

# Water Quality Monitoring Program 2024 for Tidal Creeks in Calvert County, Maryland



University of Maryland  
CENTER FOR ENVIRONMENTAL SCIENCE  
CHESAPEAKE BIOLOGICAL LABORATORY

*Pictured: Hall Creek*

# Tidal Water Quality Sampling Program in Calvert County

*Solomons Harbor since 1987*

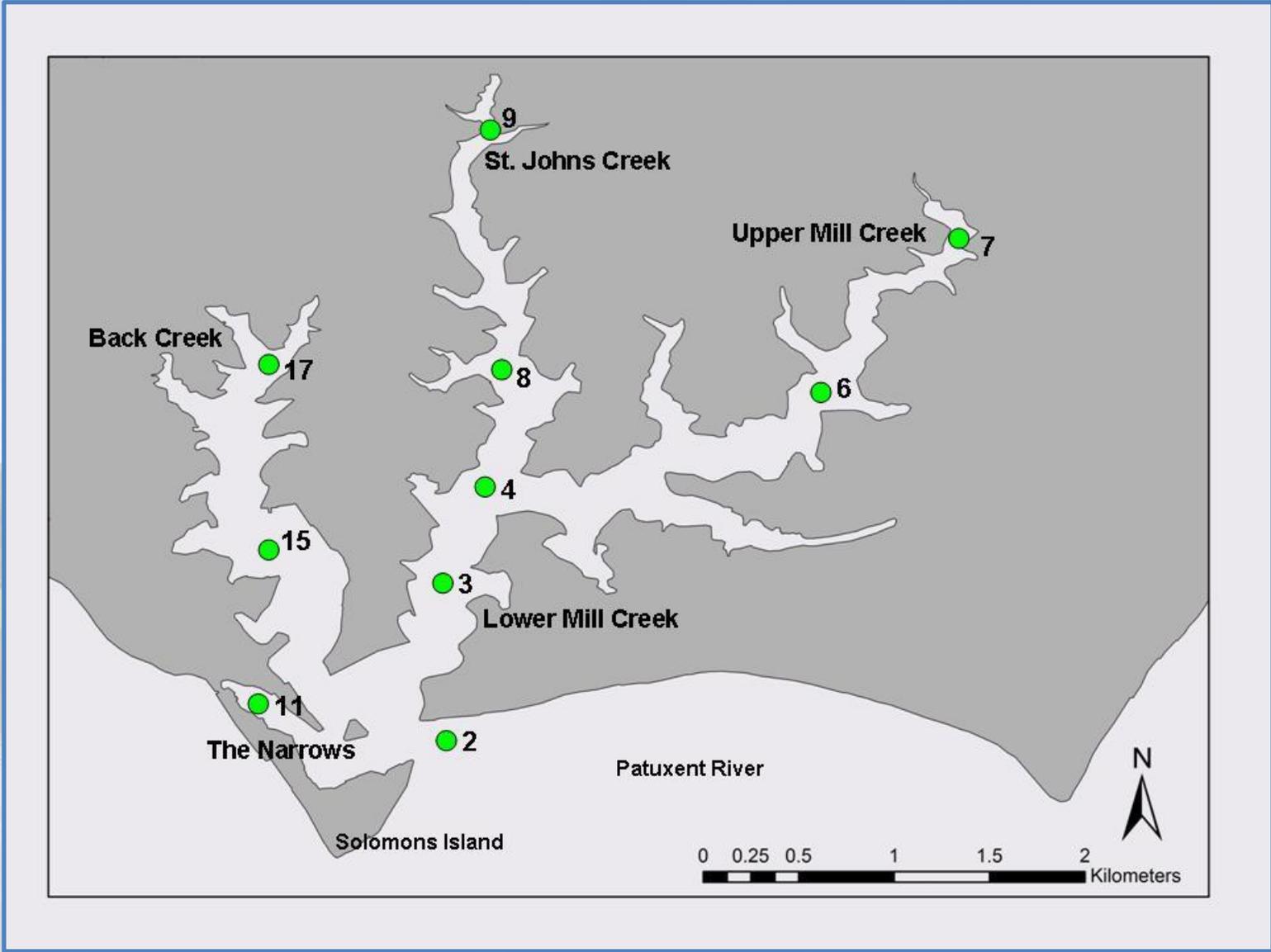
*A larger collection of smaller Calvert County tidal creeks beginning 2009*

*Parameters Measured:*

*dissolved oxygen, temperature, salinity, chlorophyll-a, secchi depth*



# Solomons Harbor Stations



# 2024 in the Context of Previous Years

## Oxygen:

**Best** 1988>2012>1991>**2024**>1992>1997>2023>2002>1994>1999>2001>2010>2009>1998>2014>2013>2016>1996>2000>2006>2015>1995>2021>1987>1990>2011>2019>2005>2022>1993>2007>2004>2008>2018>2017>2020>**2003 Worst**

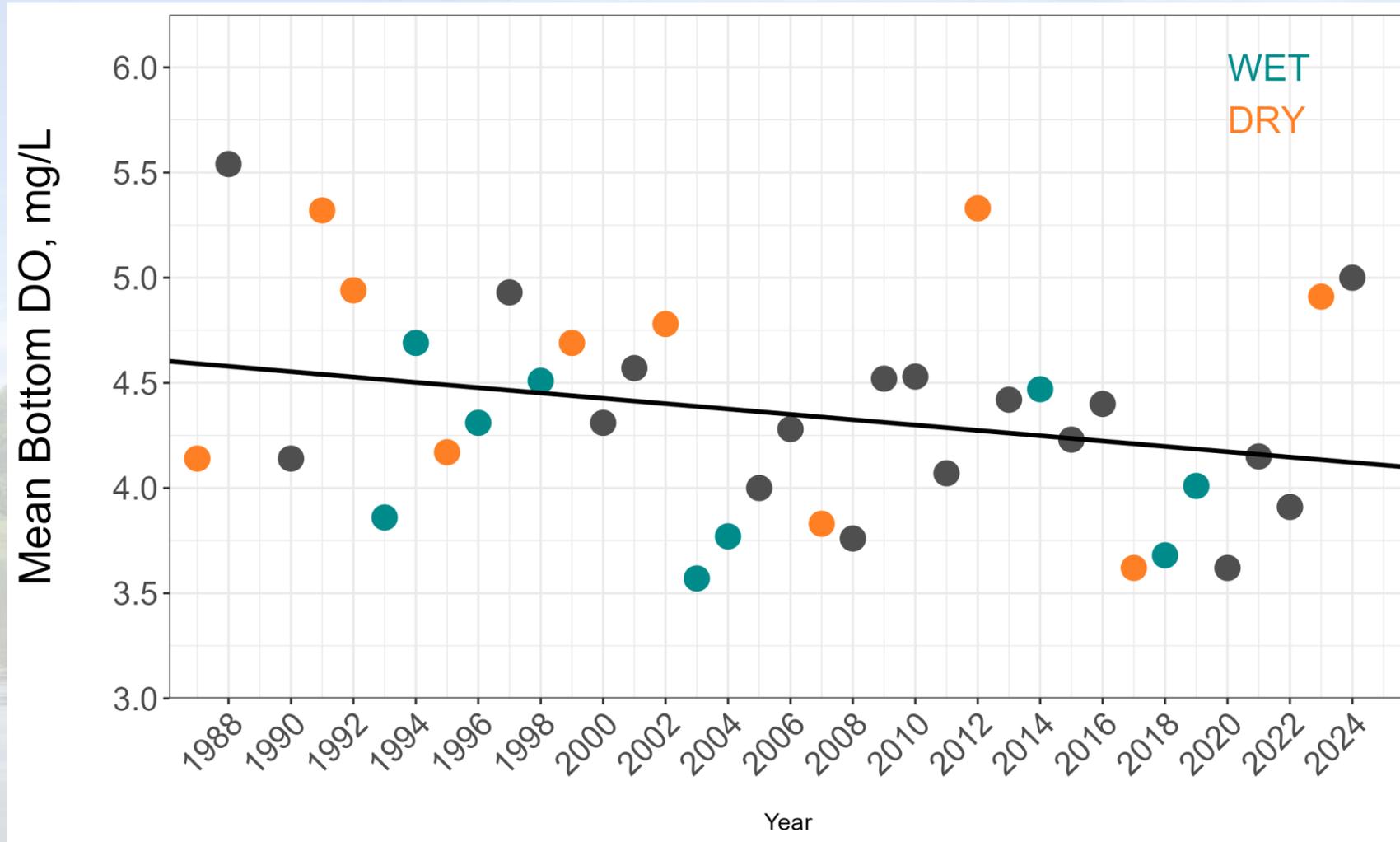
## Algae:

