



Bantam Lake Management in 2023

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Today...

- *Water Quality 2022 and 2023*
- *Investigations into Bantam Watershed*
- *Planning for an Alum Treatment*
- *But first...*

A Look Back in Time...

Temporal Changes in Diatom Valve Diameter Indicate Shifts in Lake Trophic Status

Peter A. Siver, Joel Sibley, Anne-Marie Lott, & Larry Marsicano

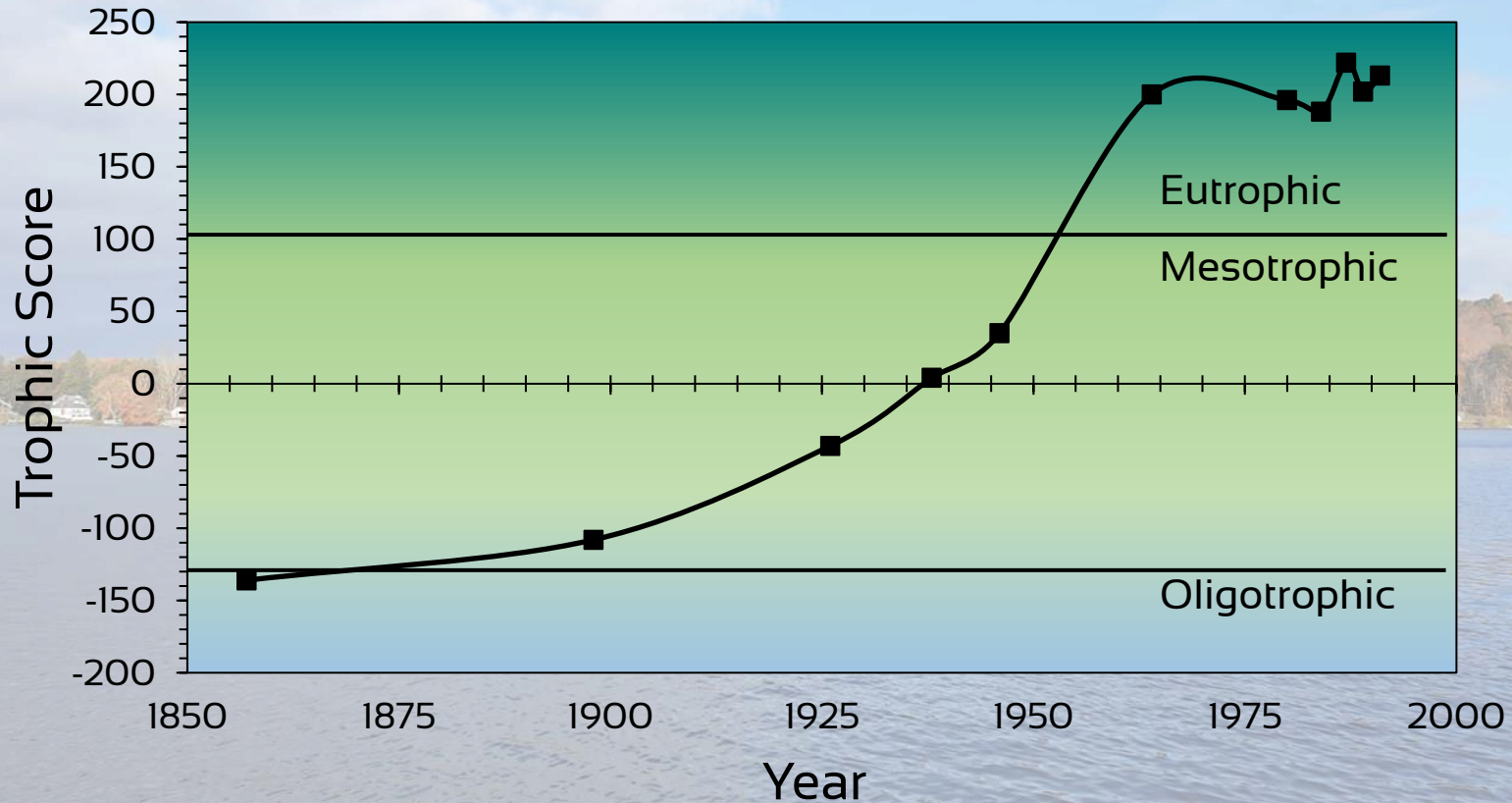
Journal of Paleolimnology

2021



Study based on Bantam Lake microalgae fossil record!

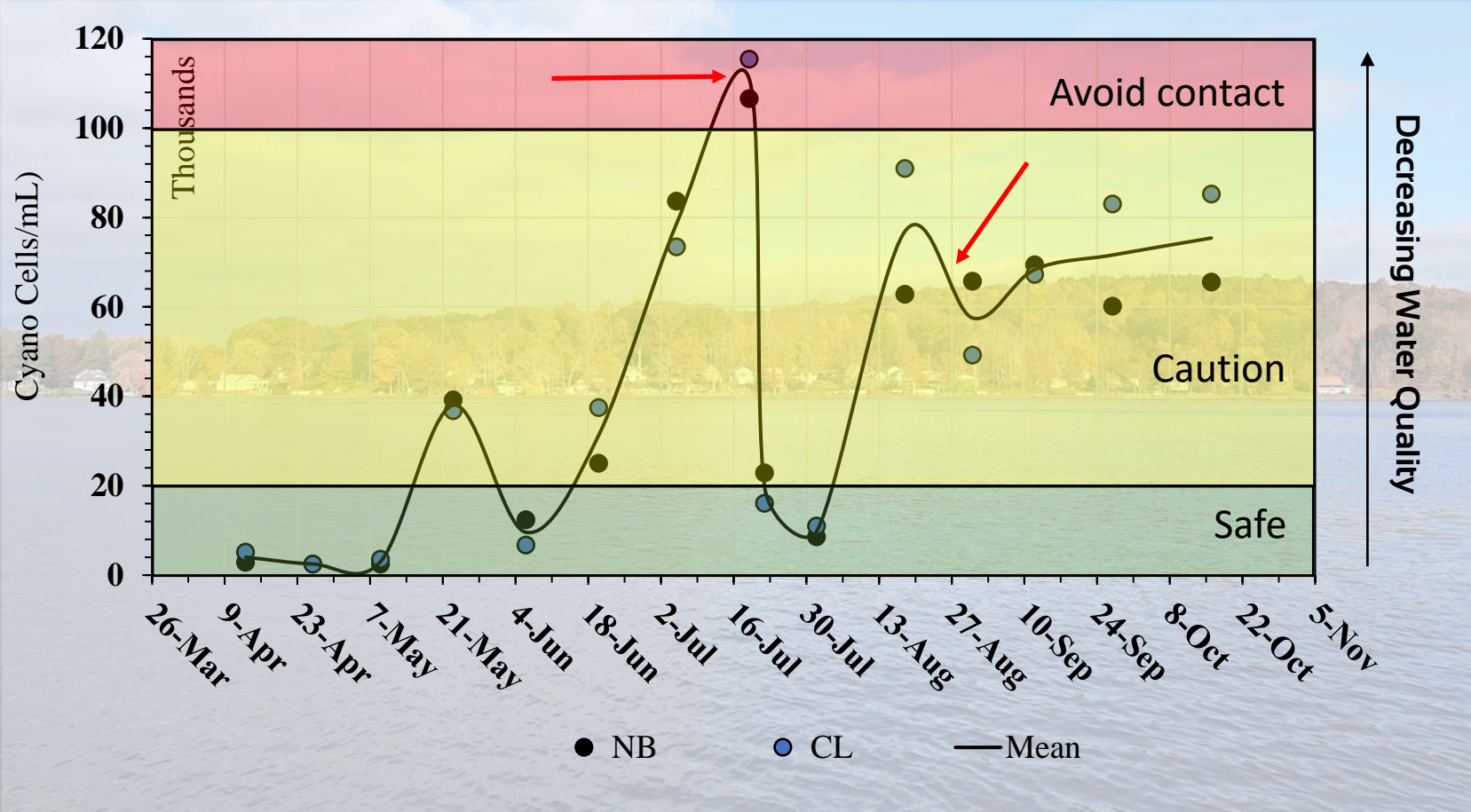
A Look Back in Time...



