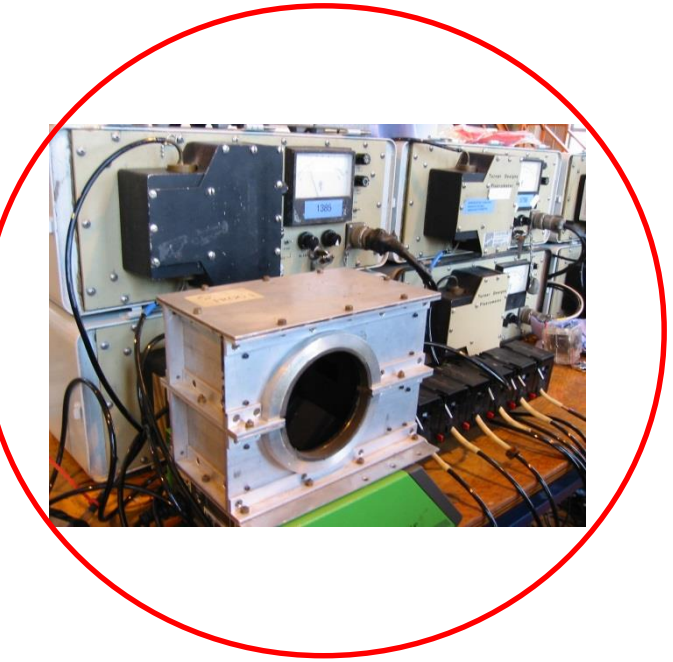
New Instrumentation Enabling Monitoring of Cyanobacteria

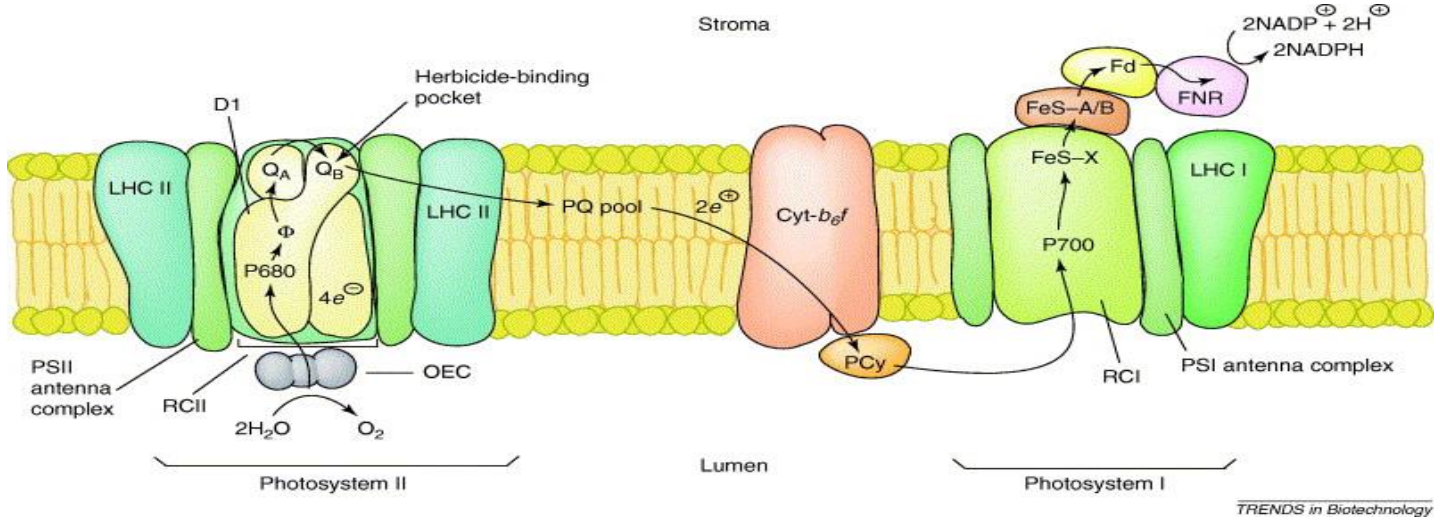
Lawrence Younan, Turner Designs Applications Scientist

