# Maryland 2018 Harmful Algal Blooms

Cathy Wazniak, Jennifer Wolny, Charlie Poukish, Chris Luckett

MARYLAND DEPARTMENT OF NATURAL RESOURCES

potential

# Shellfish Contaminators

Species of Concern:

*Alexandrium spp.*

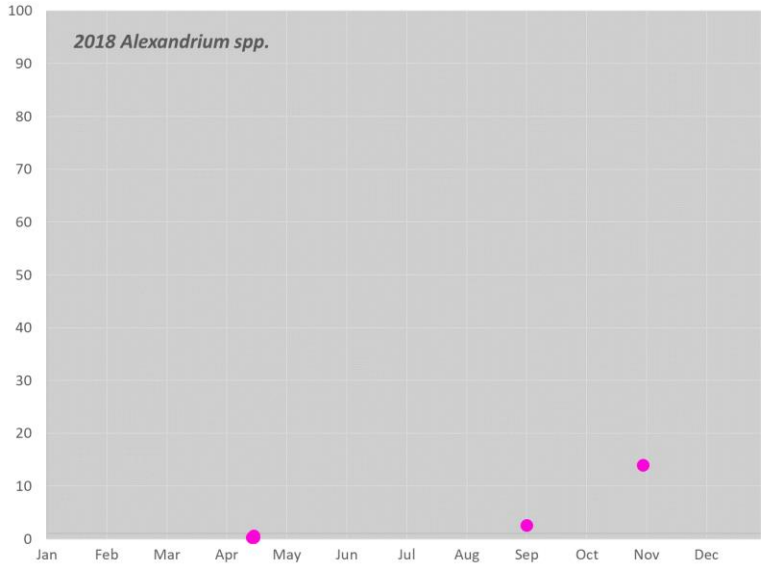
*Dinophysis sp*

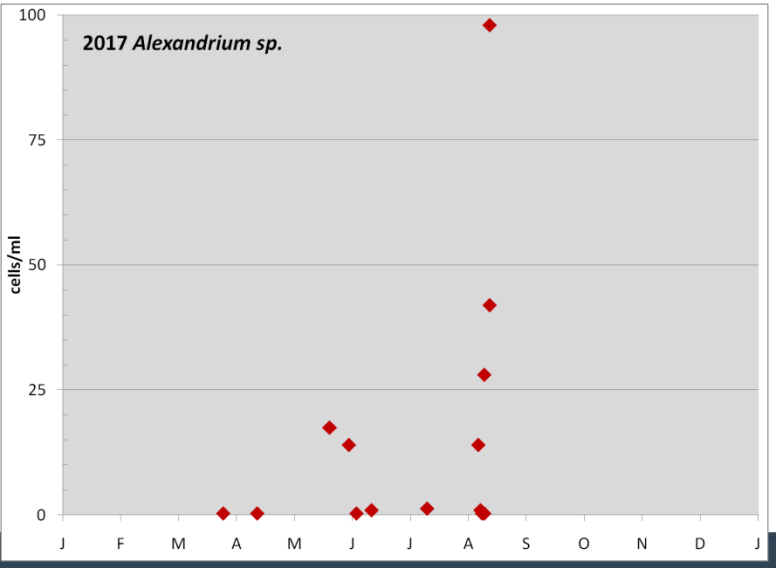
*Pseudo-nitzschia*

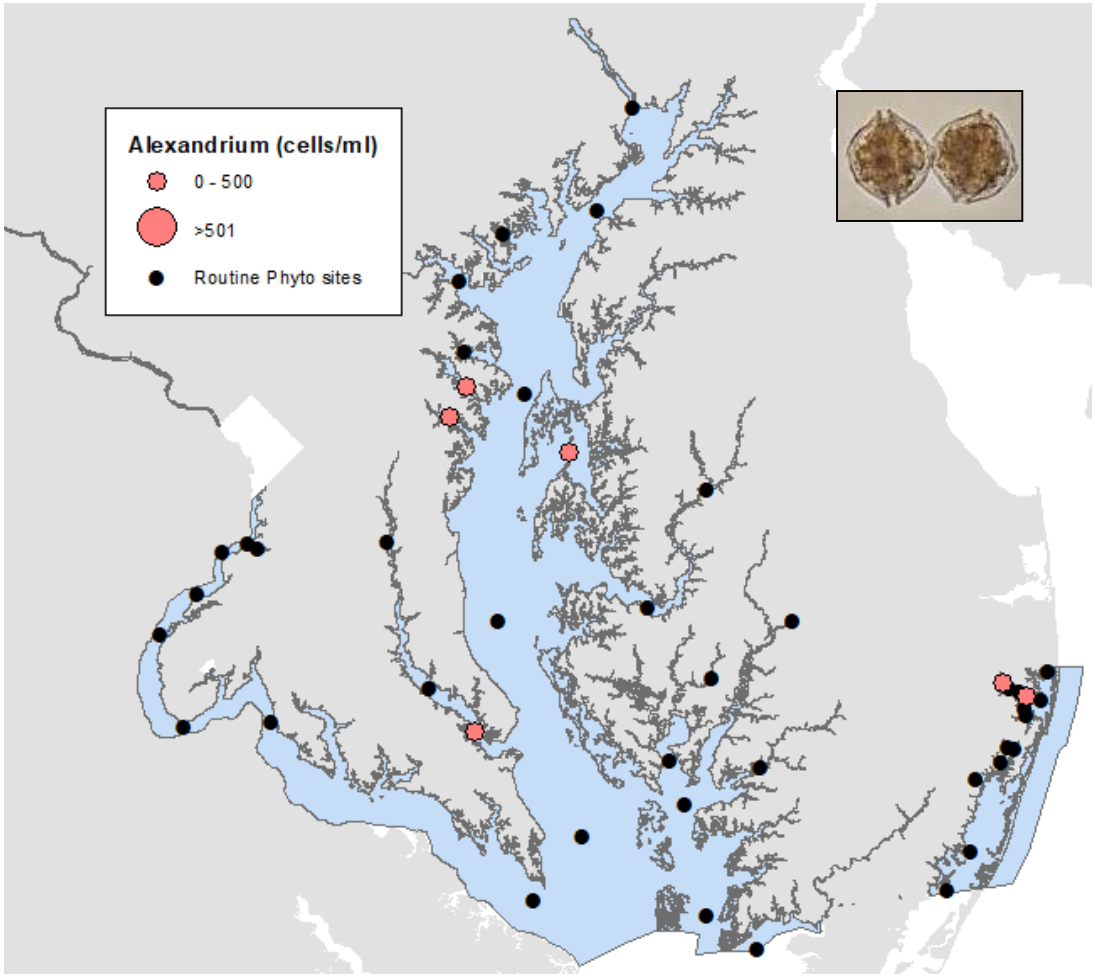
# *Alexandrium spp.*

*Bloom >500 cells/ml A. minutum*
*>1,000 cells/ml A. monilatum*

**Max abundance**
*14 cells/ml*
- *LE1.3, Nov 5*




Paralytic shellfish poisoning
-Can produce saxitoxins and spirolides

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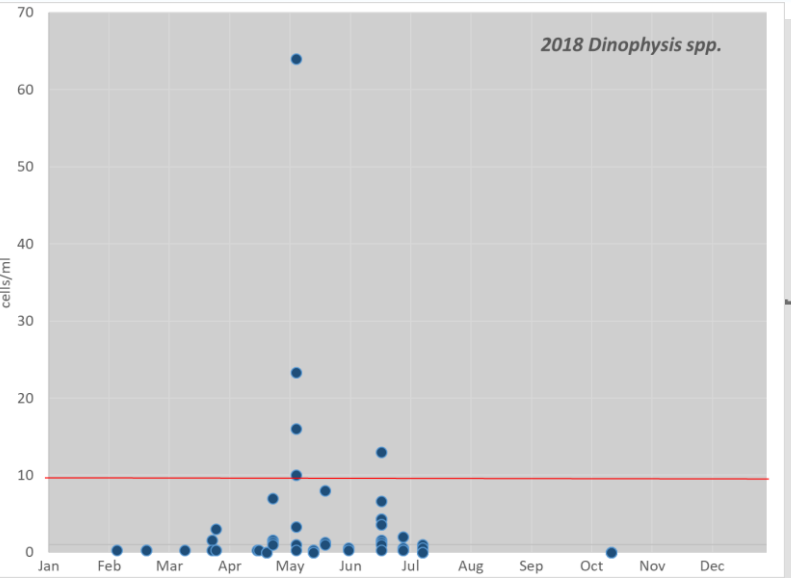
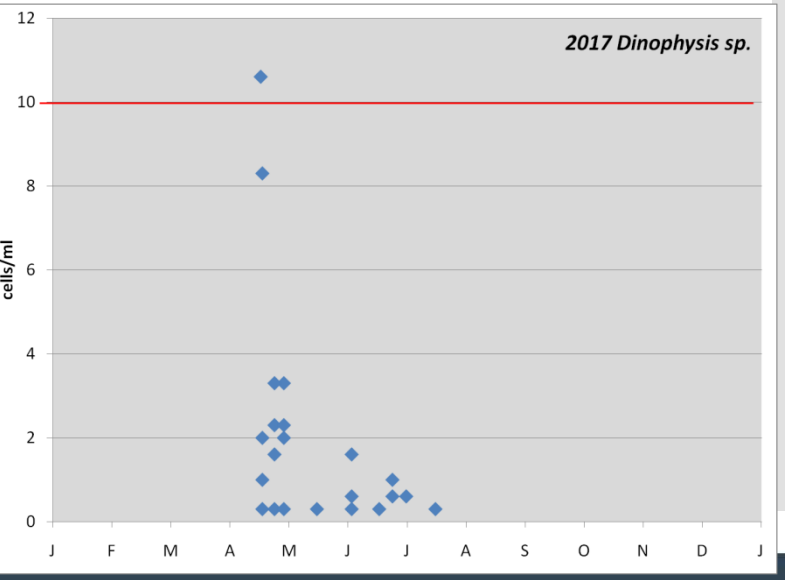
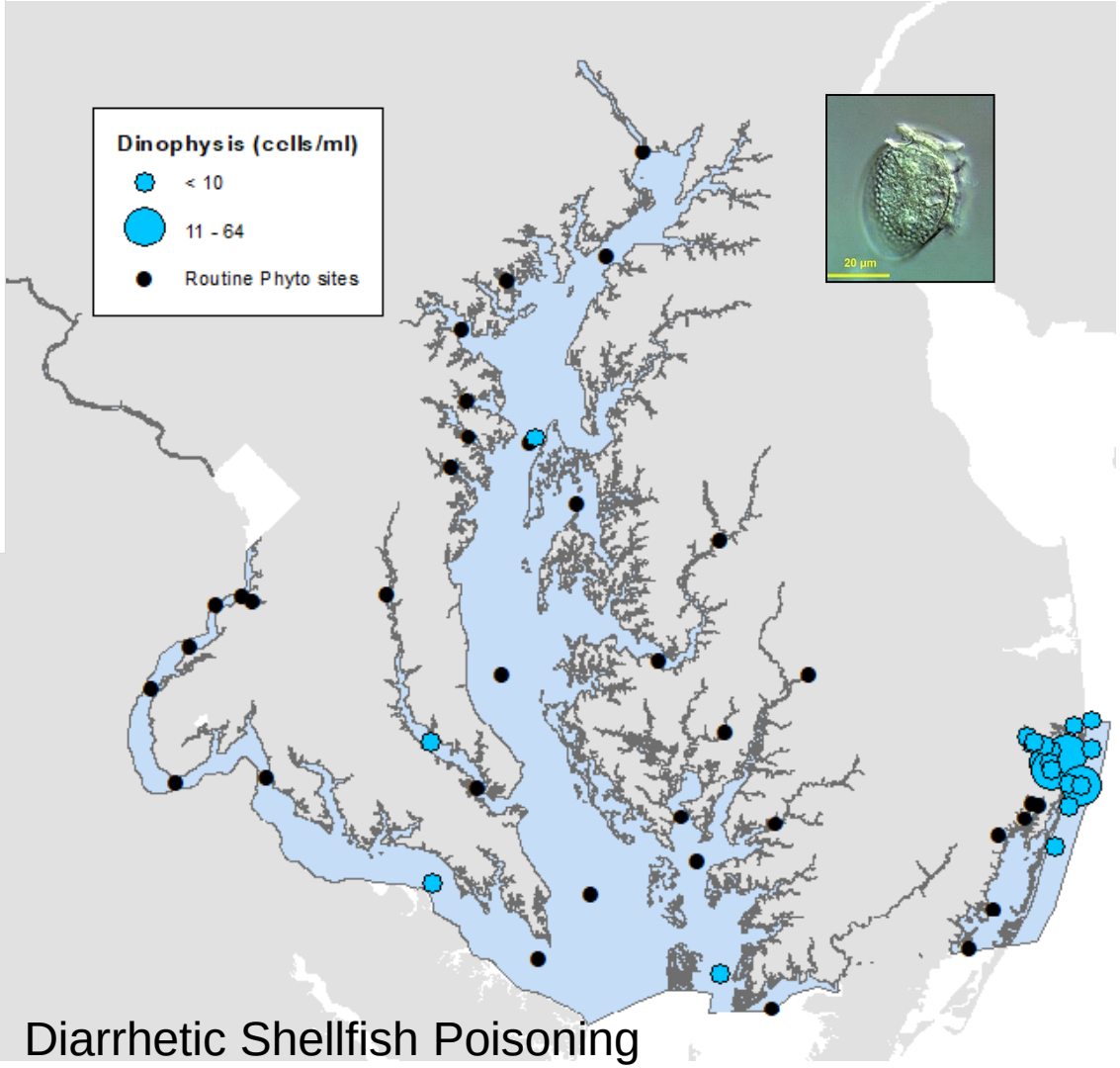
# *Dinophysis sp.*

