Maryland 2018 Freshwater Harmful Algal Blooms

Cathy Wazniak, Charlie poukish, Jennifer Wolny, Pat Brady, Chris Luckett

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Cyanobacteria

Species of Concern:

Dolichospermum spp (Anabaena-type)

Lyngbya

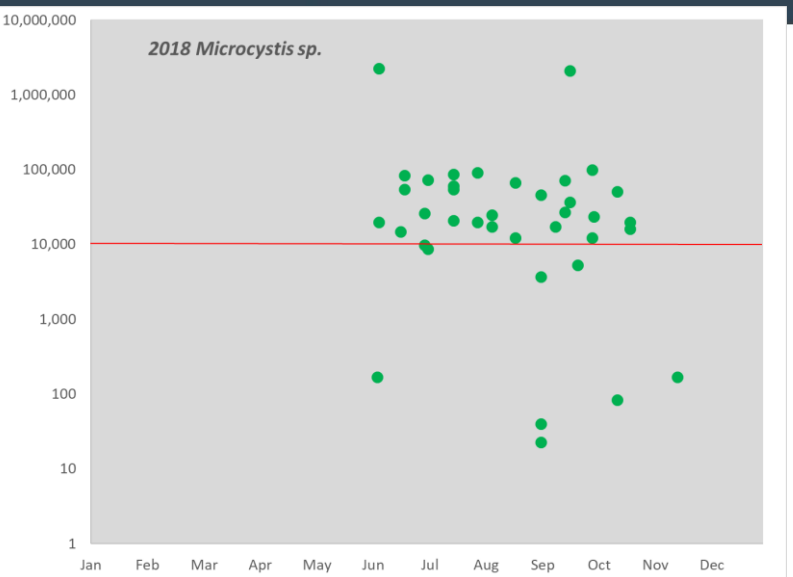
