Special Meeting for Central Plymouth County Water District Commission

Listening Session for the Silver Lake Water Quality Study

Minutes of Monday, December 4, 2023, ZOOM Meeting

The meeting took place via Zoom video. The meeting can be viewed on YouTube at https://www.youtube.com/watch?v=VTYhk2pYwJs&t=584s

Quorum was reached with three Commissioners voting in affirmative, roll call vote: Chair O'Leary – yes, Commissioner Biechler – yes, and Commissioner Egerton – yes. Three in the affirmative, the meeting began at 6:01 PM. Chair O'Leary opened the meeting.

Chair O'Leary opened the meeting with an overview of the Central Plymouth County Water District Commission and its background.

The Chair introduced Kimberly Groff, of Groff Consulting, who is a consultant for the CPCWDC and manages the day to day study for the Commissioners. She gave an overview of the project's context and the project process. After outlining the Goals of the project, she shared there is detailed information on the project on the CPCWDC website at https://www.centralplymouthcountywater.org/water-quality-monitoring-at-silver-lake.html

Ms. Groff stated that comments on the study will be accepted until January 15, 2024 by emailing them to Frank Basler, fbasler@plymouthcountyma.gov. Frank can be reached at 508.830.9104.

Ms. Groff then introduced Matthew Ladewig, project manager of TRC Companies.

Mr. Ladewig shared an overview of the major technical findings of the study including:

- Aquatic species
- Cyanobacteria levels
- Cyanotoxins present
- Dissolved oxygen levels
- Sediment readings
- Nutrient levels

Mr. Ladewig stated in conclusion, the overall Assessment of Silver Lake, applying MassDEP's weight-of-evidence approach described in the Consolidated Assessment and Listing Methodology, results of 2021-2022 monitoring program suggest Silver Lake is:

- Not supportive of Aquatic Life
    - Non-native plants
    - Dissolved oxygen – already listed as impairment by MassDEP
    - Total phosphorus
- Supportive of Aesthetics
- Not supportive of Primary Contact Recreation (although swimming is prohibited)
    - Harmful algal blooms
- Supportive of Secondary Contact Recreation (also prohibited)

However, definitive water quality assessments for surface water use support are the responsibility of MassDEP's Watershed Planning Program. Data from this study were shared with MassDEP to support this process.

The study's conclusion and key takeaways:

- Silver Lake appears to be facing multiple management issues.
- These impact aquatic life and present a challenge to future use of Silver Lake as a public water supply.
- Excessive nutrients – particularly phosphorus – were associated with many of these issues.
- Internal loading from the sediments appeared to be the primary source of phosphorus to Silver Lake.
- Diversions from East Monponsett Pond were the primary external source of nutrients.

Mr. Ladwig shared TRC's recommendations for next steps:

- Develop and implement an appropriate management response plan to address current water quality issues and mitigate future risks.
- A large-scale approach will be needed to fully address the observed issues on a broader basis including:

1. Ongoing monitoring is recommended to track water quality, water quantity, and ecological trends.
2. Additional modeling could be used to evaluate the effectiveness of alternative management scenarios.
3. Ultimately, need to develop a comprehensive management plan for Silver Lake.
4. Participate in Old Colony Planning Commission Regional "Economic Resilience and Sustainable Water Supply Study."

Chair O'Leary thanked Matt Ladewig, the TRC team, and Kimberly Groff for their great work.

Pine duBois commented on the unusual depth of Silver Lake. She also asked Mr. Ladewig about what could be done about removal of the phosphorous in the sediment.

Jeremy Gillispie stated that he believed Halifax needs to start enforcing zoning controls for surface public water supply & groundwater protection. He also asked for details on the sediment in the lake.

Don Howard asked about the use of Aquaria water supply by the City of Brockton. Pat Hill, the Brockton City DPW Commissioner, said that the City is now using 1.5MM gallons a day from Aquaria and that level will be used for about 6 months during a City filtration replacement project. He shared that these decisions are based on economics. The use of Aquaria water is usually to offset the draw from Silver Lake.

The next regularly scheduled meeting is on Tuesday, January 23 at noon on Zoom.