Evolution of Turner Designs Fluorometers



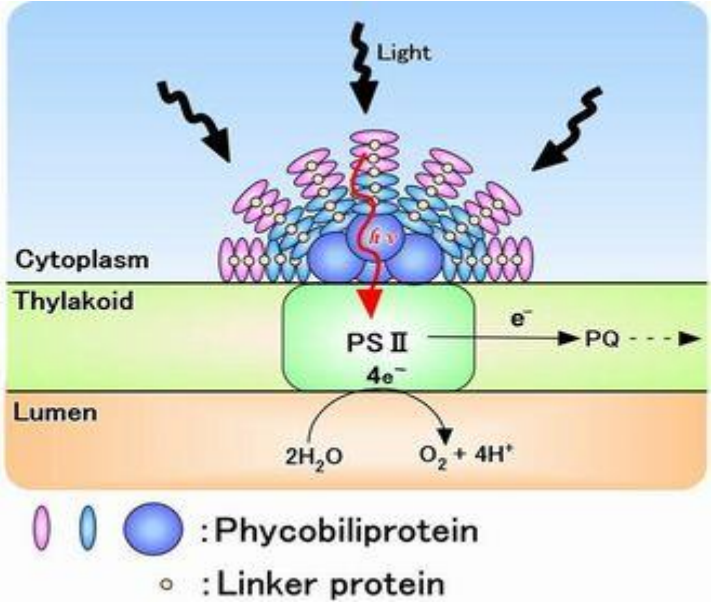
Harmful Algal Blooms

Algal Marker Pigments

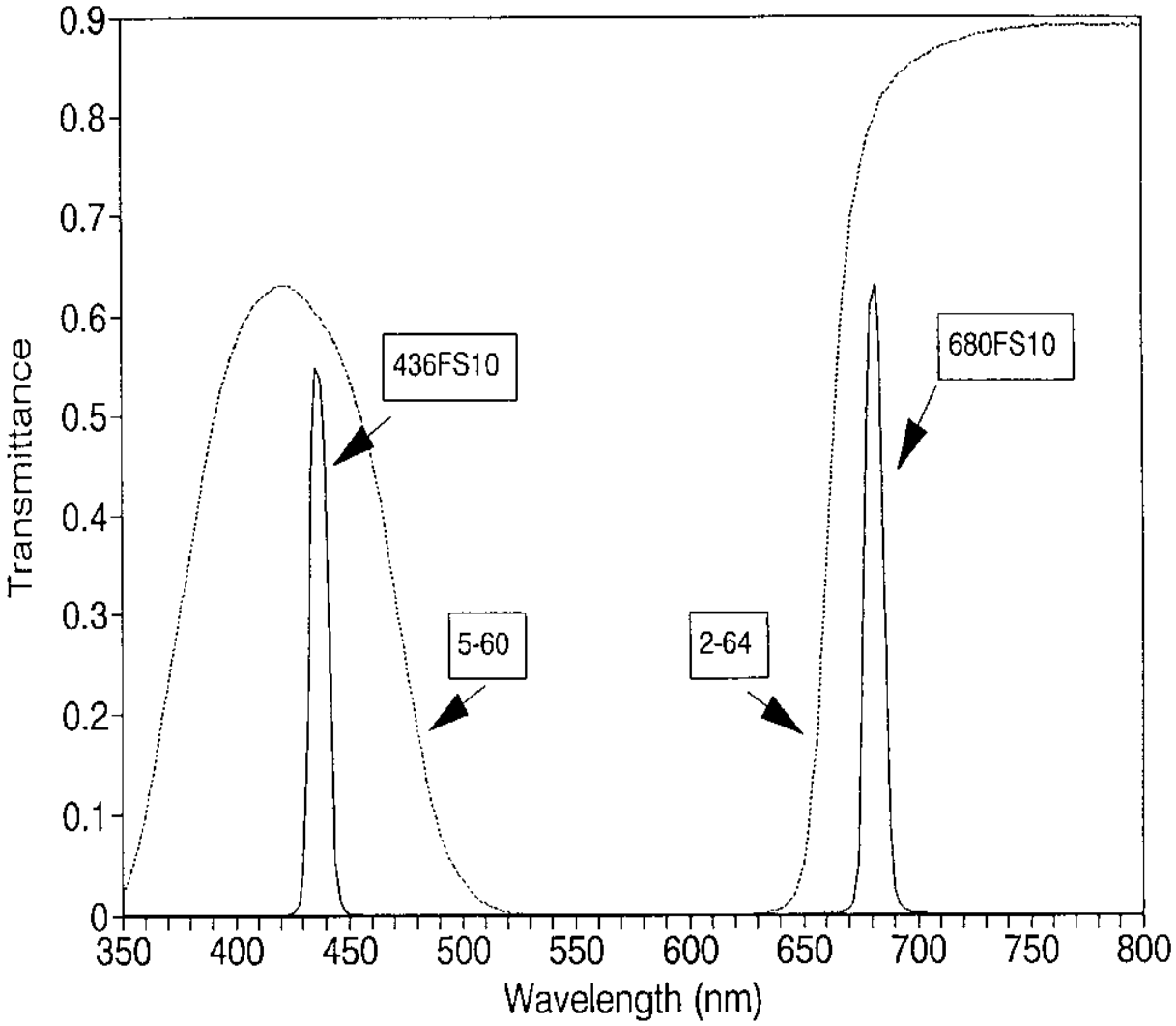


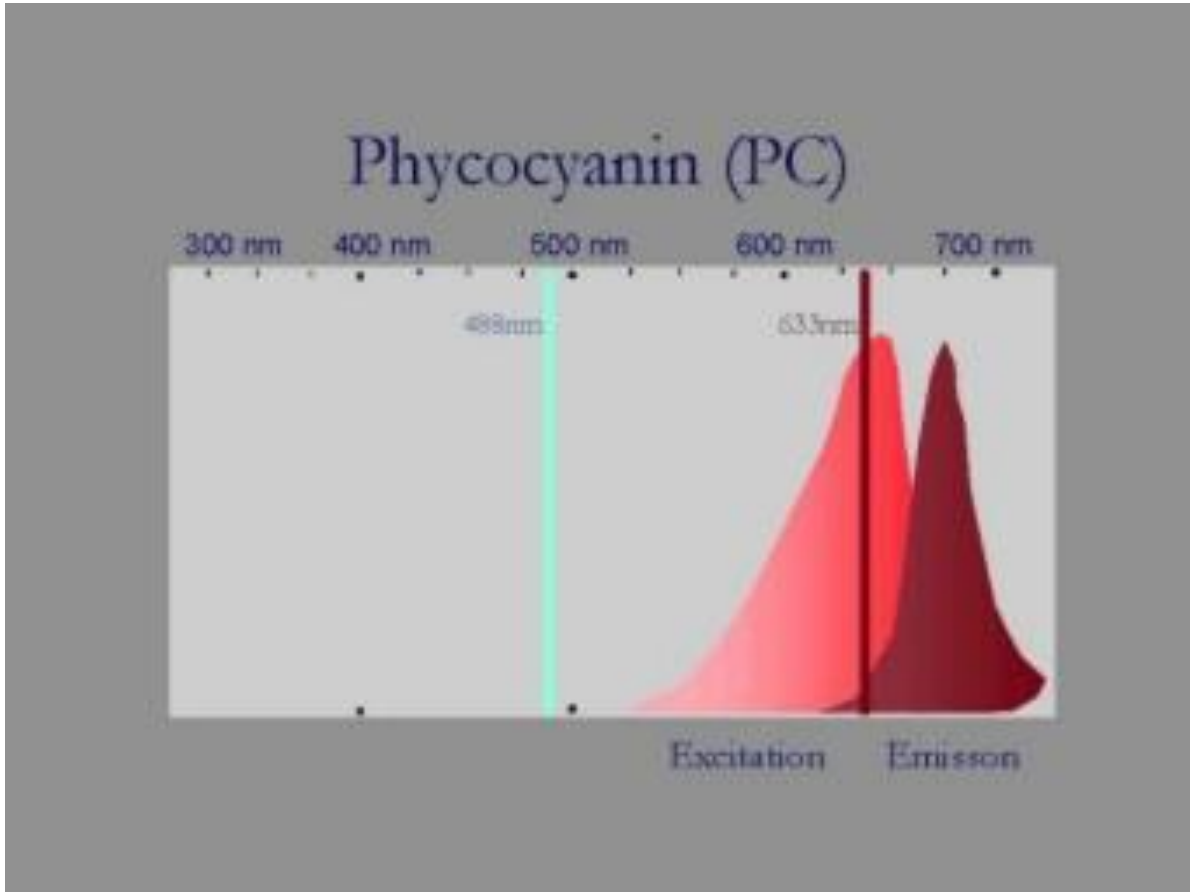
Algal Accessory Pigments

Cyanobacterial Accessory Pigments

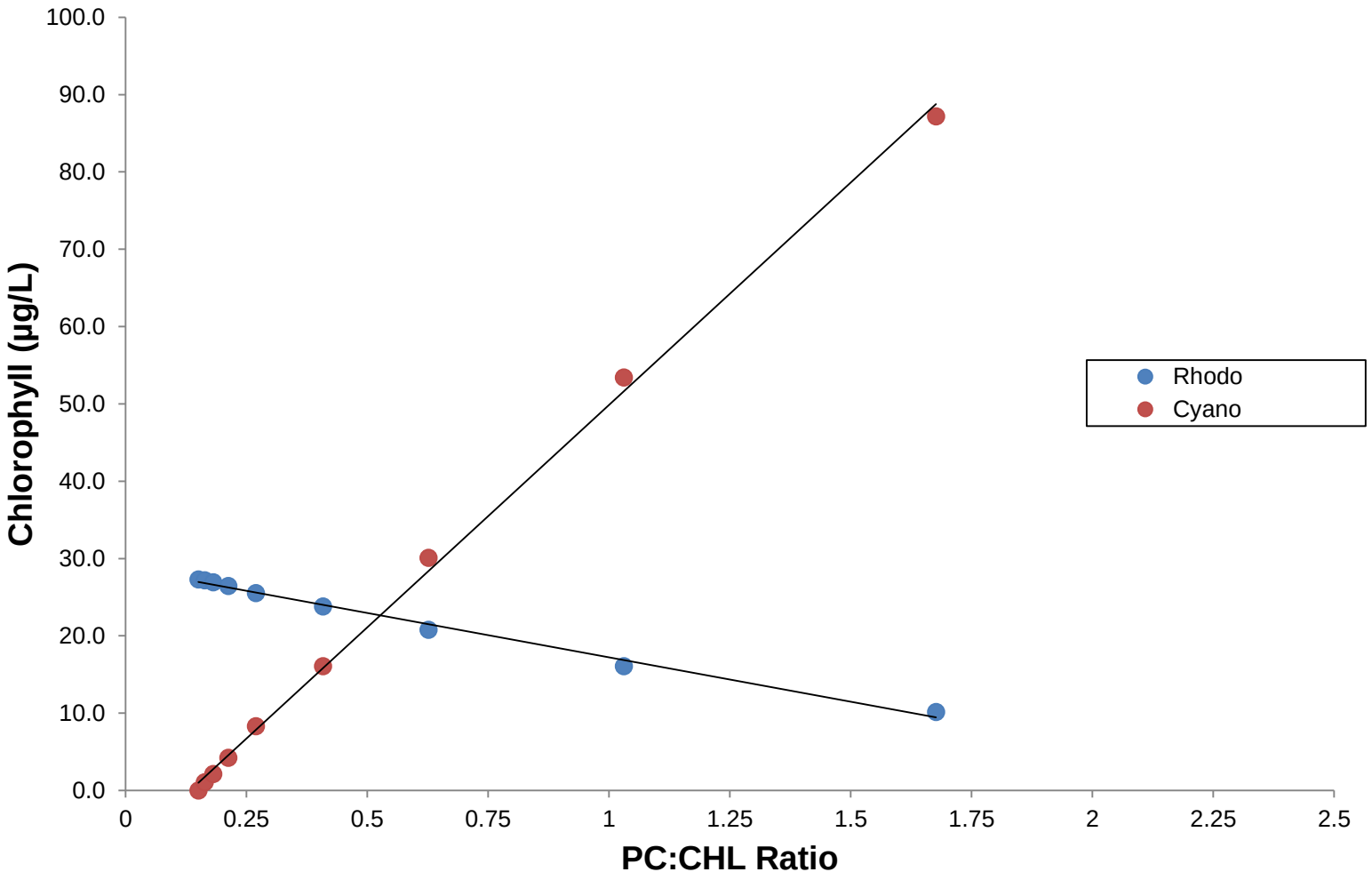


Pigment Excitation/Emission Spectra

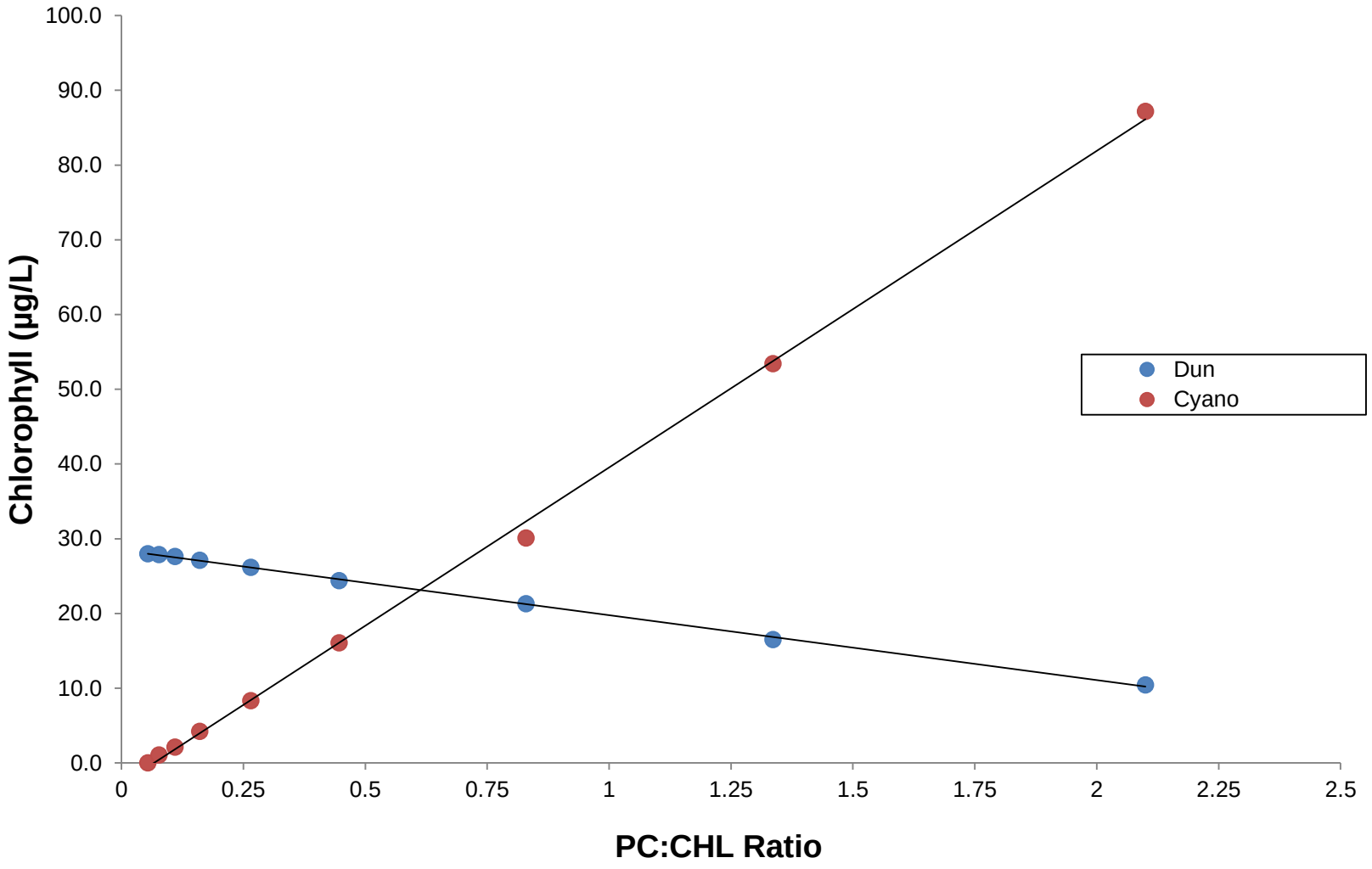