Microcystis

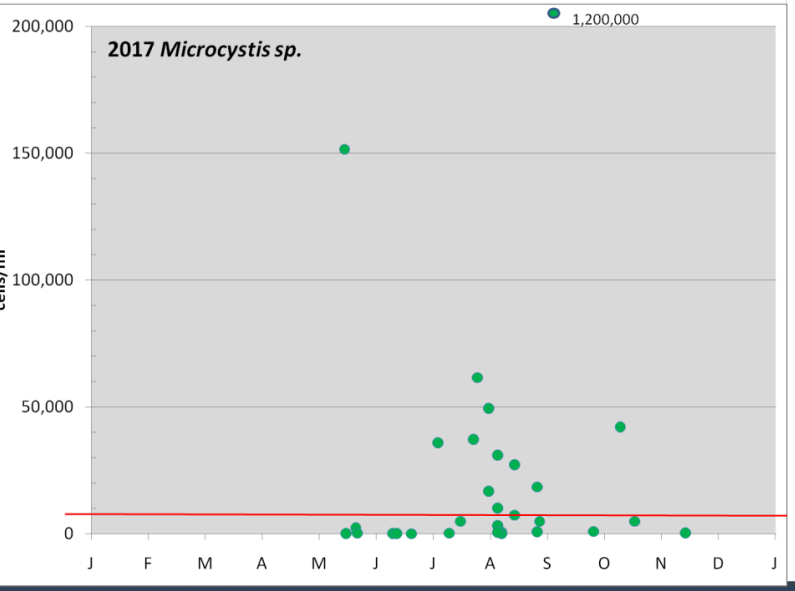
Pico-cyanobacteria

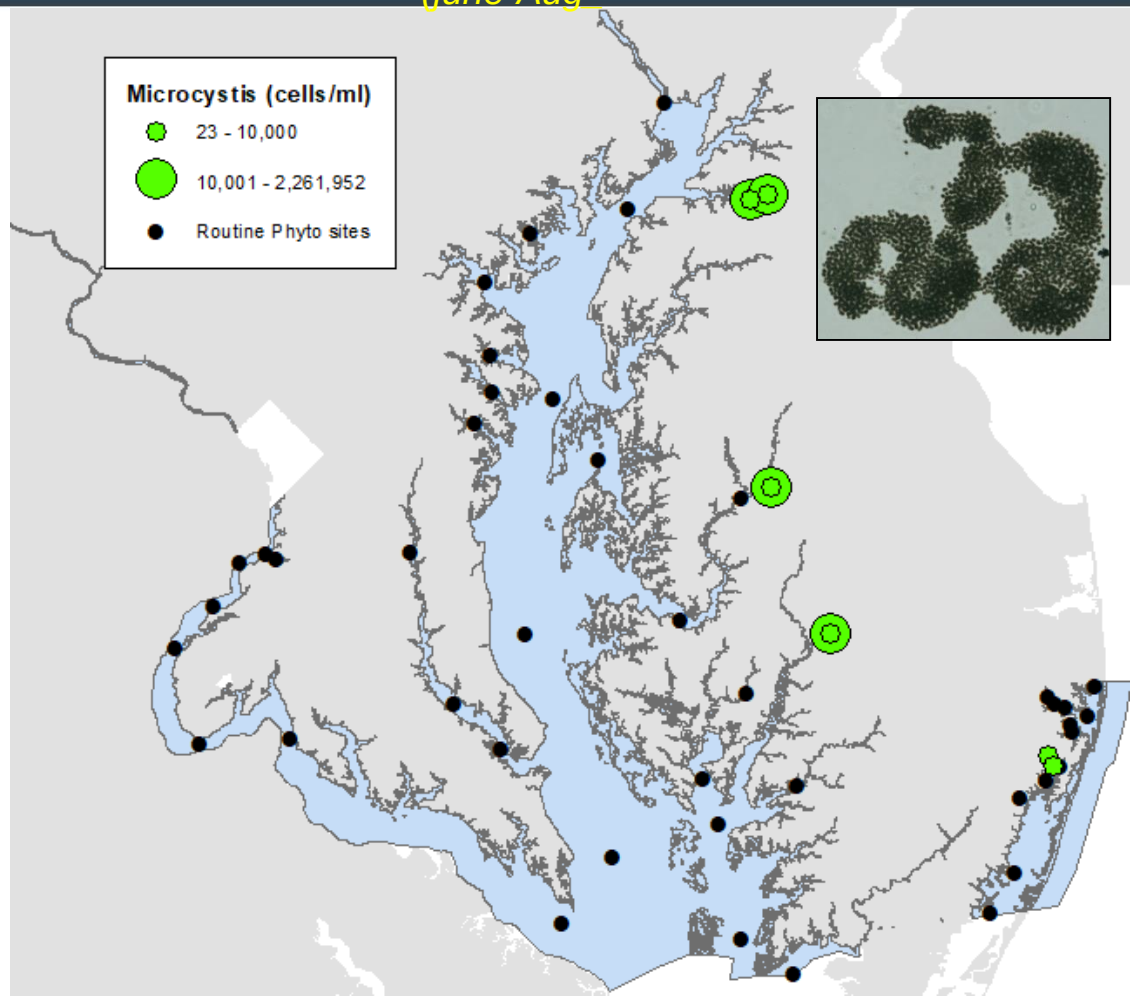
Microcystis

Max abundance

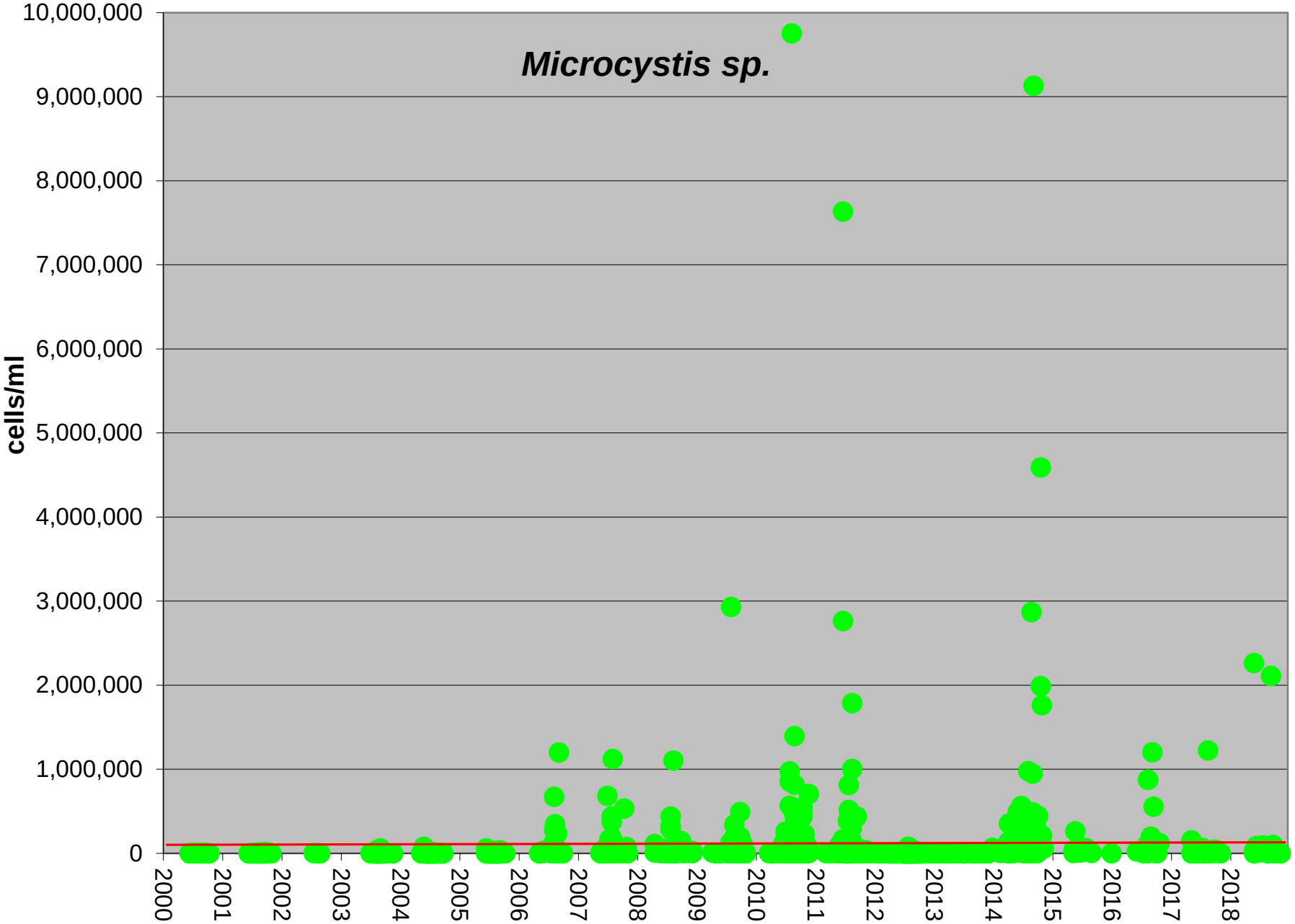
- MES restoration >2 mill
- Sassafrass 91,168 cells/ml -*August 1 (june-Aug*