The meeting was adjourned at 6:58 P.M. Roll call vote: Commissioner Biechler – yes; Commissioner Egerton – yes; and Chair O'Leary – yes. Motion passes 3-0.

Submitted by Frank Basler

Attachments: agenda for December 4, 2023, and the TRC PowerPoint.

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WATER DISTRICT COMMISSION
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NOTICE OF SPECIAL MEETING

DATE & TIME: **Monday, December 4, 2023, 6:00 pm**

MEETING LOCATION: **Zoom video/Teleconference**

Join Zoom Meeting https://us06web.zoom.us/j/88011471344 Meeting ID: 880 1147 1344

Dial by your location 646 876 9923 US 646 931 3860 US Meeting ID: 880 1147 1344

Simulcast on https://www.facebook.com/PlymouthCountyMA

This meeting notice is being filed and posted in each city or town within the Central Plymouth County Water District, pursuant to General Law Chapter 30A, Section 20. Said notice and agenda must be filed in the offices of the city and town clerks within the District **at least 48 hours** prior to such meeting. Such filing and posting shall be the responsibility of the officer calling the meeting.

AGENDA TO DISCUSS AND PRESENT STUDY FINDINGS

Meeting opening – Jack O'Leary, Chair of the CPCWDC

Background – Kimberly Groff

TRC Silver Lake Water Quality Study analysis and findings – Kimberly Groff and Matthew Ladewig

Public Comment

Action Items and Next Steps

Adjourn

Posted on Monday, November 20, 2023, at 12:00 pm at each of the eight Clerk's offices listed below and the County web site at www.plymouthcountyma.gov

TRC

Silver Lake Water Quality Monitoring Program

Technical Memorandum

Halifax, Plympton, Pembroke, and Kingston, Massachusetts

June 2023

2021-2022 Monitoring Results

Prepared For:

Central Plymouth County Water District Commission
44 Obery Street
Plymouth, Massachusetts 02360

Prepared By:

TRC Environmental Corporation
10 Hemingway Drive, 2nd Floor
East Providence, Rhode Island 02915

Central Plymouth County Water District Commission Public Meeting

Presentation of Silver Lake Monitoring Program Key Findings and Next Steps
December 4, 2023

Central Plymouth County Water District Commission

About The Central Plymouth County Water District Commission

- Established in 1964
- Serves Brockton, East Bridgewater, Halifax, Hanson, Kingston, Pembroke, Plympton and Whitman
- Is empowered to investigate and allocate water supply sources within the District, study water supply needs and resources, and investigate "all pertinent matters" relating to water quantity and quality, water resources protection, and water supply and treatment infrastructure
- Is committed to ensuring safe, sustainable drinking water supplies, ecological health and recreational enjoyment within the Central Plymouth County Water District.

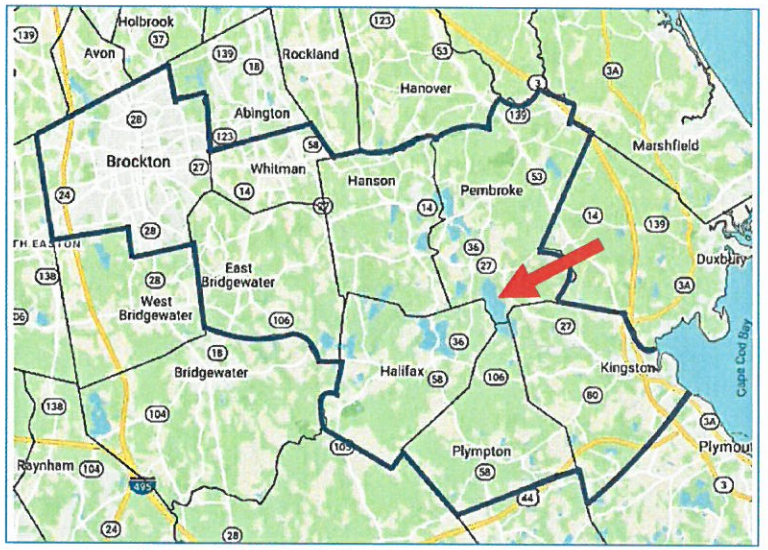
Central Plymouth County Water District Commission