**Max abundance**

- *64 cells/ml*
- *Manklin Creek; May 8*




Diarrhetic Shellfish Poisoning

-Can produce okadaic acid

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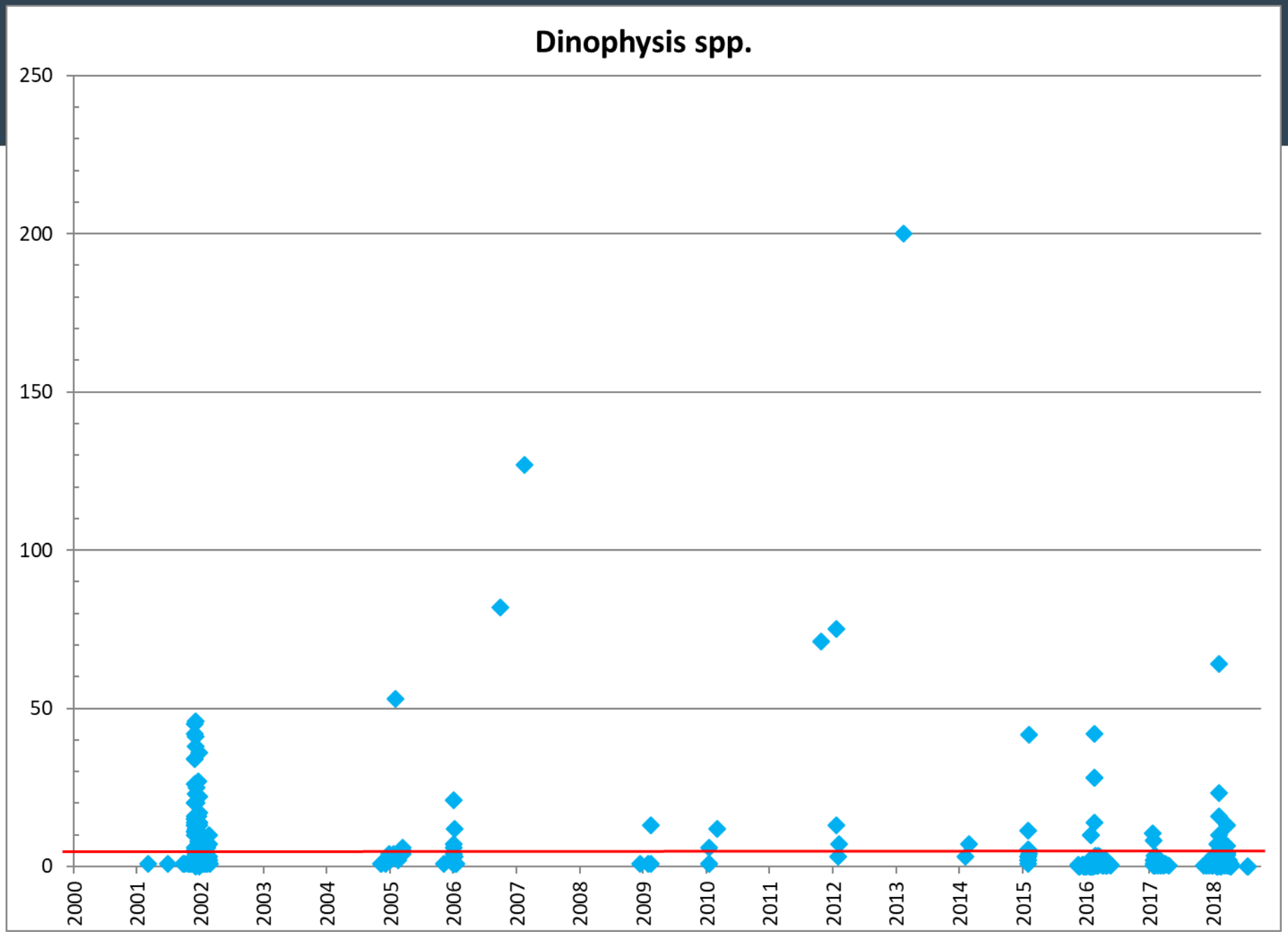
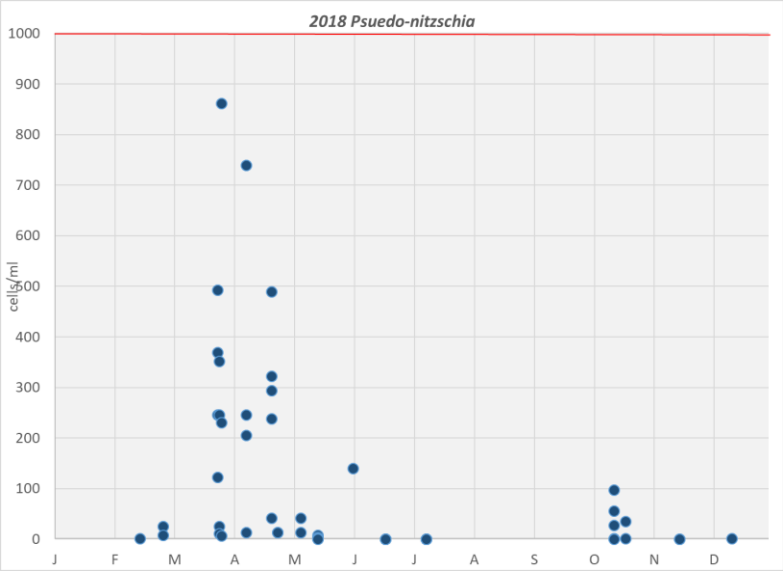
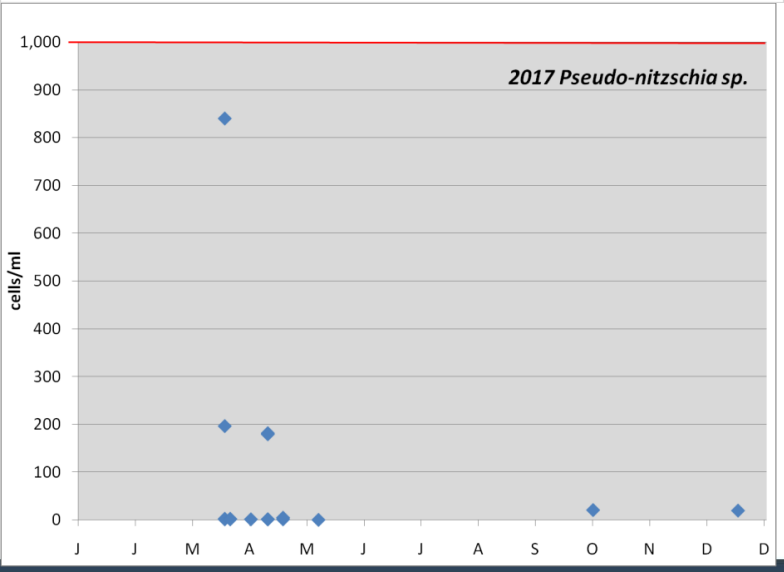

Dinophysis spp.
250
200
150
100
50
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018