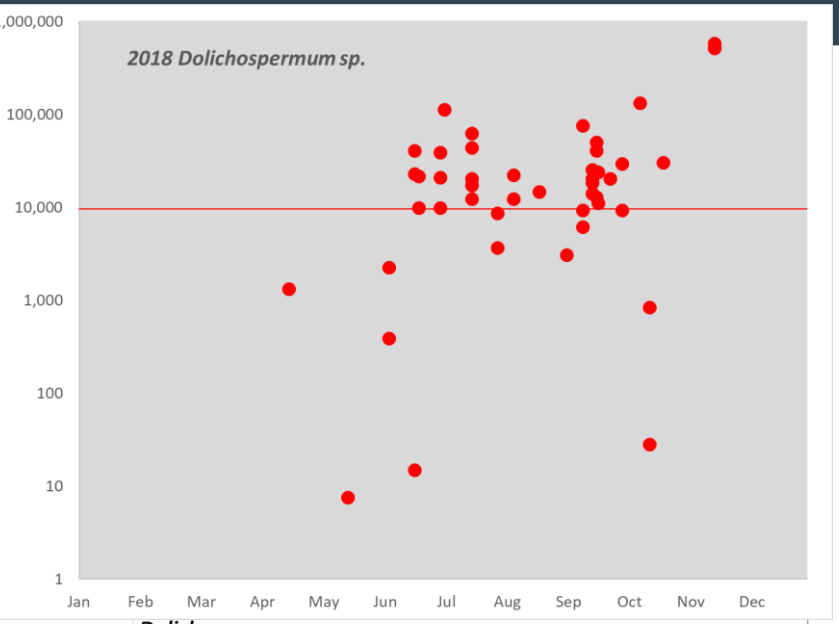
Can produce microcystins
-Liver Toxins

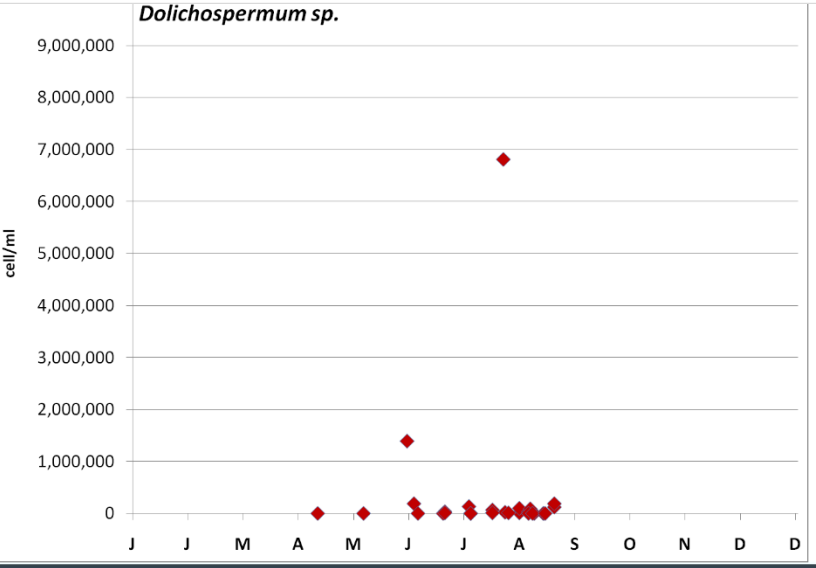

Microcystis sp.
cells/ml
10,000,000
9,000,000
8,000,000
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018