Today's Outline

- Silver Lake background and project context
- TRC overview of key findings and recommended next steps
- Opportunity for participants to ask questions and provide feedback

Project Context

- Silver Lake is used for Public Water Supply and supports aquatic life
- The natural water flow to Silver Lake and associated waterbodies has been altered
- Silver Lake, East/West Monponsett Pond, Jones River, Eel River, Furnace Pond are all impaired by MassDEP
- MassDEP Phosphorus TMDL for Monponsett Pond
- Silver Lake is under stress from Diversions (Monponsett & Furnace Ponds) and polluted runoff
- Concerns prompted the Commission to initiate a Monitoring program in 2020 to understand the condition of the pond



Central Plymouth County Water District Commission

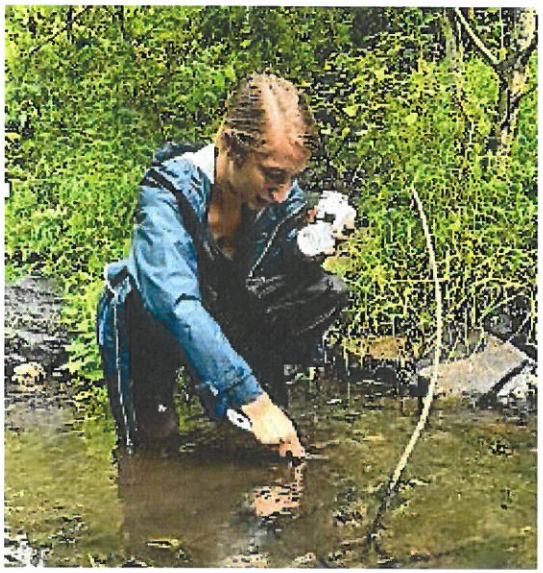
Overview of Silver Lake Monitoring Project Process

- TRC (under contract) – June 2021
- Public Involvement Plan – July 2021
- Draft Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) – August 2021
- **Public Meeting 1** (presentation of SAP and public comment) - August to September 2021
- Revised SAP– June 2022
- US EPA and MassDEP approved QAPP – May 2022
- Initiate Monitoring – August 2021, last sampling date – October 2022
- Additional sampling - September & October 2023
- Final Silver Lake Technical Memorandum Publicly Available – June 2023
- Formal Press Release – September 2023
- Submit Data to MassDEP for review and assessment – October 2023
- Addendum to Final Silver Lake Technical Memorandum – TBD
- **Public Meeting 2** – December 2023

Central Plymouth County Water District Commission

Goals of the Silver Lake Monitoring Project

1. Develop an understanding of current water quality
2. Collect information needed inform community management decisions to address water quality and quantity issues in Silver Lake and connected water bodies



Central Plymouth County Water District Commission Resources Page

- Silver Lake Public Information Tri-fold
- Silver Lake Technical Memorandum
- Silver Lake Monitoring Data Set
- All Commission Presentations/recordings
- Sampling and Analysis Plan
- Quality Assurance Project Plan
- Public Involvement Plan
- Project Schedule

https://www.centralplymouthcountywater.org/water-quality-monitoring-at-silver-lake.html

Purpose of Today

- Provide a summary of key technical findings and next steps
- Collect verbal feedback from you on Silver Lake Technical Memorandum findings and next steps
- Written comments from the public will help inform the next steps taken by the Commission

Central Plymouth County Water District Commission

To Provide Written Feedback

- Submit written comments to Frank Basler (fbasler@plymouthcountyma.gov)