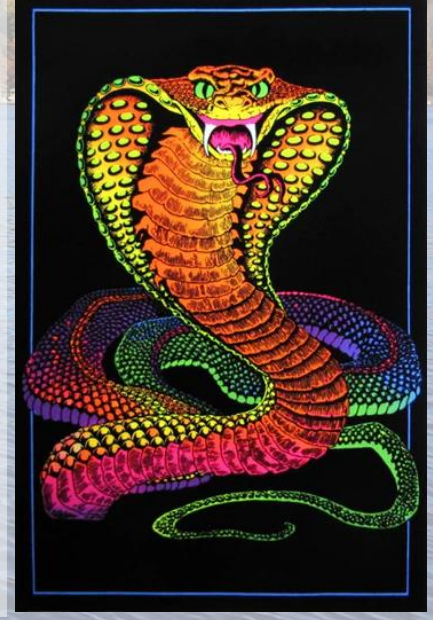
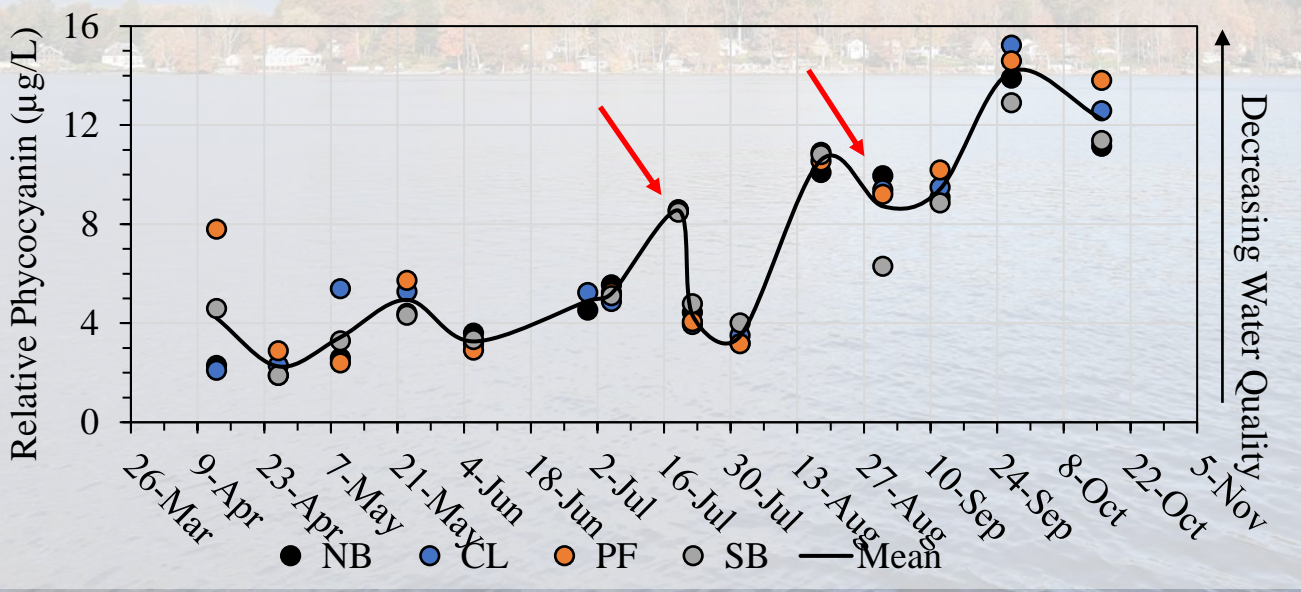
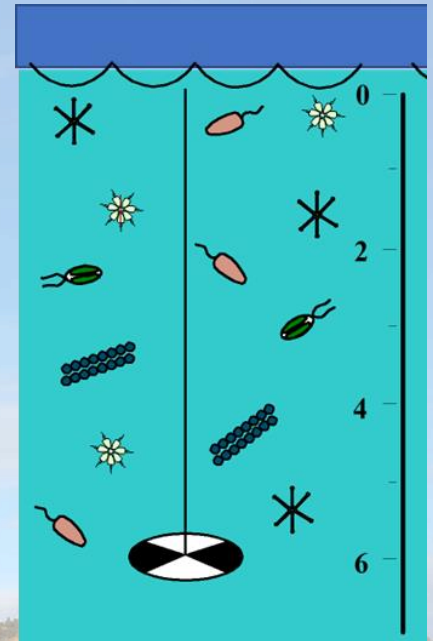
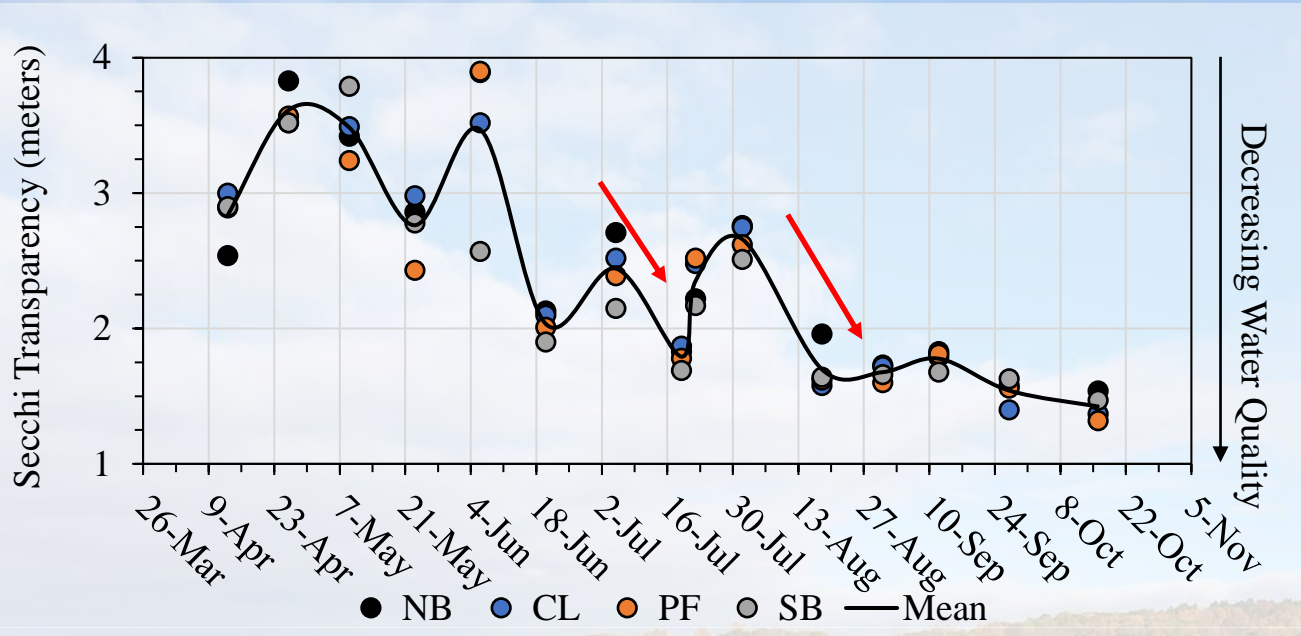
Siver et.al. 2021

Lake shifts from oligotrophic to eutrophic over the course of 175 years.