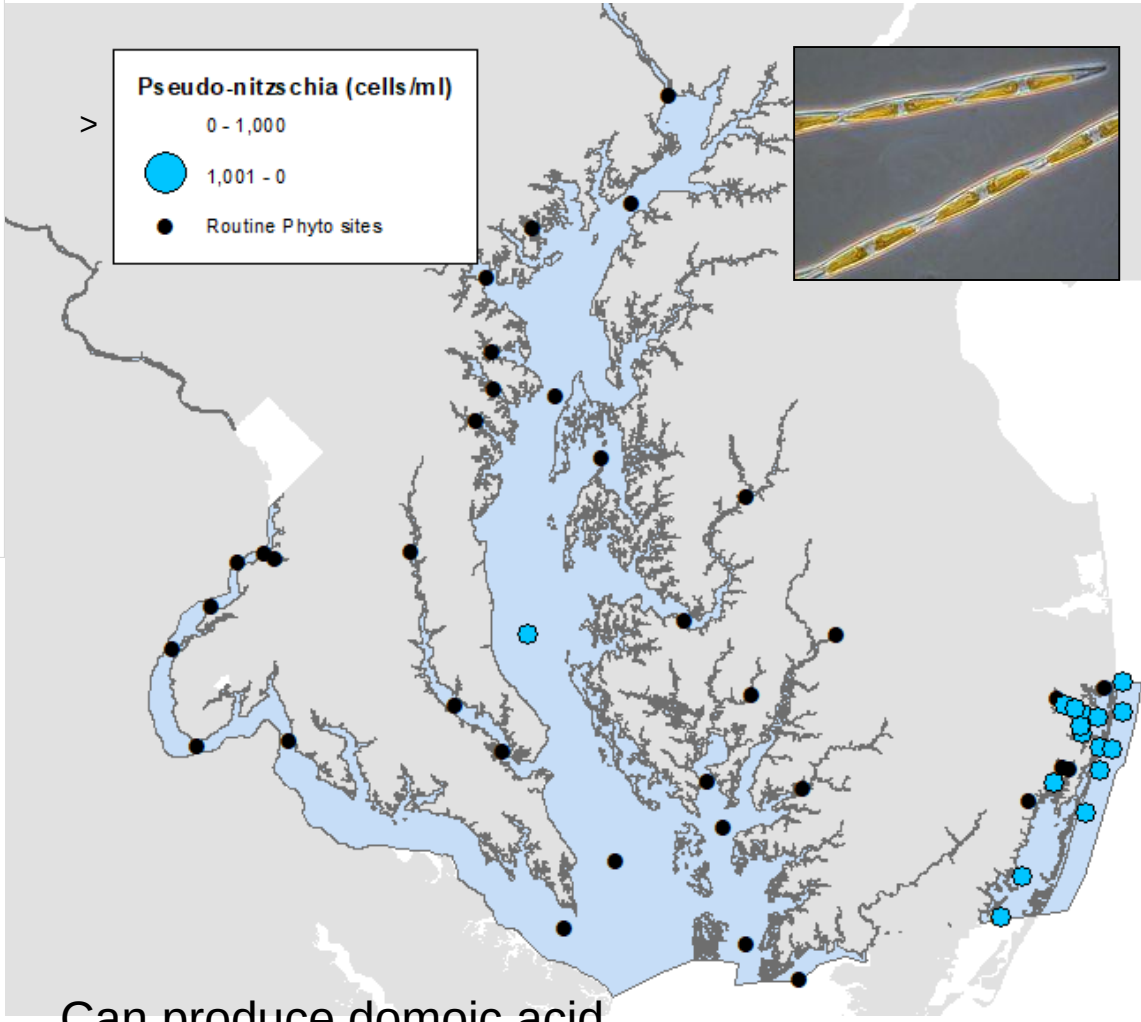
# *Pseudo-nitzschia sp.*

**Max abundance**

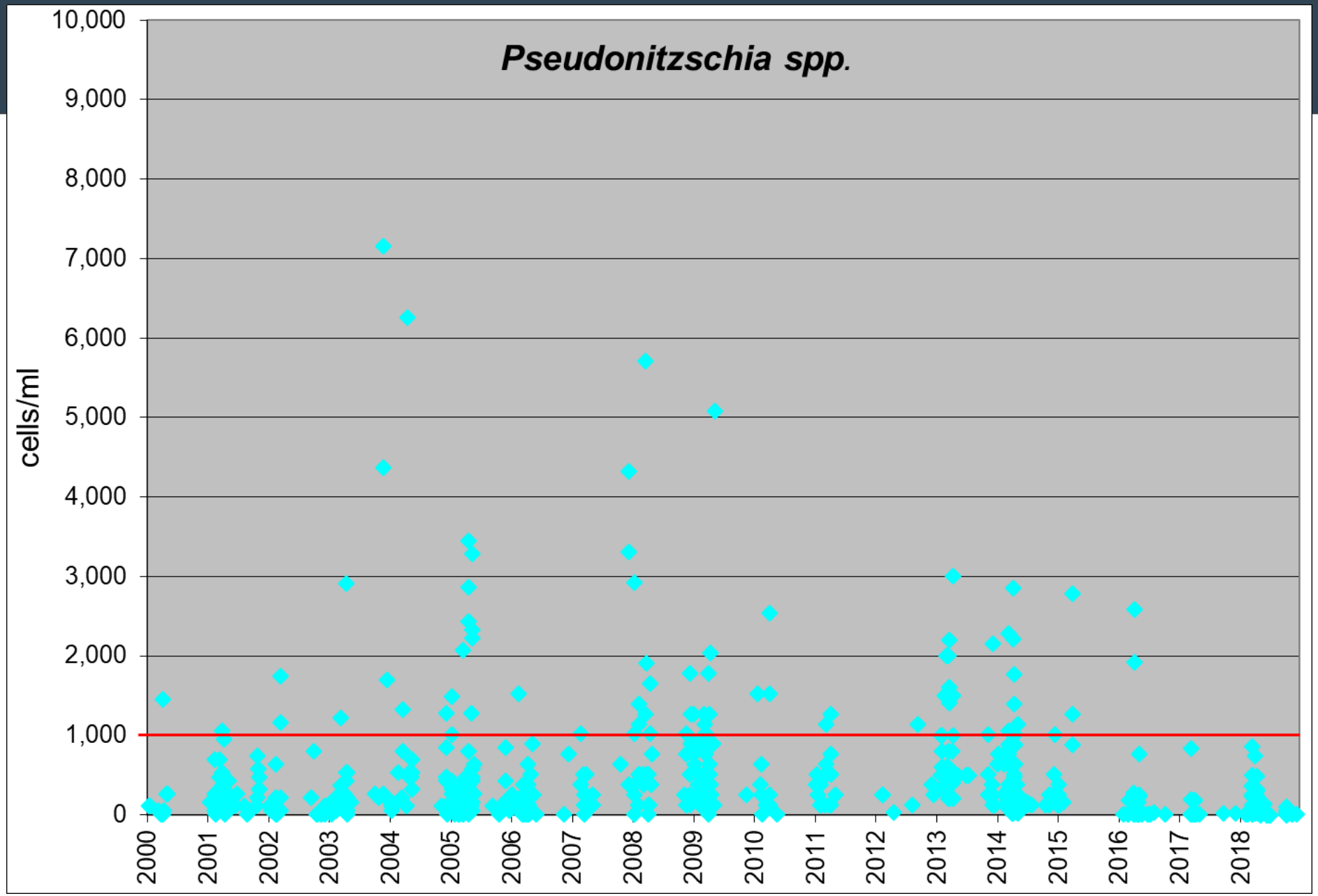
- *862 cells/ml , March 28*
- St Martin River XDN4312




Can produce domoic acid
- Amnesic Shellfish Poisoning


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

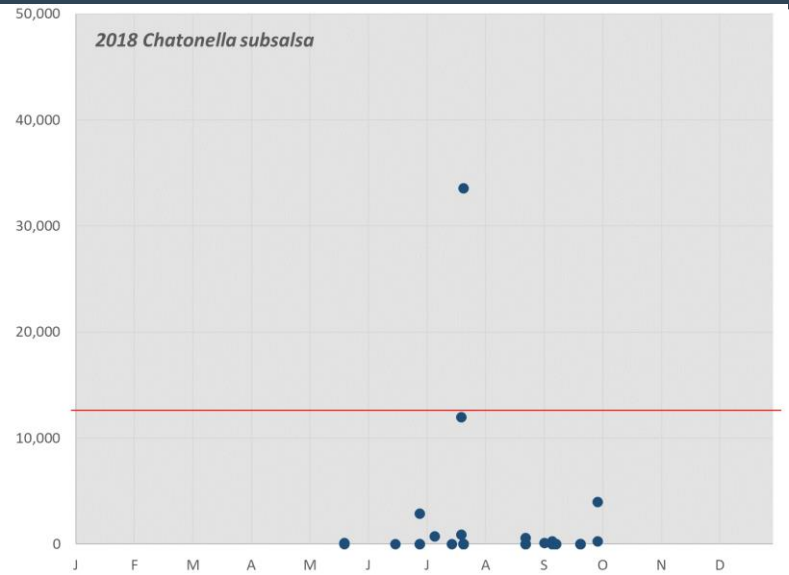
# potential Fish-Killers

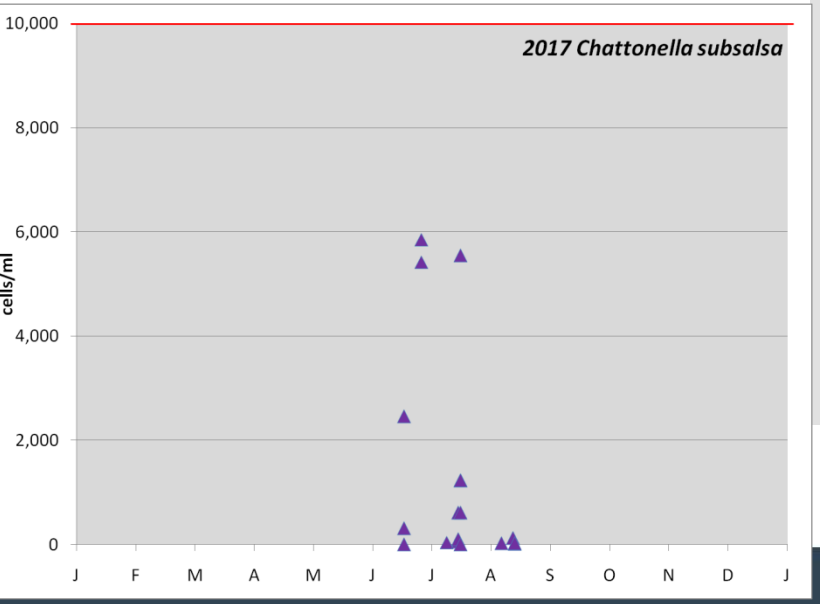
Species of Concern:

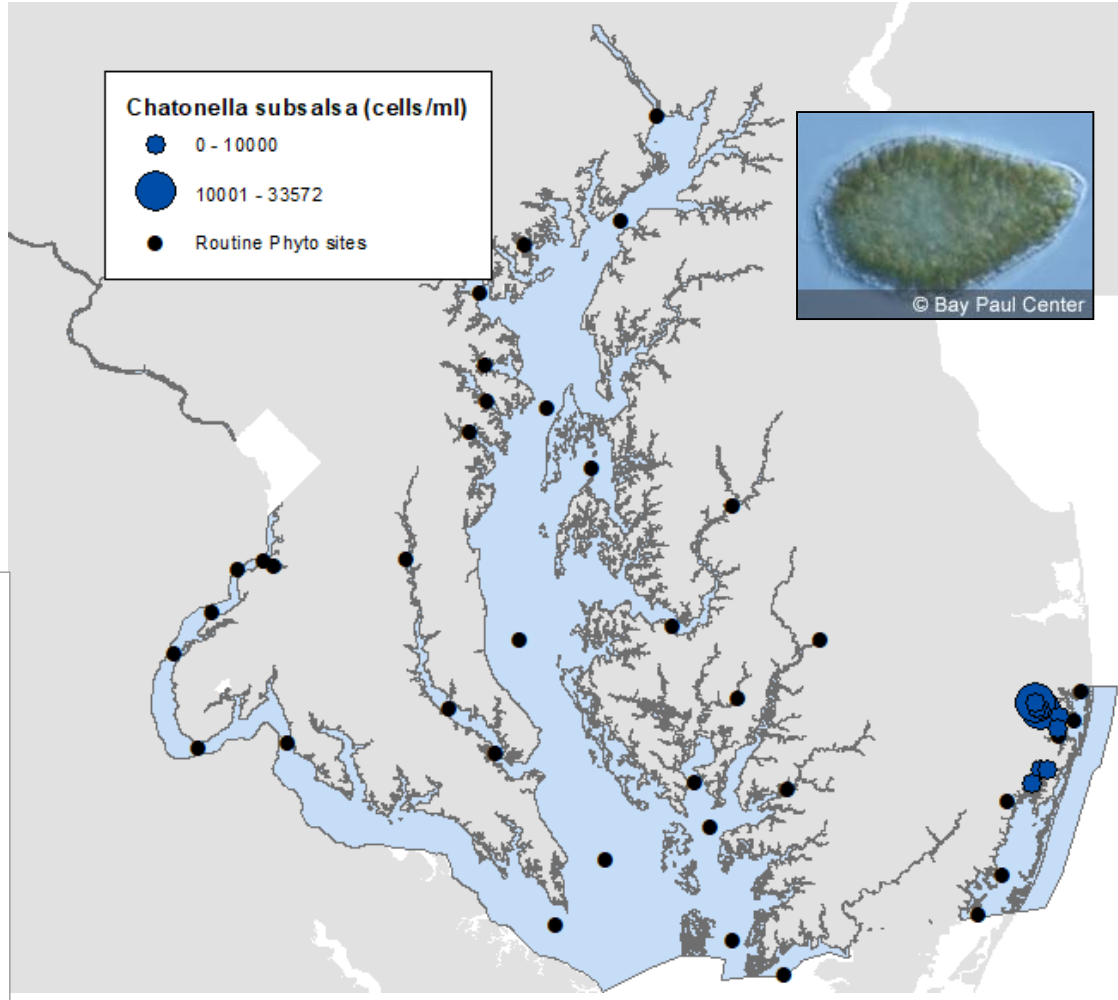
*Chattonella subsalsa*
*Chattonella cf verruculosa*
*Heterosigma akashiwo*
*Karlodinium veneficum*