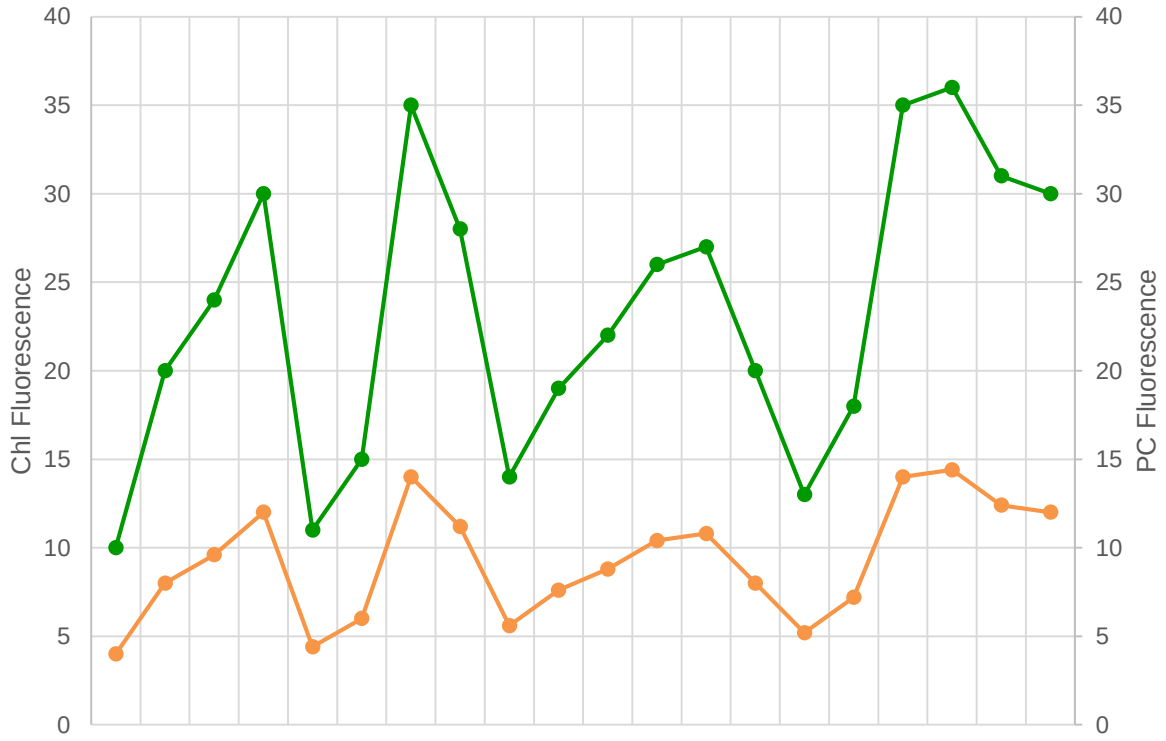
PC to CHL Ratio

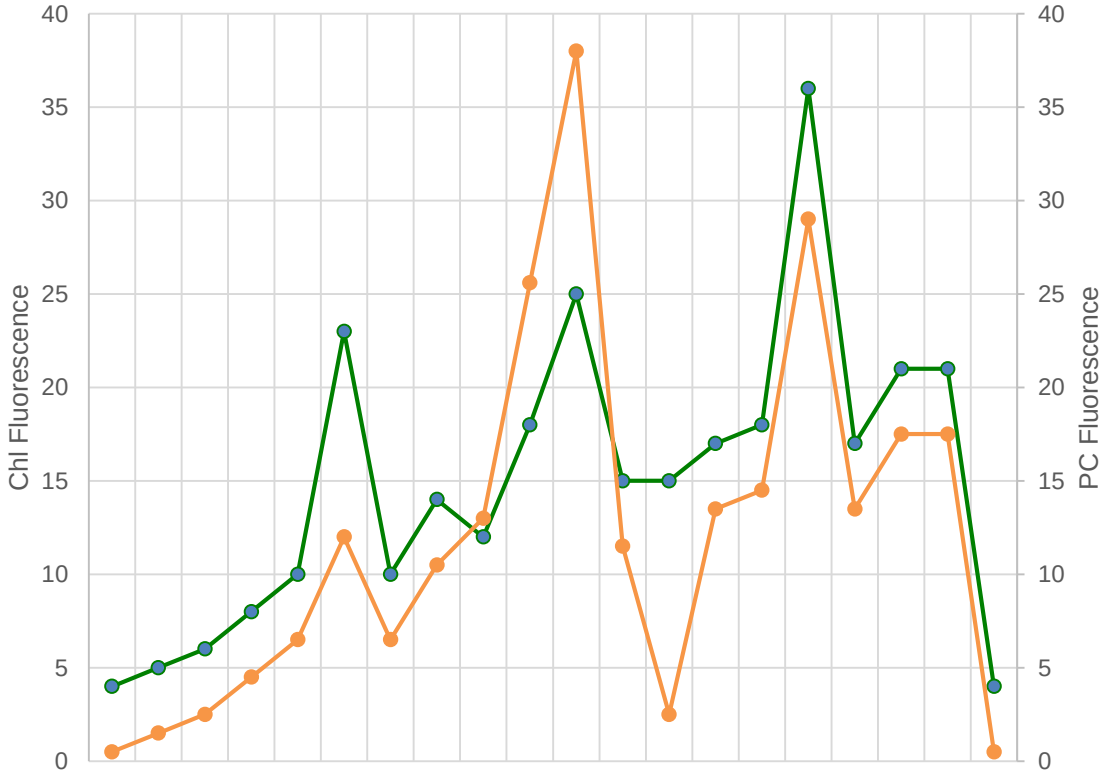


PC to CHL Ratio

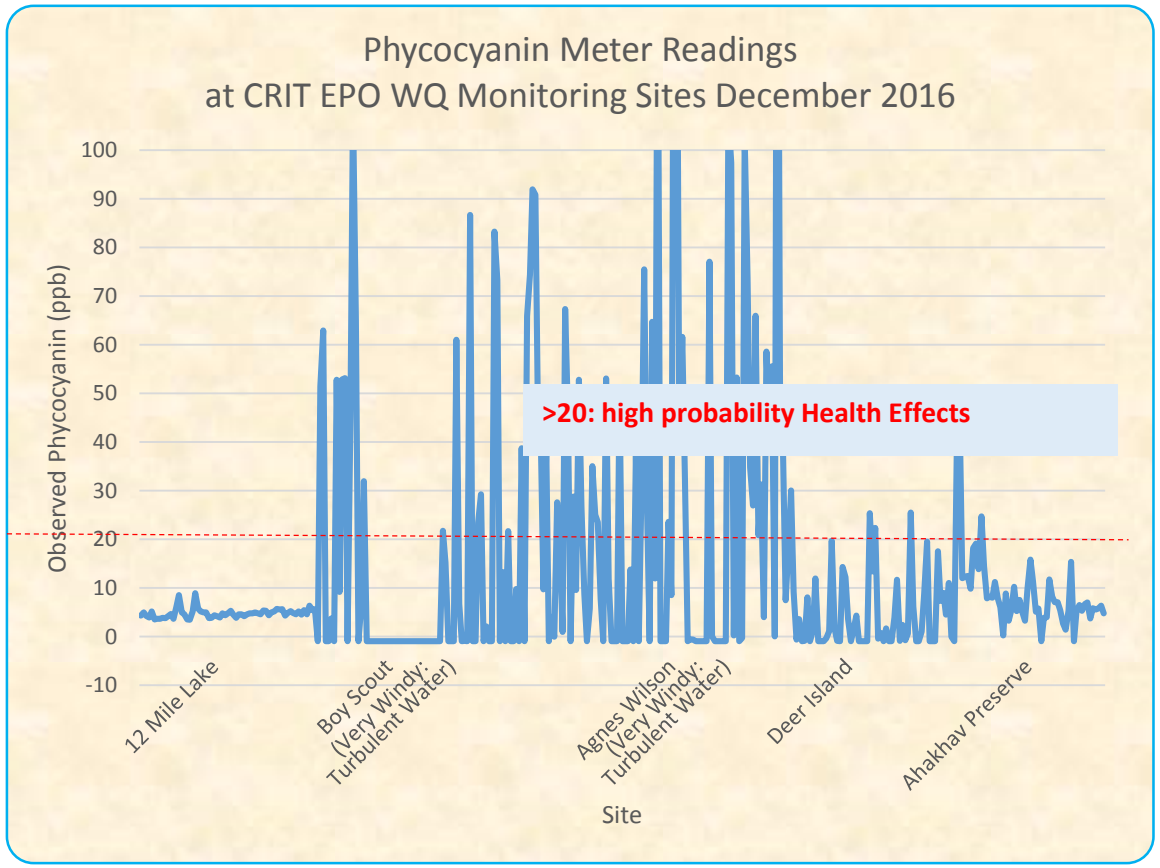


PC to CHL Ratio



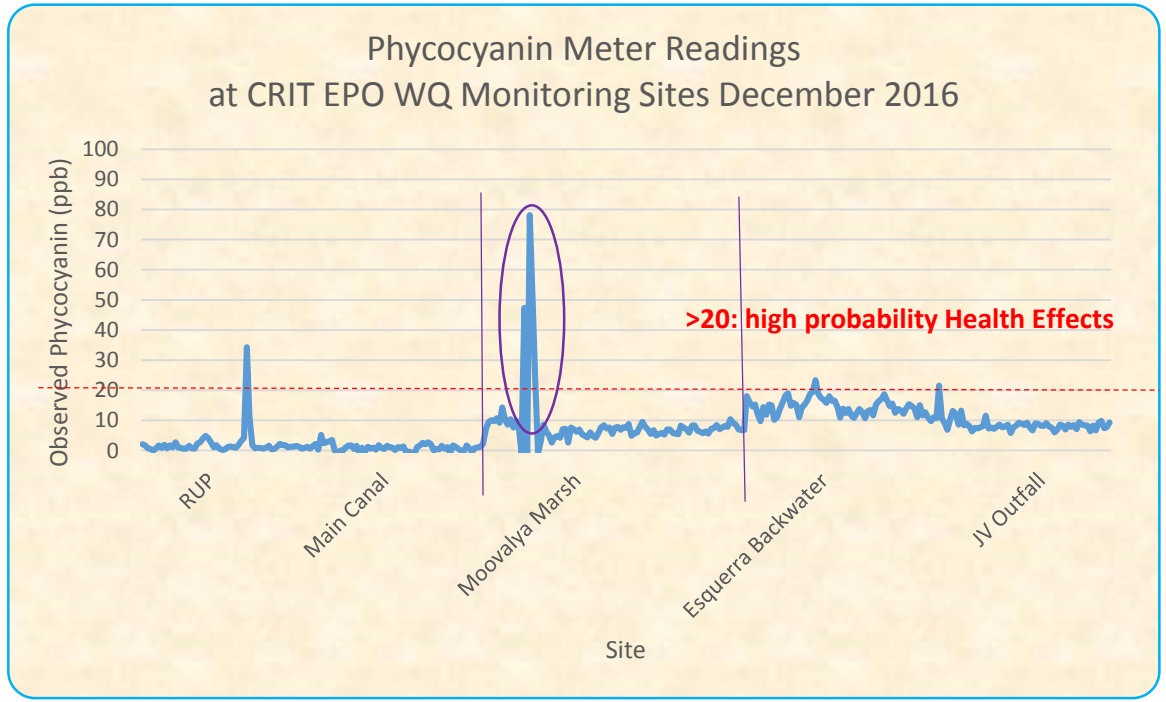


Field Data Sets



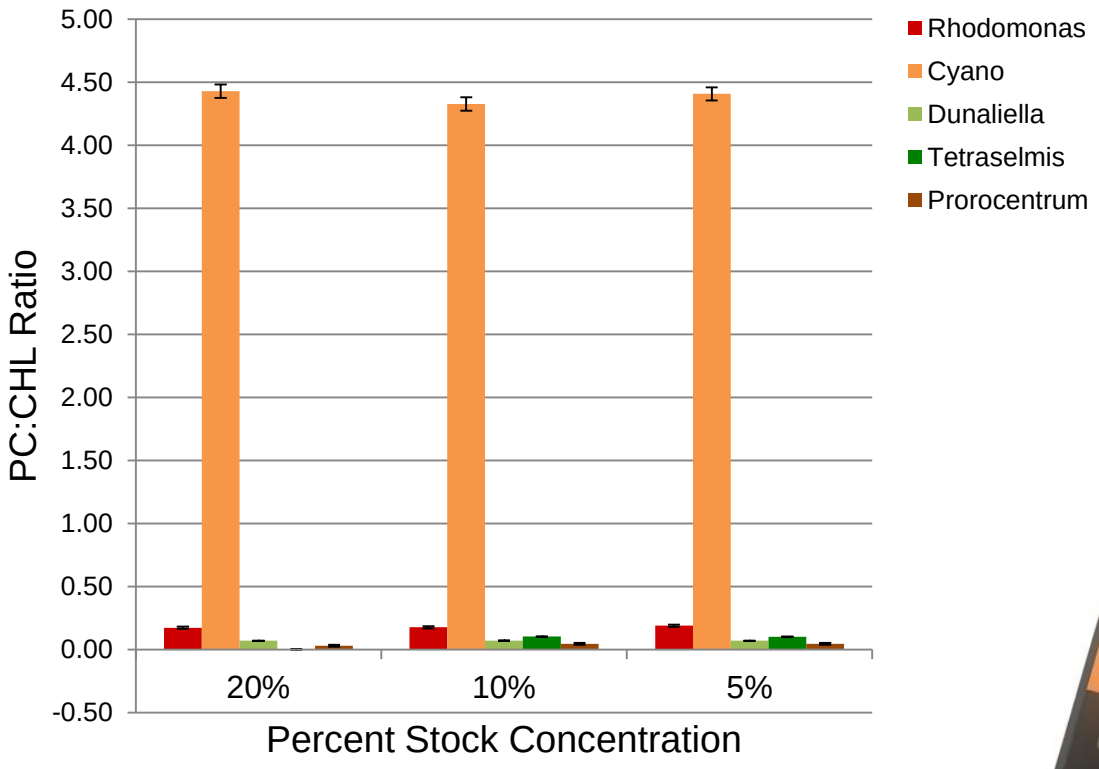
Date:	Site:	Note:	PC:CHL Ratio	PC in RFUB	CHL in RFUB	Reading #
12/14/2016	JV Outfall		0.205	210.9	1028.5	27
