122.201	15.901
7/7/22	37.559	-122.199	15.546
7/7/22	37.560	-122.196	15.565
7/7/22	37.560	-122.193	16.099
7/7/22	37.560	-122.191	16.581
7/7/22	37.560	-122.188	16.403
7/7/22	37.560	-122.185	16.528
7/7/22	37.561	-122.182	12.905
7/7/22	37.562	-122.180	8.769
8/10/22	37.770	-122.305	163.696
8/10/22	37.769	-122.306	65.567
8/10/22	37.769	-122.309	69.179
8/10/22	37.767	-122.309	50.150
8/10/22	37.766	-122.304	42.568
8/10/22	37.766	-122.301	41.958
8/10/22	37.765	-122.292	56.532
8/10/22	37.764	-122.289	57.844
8/10/22	37.763	-122.284	74.164
8/10/22	37.763	-122.281	83.108
8/10/22	37.758	-122.268	90.706
8/10/22	37.758	-122.266	70.465
8/10/22	37.756	-122.263	96.145
8/10/22	37.755	-122.261	117.040
8/10/22	37.754	-122.258	107.229
8/10/22	37.752	-122.256	87.228
8/10/22	37.750	-122.254	84.143
8/10/22	37.749	-122.252	90.447
8/10/22	37.748	-122.249	118.339
8/10/22	37.749	-122.246	84.572
8/10/22	37.749	-122.242	87.281
8/10/22	37.748	-122.245	75.915
8/10/22	37.749	-122.251	98.486
8/10/22	37.748	-122.253	120.061
8/10/22	37.745	-122.261	247.447
8/10/22	37.742	-122.266	282.506
8/10/22	37.741	-122.267	197.128

8/10/22	37.739	-122.269	197.118
8/10/22	37.732	-122.271	105.642
8/10/22	37.730	-122.272	116.092
8/10/22	37.728	-122.273	170.588
8/10/22	37.721	-122.276	82.778
8/10/22	37.719	-122.277	81.421
8/10/22	37.717	-122.278	85.150
8/10/22	37.715	-122.279	72.324
8/10/22	37.713	-122.281	65.149
8/10/22	37.710	-122.282	62.906
8/10/22	37.708	-122.283	63.178
8/10/22	37.706	-122.284	67.514
8/10/22	37.704	-122.285	85.015
8/10/22	37.702	-122.286	88.616
8/10/22	37.700	-122.288	64.790
8/10/22	37.698	-122.289	58.360
8/10/22	37.695	-122.289	54.055
8/10/22	37.693	-122.290	43.934
8/25/22	37.691	-122.292	34.578
8/25/22	37.689	-122.293	24.973
8/25/22	37.687	-122.294	28.401
8/25/22	37.601	-122.221	38.678
8/25/22	37.602	-122.219	41.882
8/25/22	37.604	-122.216	44.748
8/25/22	37.607	-122.209	46.798
8/25/22	37.609	-122.207	34.376
8/25/22	37.610	-122.204	35.021
8/25/22	37.611	-122.199	35.894
8/25/22	37.613	-122.196	34.698
8/25/22	37.614	-122.194	36.746
8/25/22	37.615	-122.191	36.930
8/25/22	37.617	-122.186	36.974
8/25/22	37.618	-122.184	38.550
8/25/22	37.619	-122.181	39.453
8/25/22	37.620	-122.179	43.056
8/25/22	37.621	-122.176	44.083
8/25/22	37.622	-122.173	45.511
8/25/22	37.624	-122.168	49.909
8/25/22	37.625	-122.165	52.763
8/31/22	37.626	-122.163	54.796
8/31/22	37.627	-122.160	103.559
8/31/22	37.626	-122.165	81.869
8/31/22	37.592	-122.242	6.746
8/31/22	37.591	-122.245	6.941