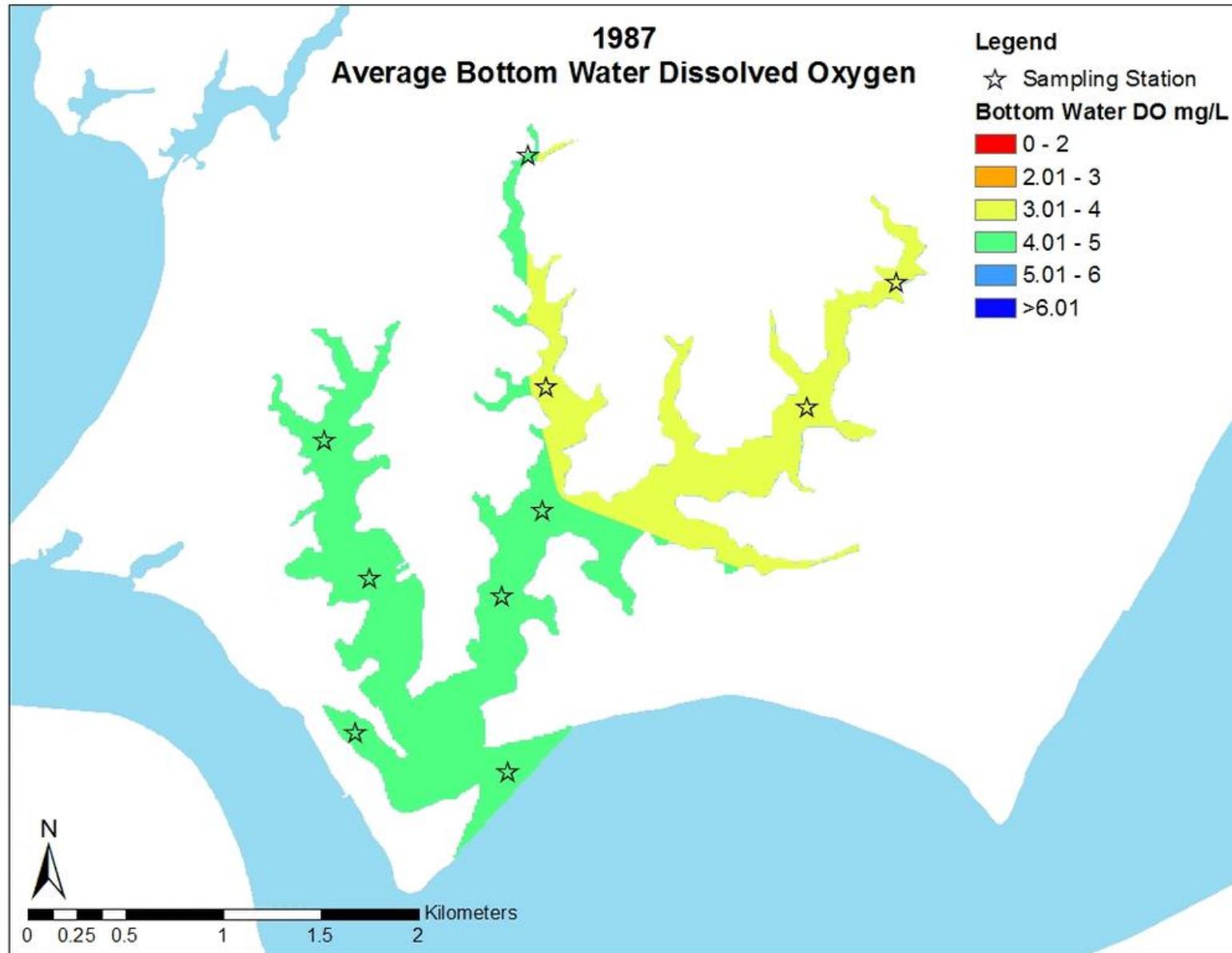
1991<1992<1995<1999<2002<2000<1997<1993<2023<2022<2012<2016<**2024**<2001<1994<2006<2015<1987<2005<2021<2013<2009<2008<2017<1996<2014<2018<2004<2010<1990<2007<2020<1998<2019<2011<**2003**

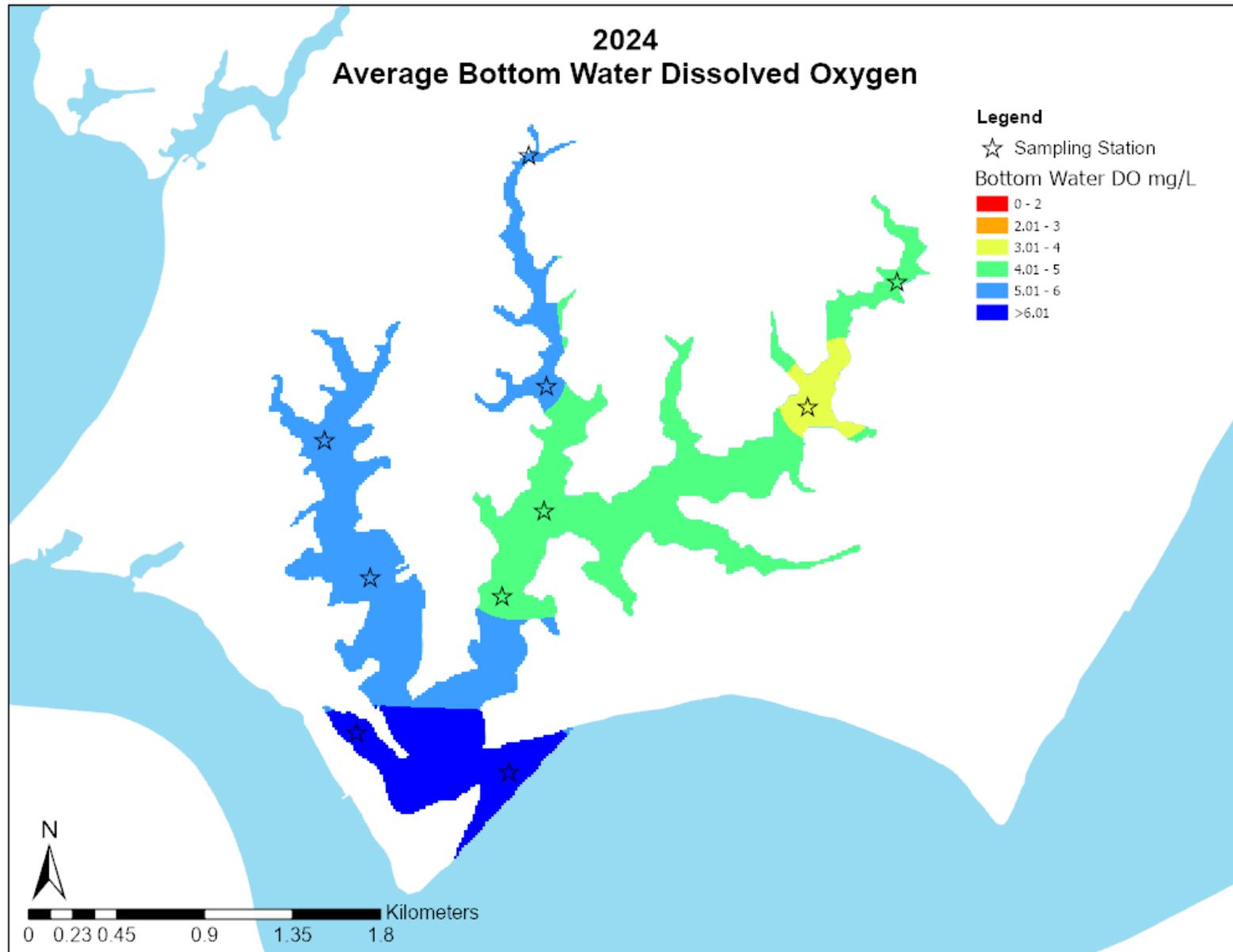
## Blooms:

1999<1995<2002<1991=1992<2005<2012<1997=2000<1993<1987=1990=2013=2023<2006=2021<2009=2022=**2024**<1994=2001=2015=2016<1996=2008=2014=2017=2020<2004=2010<2018<2019<1998<2007<2011<**2003**