# *Chattonella subsalsa*

**Max abundance:**
- *33,572 cells/ml*
- *St Martin River, July 25*

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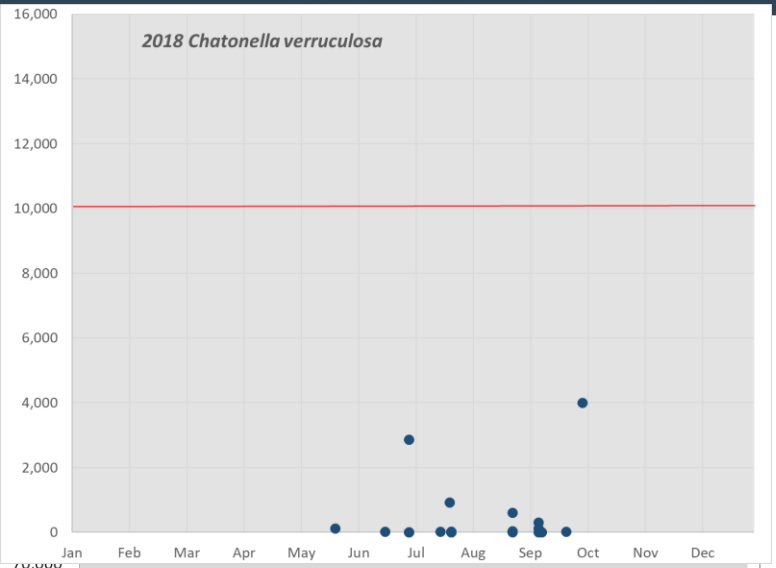
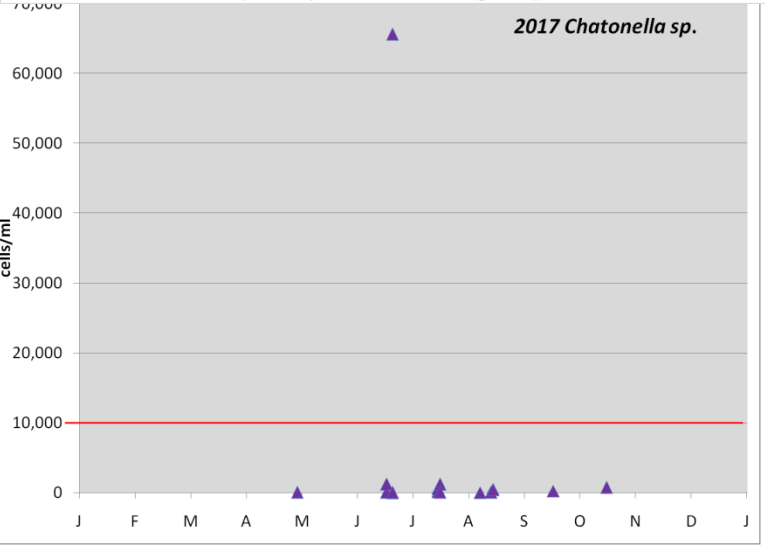
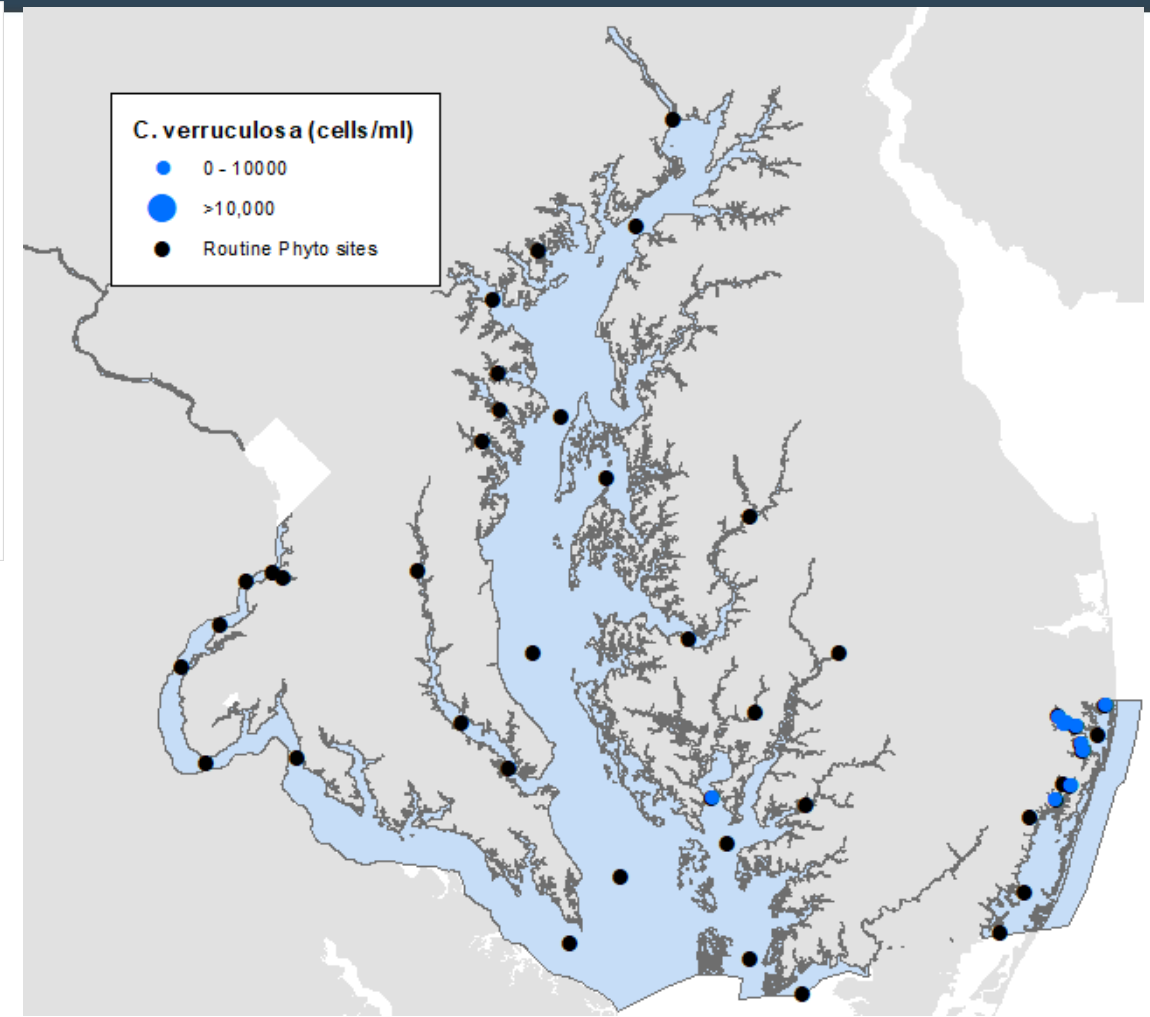
# *Chattonella cf verruculosa*