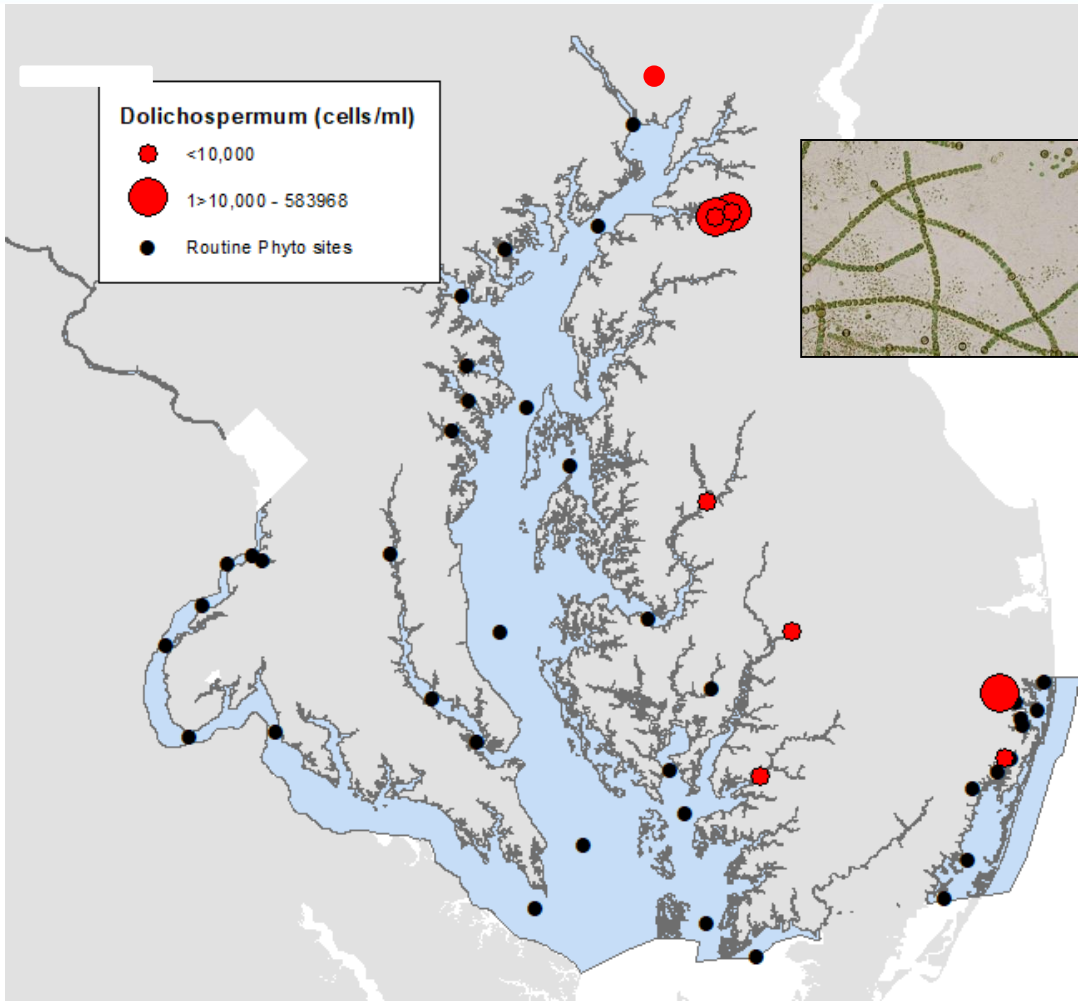
Dolichospermum

Max abundance – MES site

- *Sassafras (112,728) July 5*
- *St Martin River (~50K cells/ml) Sept 20*