8/31/22	37.590	-122.247	7.317
8/31/22	37.588	-122.248	7.740
8/31/22	37.586	-122.250	7.819
8/31/22	37.584	-122.251	7.608
8/31/22	37.584	-122.249	7.859
8/31/22	37.583	-122.248	7.634
8/31/22	37.582	-122.247	7.208
8/31/22	37.581	-122.247	7.709
8/31/22	37.581	-122.246	7.582
8/31/22	37.582	-122.247	7.799
8/31/22	37.584	-122.246	7.858
8/31/22	37.585	-122.243	7.959
8/31/22	37.585	-122.240	8.559
8/31/22	37.586	-122.237	8.785
8/31/22	37.586	-122.234	7.856
8/31/22	37.586	-122.231	5.698
8/31/22	37.587	-122.228	5.307
8/31/22	37.587	-122.225	5.534
8/31/22	37.587	-122.223	5.535
8/31/22	37.588	-122.220	5.578
8/31/22	37.588	-122.217	6.042
8/31/22	37.588	-122.214	6.640
8/31/22	37.588	-122.211	6.736
8/31/22	37.589	-122.208	6.906
8/31/22	37.589	-122.205	6.445
8/31/22	37.589	-122.202	6.164
8/31/22	37.590	-122.199	6.339
8/31/22	37.590	-122.196	6.427
8/31/22	37.590	-122.193	6.394
8/31/22	37.590	-122.190	6.582
8/31/22	37.591	-122.188	6.868
8/31/22	37.591	-122.185	5.423
8/31/22	37.592	-122.182	4.657
9/7/22	37.592	-122.179	4.456
9/7/22	37.592	-122.176	4.654
9/7/22	37.592	-122.174	5.056
9/7/22	37.628	-122.246	9.672
9/7/22	37.629	-122.244	8.378
9/7/22	37.630	-122.244	8.538
9/7/22	37.630	-122.242	7.892
9/7/22	37.630	-122.239	10.716
9/7/22	37.631	-122.237	12.424
9/7/22	37.632	-122.234	20.819
9/7/22	37.633	-122.231	26.202

9/7/22	37.634	-122.229	35.559
9/7/22	37.635	-122.226	31.460
9/7/22	37.636	-122.224	20.499
9/7/22	37.637	-122.221	19.193
9/7/22	37.638	-122.218	20.956
9/7/22	37.639	-122.216	15.889
9/7/22	37.640	-122.213	11.644
9/7/22	37.641	-122.211	11.241
9/7/22	37.642	-122.208	13.912
9/7/22	37.643	-122.205	18.120
9/7/22	37.643	-122.202	24.250
9/7/22	37.644	-122.200	22.792
9/7/22	37.645	-122.197	22.800
9/7/22	37.646	-122.194	23.410
9/7/22	37.646	-122.191	22.600
9/7/22	37.646	-122.188	20.648
9/7/22	37.646	-122.186	18.732
9/7/22	37.646	-122.185	18.649
9/7/22	37.645	-122.182	20.408
9/7/22	37.645	-122.180	18.777
9/7/22	37.645	-122.177	17.752
9/7/22	37.644	-122.174	16.893
9/7/22	37.644	-122.171	16.782
9/14/22	37.644	-122.168	17.012
9/14/22	37.645	-122.166	14.117
9/14/22	37.645	-122.166	13.972
9/14/22	37.645	-122.234	3.342
9/14/22	37.646	-122.237	2.806
9/14/22	37.646	-122.240	2.789
9/14/22	37.646	-122.242	2.725
9/14/22	37.647	-122.245	2.849
9/14/22	37.648	-122.248	3.497
9/14/22	37.649	-122.251	4.374
9/14/22	37.650	-122.253	4.732
9/14/22	37.651	-122.256	5.267
9/14/22	37.651	-122.259	6.632
9/14/22	37.651	-122.261	7.936
9/14/22	37.651	-122.263	9.709
9/14/22	37.650	-122.265	10.073
9/14/22	37.650	-122.268	9.262
9/14/22	37.650	-122.271	10.370
9/14/22	37.651	-122.274	11.438
9/14/22	37.651	-122.277	10.712
9/14/22	37.652	-122.280	15.448

9/14/22	37.652	-122.283	11.840
9/14/22	37.652	-122.285	10.642
9/14/22	37.652	-122.288	8.654
9/14/22	37.651	-122.291	10.205
9/14/22	37.651	-122.294	8.150
9/14/22	37.651	-122.297	7.388
9/14/22	37.651	-122.300	7.190
9/14/22	37.651	-122.303	12.601
9/14/22	37.651	-122.306	14.458
9/14/22	37.653	-122.308	13.218
9/14/22	37.654	-122.311	13.642
9/14/22	37.655	-122.313	13.607
9/14/22	37.656	-122.316	12.331
9/14/22	37.656	-122.317	11.347
9/14/22	37.656	-122.316	11.361
9/14/22	37.656	-122.314	12.050
9/14/22	37.658	-122.312	12.715
9/14/22	37.659	-122.310	14.492
9/14/22	37.659	-122.307	14.228
9/14/22	37.660	-122.304	12.830
9/14/22	37.661	-122.302	11.273
9/14/22	37.662	-122.299	7.650
9/14/22	37.663	-122.296	7.679
9/14/22	37.664	-122.293	9.411
9/14/22	37.665	-122.291	6.248
9/14/22	37.665	-122.288	9.514
9/14/22	37.665	-122.285	8.842
9/14/22	37.665	-122.282	6.899
9/14/22	37.666	-122.279	9.238
9/14/22	37.666	-122.276	10.324
9/14/22	37.667	-122.274	13.119
9/14/22	37.668	-122.271	7.176
9/14/22	37.669	-122.268	5.459
9/14/22	37.669	-122.265	4.207
9/14/22	37.669	-122.263	3.759