by January 15, 2024 at 5PM via email

Silver Lake Water Quality Monitoring Program

Summary of Project Findings and Next Steps

Central Plymouth County Water District Commission
December 2023

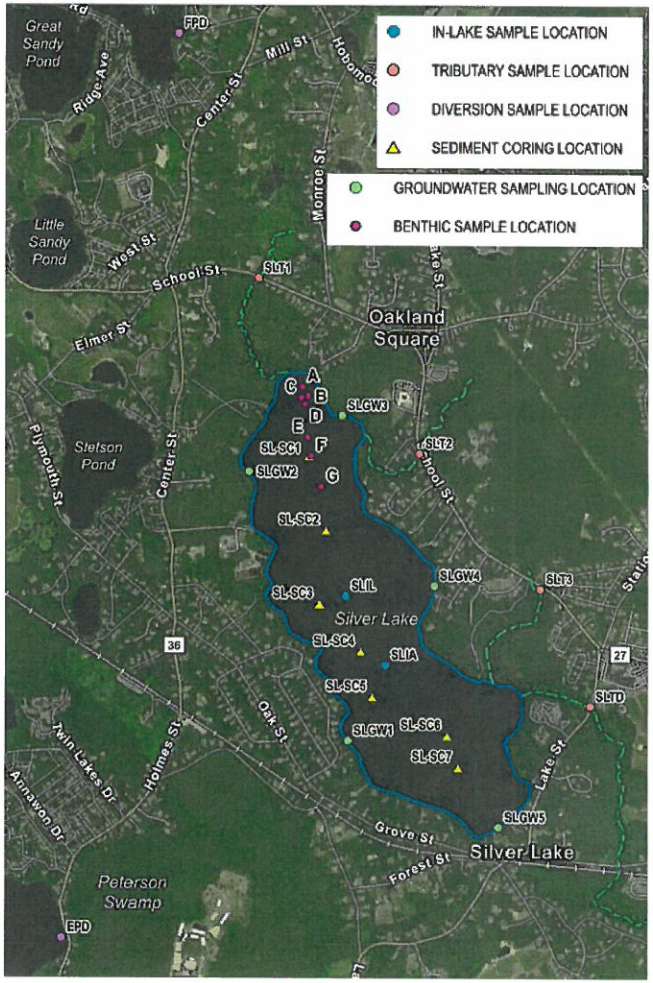
Central Plymouth County Water District Commission

SUPPORTING [DOING] LEADING

TRCcompanies.com

Monitoring Program At-a-Glance

- 29 total sampling locations
  - 4 in-lake surface water locations
  - 4 tributary and outlet surface water locations
  - 2 diversion source surface water locations
  - 7 sediment coring locations
  - 5 shoreline groundwater locations
  - 7 benthic macroinvertebrate locations
  - Additional in-lake water depth and aquatic plant mapping locations
- Monthly visits from September 2021 to October 2022
- Continuous data loggers in Silver Lake and streams
- More than 88,000 data points collected over course of program



Technical Findings

Silver Lake Water Quality Monitoring Program

Technical Findings – Overview

Key findings from the 2021-2022 study period:

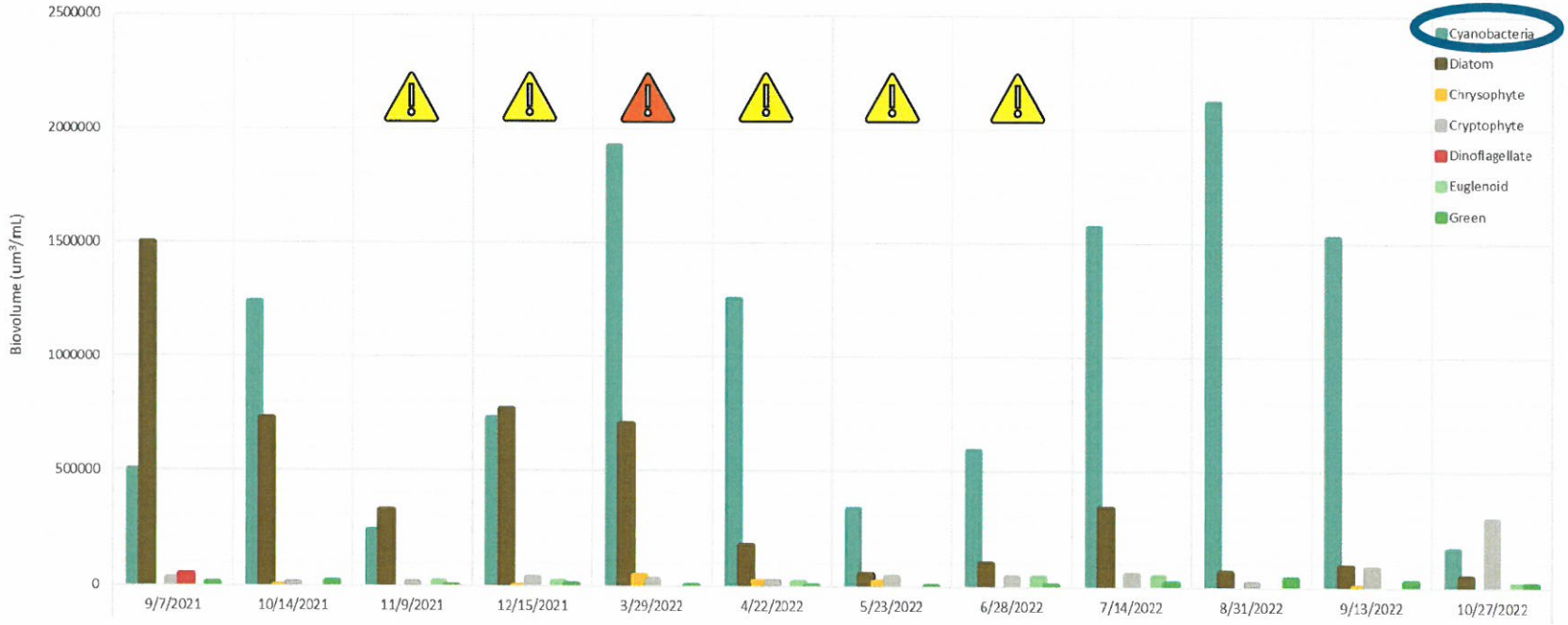
- Aquatic invasive plants present and widely distributed in Silver Lake
- Cyanobacteria common to dominant much of the year
- Cyanotoxins present at detectable concentrations each visit from November 2021 to June 2022
- Dissolved oxygen low or absent from bottom waters for several months of the year
- Sediments rich in phosphorus, including forms that readily release into the water column
- Nutrient levels elevated in water column