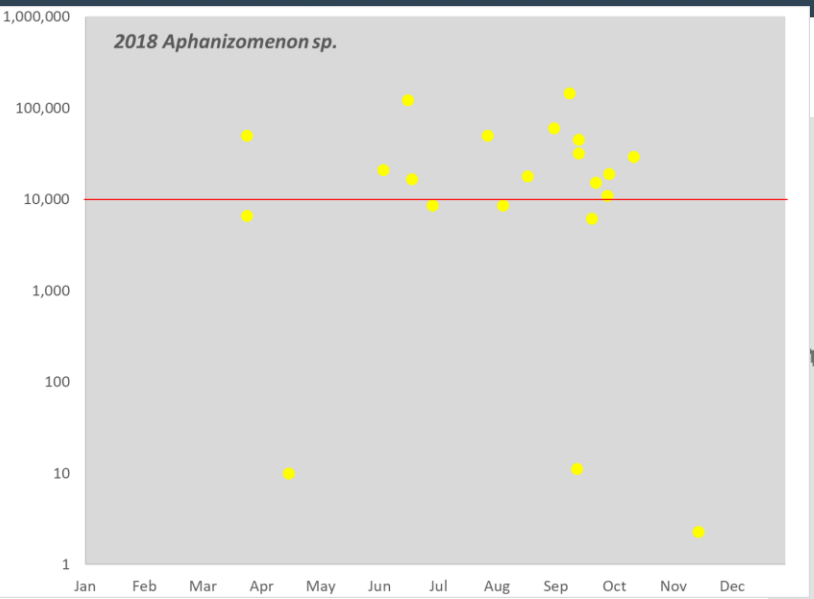


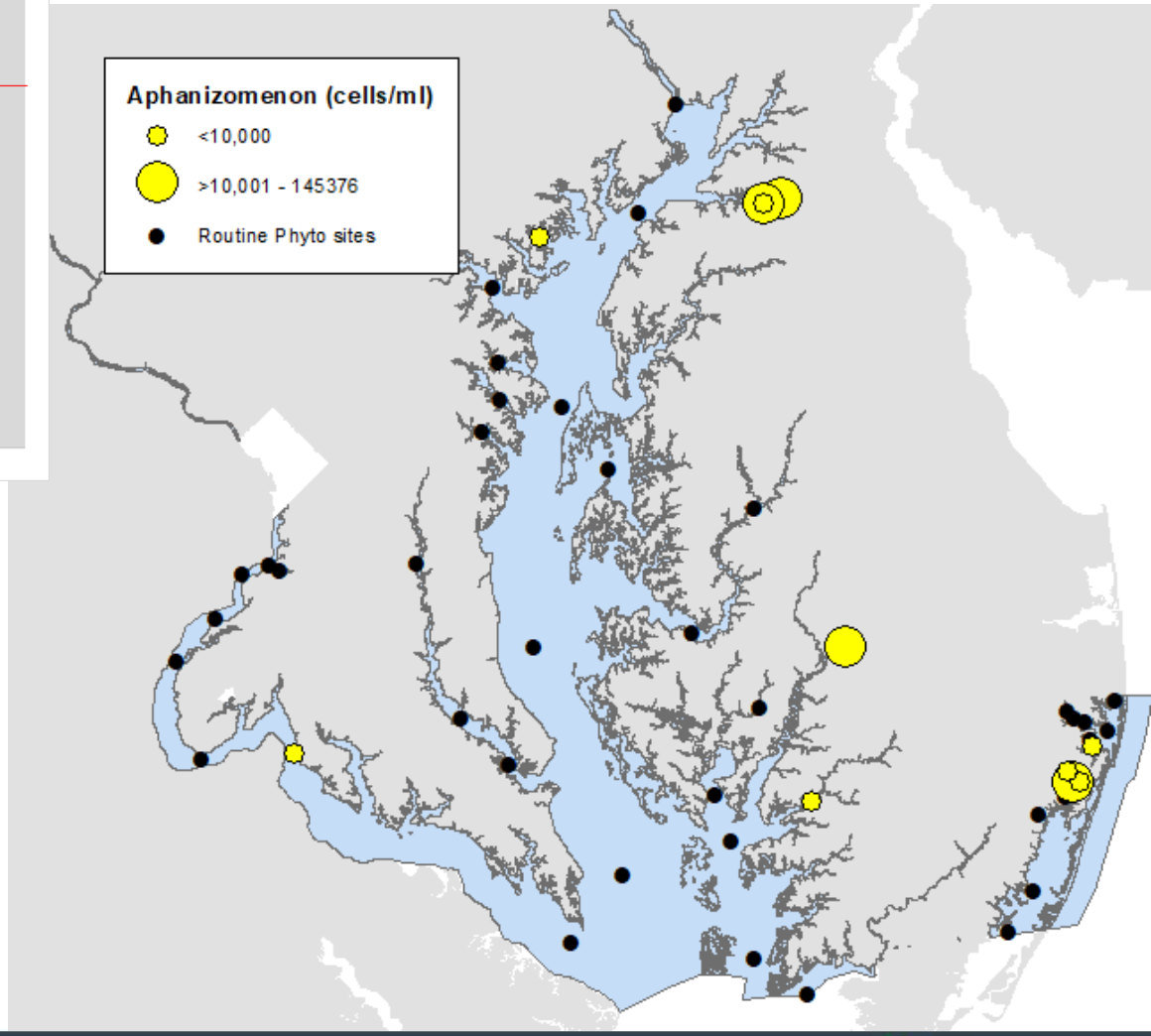
Can produce Anatoxin
-potent neurotoxin

Aphanizomenon sp.