Max Abundance

- *4,004 cells/ml*
- *xdn6921, Oct 4*



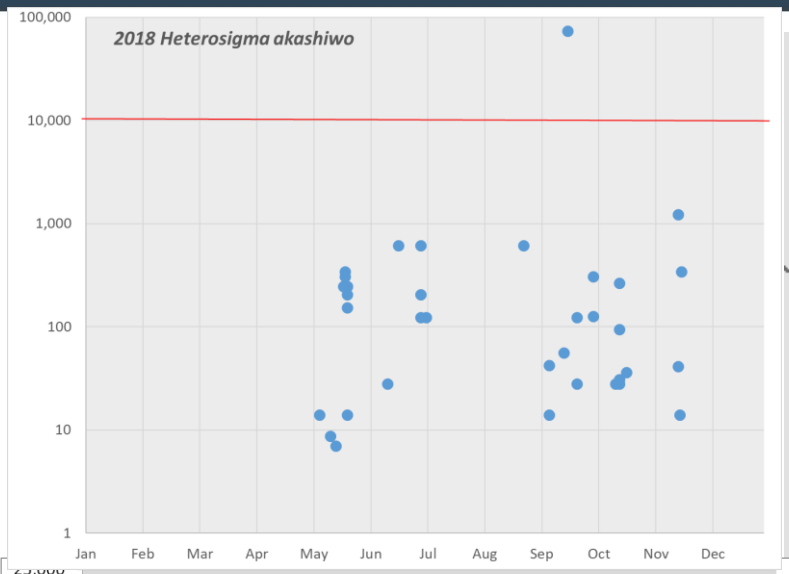

Neurotoxic Shellfish Poisoning

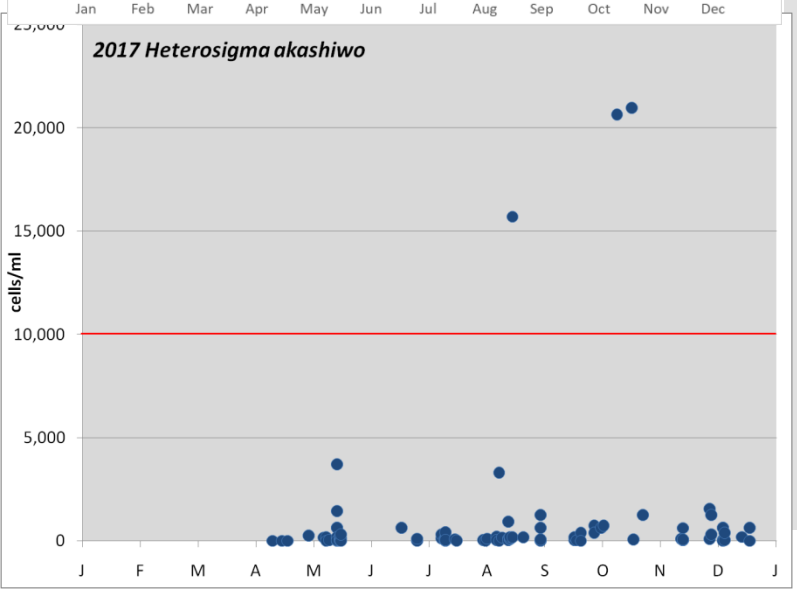
-Fish killer

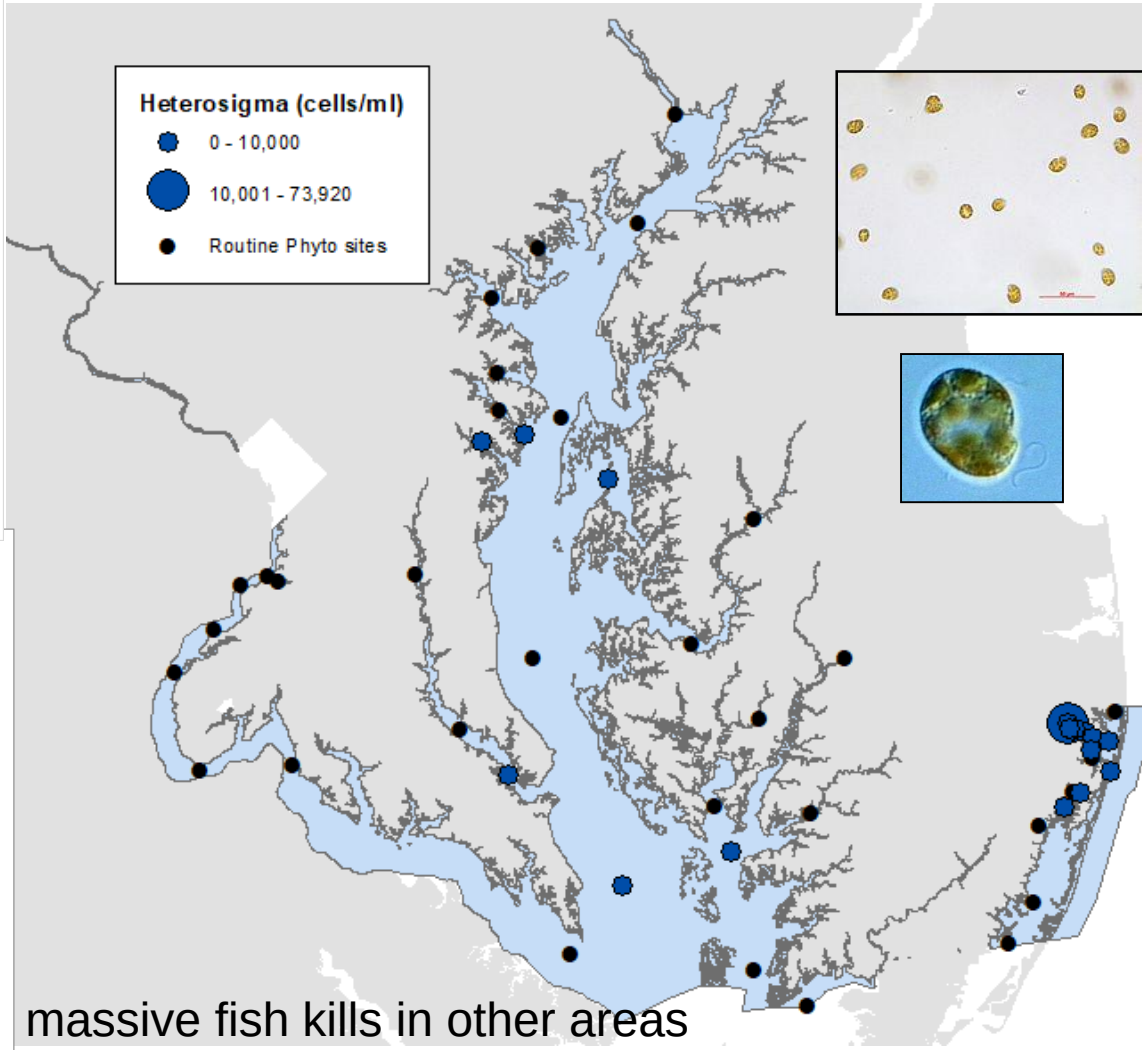
# *Heterosigma akashiwo*

**Max abundance**

- *73,932 cells/ml*
- *St Martin River, Sept 20*




massive fish kills in other areas

- Reactive Oxygen species
- brevetoxin-like compound(s),
- excessive mucus or hemolytic activity

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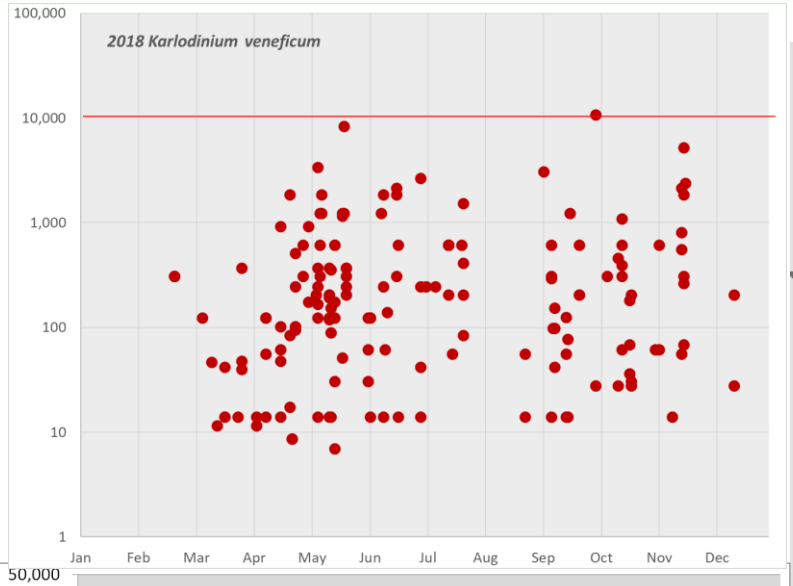
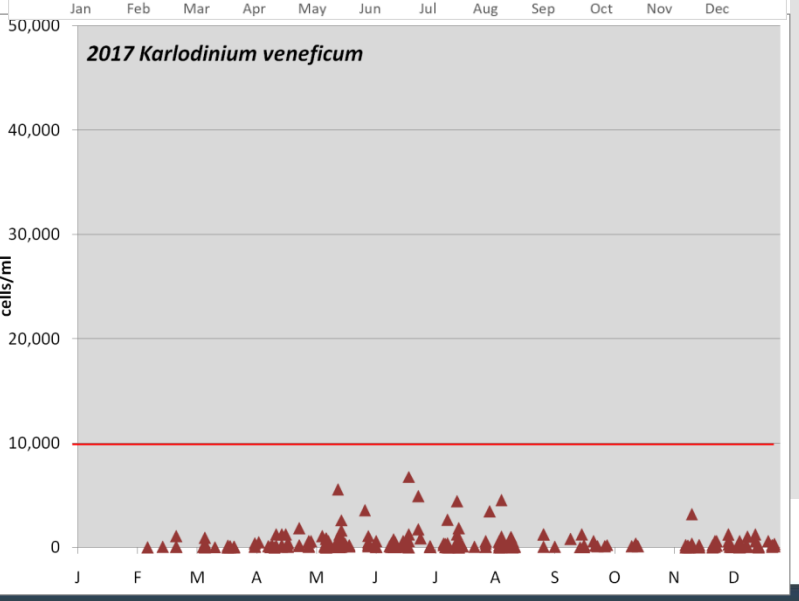
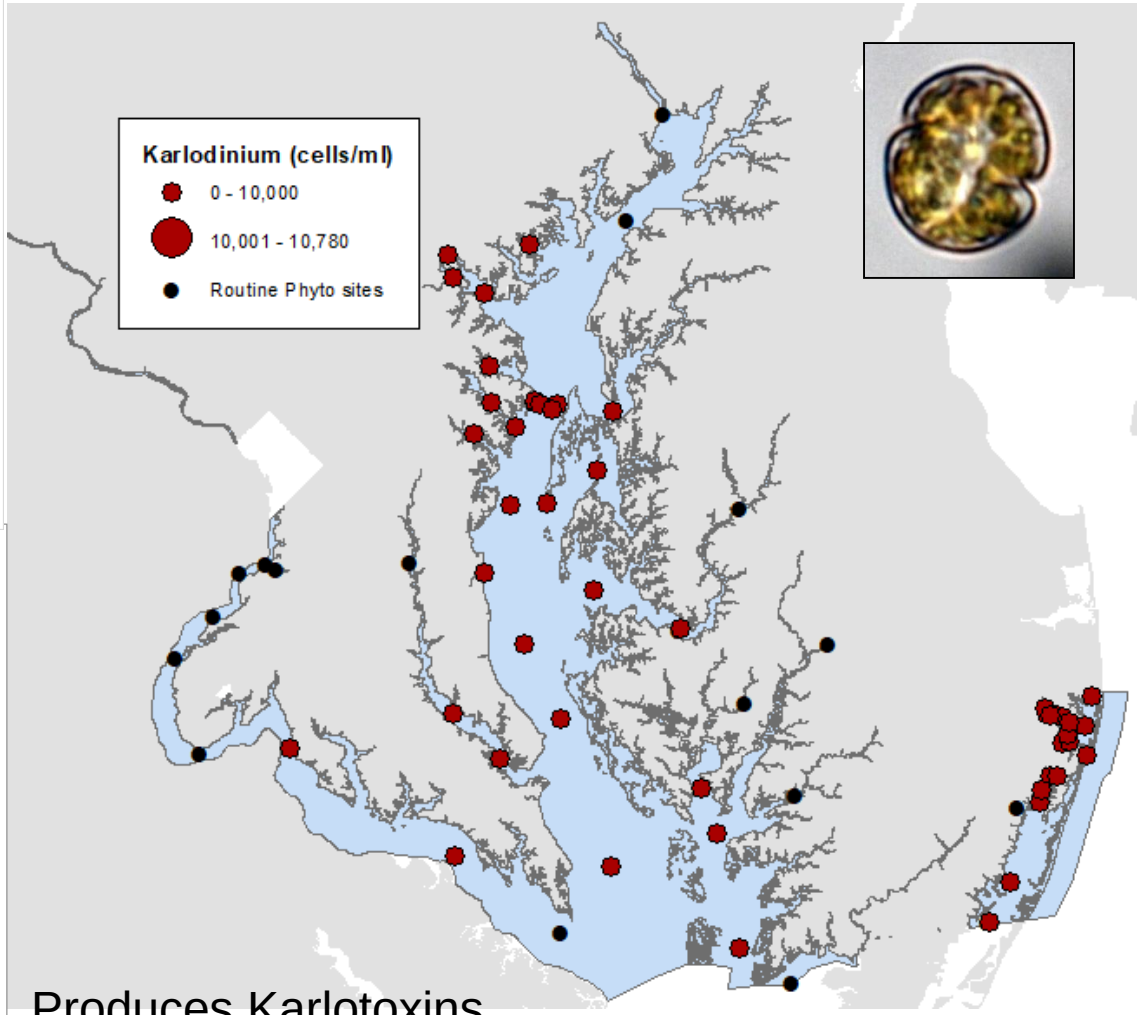
# *Karlodinium veneficum*

**Max abundance**

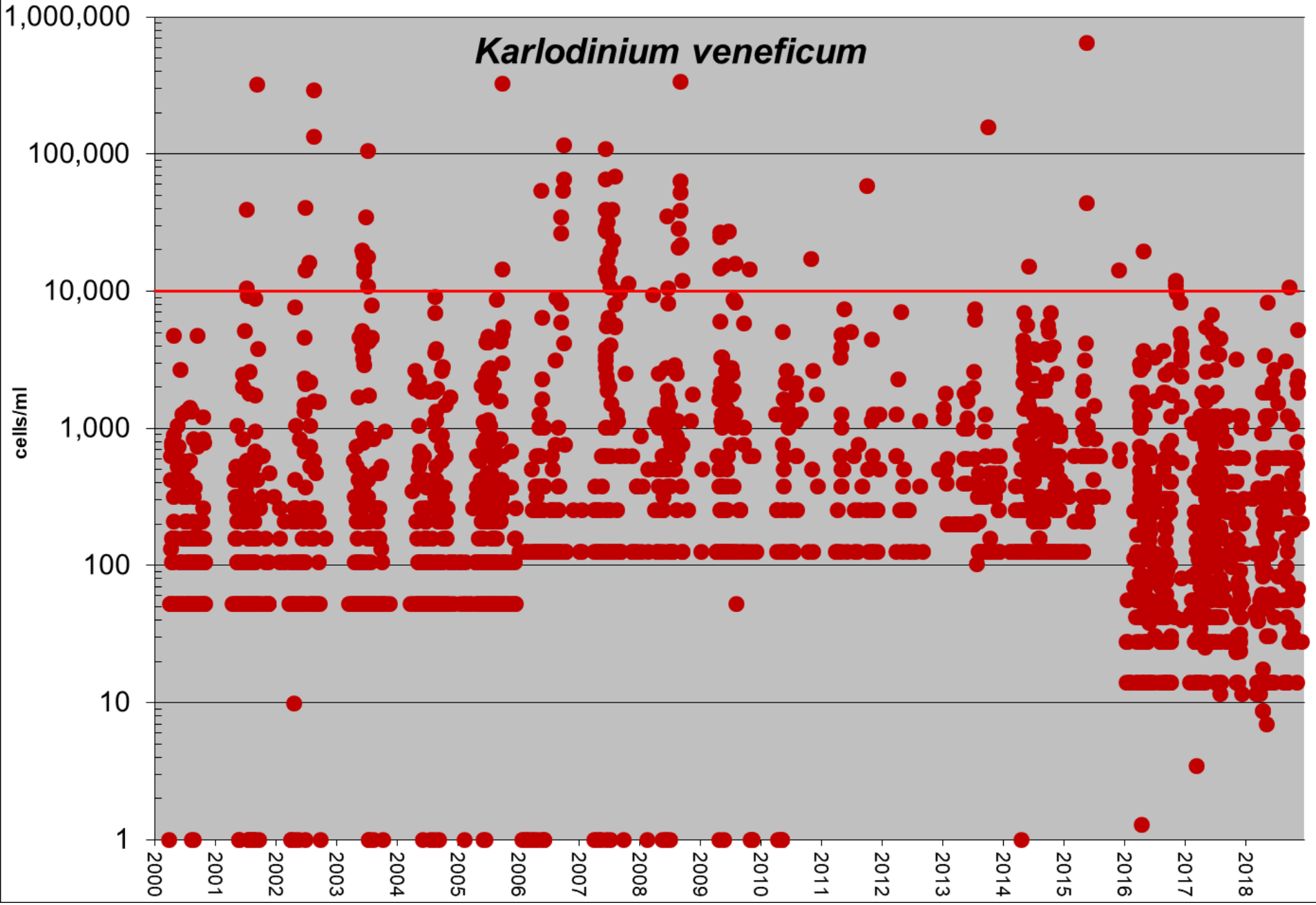
- *6,776 cells/ml*
- *Ayres Creek June 22*