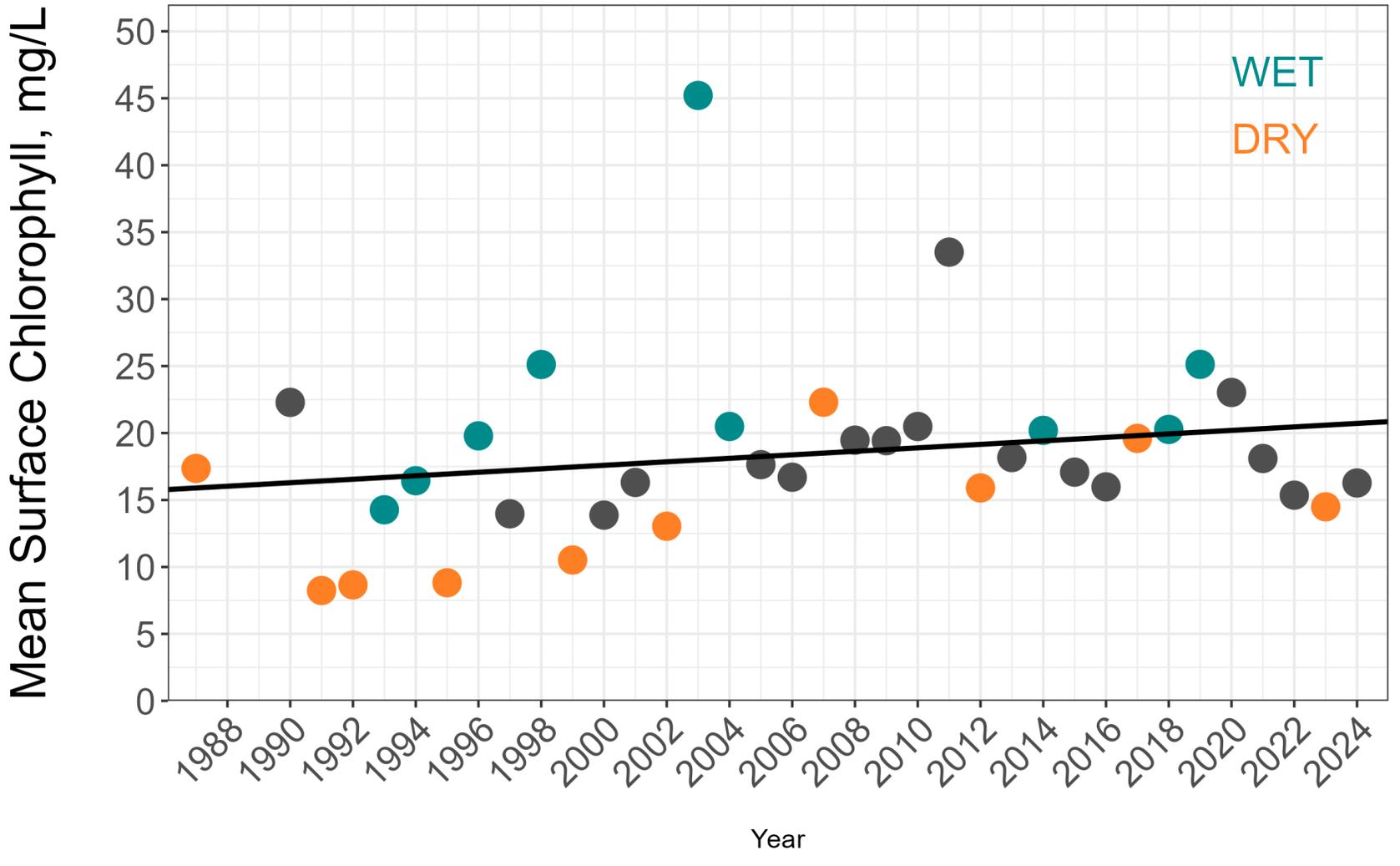
# Oxygen at 5 Long-term Sites

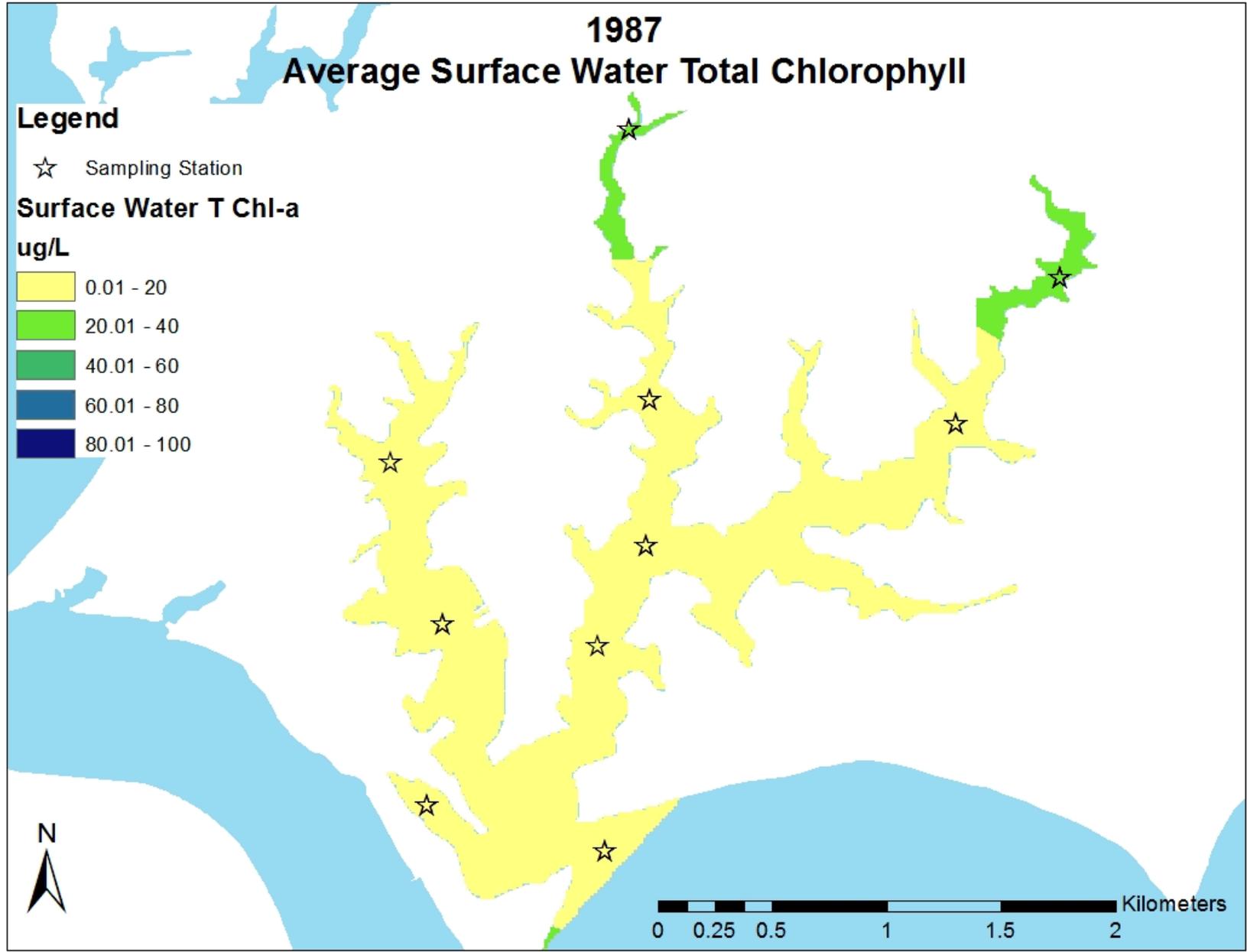


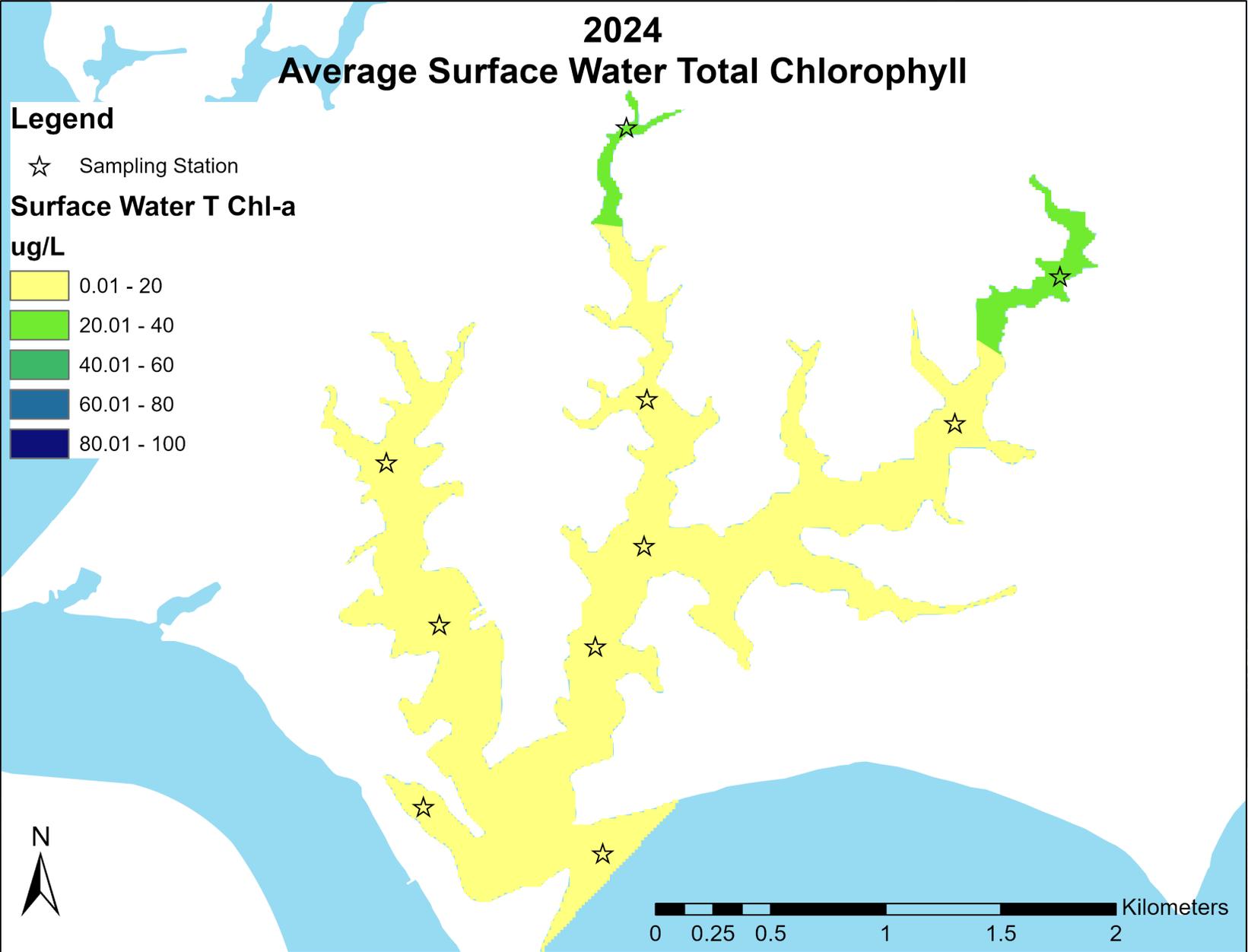