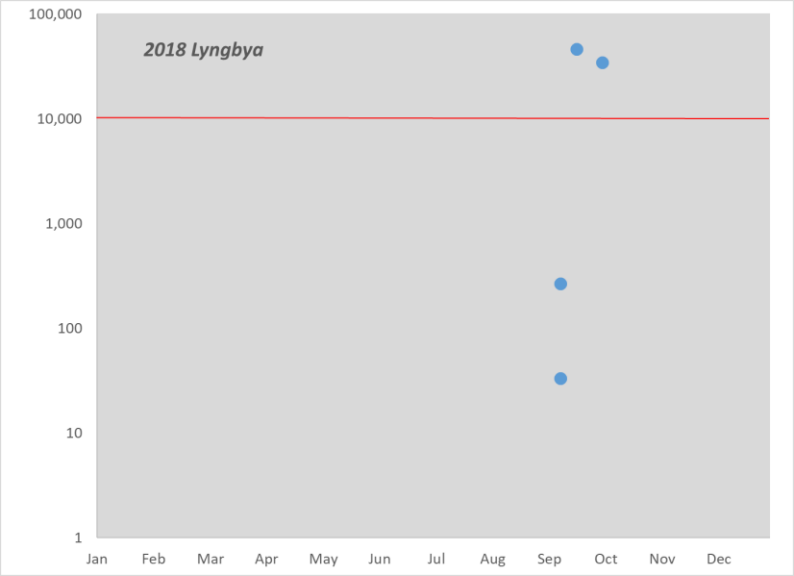
Max abundance

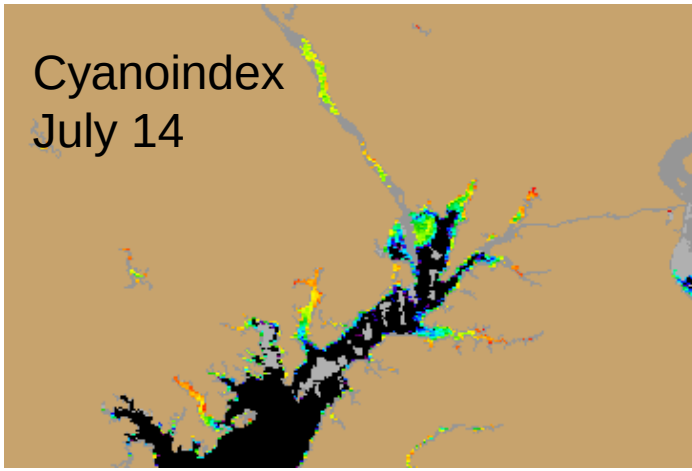
- *Sassafrass (123,200 cells) June 20*
- *Trappe creek (~50K cells/ml) March 27*