Produces Karlotoxins
- no fish kills in 2018


Karlodinium veneficum
cells/ml
1,000,000
100,000
10,000
1,000
100
10
1
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018

# High Biomass Bloom Species

<u>Species of Concern</u>:

*Aureococcus anophagefferens*

*Heterocapsa species*

*Gyrodinium sp.*

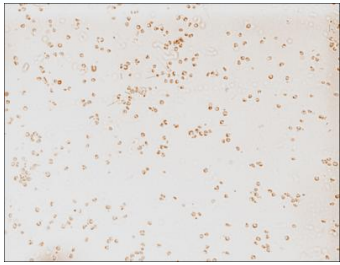
*Prorocentrum minimum*

Macroalgae

# *Aureococcus anophagefferens*

**Max abundance**

- *waiting on 2018 data*



**2017 DATA coming soon**

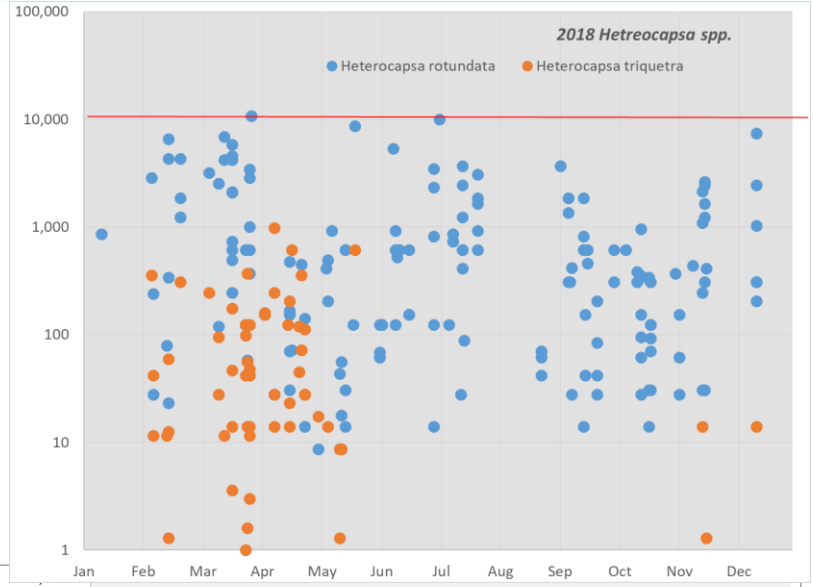
Some toxic strains
Starves shellfish
Shades seagrasses