12/16/2016	12 Mile Lake	at Bridge	0.0952	175.1	1650.6	28
12/16/2016	12 Mile Lake	Duplicate	0.1097	163.94	1494.3	29
12/16/2016	Boy Scout	high winds, water turbulent	0.0444	12.64	284.97	30
12/16/2016	Agnes Wilson Bridge	high winds, water turbulent	0.1332	29.8	223.68	31
12/16/2016	Deer Island		0.0958	119.3	1245.1	32
12/16/2016	Ahakhav Preserve	Willow Beach	0.1458	174.26	1195	33

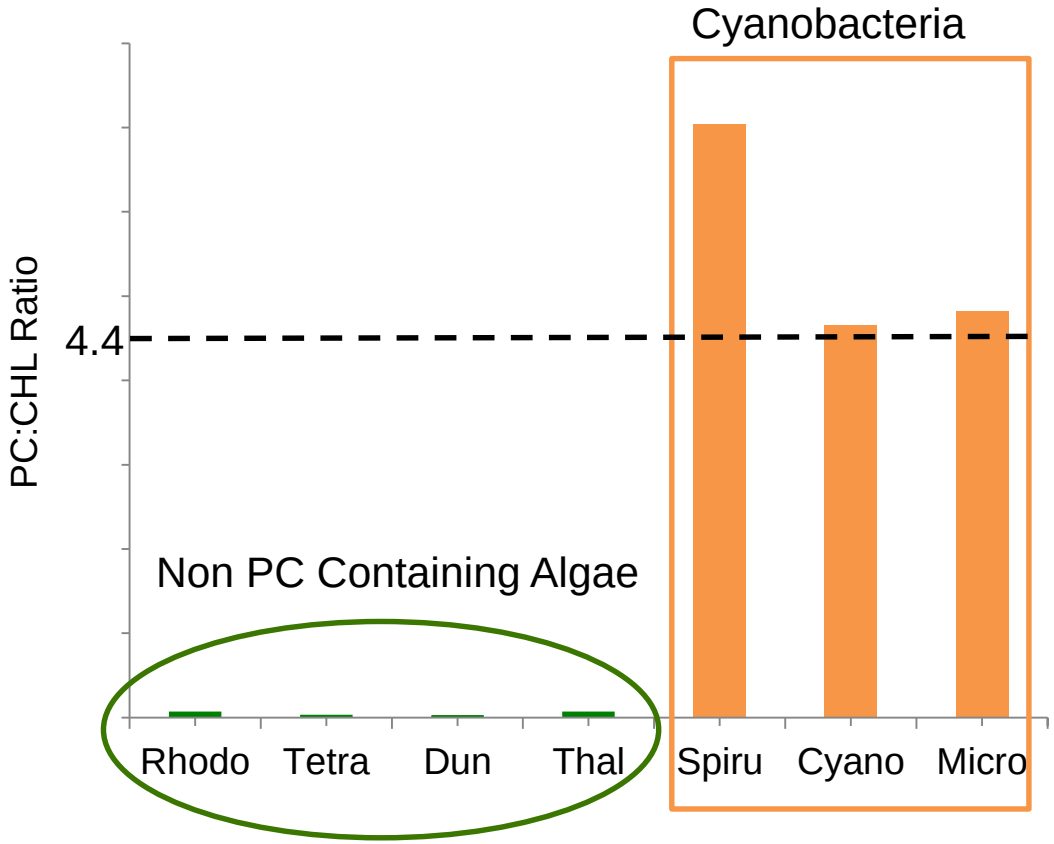
Field Data Sets



Date:	Site:	Note:	PC:CHL Ratio	PC in RFUB	CHL in RFUB	Reading #
12/14/2016	RUP	at Concrete dock	0.1392	27.59	198.16	22
12/14/2016	RUP	duplicate	0.0606	12.64	208.41	23
12/14/2016	Main Canal		0.0614	11.48	186.93	24
12/14/2016	Moovalya Marsh		0.0897	169.74	1891.6	25
12/14/2016	Esquerra Backwater		0.101	104.35	1032.6	26
12/14/2016	JV Outfall		0.205	210.9	1028.5	27

