



# Tioughnioga Lake 9 Element Watershed Management Plan

PUBLIC MEETING #2

June 8, 2023

# Zoom Features Overview

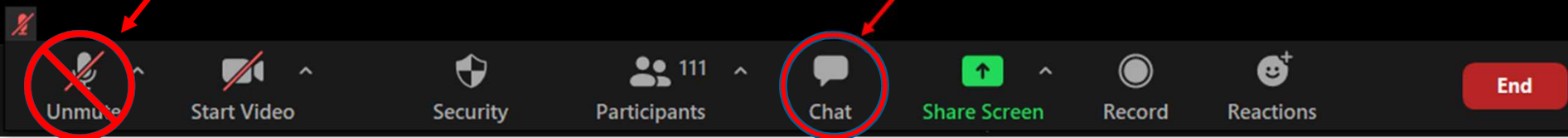


Zoom ▾

Leave

Please **keep microphones muted** during the meeting

Please utilize chat button to submit questions





## Project Team Introductions

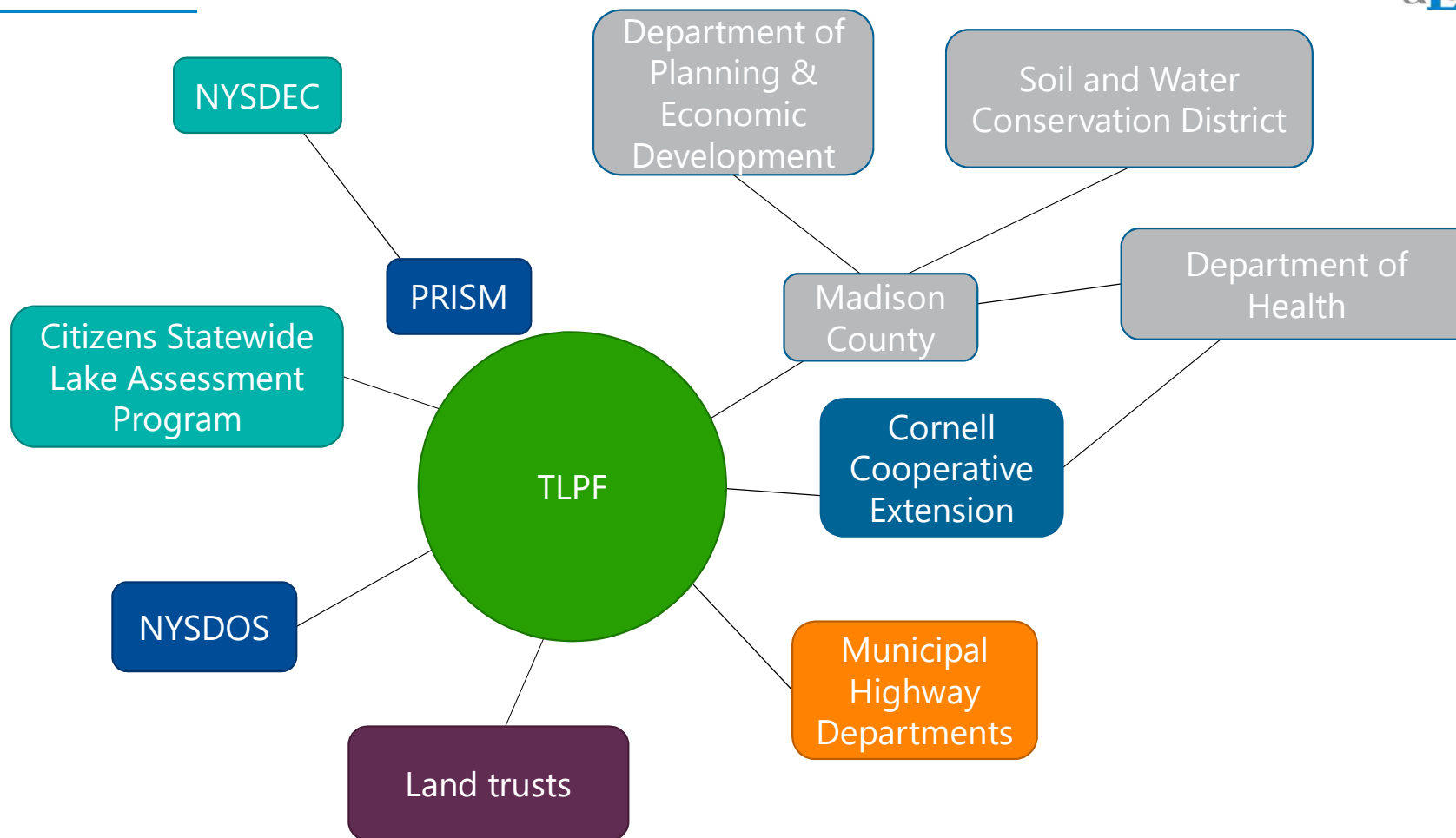
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- Barton & Loguidice, D.P.C.
- Anchor QEA
- Upstate Freshwater Institute
- Stakeholders