Cyanobacteria (aka blue-green algae) Cell Concentrations in 2022



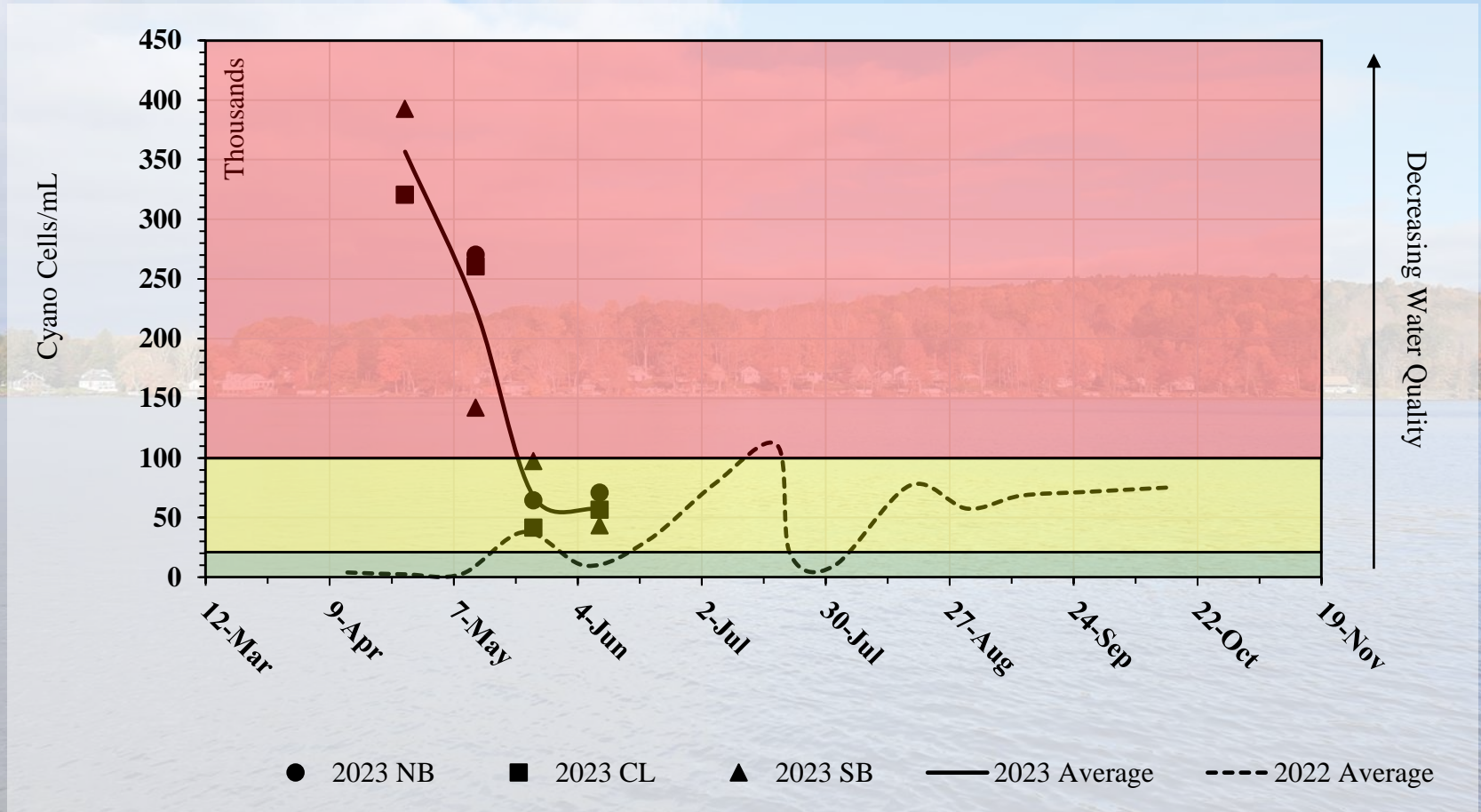
Colors correspond to the CT DEEP Visual Ranking System (CT DPH & CT DEEP 2021)

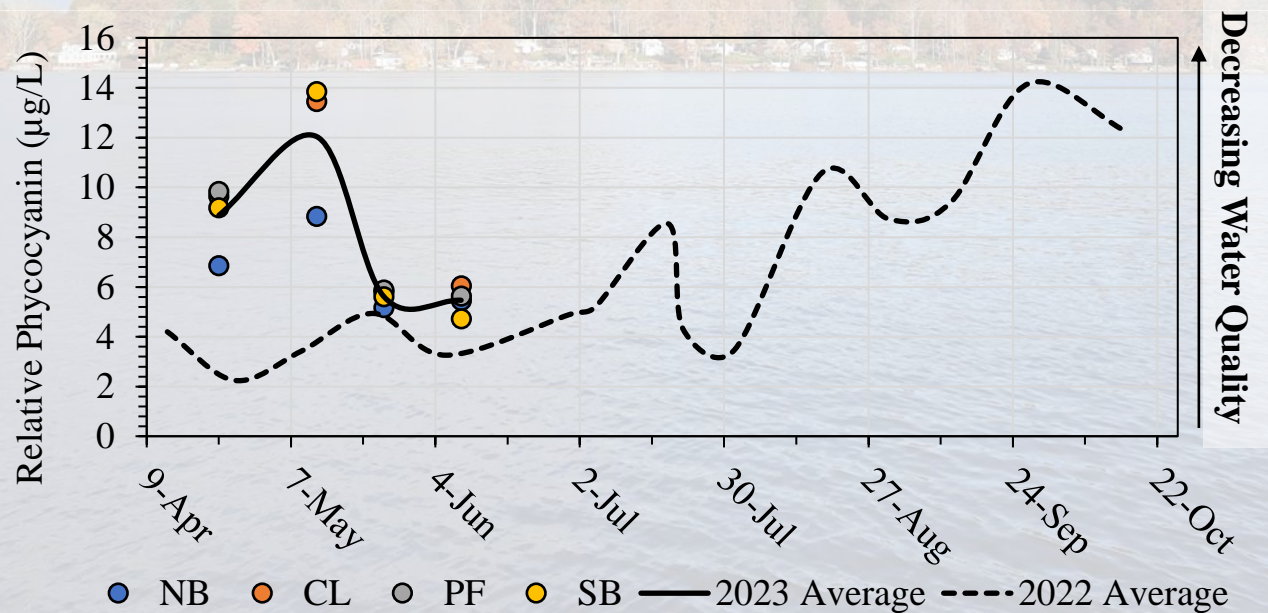
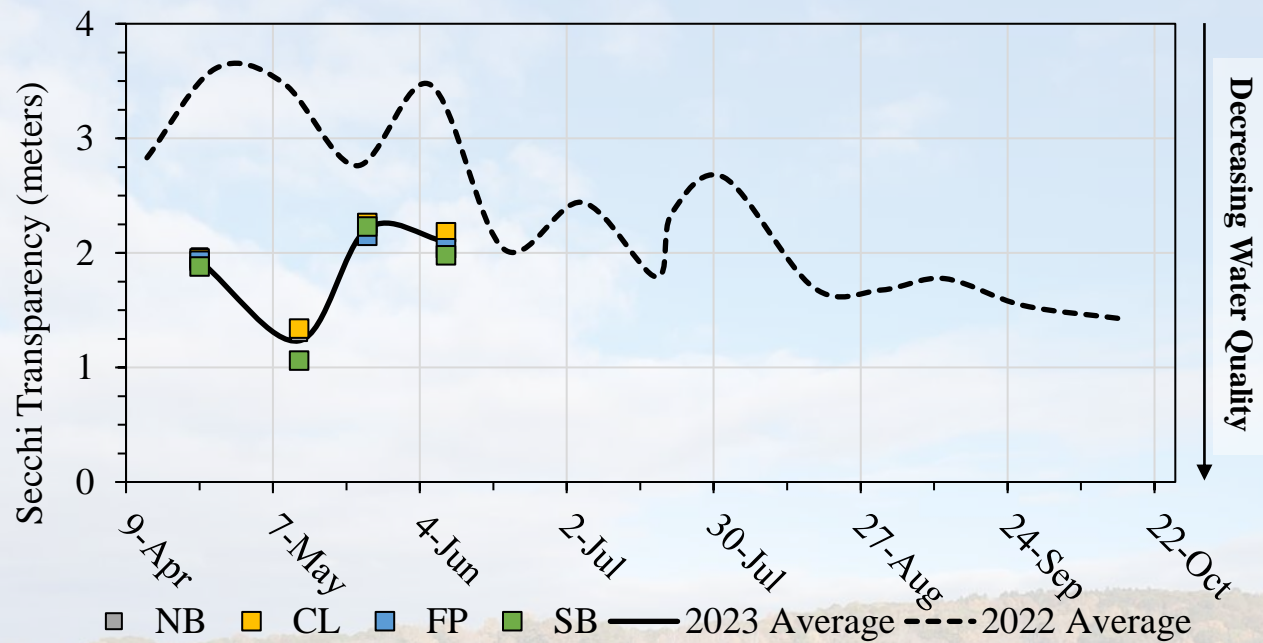


Corroborating lines of data collected at Bantam.