CyanoFluor - PC to CHL Ratio

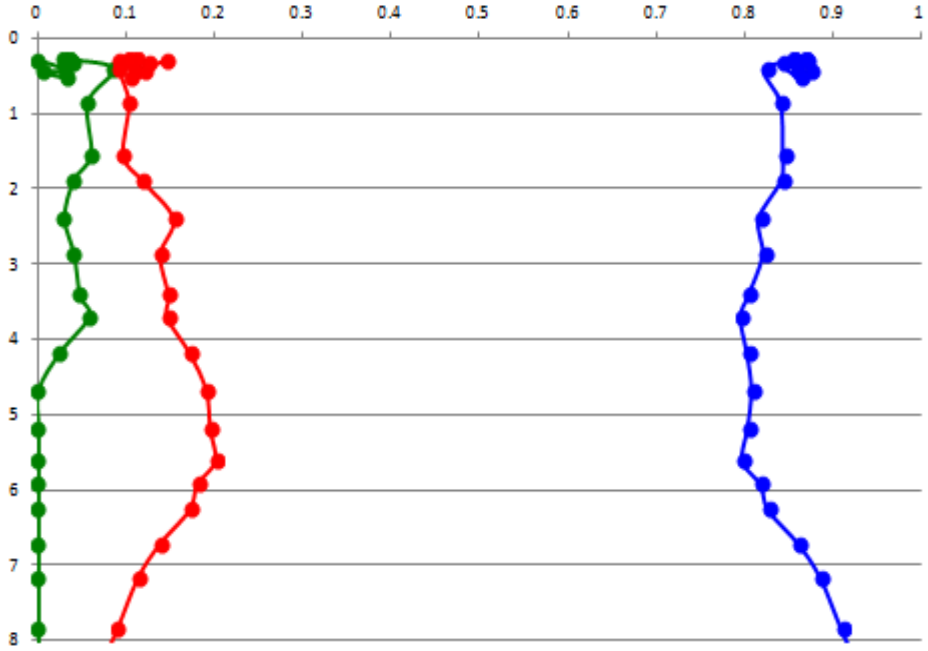




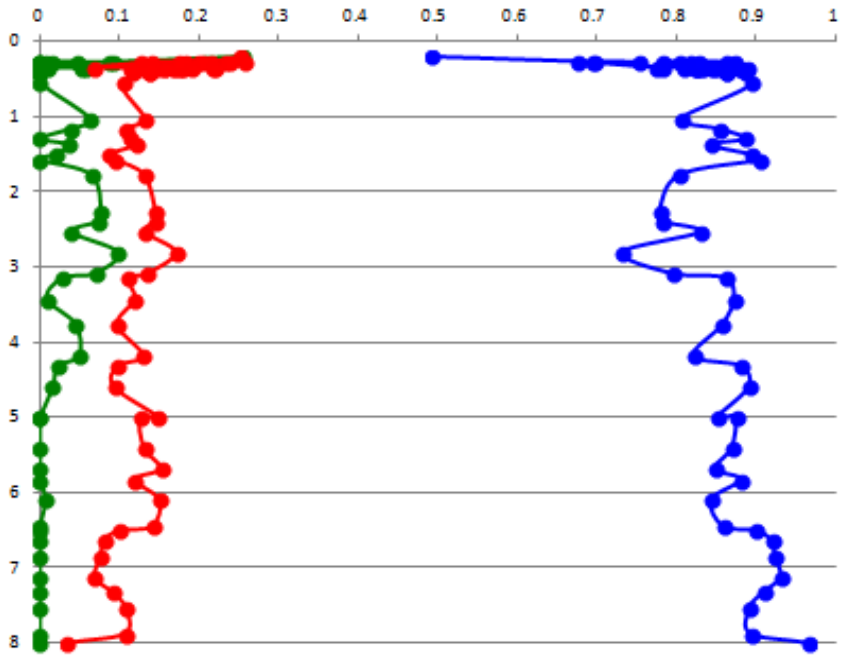
In Situ Algal Classification Tool

Harbor Profiles

BBE Profile

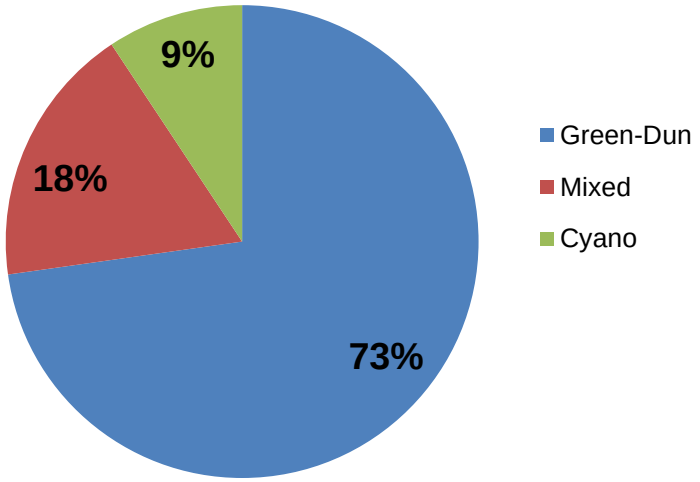


PhytoFind Profile

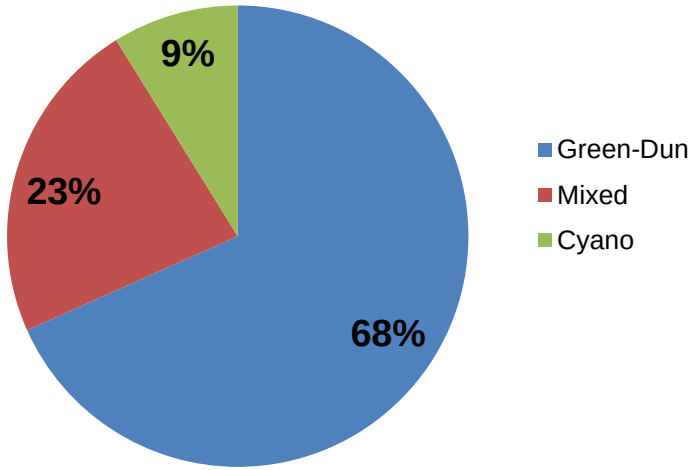


DOM Effects

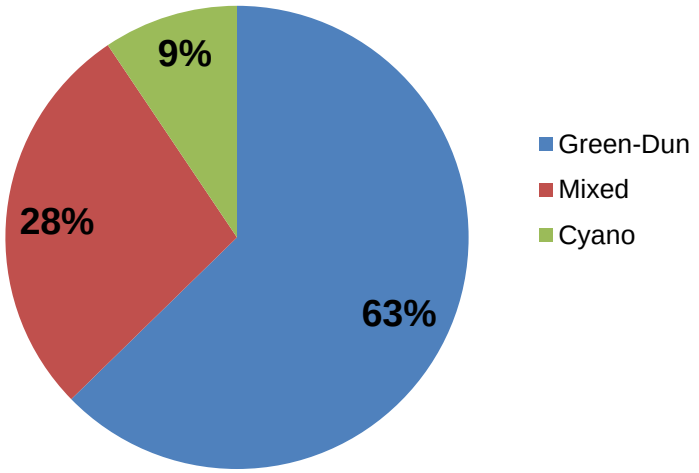
21 µg/L CHL @ 0mg/L DOM