Lyngbya





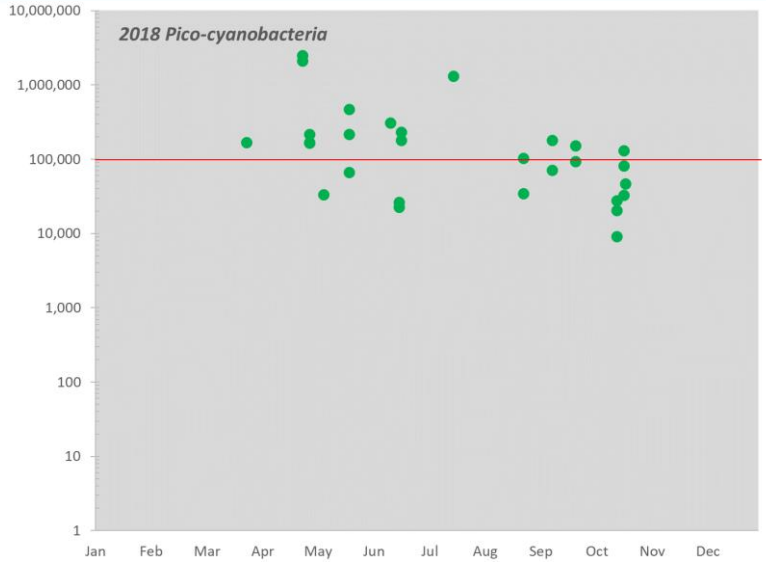
Max abundance

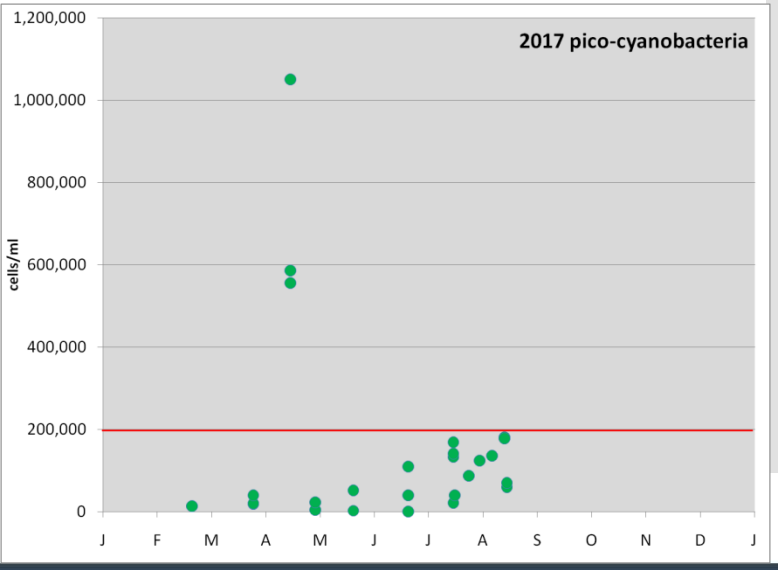
- *Flats presence*

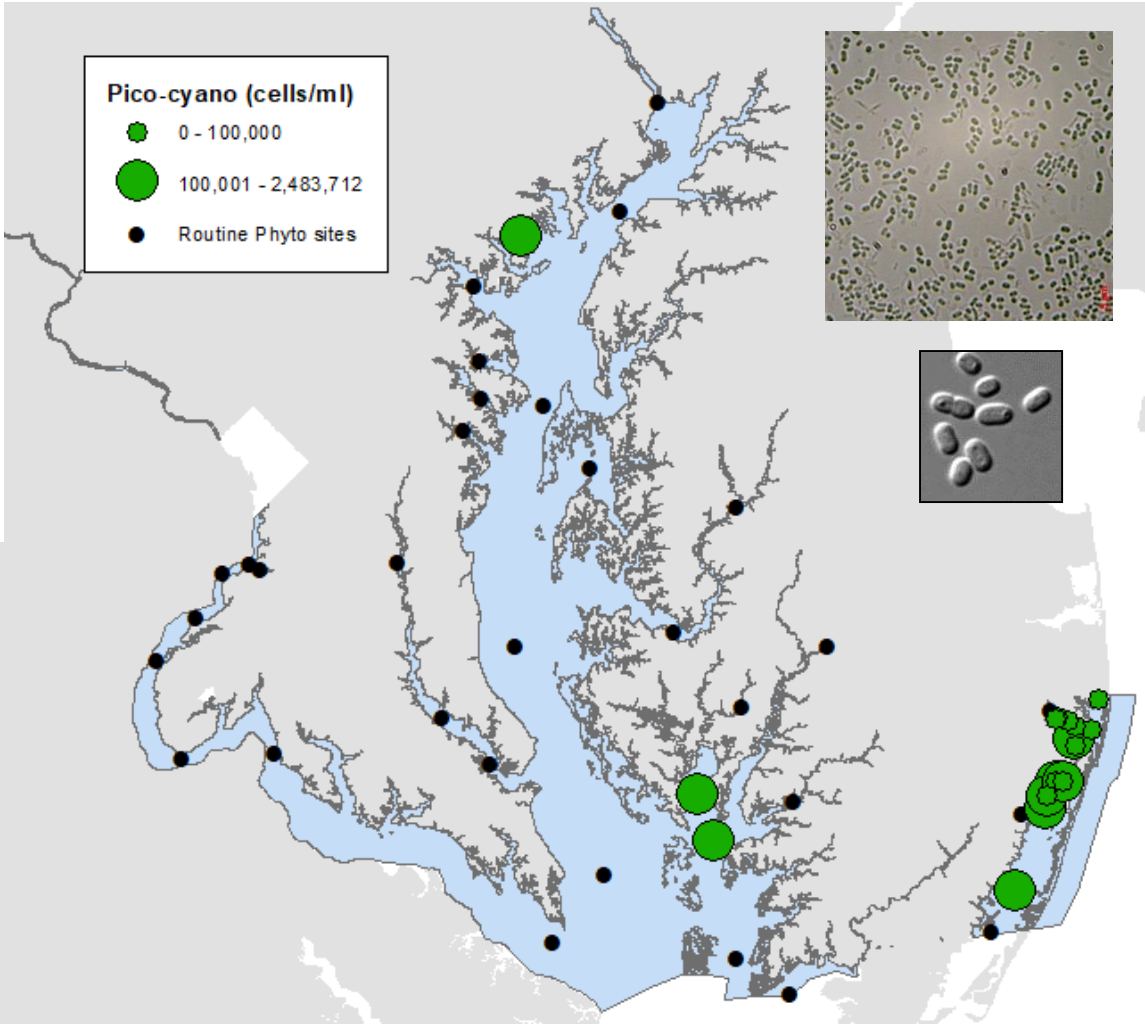
Pico-cyanobacteria

Max abundance

- *MES restoration*
- *Fishing Bay 6/14 (>1mill)*







MDE ALGAE BLOOMS OF NOTE IN 2018

LOCATION	DATE COLLECTED	ALGAL TAXA	COUNT (cells/mL)	microcystin (ppb)
Spahrs Quarry	4-27-2018	Planktothrix sp.	>40,000	92
Lake Anita Louise	7-25-2018	Planktothrix	<40,000	0.33
Lake Needwood	8-16-2018	Microcystis aeruginosa Pseudanabaena Dolichospermum	2,036,250 91,627 9,588	130
Swantown Creek	10-4-2018	Microcystis sp. Limnothrix mirabilis	129,892 496,920	<2 (in water)

Three cyanotoxin advisories in 2018

2018 HAB Events in MD	Microcystin ppb	Microcystin Producers cells/ml
Spahr Quarry	92	>40,000 Planktothrix sp.
Lake Williston	0.22	green algae spp
Sassafras River-Budd's Landing	0.41	14,000 microcystis spp
Sassafras River-Budd's Landing	0.32	81,000 microcystis spp
Sassafras River-Budd's Landing	1.7	27,000 microcystis spp
Sassafras River-Georgetown	<0.15	38,000 microcystis spp
Sassafras River-Georgetown	1.4	71,000 microcystis spp
Sassafras River-Georgetown	2.6	microcystis spp
Sassafras River-Swantown Creek "follow-up water samples were 2ppb or less"	50*	2,146,144 microcystis spp
Lake Anita Louise	<0.15	<40,000 Plantothrix spp
Lake Merle	19	>40,000 Planktothrix sp.
Lake Needwood	130	2,036,250 Microcystis aeruginosa
Constitution Pond, D.C.	0.33	42,420,000 Dolichospermum
Lloyd's Pond Water	<0.15	diatom ssp
Lloyd's Pond benthic algae	69.6	Oscillatoria limosa
Deep Creek, unnamed Cove	8	300,000 Woronichinia spp
Deep Creek, Beckman Cove	<0.15	74,000 Woronichinia spp