Technical Findings – Key Results: Plants

- Three aquatic invasive plants present
- Why are these an issue?
  - Large plants that outcompete native species and spread easily via fragmentation
  - Impact habitat for aquatic life
  - Contribute to eutrophication (nutrient enrichment)
  - May alter other water quality (e.g., dissolved oxygen) when abundant enough

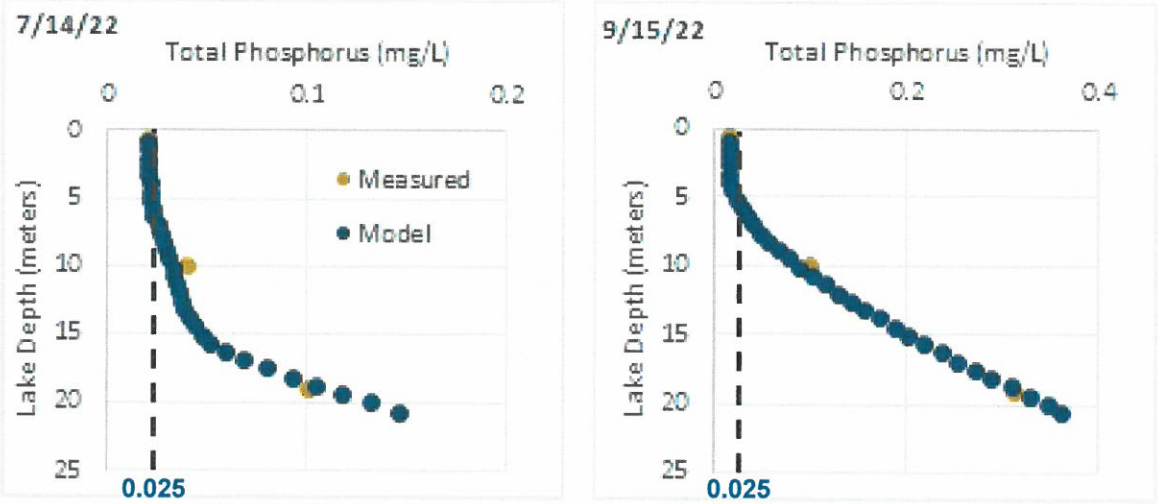
Technical Findings – Key Results: Cyanobacteria and Cyanotoxins (2021-2022)

- Cyanobacteria common to dominant much of the year
- ⚠ Cyanotoxins detectable from November 2021 to June 2022