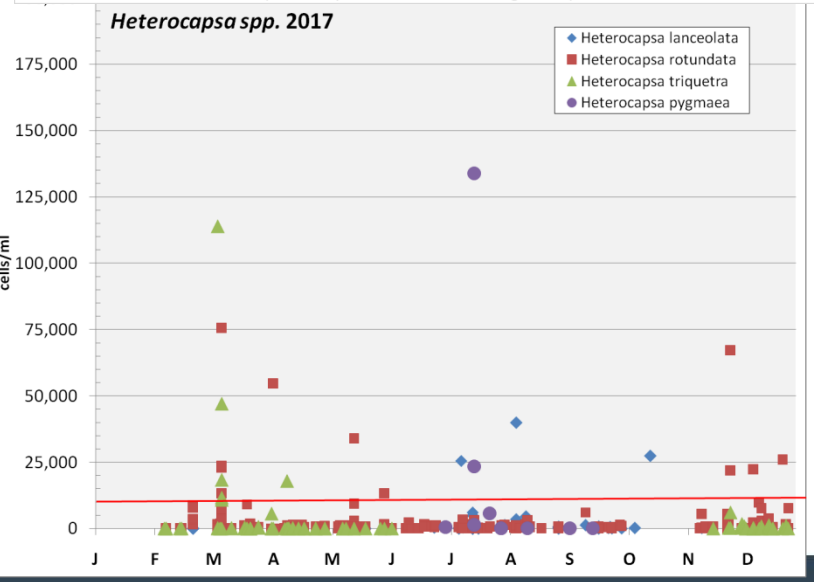
# *Heterocapsa spp.*

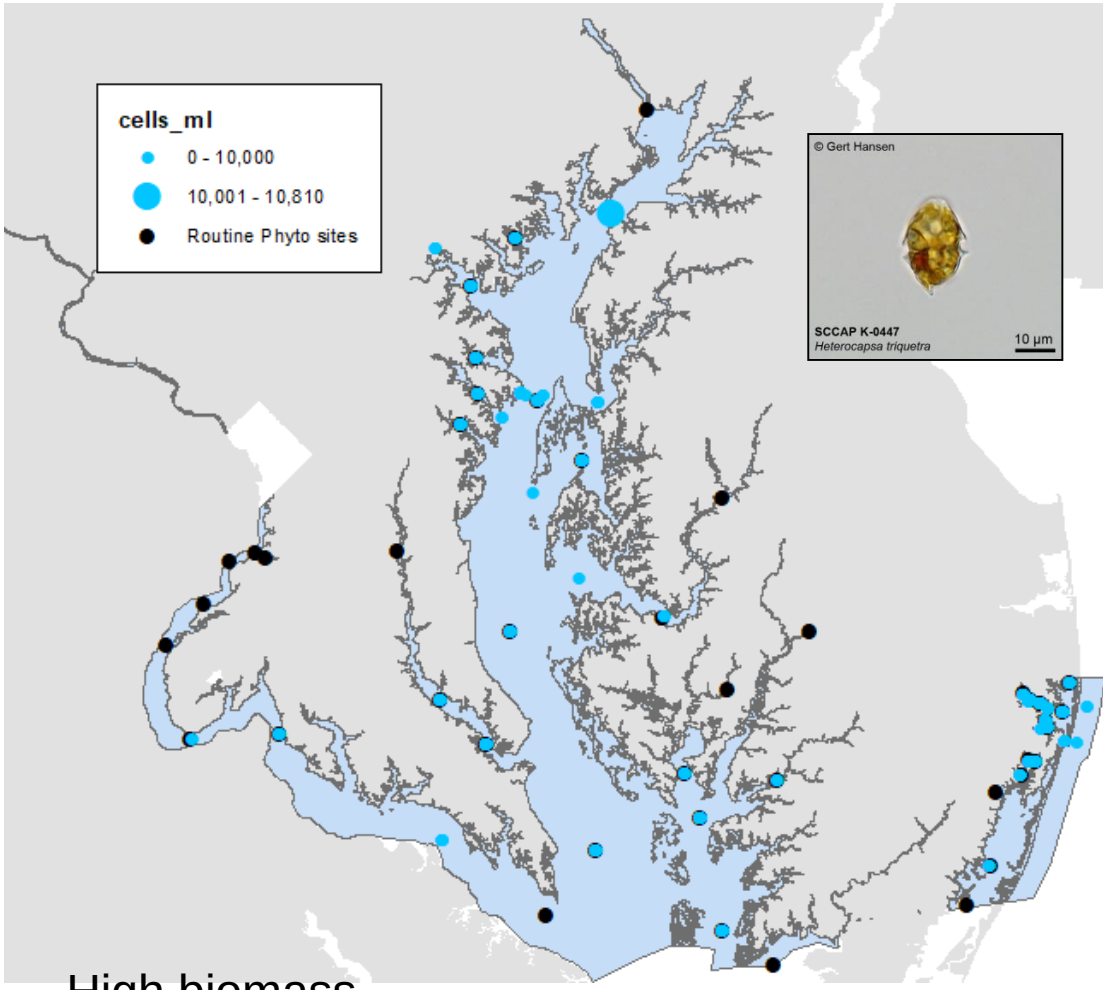
**Max abundance**

***H. rotundata***
- *cells/ml*
- Mar

***H. triquetra***
- *cells/ml*
- *Potomac Mar*



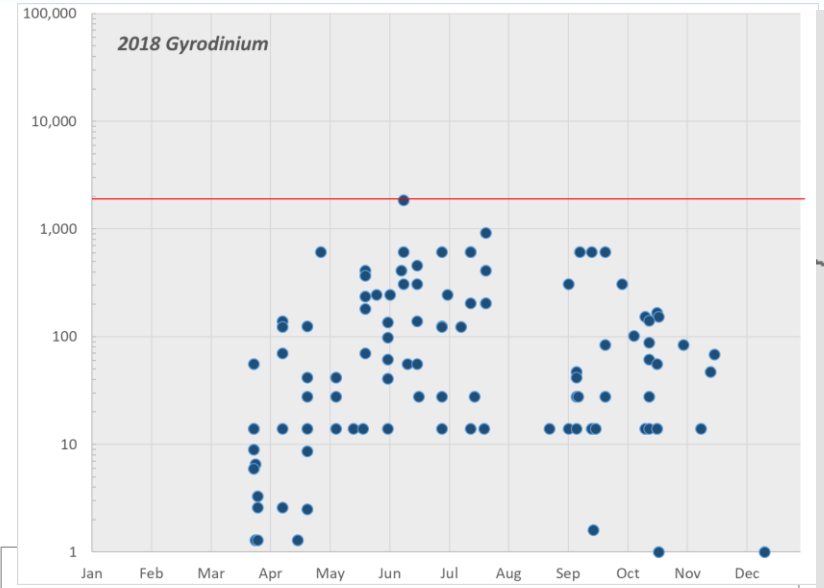



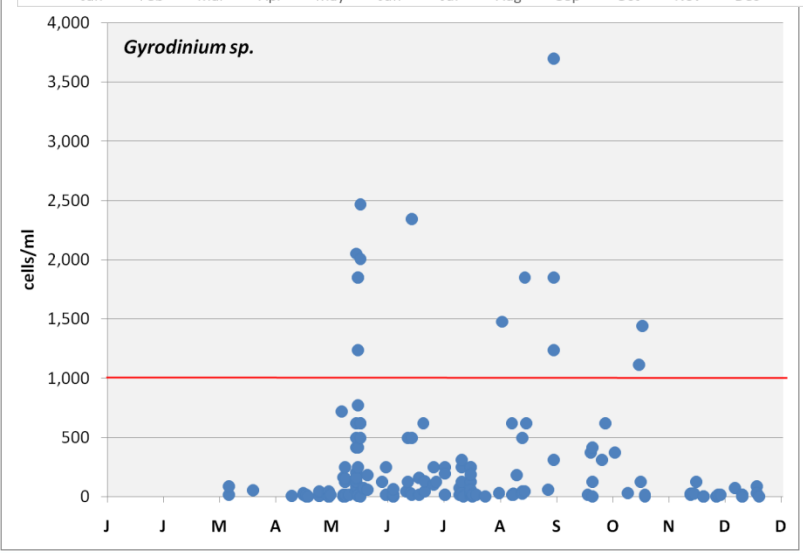



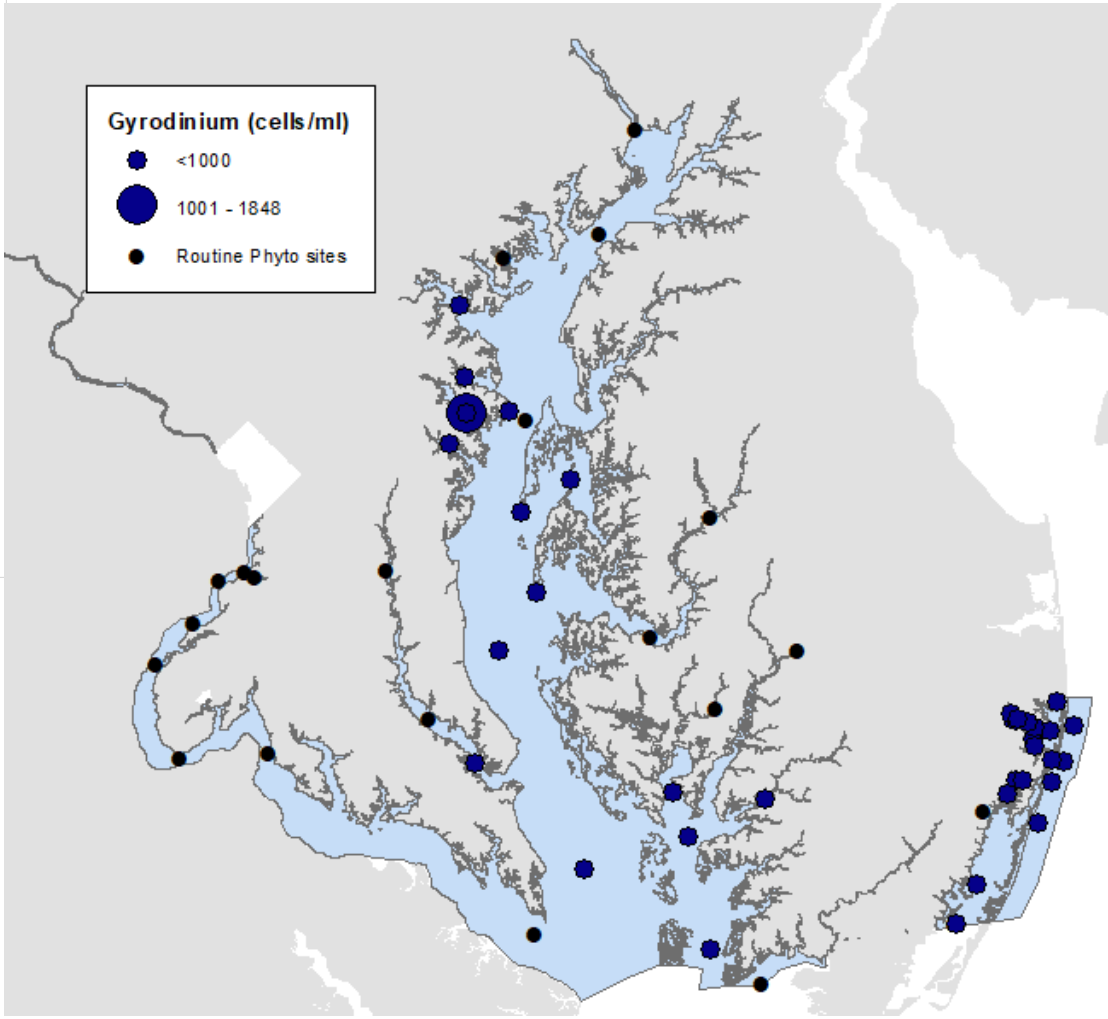

High biomass
-Typically winter bloomer
-some species summer

# *Gyrodinium spp.*

**Max abundance**
- *1,848 cells/ml*
- *WT7.1 June 12*




High biomass bloom former

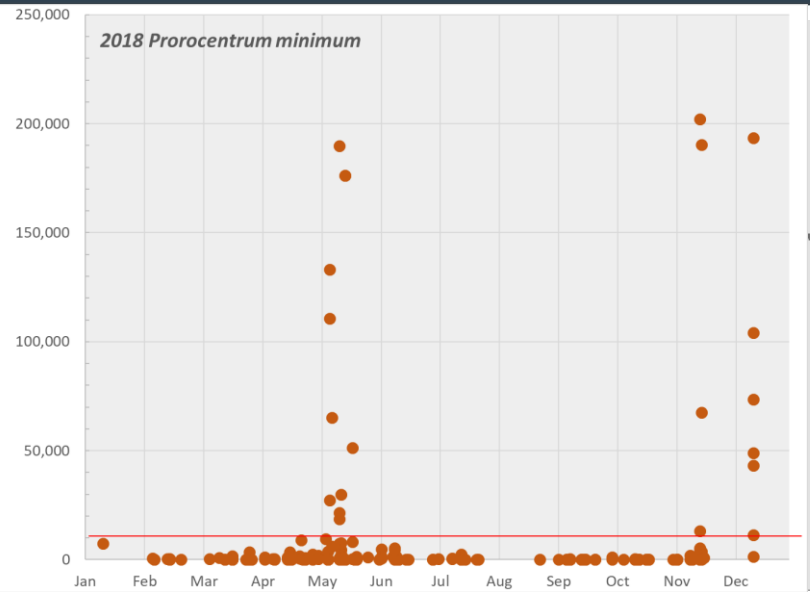
- Linked to low DO fish kills

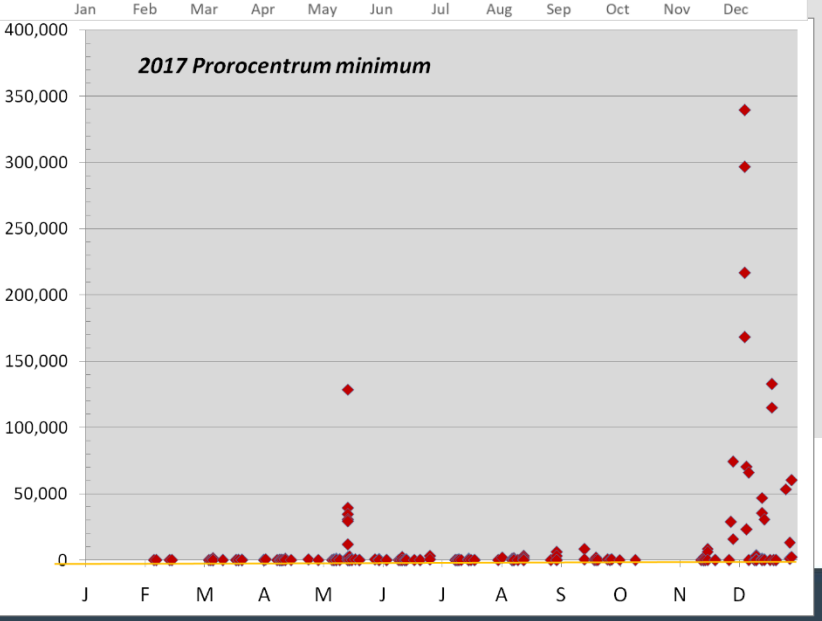
# *Prorocentrum minimum*

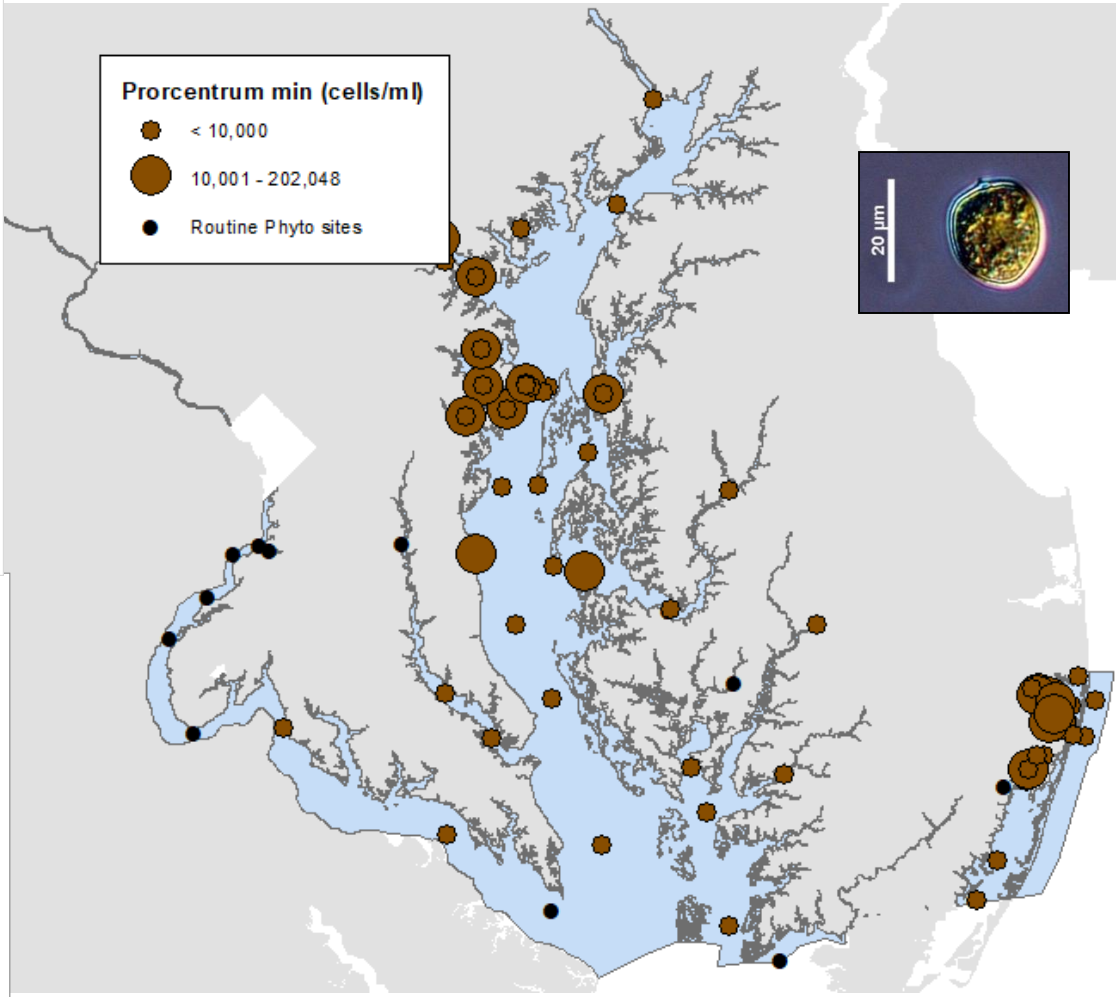
**Max abundance**

*another winter bloom in 2018

- *202,408 cells/ml*
- *St Martin River Nov 19*




High biomass blooms

-shades SAV and contributes to dead zone

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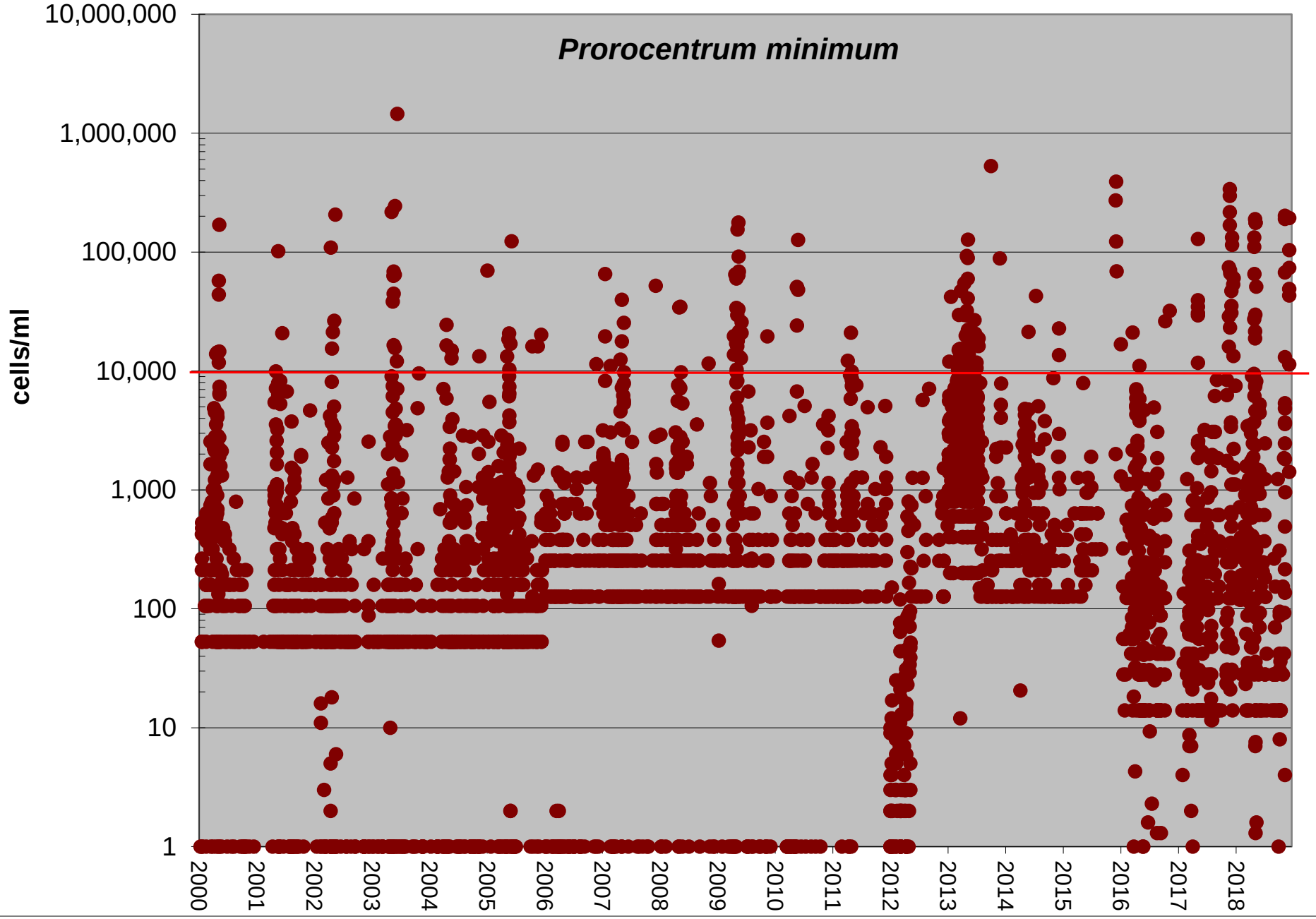
# MDE ALGAE BLOOMS OF NOTE IN 2018

| LOCATION | DATE COLLECTED | ALGAL TAXA | COUNT (cells/mL) |
|---|---|---|---|
| OC Inlet | 2-26-2018 | *Pseudo nitzchia ssp* | Present |
| Herring Creek | 2-26-2018 | *Heterocapsa sp.* | 8,969 |
| South River | 3-1-2018 | *Heterocapsa rotundata* | 3,555 |
| Church Creek | 4-24-2018 | *Prorocentrum minimum* | 113,686 |
| South River | 4-24-2018 | *Prorocentrum minimum* | 105,040 |
| Chesapeake Bay between mouth of West River and Herring Bay | 5-2-2018 | *Prorocentrum minimum* | 53,732 |