* Recreational **Caution** issued because it was benthic algae (not likely ingested).

2018 Summary

- Blooms of Microcystis in Sassafrass (mixed species) and Nanticoke (October)
- Three no-contact advisories in inland waters (microcystin >10 ppb)
  - 2 Planktothrix and 1 Microcystis

Cyanobacteria bloom detected

Microcystis or *Planktothrix* >40,000 cells/ml OR Total potentially toxic cyanobacteria >100,000 cells/ml

Analyze for microcystin using Abraxis test strips *within 24 hours*

- Microcystin < 10 ppb → No Action
- Microcystin ≥ 10 ppb → Notify DHMH & MDE Send sample to MDE to determine concentration → **No Contact Advisory** DHMH local health department will post follow up monitoring TBD

Dolichosp >75,000 cells/ml *or* *Aphanizomenon, Cuspidothrix, Oscillatoria sp.* >100,000 cells/ml

Analyze for anatoxin using Abraxis test strips *within 24 hours*

- Anatoxin < 2.5ug/L → No Action
- Anatoxin ≥ 2.5ug/L → Notify DHMH & MDE Send sample out to determine concentration
  - Anatoxin < 20 ug/L → No Action
  - Anatoxin ≥ 20 ug/L → **No Contact Advisory** Follow up monitoring TBD

Dolichosp, *Aphanizomenon, Cylindrospermopsis or Lyngbya sp.* Plantothrix, Cusodpthrix >100,000 cells/ml

Notify DHMH & MDE

Analyze for saxitoxin By MDE ELISA or outside lab

- Saxitoxin < 10 ug/L → No Action
- Saxitoxin ≥ 10 ug/L → **No Contact Advisory** Follow up monitoring TBD

Cylindrospermopsis, Oscillatoria. Dolichosp *Apanizomenon, Cuspidothrix &/or* >100,000 cells/ml

Analyze for cylindrospermopsin By outside lab- SUNY or Greenwater

- cylindro ≥8 ug/L → **No Contact Advisory** Follow up monitoring TBD
- cylindro < 8 ug/L → No Action

MARYLAND DEPARTMENT OF NATURAL RESOURCES