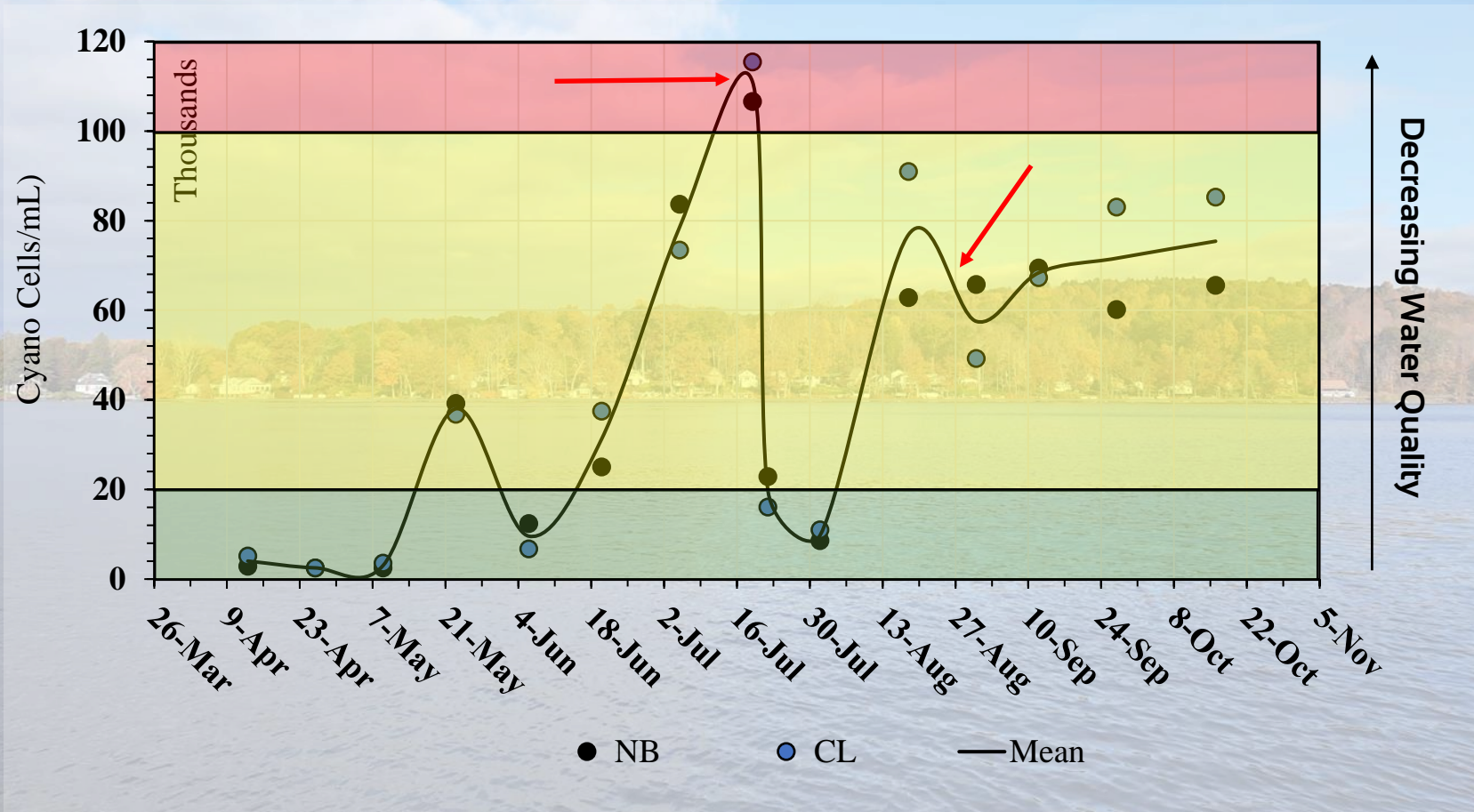
Blacklight poster!

Cyanobacteria Cell Concentrations in 2022 and 2023





Cyanobacteria Cell Concentrations in 2022




Red arrows are when copper sulfate treatments occurred. Reactive management.

Reactive vs Proactive Treatment

ERDC/EL TR-22-10

 **US Army Corps of Engineers**
Engineer Research and Development Center



Aquatic Nuisance Species Research Program

Identification and Preventative Treatment of Overwintering Cyanobacteria in Sediments

A Literature Review

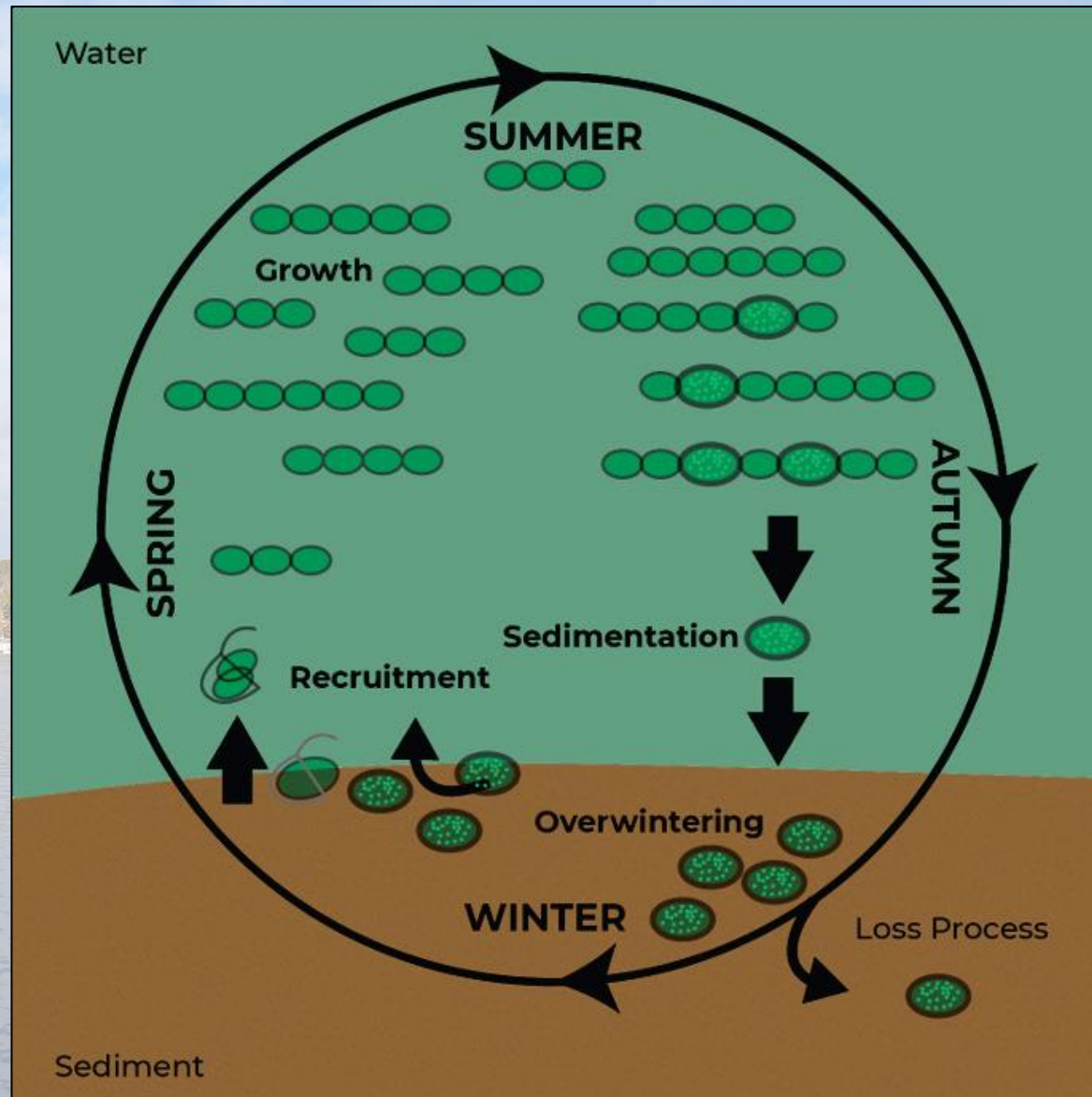
Alyssa J. Calomeni, Andrew D. McQueen,
Ciera M. Kinley-Baird, and Gerard A. Clyde, Jr.