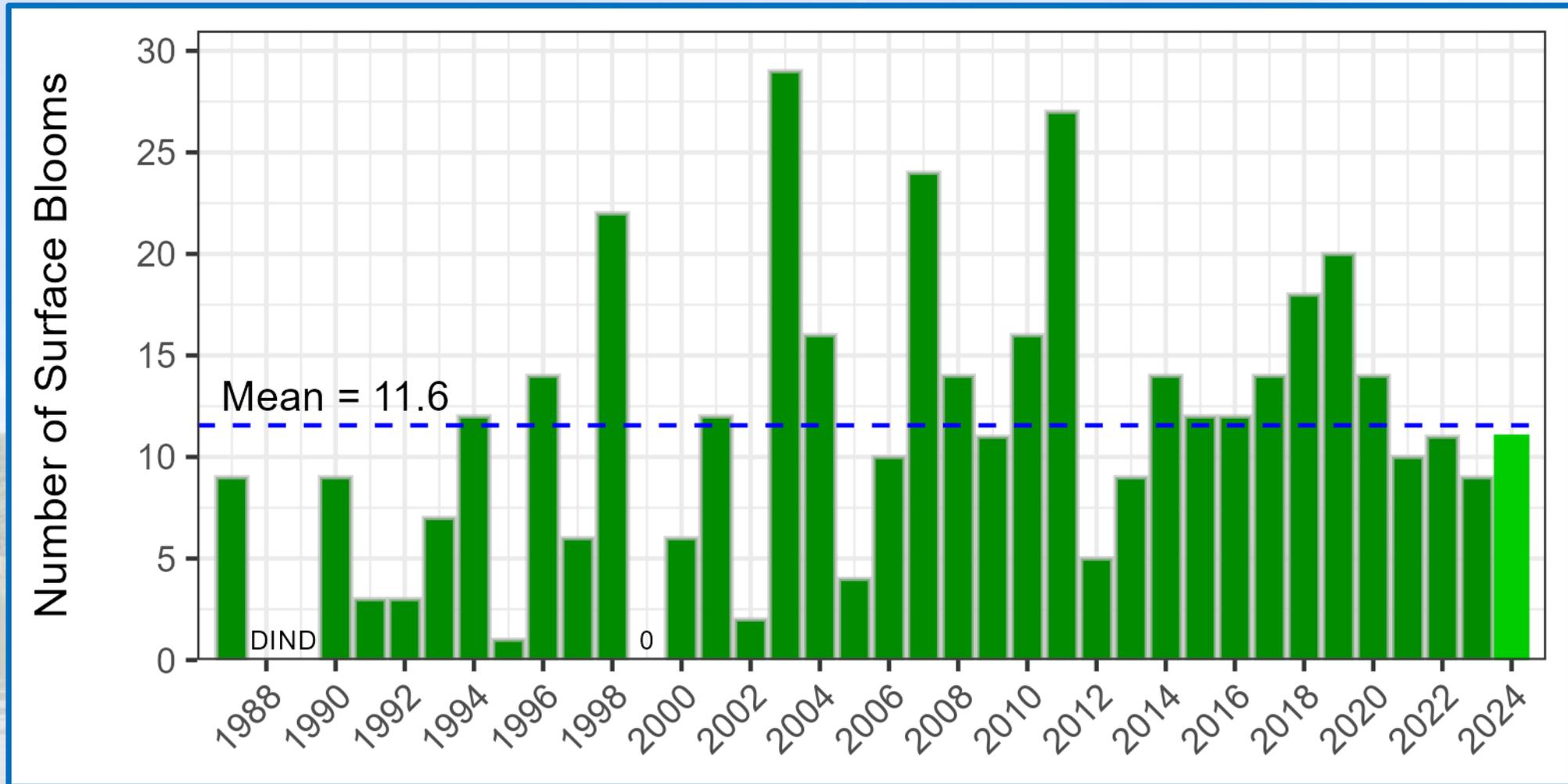
# Algae at 5 Long-term Sites







# Algal Bloom Frequency



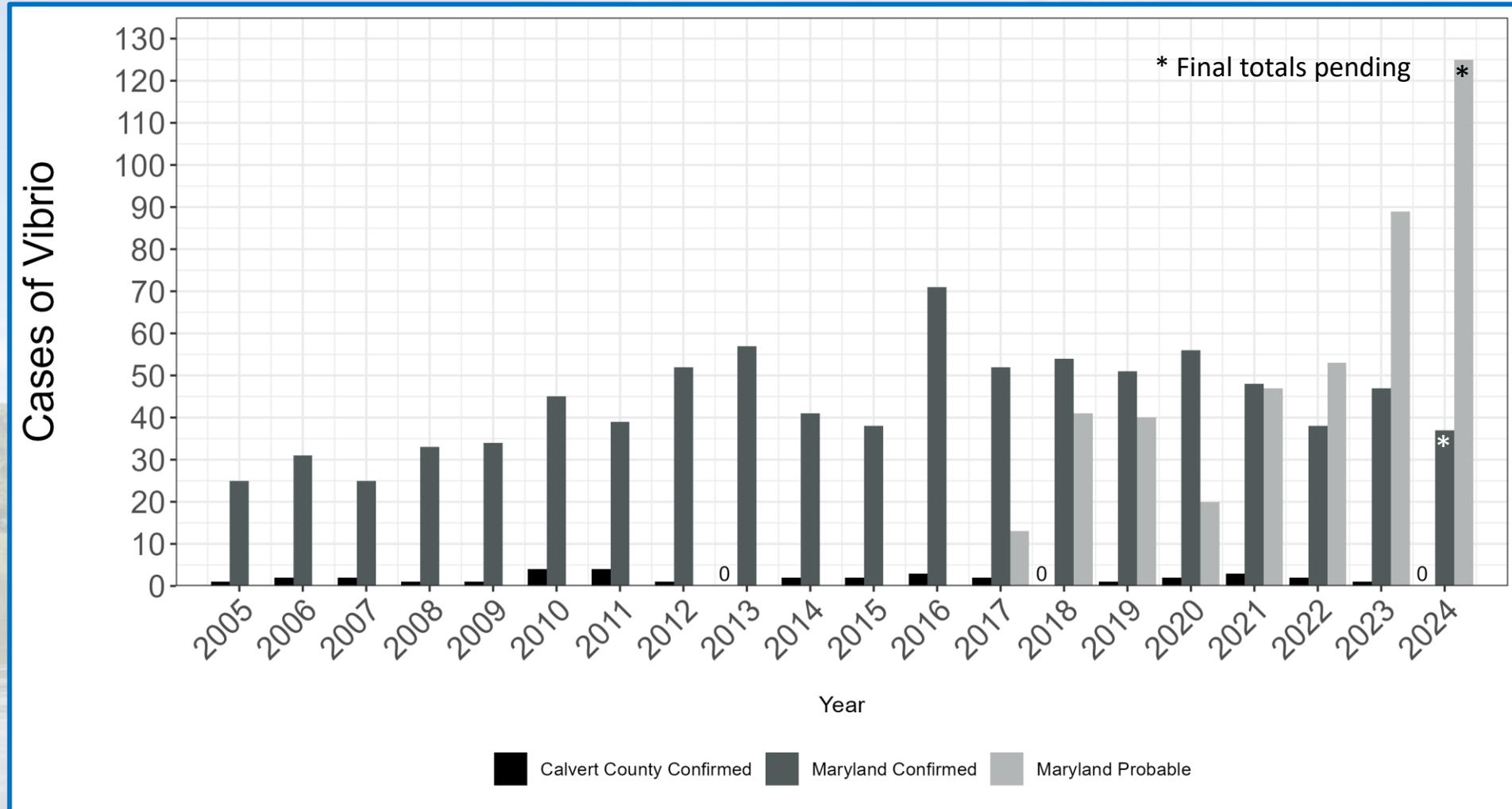
DI= incomplete data set  
ND= no study that year