# Project Stakeholders



# Agenda

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- I. Welcome and Introductions
- II. Overview of the Nine Element Watershed Management Plan
- III. Progress to Date
- IV. Public Feedback
- V. Discussion: Vision and Opportunities
- VI. Next Steps





The Experience to **Listen**.  
The Power to **Solve**.

# 9E Plan Overview



# Watershed Planning Framework



## Similarities and Differences: Watershed Management Plans / Nine Element Plans

Attribute	Watershed Management Plan	Nine Element Plan
Best Available Science	★	★
Community-driven Priorities	★	★
Public Engagement	★	★
Commitment to Adaptive Management	★	★



## Similarities and Differences: Watershed Management Plans / Nine Element Plans

Attribute	Watershed Management Plan	Nine Element Plan
Best Available Science	★	★
Community-driven Priorities	★	★
Public Engagement	★	★
Commitment to Adaptive Management	★	★
USEPA/NYSDEC Framework		★
Quantitative Analysis of Sources and Targets		★
Tool to Focus Investments on Effective Measures for Remediation/Protection		★

# The Nine Elements



Quantify Pollutant Inputs and Sources

Set Pollutant Reduction Goals

Identify Best Management Practices

**Implementation Plan**

Schedule

Funding Sources

Measure Progress

Monitoring

Evaluation

 = 9E elements where water quality models can be used to support evaluations



The Experience to **Listen**.  
The Power to **Solve**.

# Progress to Date

## Where are We Now? Current Conditions and Trends

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### **Watershed Characteristics**

- Land Use/Land Cover
- Population, Housing, Waste Disposal
- Agricultural Practices

### **Water Quality Conditions**

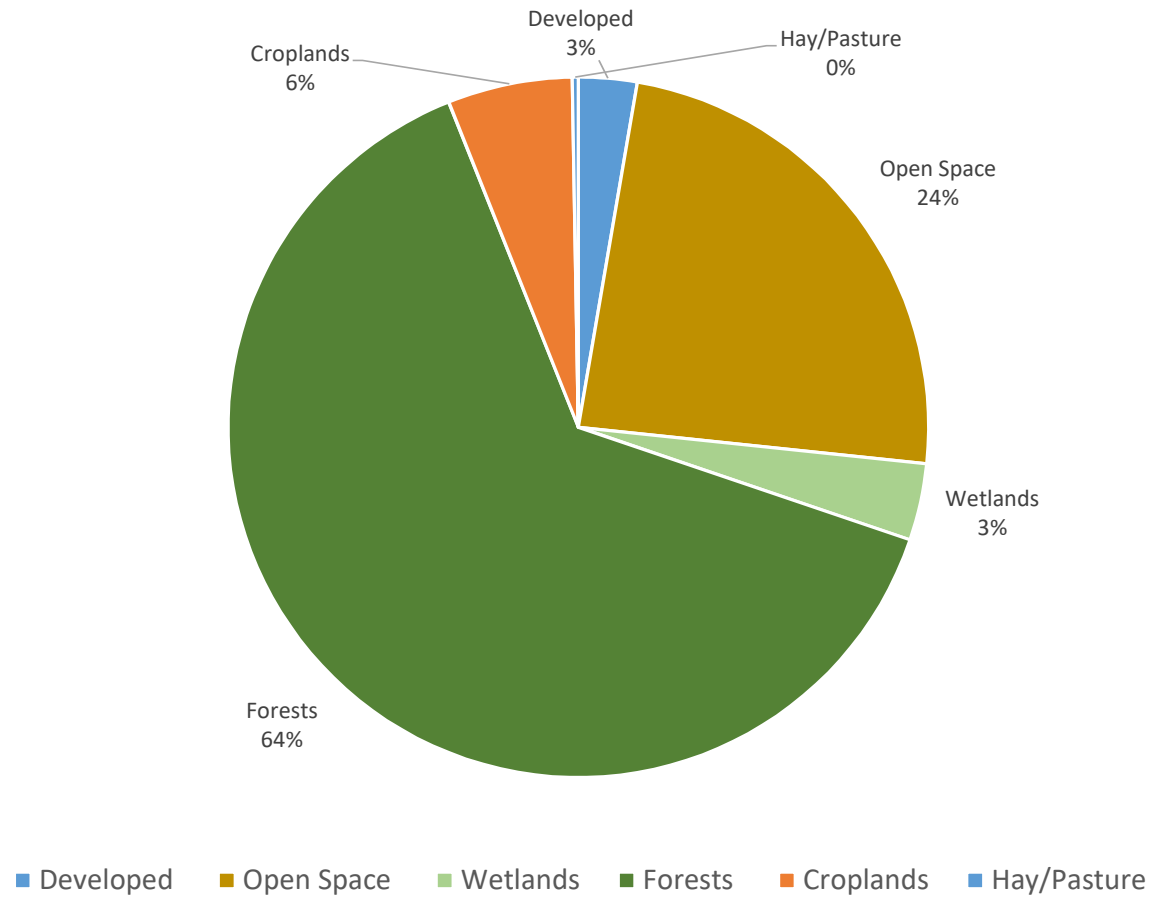
- Streams, including storm events
- DeRuyter Reservoir (CSLAP data)