August 2022



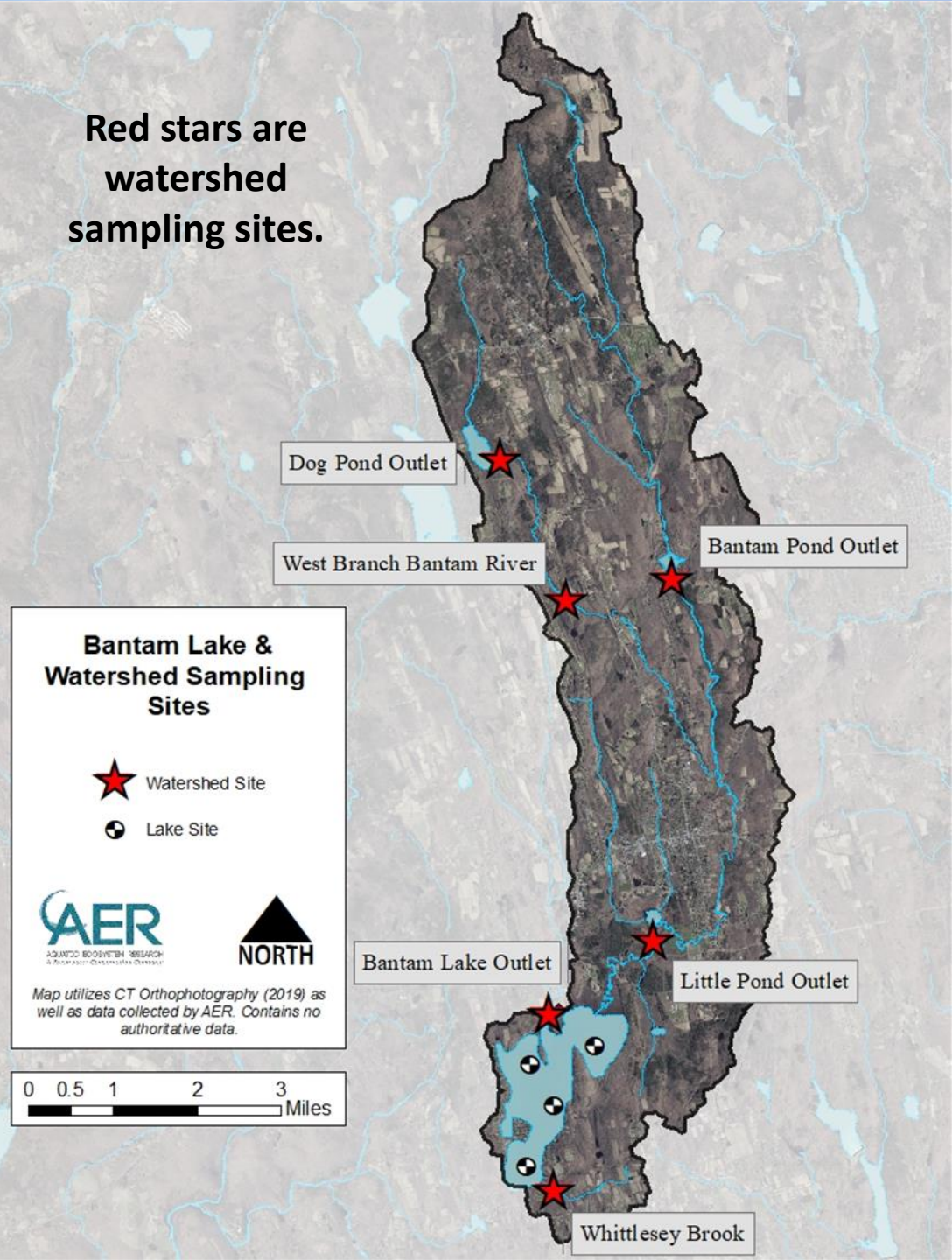
Environmental Laboratory

Approved for public release; distribution is unlimited.



TMDL and Bantam Watershed Monitoring

Red stars are
watershed
sampling sites.





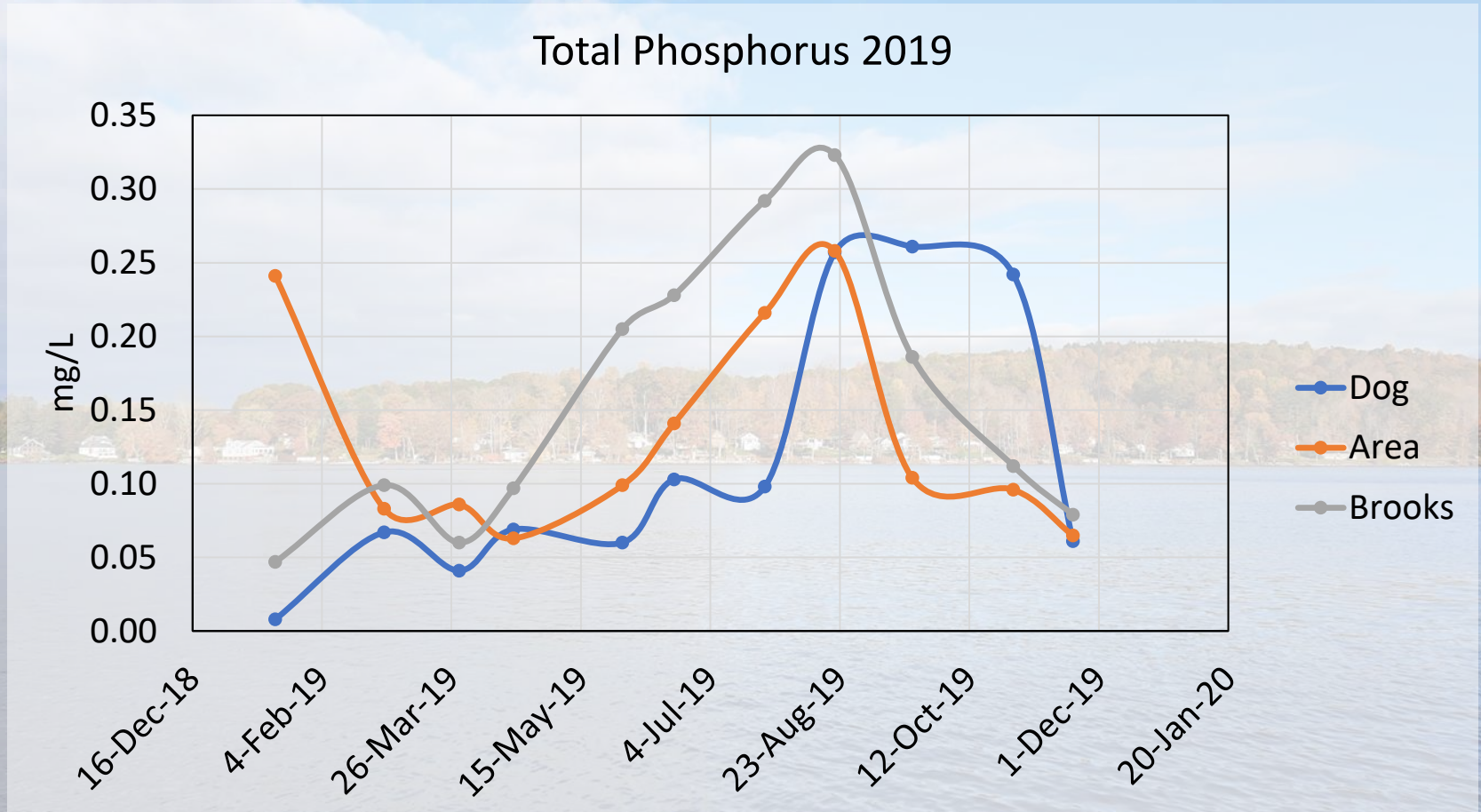
Connecticut Statewide Lake Nutrient TMDL

Appendix 1: **Bantam Lake Watershed TMDL**

Table 2: Recent total phosphorus and total nitrogen loading from Woodridge Lake WPCF.