# Fecal Coliform from MDE stations

Average Fecal Coliform  
MPN per 100 mL

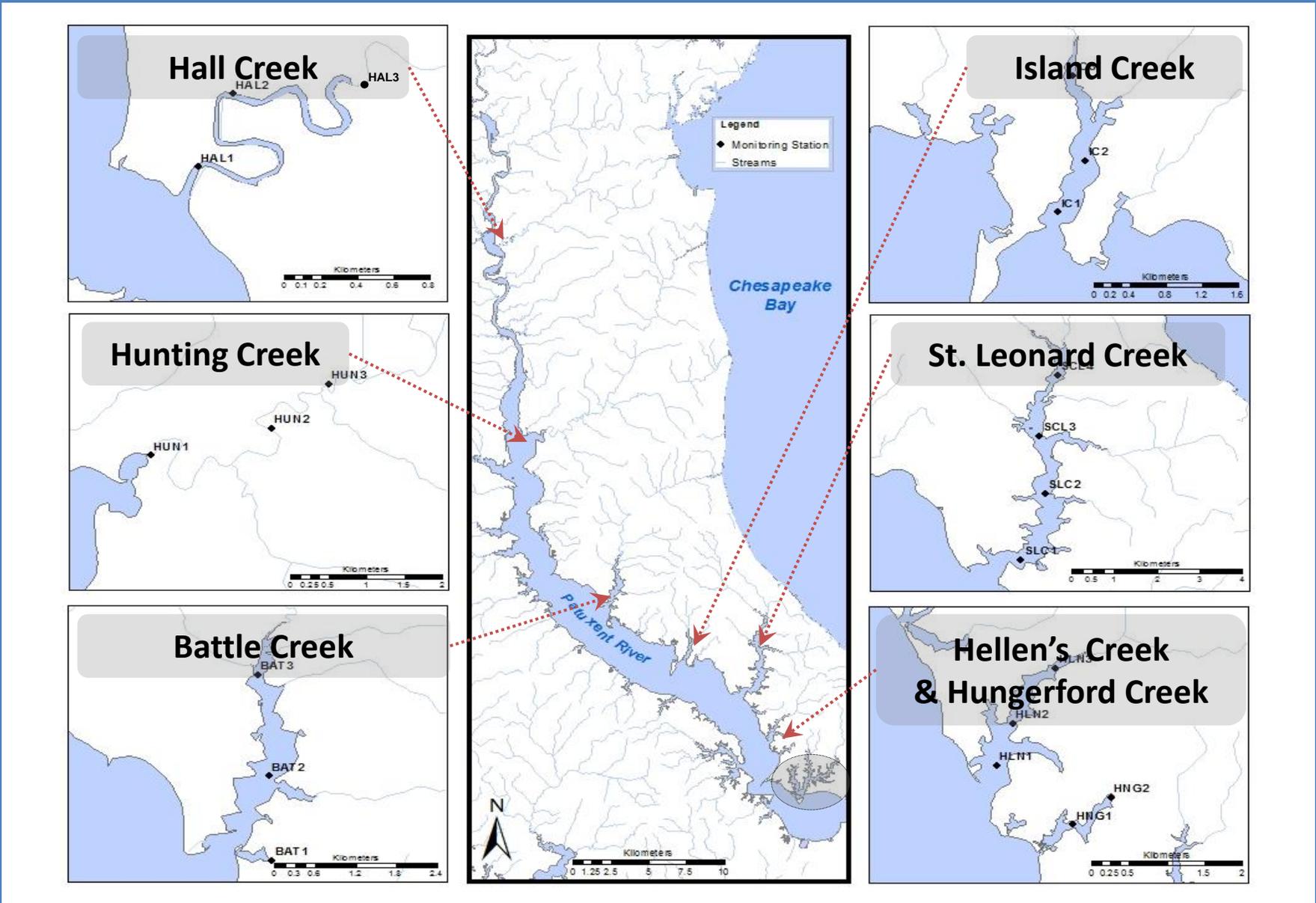
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Sandy Point	5	1	1	5	4	3	2	2	2	2	2	3	7	11	1	1	7	<b>3</b>
Calvert Marina	27	37	44	33	<b>103</b>	22	14	20	25	39	48	14	31	<b>161</b>	39	31	44	<b>16</b>
Mill Creek	11	12	4	<b>131</b>	50	43	8	26	47	<b>77</b>	30	12	31	<b>146</b>	35	6	<b>64</b>	<b>21</b>
CBL Boat Shop	8	45	5	20	35	15	51	7	<b>95</b>	50	7	4	16	<b>77</b>	17	9	19	<b>13</b>

# Cases of non-cholera *Vibrio* in Maryland and Calvert County



*New definition of probable cases occurred in 2017*

# Patuxent Creeks



# Lower Patuxent Creeks

## ALGAE

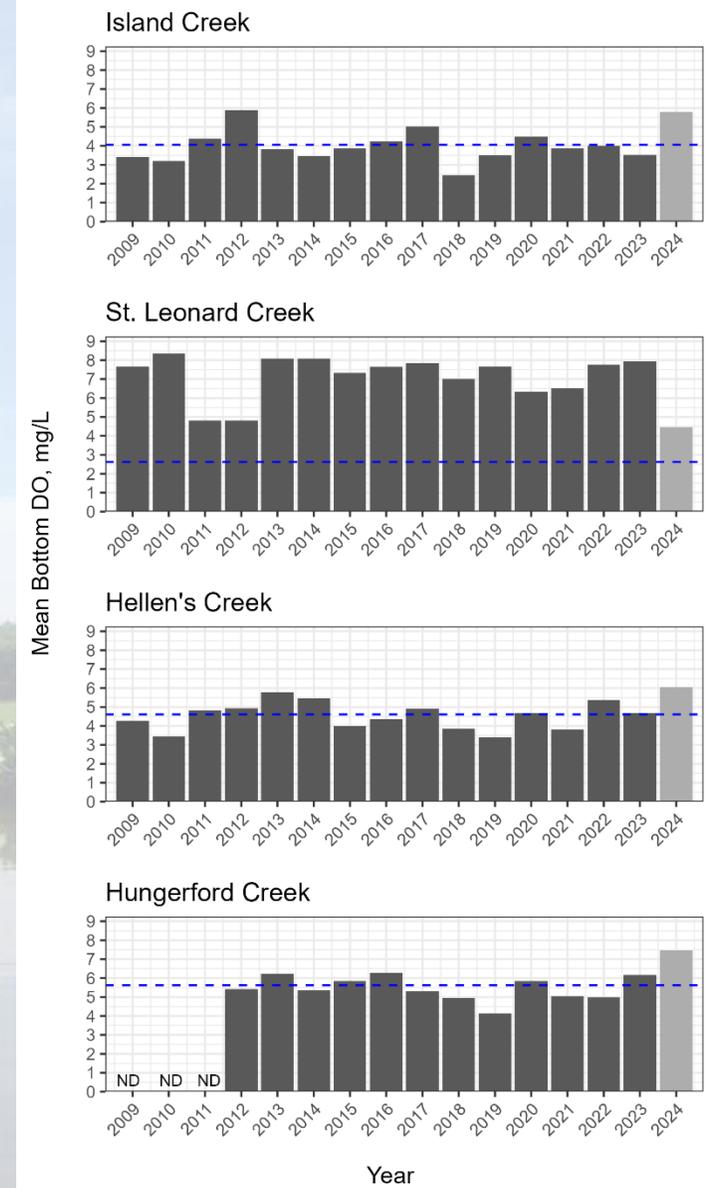
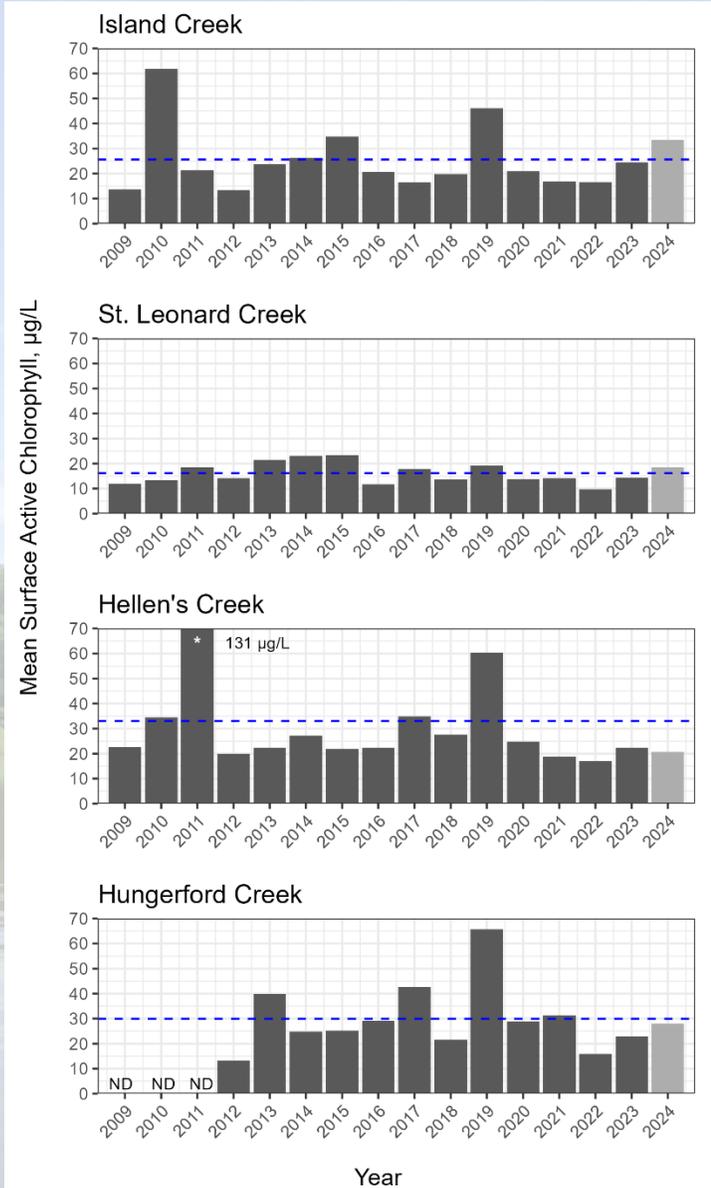
## OXYGEN