### **Community Initiatives**

- Partnerships
- Local Laws
- Infrastructure (roadways, ditches, etc.)



# DeRuyter Reservoir Land Cover





# Watershed Monitoring and Analysis

## Monitoring Report for DeRuyter Reservoir Tributaries, 2020

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Prepared for:  
Toughnioga Lake Preservation Foundation  
P.O. Box 476  
DeRuyter, NY 13052

Prepared by:  
Upstate Freshwater Institute  
224 Midler Park Drive  
Syracuse, NY 13206



April 2021

## DeRuyter Reservoir Tributaries Monitoring Report, 2021

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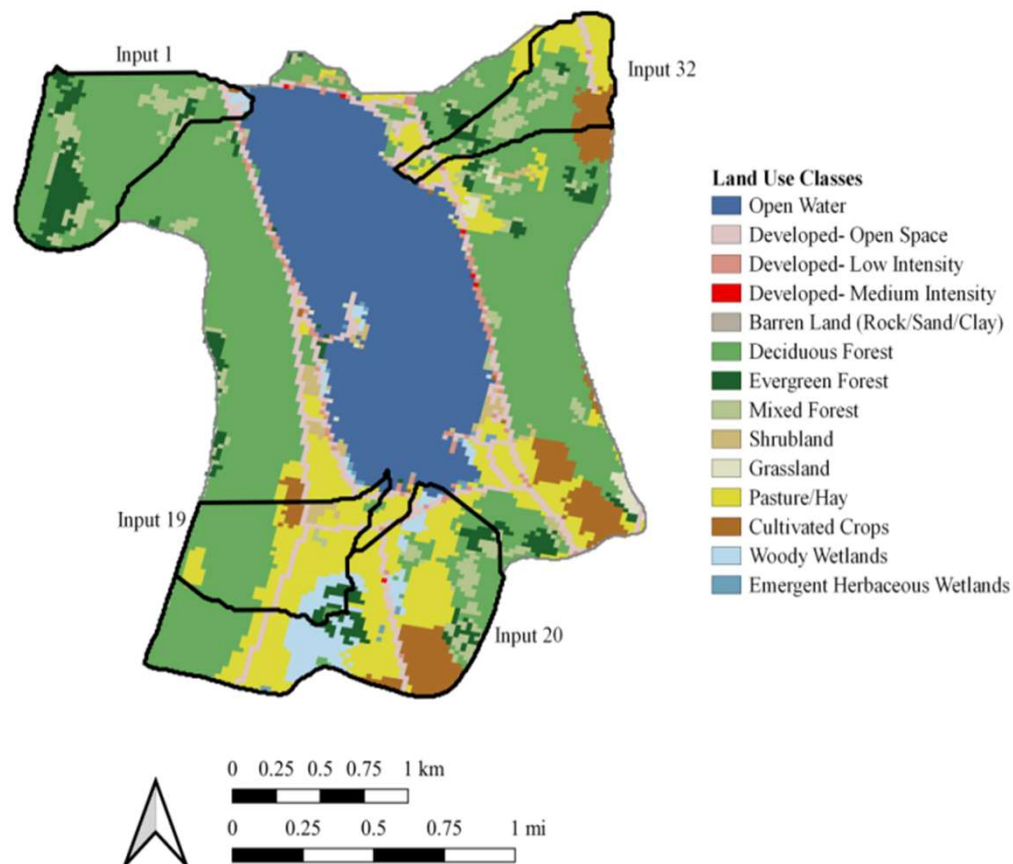
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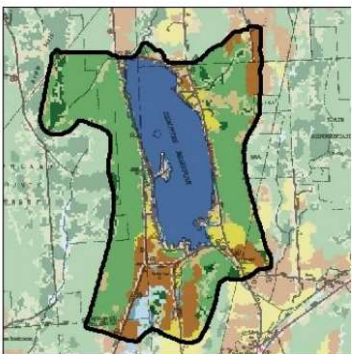
March 2022