| Herring Bay | 5-2-2018 | *Prorocentrum minimum* | 21,654 |
| Rhode River off Camp Letts | 5-2-18 | *Prorocentrum minimum* | 19,796 |
| Lower Rhode River | 5-2-2018 | *Prorocentrum minimum* | 28,038 |
| Mouth of West River | 5-2-2018 | *Prorocentrum minimum* | 4,686 |
| Breton Bay | 5-9-2018 | *Prorocentrum minimum* | 19,473 |
| Assawoman Bay | 5-14-2018 | *Dinophysis acuminata* | 8 |
| Northwest Creek | 7-4-2018 | *Euglena sp.* | 24,240 |
| Wye River | 10-17-2018 | *Gyrodinium uncatenum* | 2,040 |

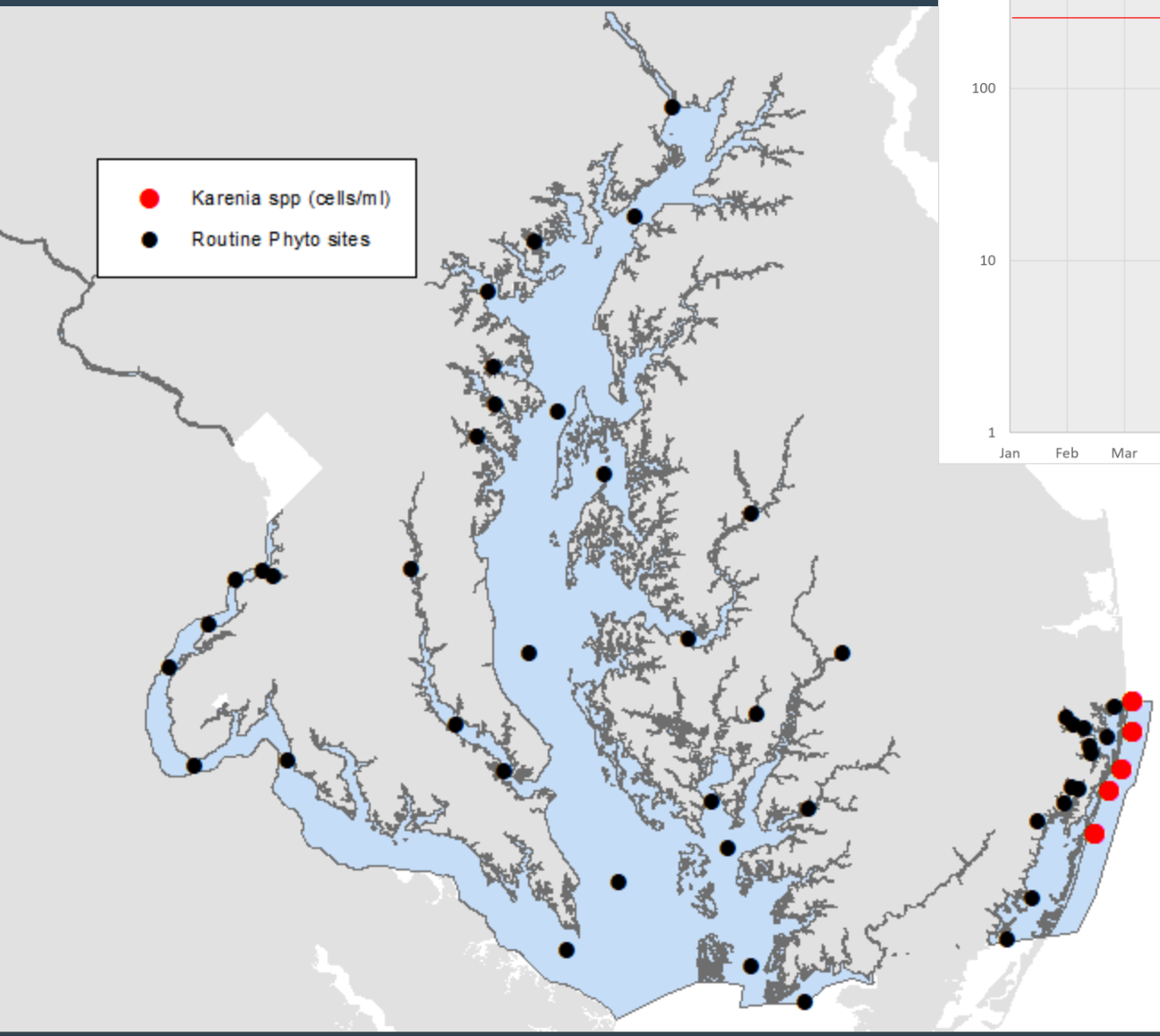

Prorocentrum minimum
cells/ml
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018

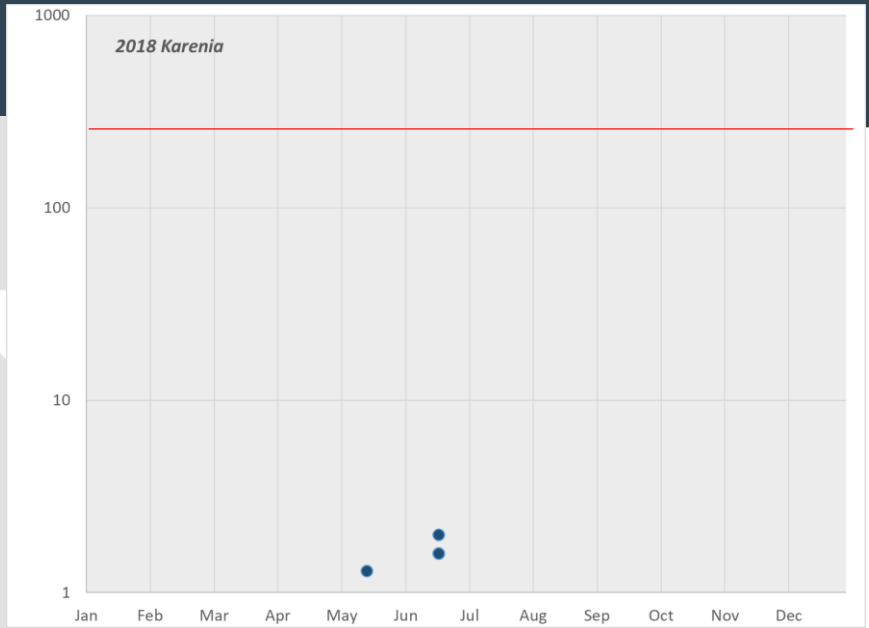
# Offshore

Species of Concern:
*Karenia*

*Already plotted:*
*Dinophysis, Chattonella sp, Heterocapsa*
*Pseudo-nitzschia, Prorcentrum*

# *Karenia spp.*


Karenia spp (cells/ml)
Routine Phyto sites


2018 Karenia
1000
100
10
1
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

# 2018 Summary

- Blooms
  - 1 occurrence of *Chatonella subsalsa* and *Heterocapsa akashiwo*
  - *Dinophysis*
- *Prorocentrum minimum* Blooms
  - Spring blooms in mid CB
  - Winter blooms Nov-Feb in Coastal Bays (foam)
- Detection of Harmful Algae offshore
  - Bloom level of *Dinophysis spp.*
  - Presence of *Pseudo-nitzschia, Heterocapsa*, and *Karenia* offshore
  - Presence of *Gyrodinium* and *Prorocetrum minimum*
- No fish kills