Technical Findings – Key Results: Nutrients and DO

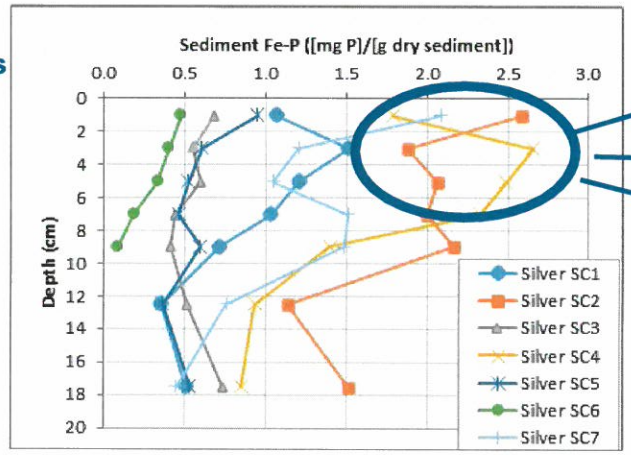
- Total phosphorus exceeds EPA's "Gold Book" standard of 0.025 mg/L (25 ppb)
- This suggests Silver Lake is at a high risk for cyanobacteria bloom issues (MassDEP 2021 Guidance on Cyanobacteria and Public Water Systems)



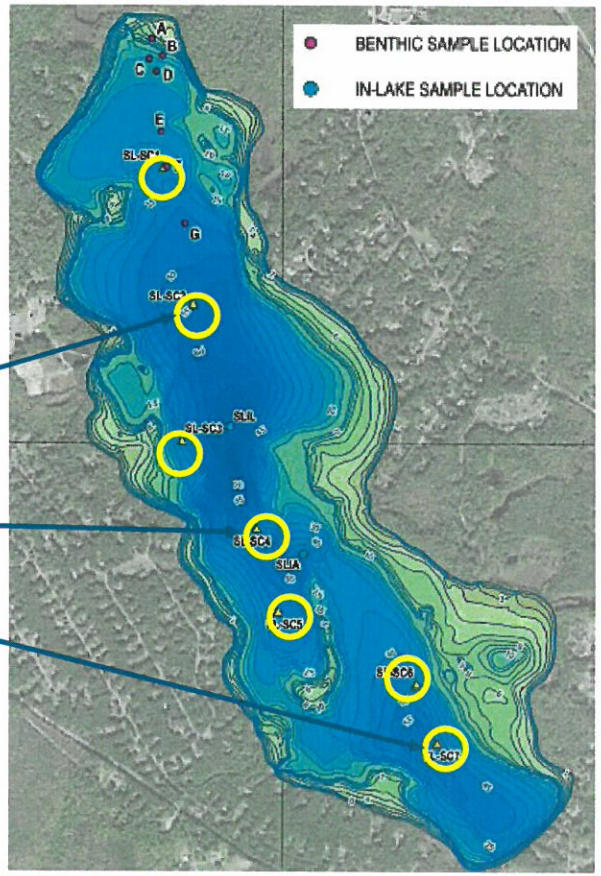
Technical Findings – Key Results: Sediment Phosphorus

- Internal Loading: Sediment phosphorus can easily release into the water when bound to iron and exposed to low dissolved oxygen over a long time
- Iron-bound phosphorus is abundant in surface sediments of Silver Lake, especially in deeper waters