## Key Findings from Tributary Monitoring



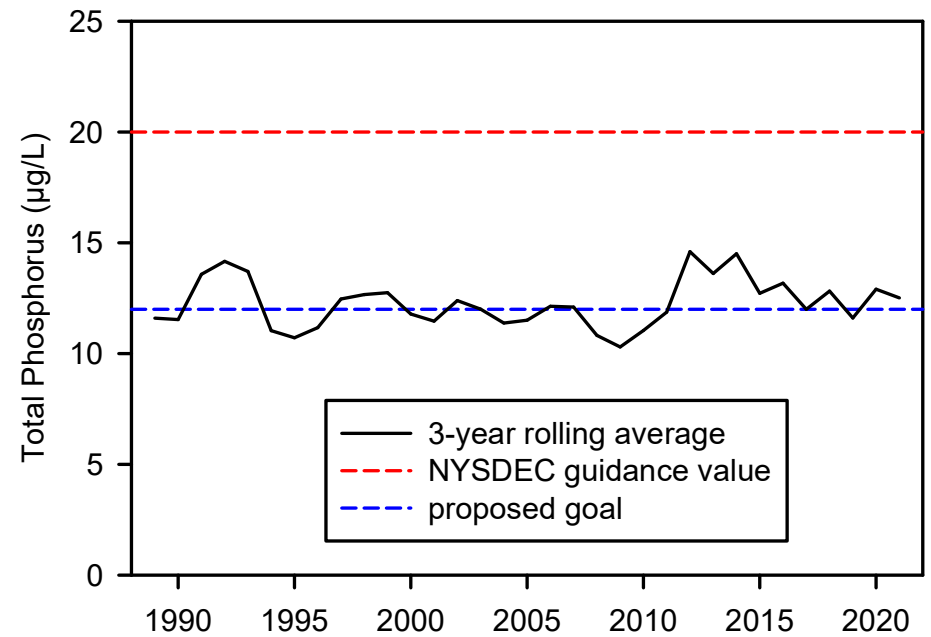
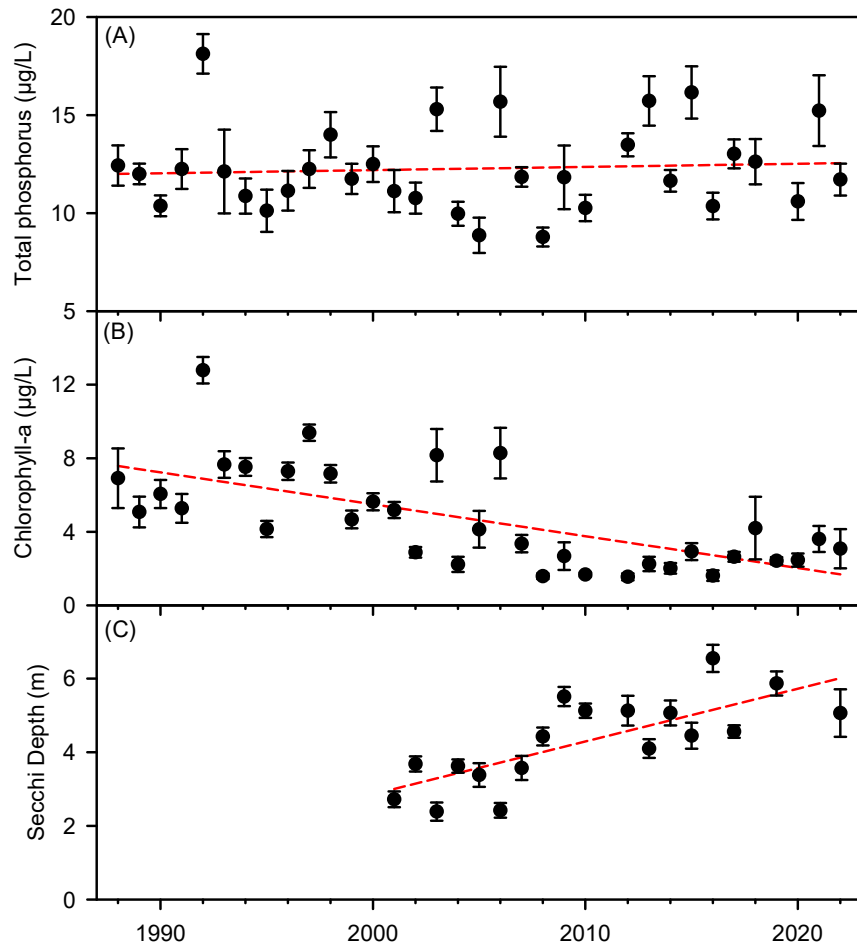
- Inputs 1 and 32 are flashy, ephemeral, and have relatively high sediment loads
- Inputs 19 and 20 are perennial and have higher concentrations of dissolved nutrients (phosphorus and nitrogen)
- Consistent with topography and land cover
- Implications for water quality management