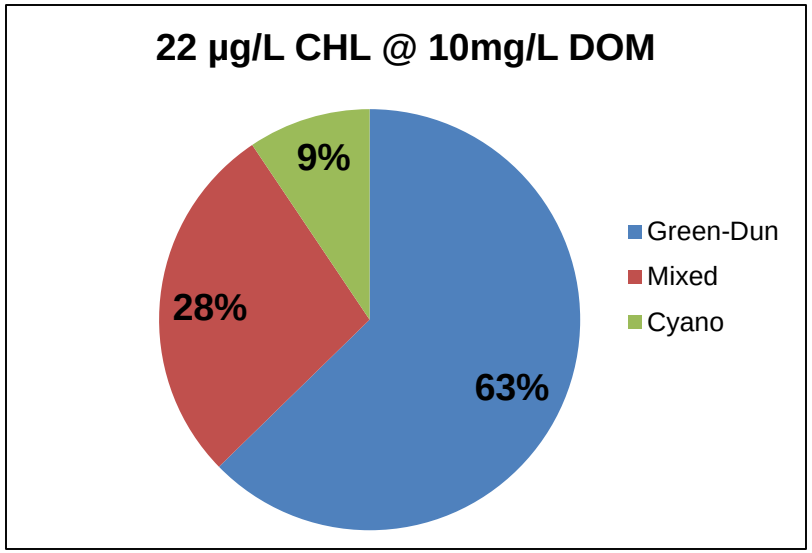
22 µg/L CHL @ 5mg/L DOM



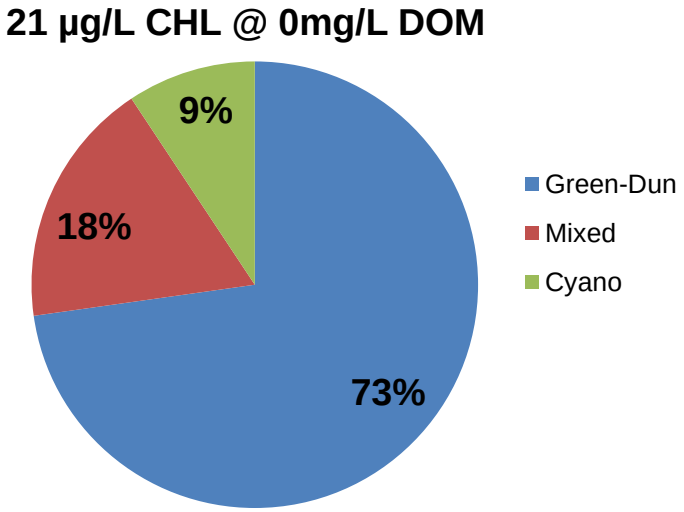
22 µg/L CHL @ 10mg/L DOM

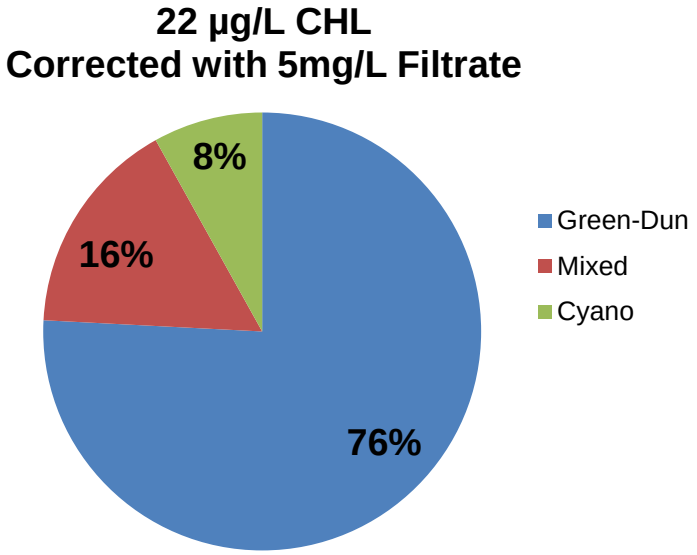


DOM Correction



Target

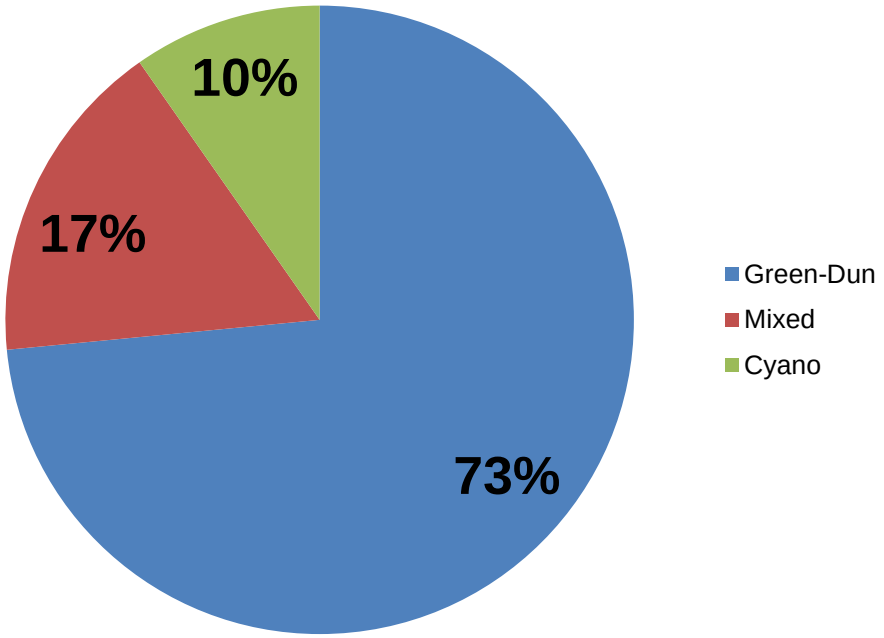




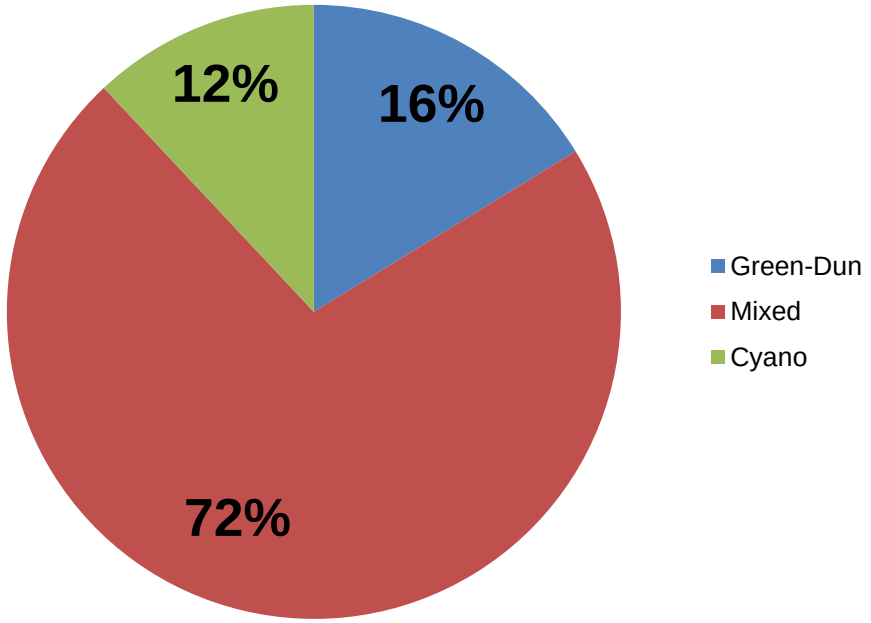
DOM Correction – High DOM Concentration

@ 20 µg/L CHL and 40mg/L DOM

Ratio Green-Dun(76%):Mixed(14%):Cyano(10%)