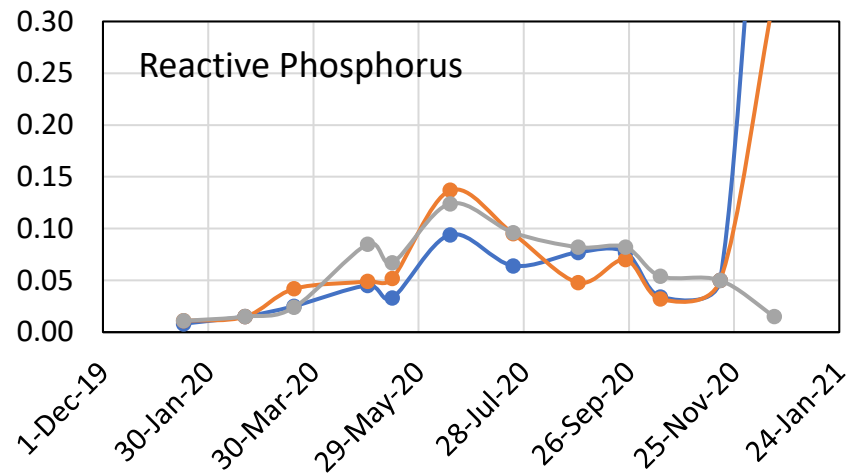
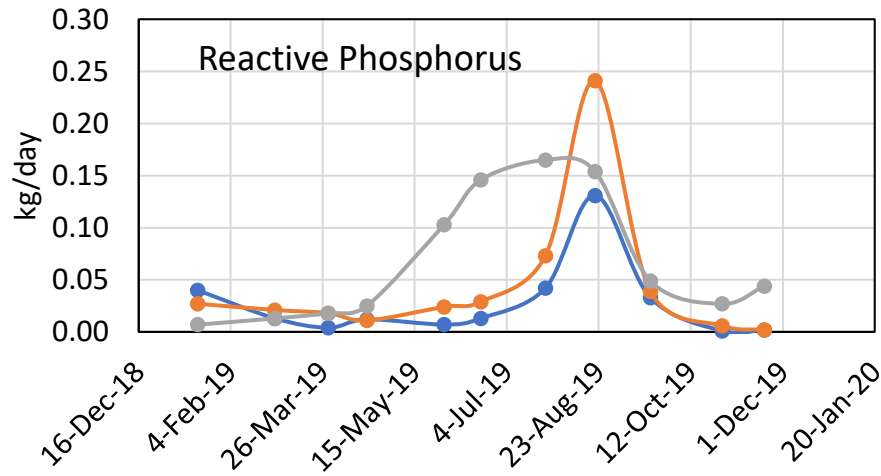
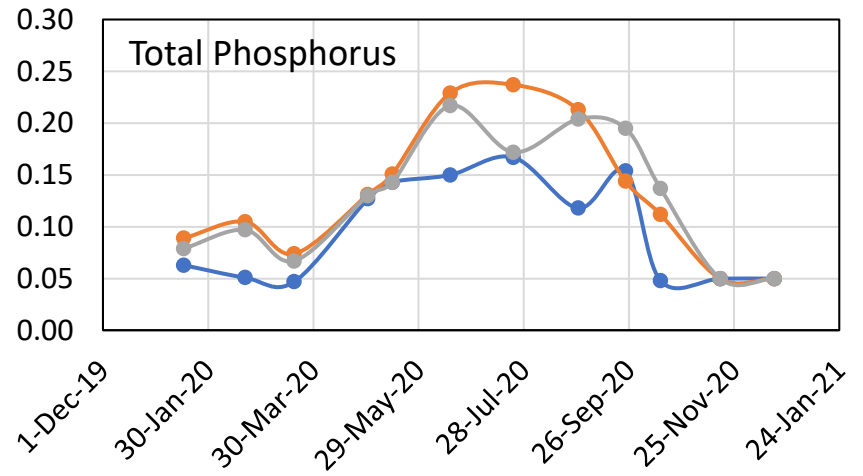
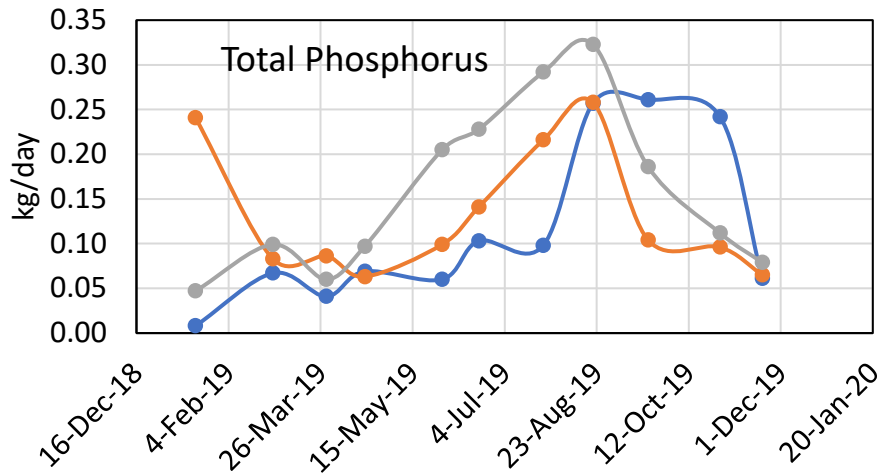
Year	Total Phosphorus			Total Nitrogen		
	Total Load (kg/yr)	Attenuation Factor	Delivered Load to Bantam Lake (kg/yr)	Total Load (kg/yr)	Attenuation Factor	Delivered Load to Bantam Lake (kg/yr)
2011	335.23	0.648	217.23	1,485.55	0.648	962.64
2012	394.64	0.648	255.73	1,344.09	0.648	870.97
2013	375.09	0.648	243.06	1,584.86	0.648	1,026.99
2014	436.93	0.648	283.13	1,705.80	0.648	1,105.36
2015	434.77	0.648	281.73	1,473.45	0.648	954.80
2016	402.93	0.648	261.10	1,438.55	0.648	932.18
2017	315.04	0.648	204.14	1,265.57	0.648	820.09
2018	383.07	0.648	248.23	1,475.28	0.648	955.98
2019	395.44	0.648	256.24	1,437.76	0.648	931.67
2020	662.76	0.648	429.47	2,350.44	0.648	1,523.09

West Branch Bantam River



Data nutrient data collected and shared by the Woodridge Lake WPCF from the West Branch of the Bantam River

West Branch Bantam River

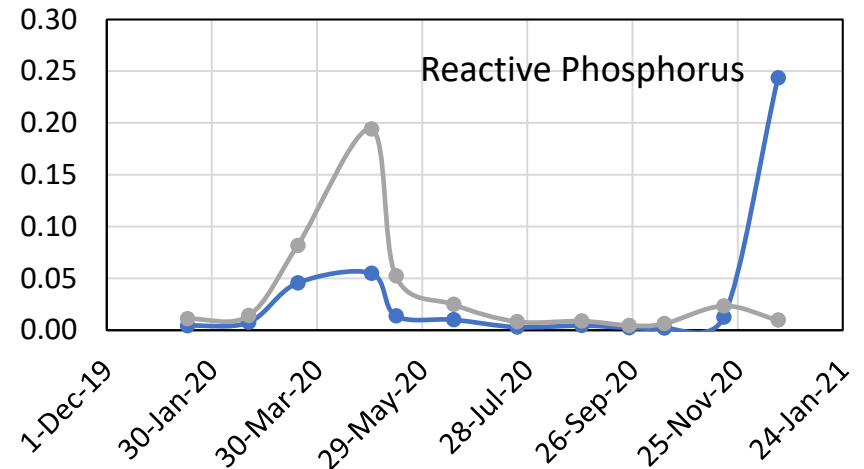
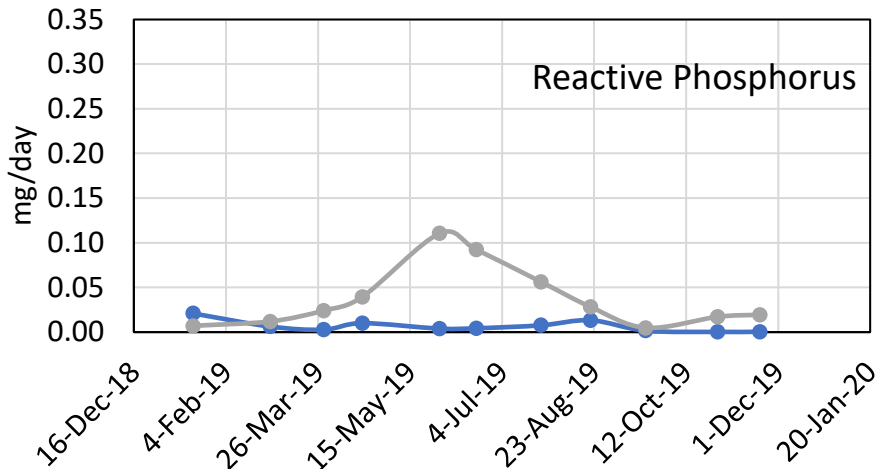
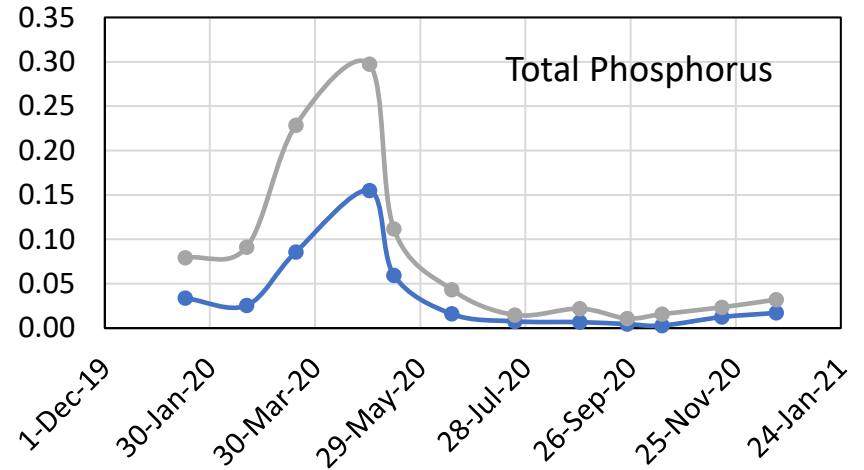
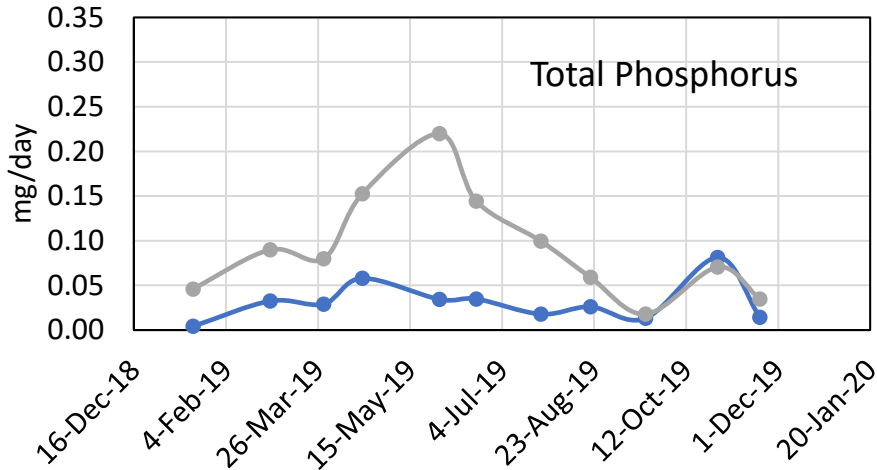