## Citizens Statewide Lake Assessment Program (CSLAP)

<b>DeRuyter Reservoir</b>		Toughnioga Lake Association or DeRuyter Lake Association	Town of DeRuyter	Madison County
	<b>Lake Characteristics</b>	Surface area (ac/ha)	557 / 225	
		Max depth (ft/m)	52 / 16	
		Mean depth (ft/m)	24 / 7	
		Retention time (years)	3.3	
		Lake Classification	B	
		Dam Classification	0	
	<b>Watershed Characteristics</b>	Watershed area (ac/ha)	2498/1011	
		Watershed / Lake ratio	4	
		Lake & wetlands %	19%	
		Agricultural %	1%	
		Forest, shrub, grasses %	80%	
		Residential	<1%	
	<b>CSLAP Participation</b>	Years	1988-2010, 2012-2019	
Volunteers		Kathy Sherlock and Jim Adsitt		
<b>Trophic state</b>	<b>HABs Susceptibility</b>	<b>Invasive Vulnerability</b>	<b>PWL Assessment</b>	
Mesotrophic	Frequent blooms, Moderate Susceptibility	Invasives present, High Vulnerability	Stressed	

- Volunteer lake monitoring and education program
- Collaboratively managed by NYSDEC and NYSFOLA
- Monitors existing water quality of lakes, ponds and reservoirs
- 180+ lakes in 2023
- DeRuyter has participated annually from 1988-present
- Provides data for evaluation of water quality trends

# DeRuyter Reservoir Water Quality Trends



**Current 3-Year Rolling Average In-Lake Phosphorus Concentration = 12.5  $\mu\text{g/L}$**

Selected Area 4 mi<sup>2</sup>



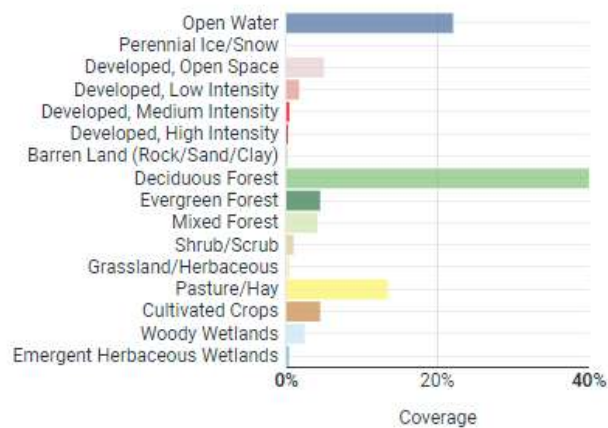
Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land Use/Cover 2019 (NLCD19)

**Land Use/Cover 2019 (NLCD19)**

Related Layer: Land Use/Cover 2019 (NLCD19)  Turn off

Source: National Land Cover Database (NLCD 2019)