Corrected

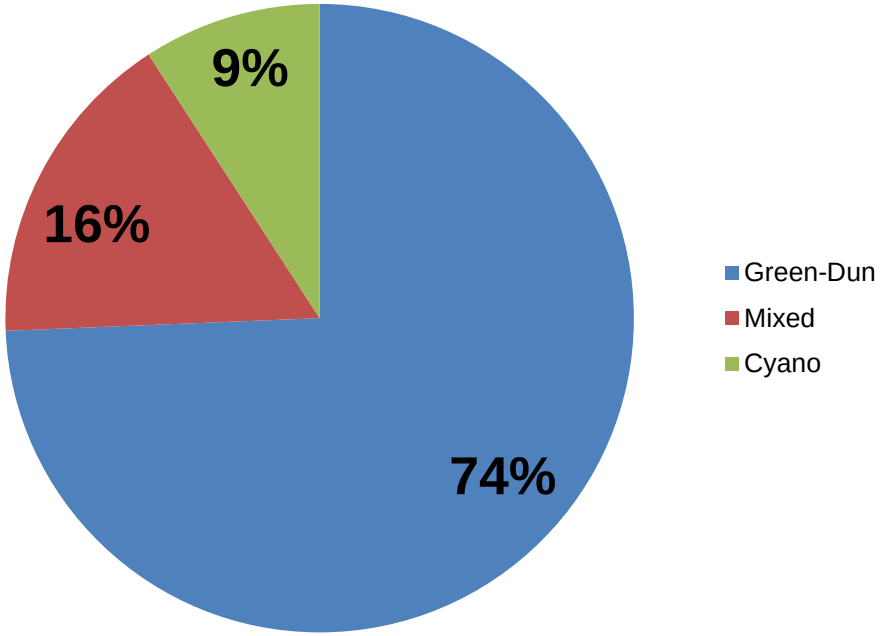


Uncorrected

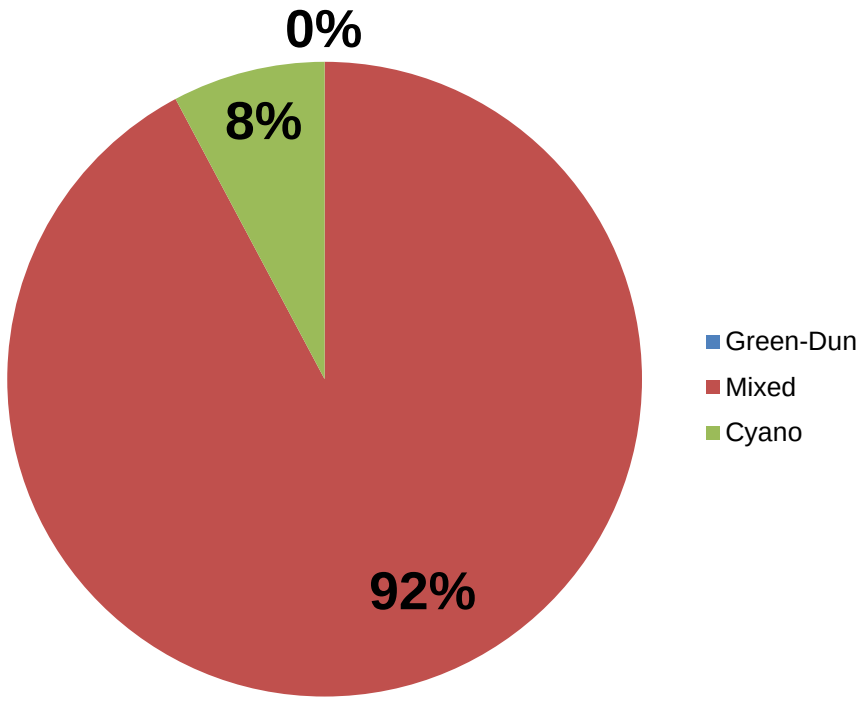
DOM Correction – Low Algal Abundance

@ 2.5 µg/L CHL in 40mg/L DOM

Ratio Green-Dun(76%):Mixed(14%):Cyano(10%)

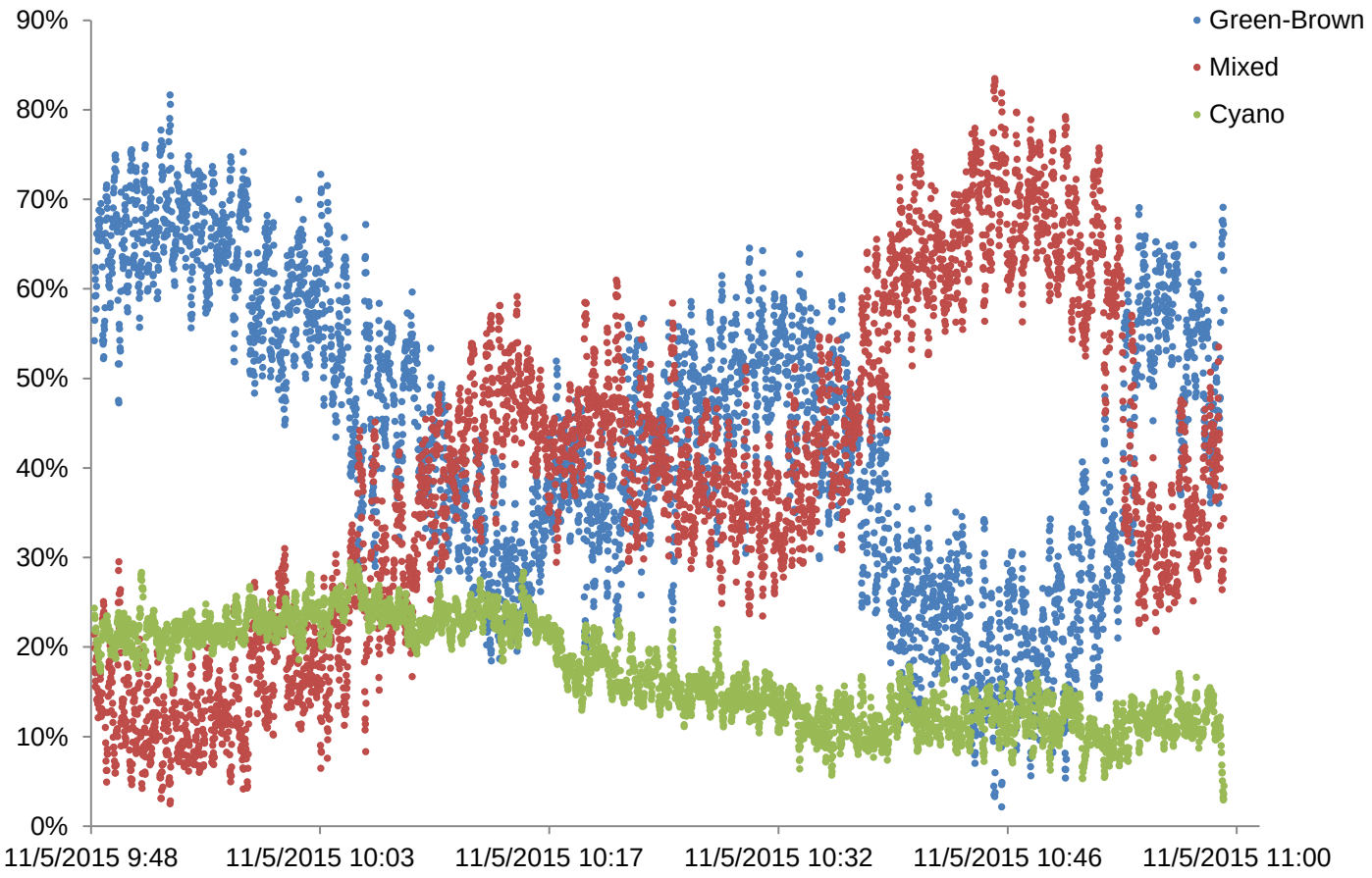


Corrected



Uncorrected

Monitoring/Surveying



Early HAB Detection Tools

Algae rolling in the tide at Bathtub Beach on Hutchison Island, 6-26-16, JTL

Questions?