— Dog — Area — Brooks

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Data nutrient data collected and shared by the Woodridge Lake WPCF from the West Branch of the Bantam River

West Branch Bantam River

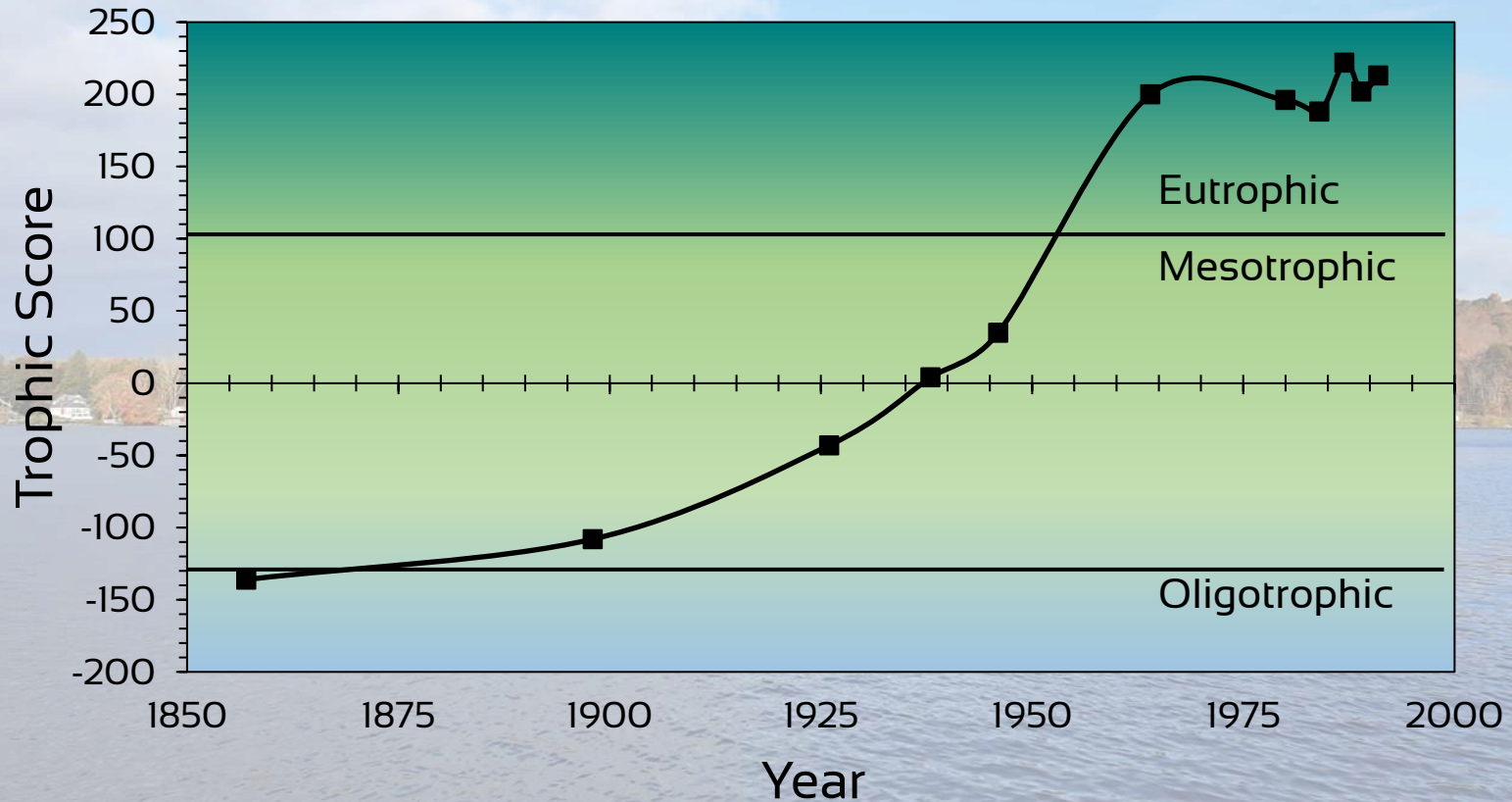


—● Dog —● Brooks

—● Dog —● Brooks

Data nutrient data collected and shared by the Woodridge Lake WPCF from the West Branch of the Bantam River. Concentration X volume of water yields a daily loading upstream and downstream of WPCF