More Recent Sediments



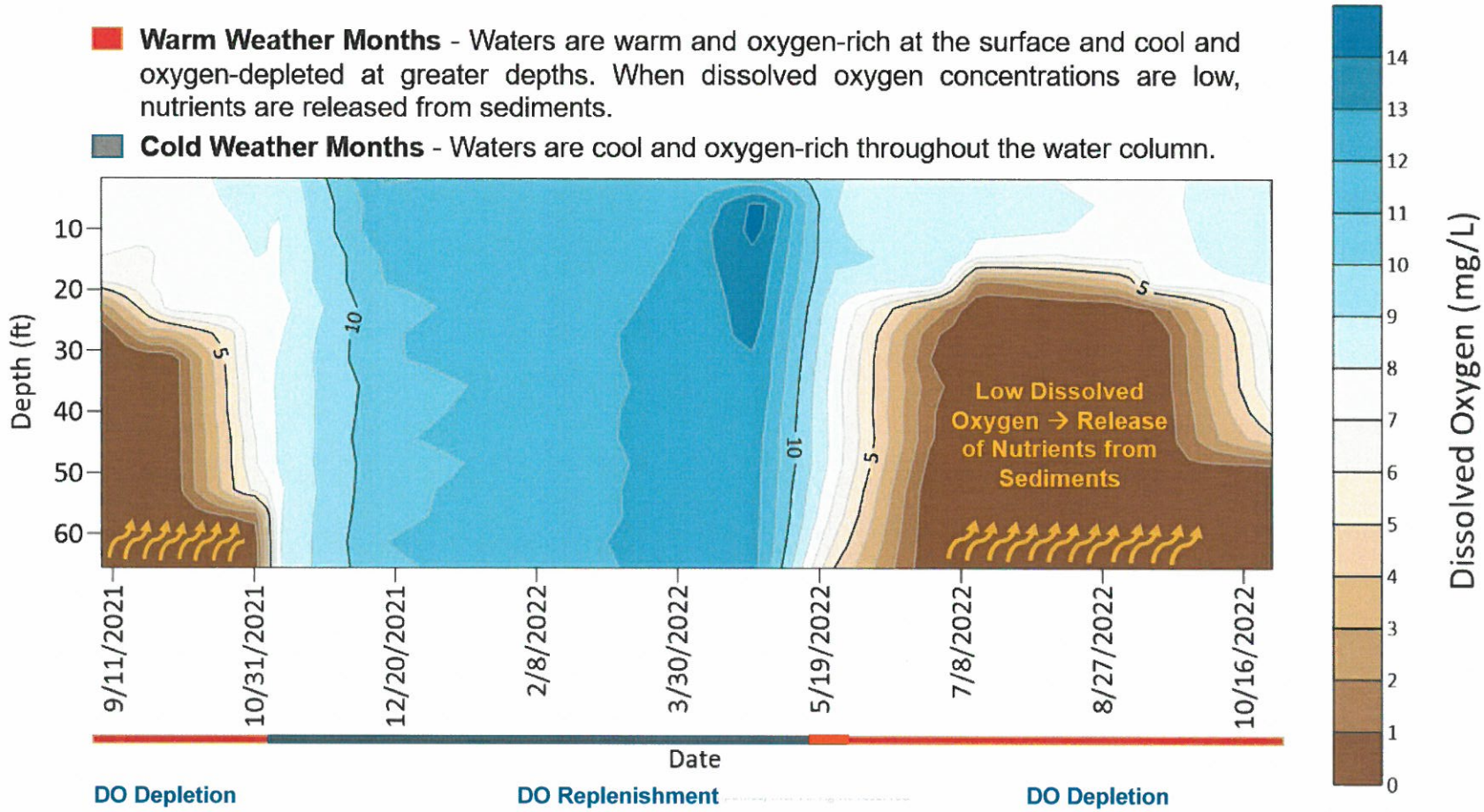
Older Sediments



Technical Findings – Key Results: Nutrients and DO

Warm Weather Months - Waters are warm and oxygen-rich at the surface and cool and oxygen-depleted at greater depths. When dissolved oxygen concentrations are low, nutrients are released from sediments.

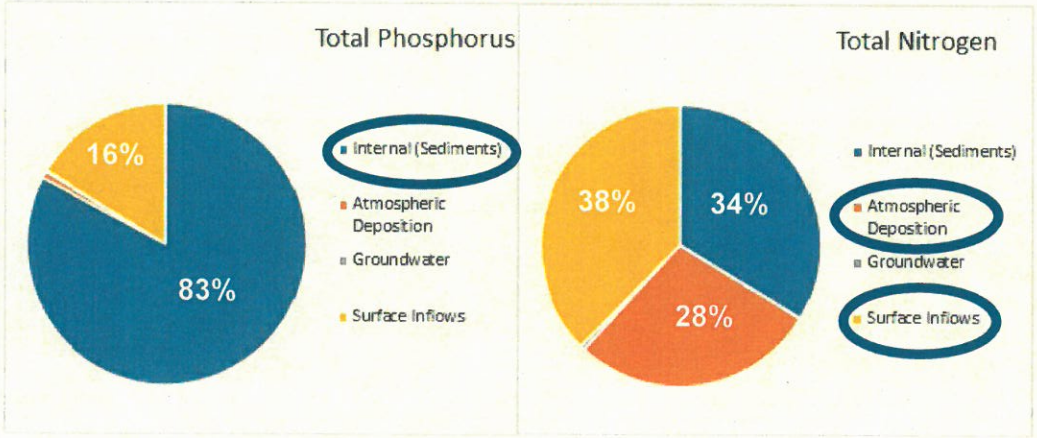
Cold Weather Months - Waters are cool and oxygen-rich throughout the water column.