North

South

North

South



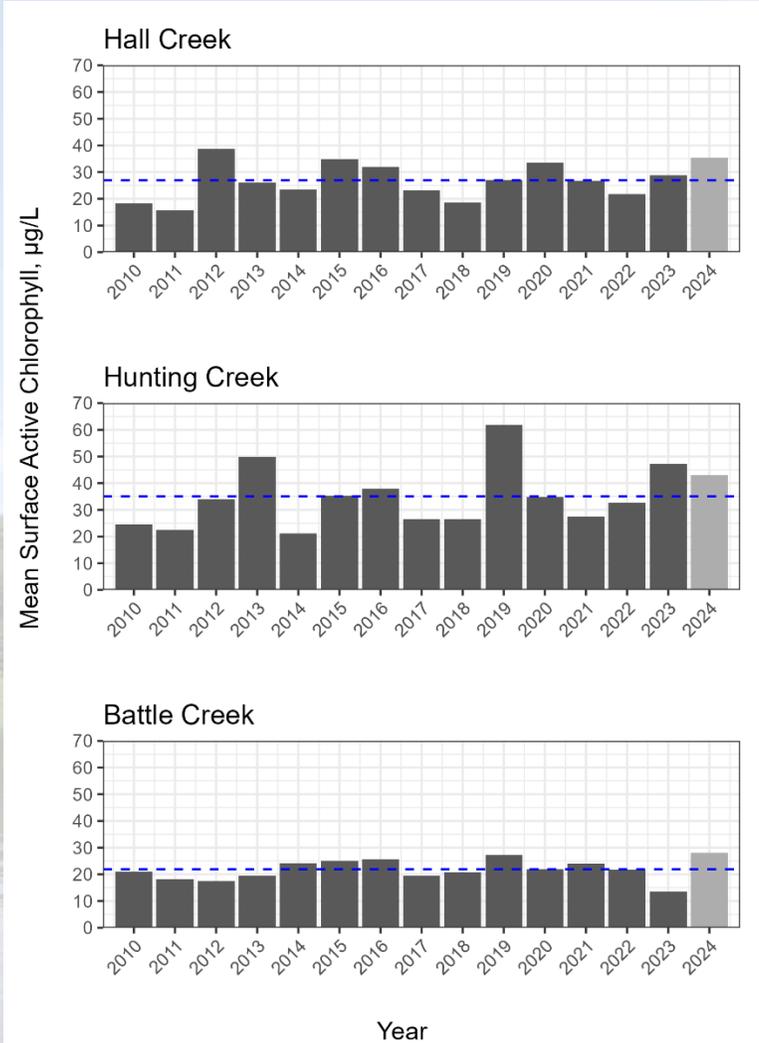
# Upper Patuxent Creeks

## ALGAE

## OXYGEN

North ↑

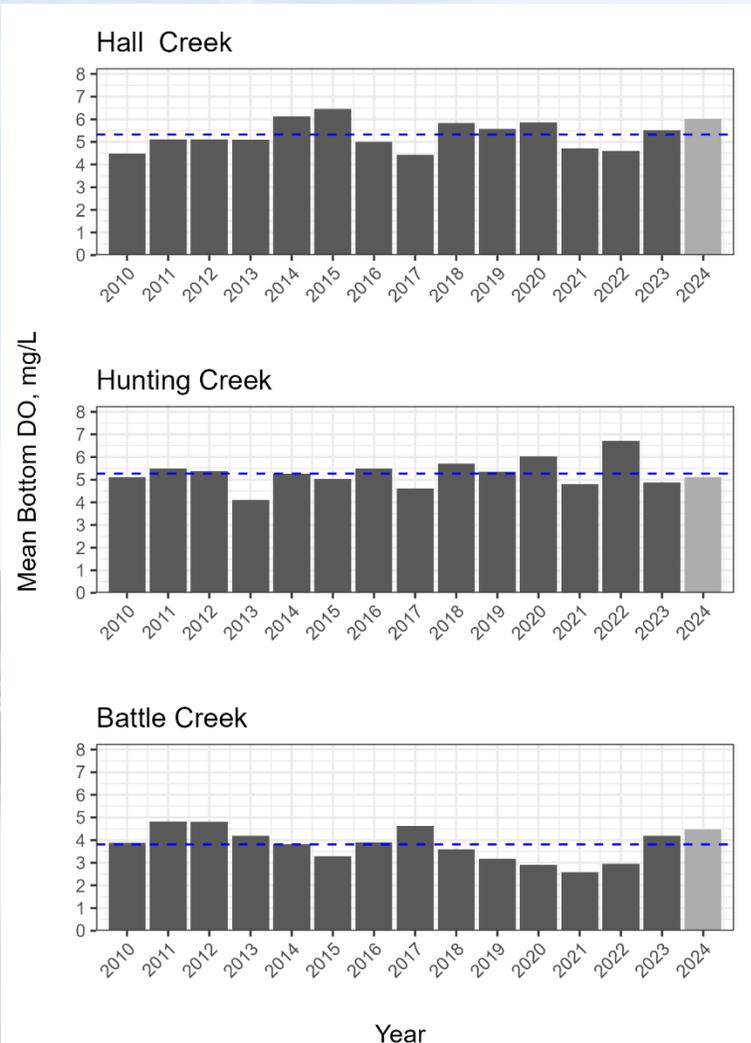
North ↑



mean = 27  $\mu\text{g L}^{-1}$

mean = 35  $\mu\text{g L}^{-1}$

mean = 22  $\mu\text{g L}^{-1}$



mean = 5.33  $\text{mg L}^{-1}$

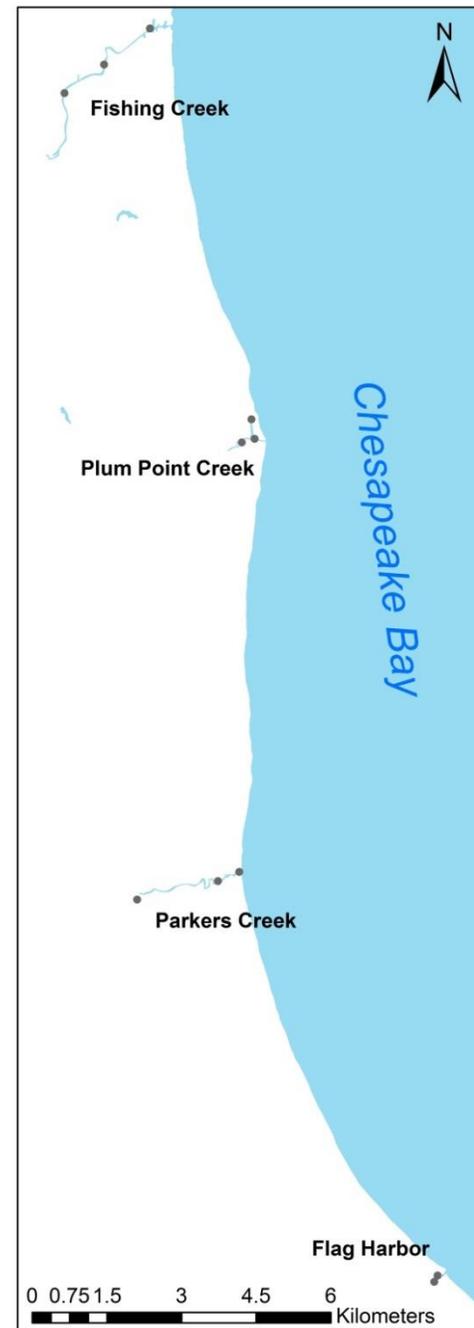
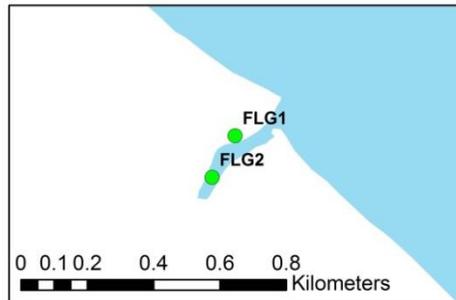
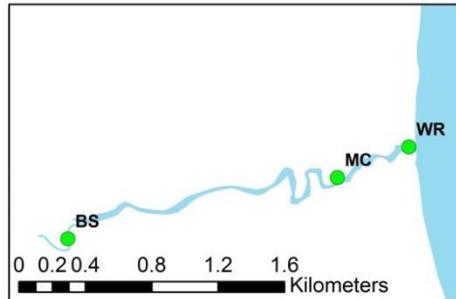
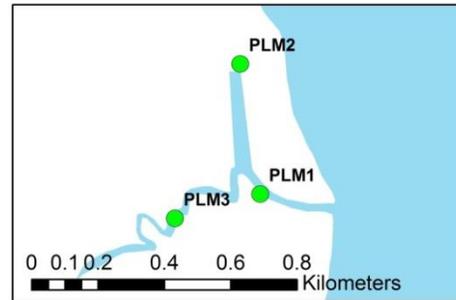
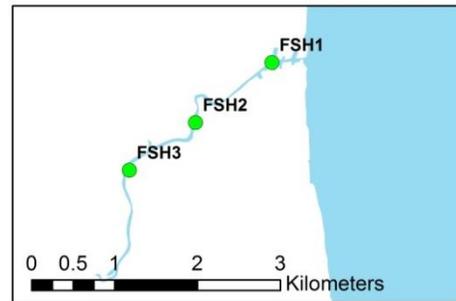
mean = 5.27  $\text{mg L}^{-1}$