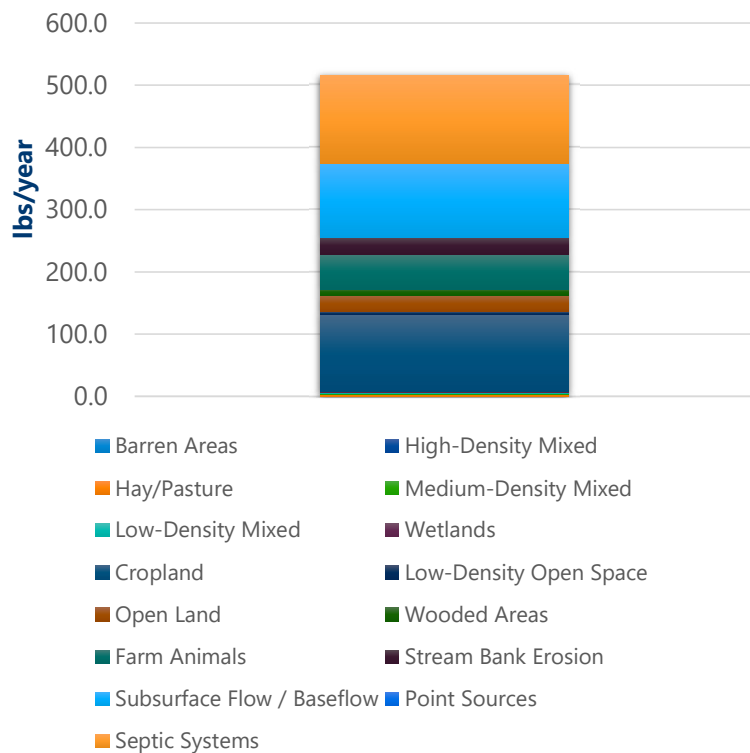


## Quantitative Tool: Model My Watershed

- Assess Current Conditions
- Forecast
  - Effects of a Changing Climate
  - Continued Residential Growth
  - Agricultural Practices
  - Increased Hydrologic Resilience



## Annual Phosphorus Contributions by Source



## Sources of Phosphorus - Existing

Sources	Area (acres)	Existing Conditions	
		Total Phosphorus (lb/year)	Loading Rate (lbs/acre)
Barren Areas	0.4	0	0.00
High-Density Mixed	0.4	0.1	0.25
Hay/Pasture	6.0	3.1	0.52
Medium-Density Mixed	10.7	1.7	0.16
Low-Density Mixed	45.8	1.5	0.03
Wetlands	74.8	1.3	0.02
Cropland	121.5	123.6	1.02
Low-Density Open Space	135.9	4.3	0.03
Open Land	369.8	26.9	0.07
Wooded Areas	1,346.5	10	0.01
Farm Animals	N/A	55.9	N/A
Stream Bank Erosion	N/A	26.5	N/A
Subsurface Flow / Baseflow	N/A	118.6	N/A
Point Sources	N/A	0	N/A
Septic Systems	N/A	142	N/A
<b>TOTAL</b>	<b>2,111.8</b>	<b>515.5</b>	<b>0.24</b>

# Climate Projections: Increased Rainfall Scenario



## Approach

Climate Projection/Increased Rainfall Scenario included increasing of storm event magnitudes by 15% for storm events falling between the 1-year (1.95") and 100-year (5.68") 24-hour extreme precipitation design storms.

Sources	Area (acres)	Extreme Precip (Applied to 1.95" - 5.68" Events)		
		Total Phosphorus (lb)	Loading Rate (bs/acre)	% P Loading Increase
Barren Areas	0.4	0	0.00	0.0%
High-Density Mixed	0.4	0.1	0.25	0.0%
Hay/Pasture	6.0	4.2	0.70	35.5%
Medium-Density Mixed	10.7	1.8	0.17	5.9%
Low-Density Mixed	45.8	1.6	0.03	6.7%
Wetlands	74.8	1.7	0.02	30.8%
Cropland	121.5	174.1	1.43	40.9%
Low-Density Open Space	135.9	4.7	0.03	9.3%
Open Land	369.8	38.1	0.10	41.6%
Wooded Areas	1,346.5	13.6	0.01	36.0%
Farm Animals	N/A	59.5	N/A	6.4%
Stream Bank Erosion	N/A	28.7	N/A	8.3%
Subsurface Flow / Baseflow	N/A	131.6	N/A	11.0%
Point Sources	N/A	0	N/A	0.0%
Septic Systems	N/A	142	N/A	0.0%
<b>TOTAL</b>	<b>2,111.8</b>	<b>601.7</b>	<b>0.28</b>	<b>16.7%</b>