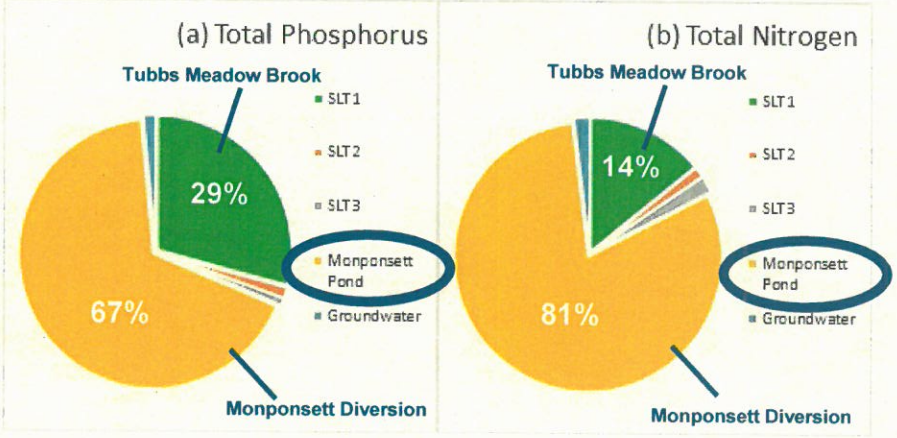
Technical Findings: Nutrient Loading to Silver Lake

- Internal loading from sediments was largest source of phosphorus to Silver Lake (>80%)
- External loading accounted for a larger share of nitrogen loading, mostly through surface inflows and atmospheric deposition
- Monponsett diversion was the largest source of external phosphorus (67%) and nitrogen (81%) loading

All Loading



Surface and Groundwater Loading Only



Conclusions and Recommendations for Next Steps

Silver Lake Water Quality Monitoring Program

In Conclusion – Overall Assessment of Silver Lake

Applying MassDEP's weight-of-evidence approach described in the Consolidated Assessment and Listing Methodology, results of 2021-2022 monitoring program suggest Silver Lake is:

- Not supportive of Aquatic Life
  - Non-native plants
  - Dissolved oxygen – already listed as impairment by MassDEP
  - Total phosphorus
- Supportive of Aesthetics
- Not supportive of Primary Contact Recreation (although swimming is prohibited)
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In Conclusion – Key Takeaways

- Silver Lake appears to be facing multiple management issues.
- These impact aquatic life and present a challenge to future use of Silver Lake as a public water supply.
- Excessive nutrients – particularly phosphorus – were associated with many of these issues.
- Internal loading from the sediments appeared to be the primary source of phosphorus to Silver Lake.
- Diversions from East Monponsett Pond were the primary external source of nutrients.

Recommendations for Next Steps

- Develop and implement an appropriate management response plan to address current water quality issues and mitigate future risks.
- Large-scale approach will be needed to fully address the observed issues on a broader basis.

1. Ongoing monitoring is recommended to track water quality, water quantity, and ecological trends.
2. Additional modeling could be used to evaluate the effectiveness of alternative management scenarios.
3. Ultimately, need to develop a comprehensive management plan for Silver Lake.
4. Participate in Old Colony Planning Commission Regional "Economic Resilience and Sustainable Water Supply Study."

What Do You Think?
Feedback & Comments

Remember - To Provide Written Feedback:

Submit written comments to Frank Basler (fbasler@plymouthcountyma.gov)

by January 15, 2024 at 5PM via email