mean = 3.81  $\text{mg L}^{-1}$

South ↓

South ↓

# Western Shore Creeks



# Western Shore Creeks

## ALGAE

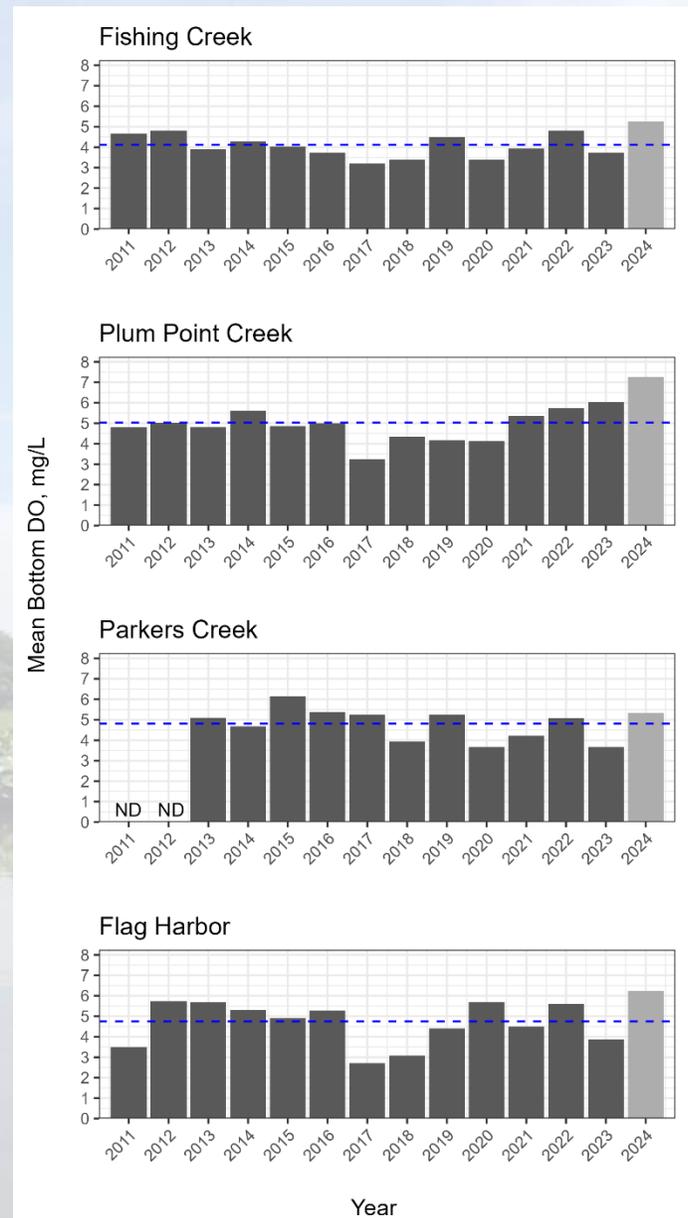
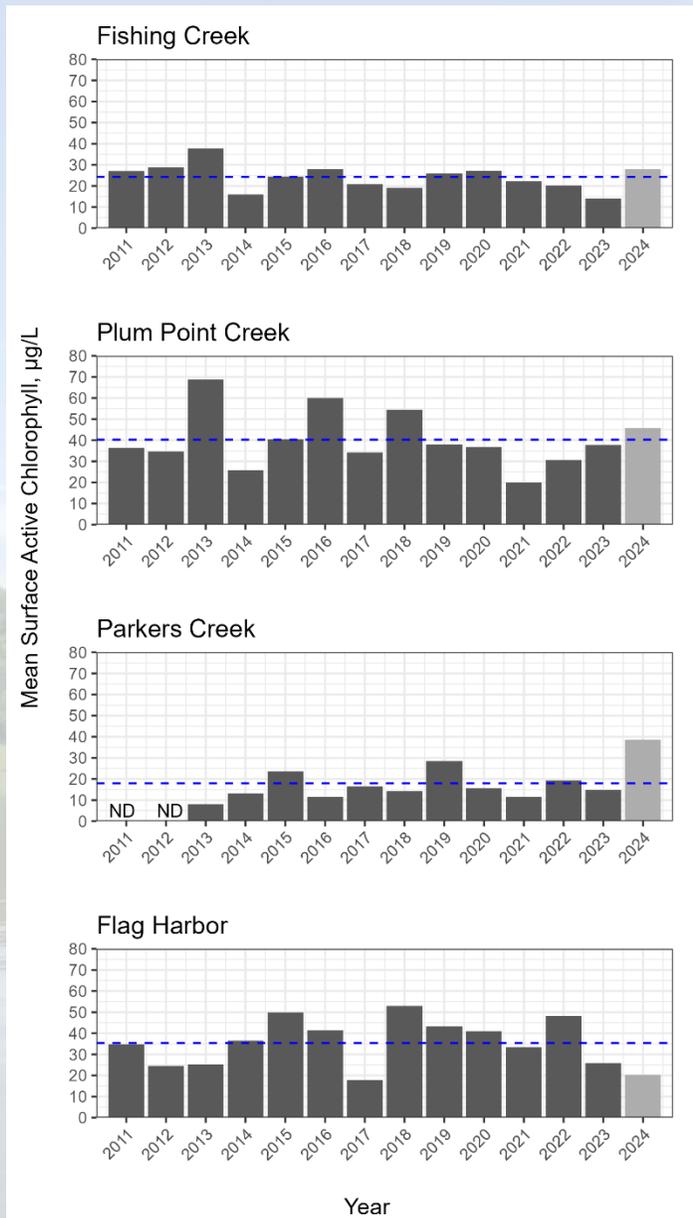
## OXYGEN

North

North

South

South



# Tidal Creek Trends Compared to Mainstem Stations Trends

## Secchi



## Chlorophyll



## Dissolved Oxygen



# Recommendations

- Implement the Calvert WIP to the maximum extent practicable
  - *Focus on practices and locations where the effectiveness will be greatest*
- Continue to support planning and eventual implementation of:
  - *Sewer upgrades, BMPs, installation of enhanced nutrient removal (ENR) septic systems, riparian buffer zones, and encourage the use of pump-out facilities by boaters*
- Continue to support the local county and state environmental educational programs so the public can make informed decisions at the personal, local and regional levels.
- Consider where efforts to mitigate flooding intersect with restoration around water quality to optimize environmental management