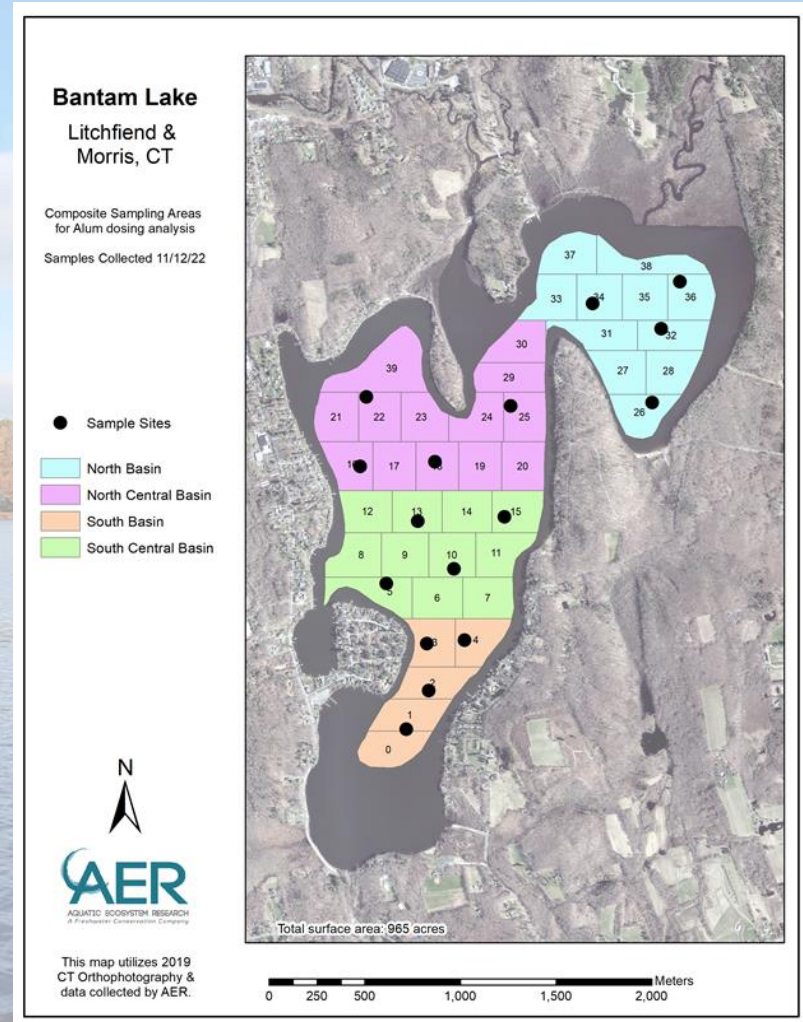
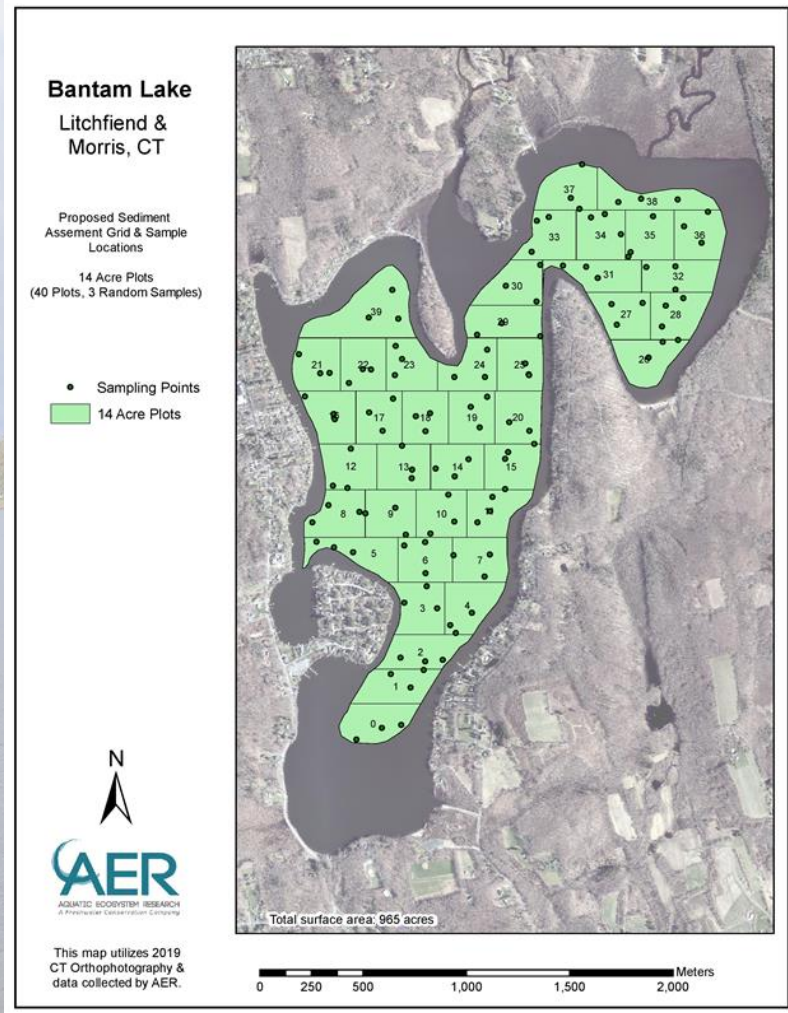
A Look Back in Time...



Siver et.al. 2021

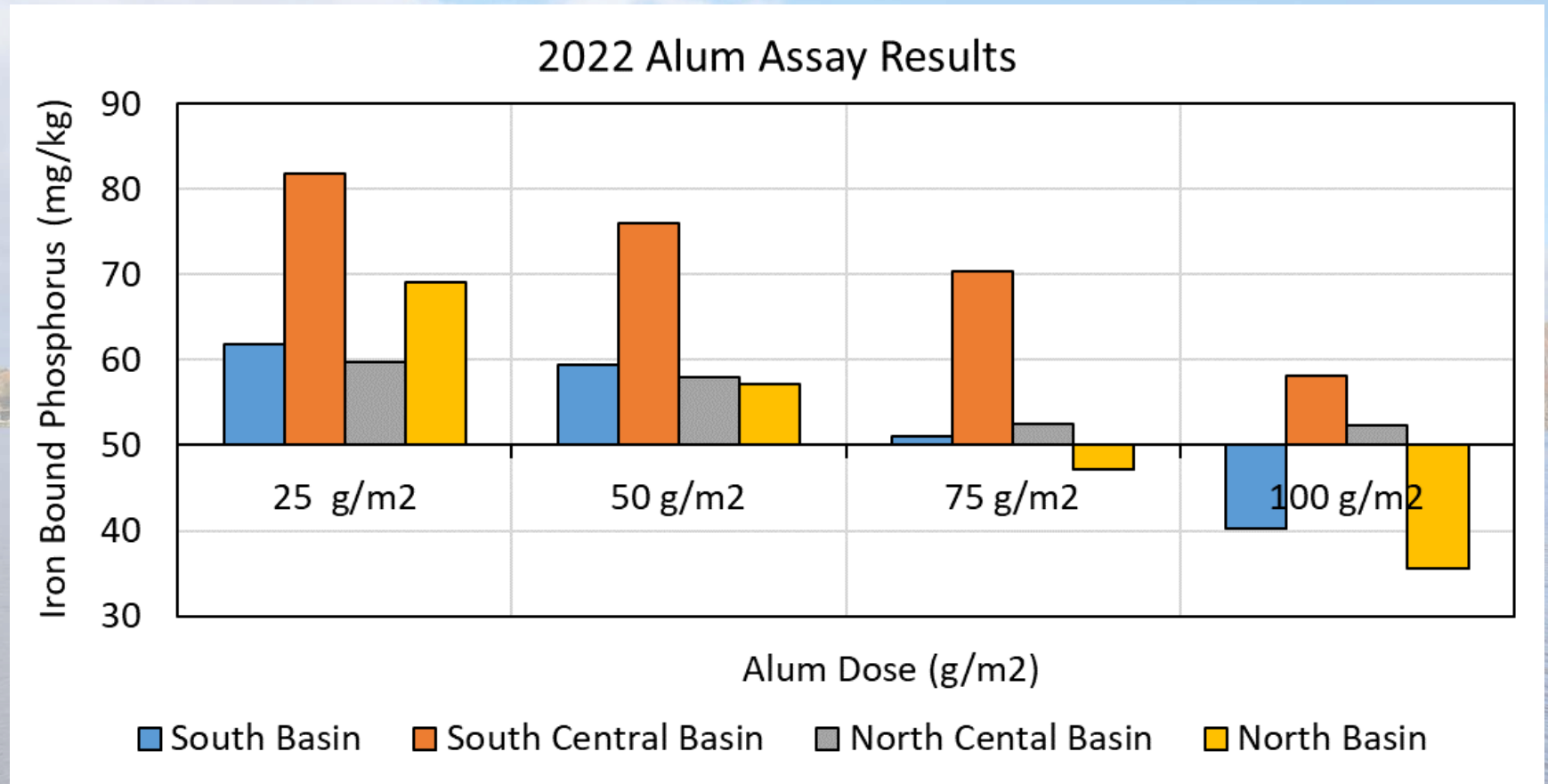
Timing of inferred eutrophic conditions and permitting of treatment facility raises questions.

Planning for Alum Treatment



Lots of sediment samples collected over the last 3 years...

Planning for Alum Treatment



Different concentrations of alum were titrated to achieve 50 g/m² – an important target threshold,

Planning for Alum Treatment

Sub Basin	Area (acres)	Area (m2)	Dose Year n (g/m2)	Dose Year n+2 (g/m2)	Alum Year n (kg)	Alum Year n+2 (kg)
South Basin	70.9	286,922	50	25	14,346	7,173
South Central Basin	155.9	630,905	75	25	47,318	15,773
North Central Basin	197.6	799,660	50	25	39,983	19,991
North Basin	156.7	634,143	50	25	31,707	15,854
Totals ----	581.1	2,351,630			133,354	58,791

The recommended two-treatment regime (Year n and Year n+2) extends longevity of treatment and provides fiscal flexibility.

A wide-angle photograph of a calm lake. In the background, a dense line of trees shows vibrant autumn foliage in shades of orange, yellow, and red. Several white houses are visible along the shoreline. The sky is a deep blue, filled with soft, white, scattered clouds. The water in the foreground is dark blue with gentle ripples.

Thank you.
Take it away Dom!