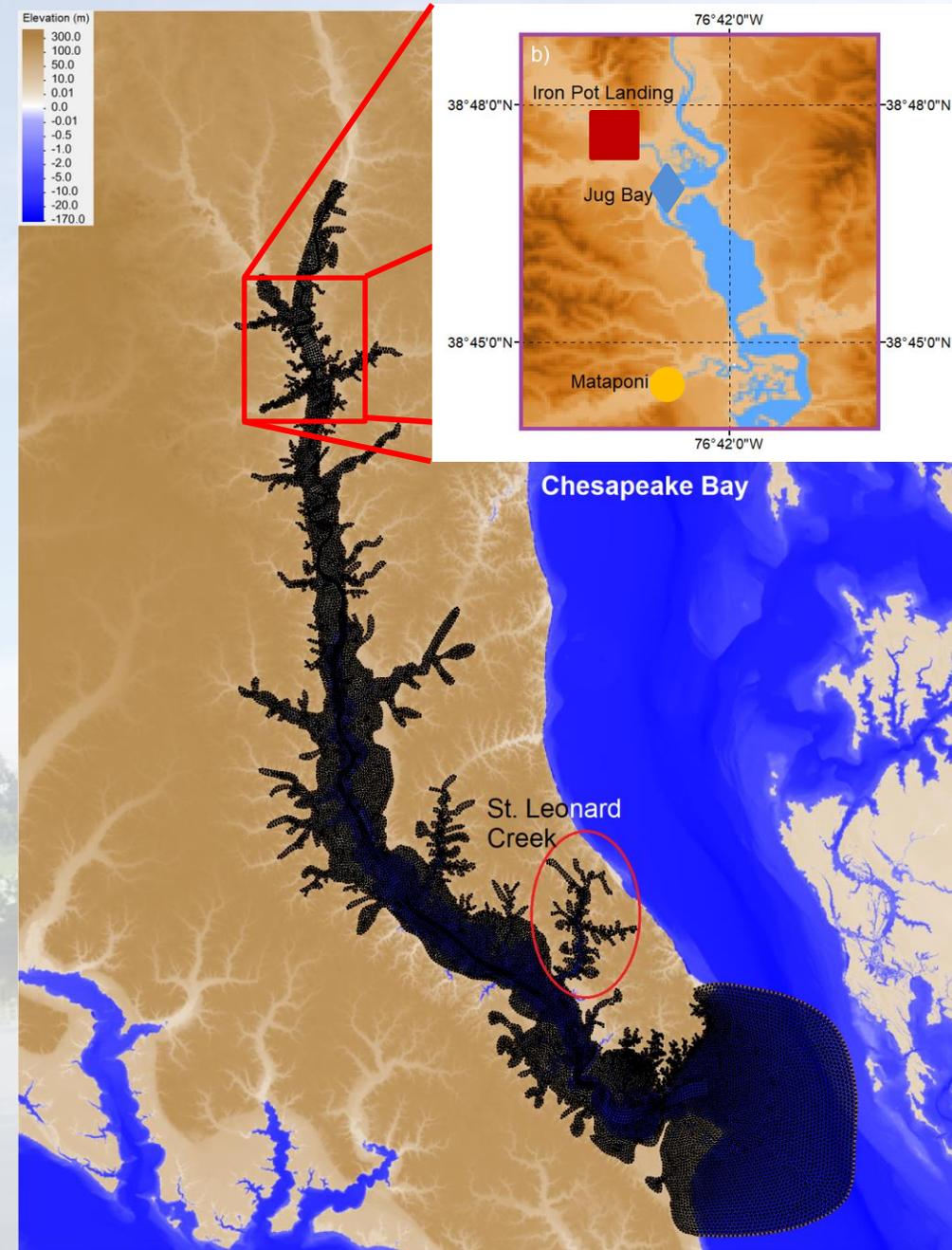
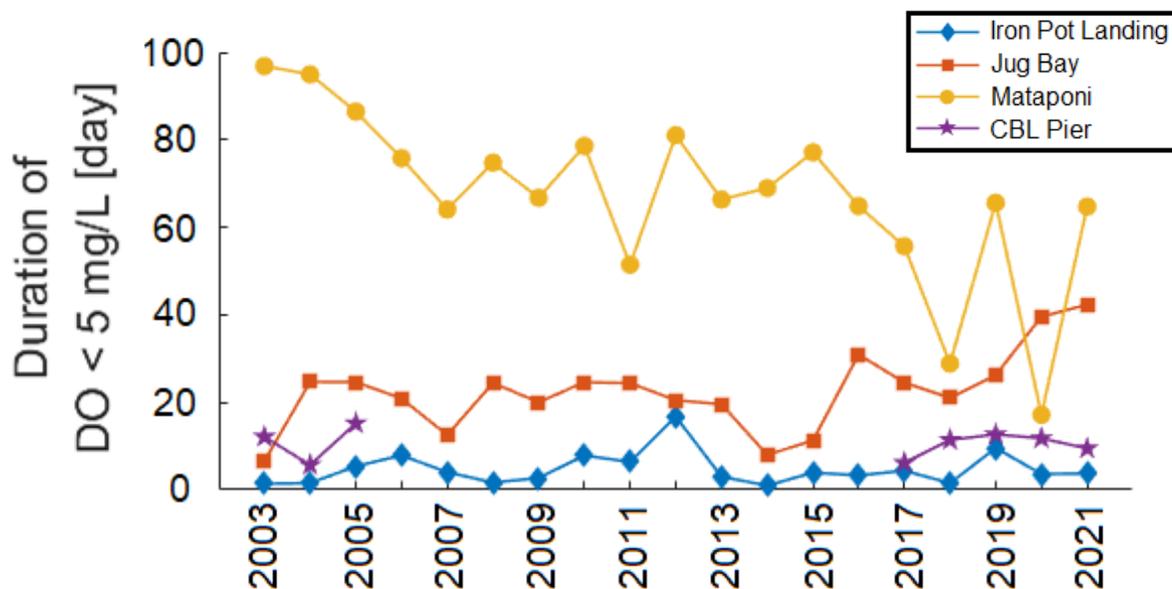
# Recommendations From Last Year

- Continue to monitor tidal creeks in Calvert County
  - *Negative and positive trends in water quality can be clearly documented*
  - *Renew efforts to connect with nontidal monitoring program*
  - *Nontidal monitoring has the potential to document shifts in the local watersheds and mechanisms for changes in receiving waters*
  - *Connect with Chesapeake Bay Program's efforts to model shallow water ecosystems and to enhance restoration options in tributaries*
- UMCES is a resource
  - *The Chesapeake Biological Laboratory is ready to provide advisory service to the county regarding implementation of the TMDL for the Chesapeake Bay*
  - *We are here to listen to your questions and respond to county needs with sound science and creativity*

# New Tools Developing at CBL

- State-of-the Art Water Quality Model

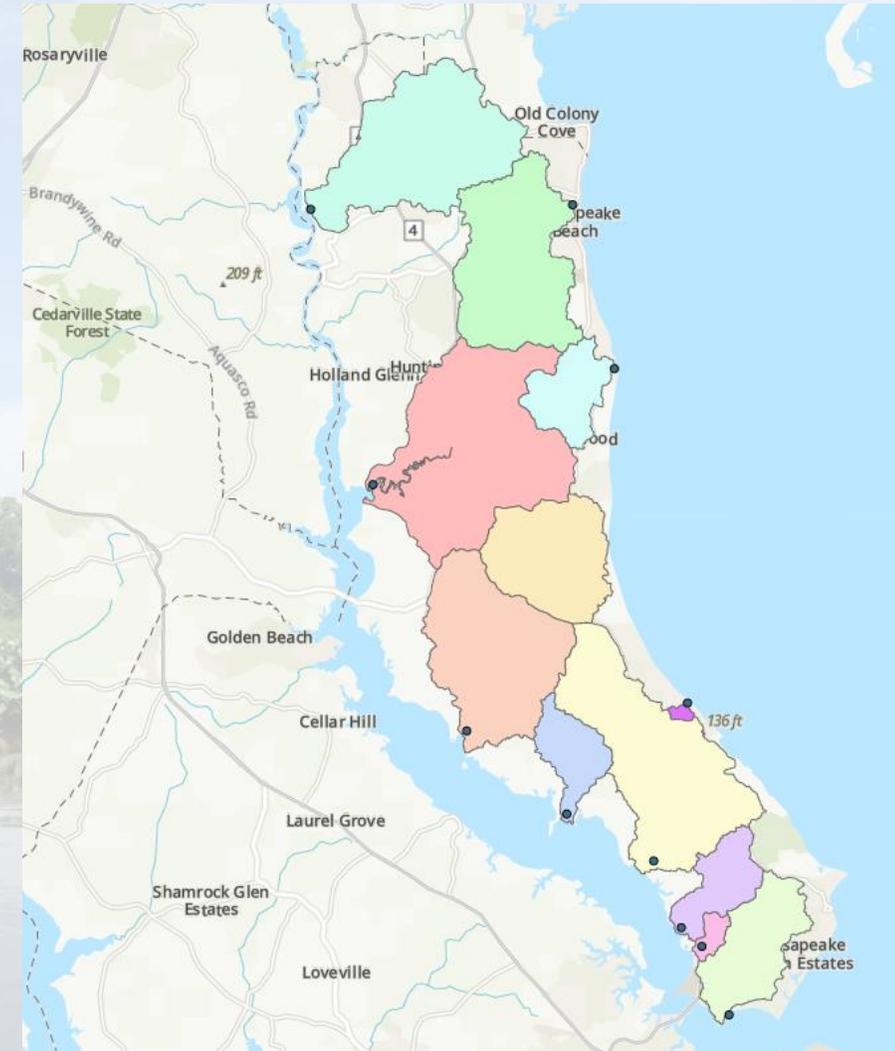
- *Allows us to represent the small tidal creels*
- *Gets maximum value out of monitoring data*
- *Can inform specific questions about local activities*





# Project Update: Tools to Address Water Quality Restoration in Tidal Waters

- It can be difficult to select the restoration strategies and projects with the most impact on water quality.
- CBL and county planners are working to quantify the potential impacts of restoration projects.
- The project expands an existing partnership between the CBL and Calvert County to assess water conditions, analyze monitoring data, and ultimately select the best ways to improve Calvert's waterways.
- As a result of this data analysis and modeling, informational materials will be developed for other Maryland counties and municipalities to use in making informed choices about impactful investments in restoration.





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Thanks to  
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