## Key Takeaways

- Greatest sources of phosphorus loading:
  - Agricultural activities
  - Septic systems
  - Subsurface/Baseflow
- Current Estimated annual phosphorus load = 515 lbs/year
- Current estimated increase from climate projection scenario = 86 lbs/year (16.7% increase)



## Goals

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- **Watershed Goal = Hydrologic Resilience**
- Maintain baseline phosphorus loading through anticipated climate change
  - Reduce total annual phosphorus load for climate projection by 86.2 lbs (16.7%)
  - Avoid increase in phosphorus loading associated with future increased rainfall projections



## Phosphorus Goals

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- In-Lake Goal = concentrations not exceeding 12 ug/L
- Current 3-year rolling average = 12.5 ug/L





## How Do We Get There?

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1. Identify feasible and fundable mitigation alternatives
2. Identify applicable funding sources
3. Identify lead stakeholders and agencies

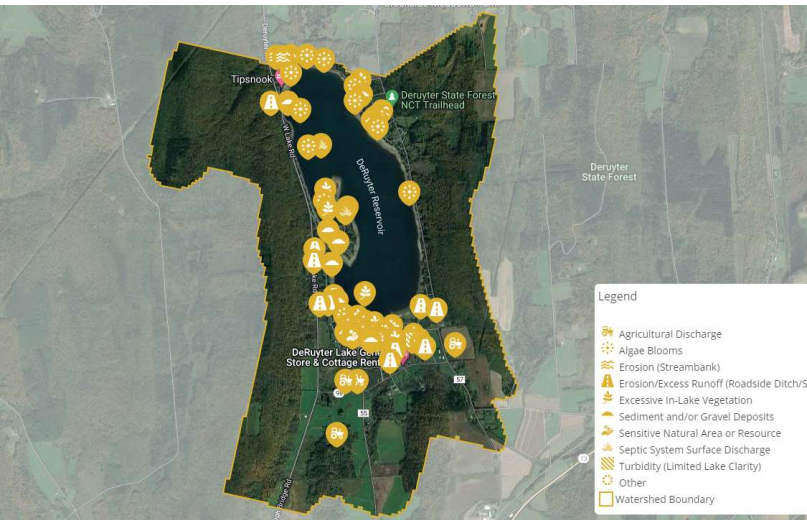




The Experience to **Listen**.  
The Power to **Solve**.

# Public Feedback

# Local Input: Areas of Concern



- Interactive Mapper - Identify problem areas or potential opportunities for watershed improvement
- Community Survey – Identify stakeholder priorities and perceptions of the watershed

- [TLPF Website](#)
- [Interactive Mapper](#)
- [Community Survey](#)

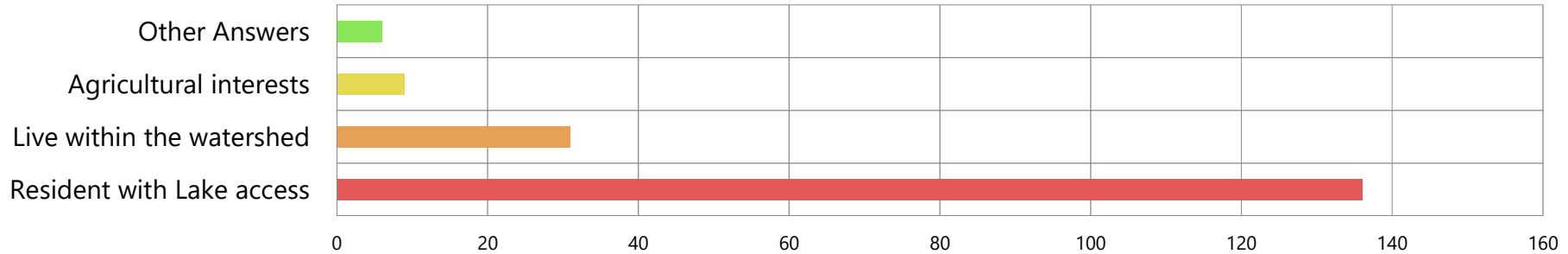


<https://www.foundationatderuyterlake.org/watershedmanagement>

# Community Survey – Summary & Takeaways

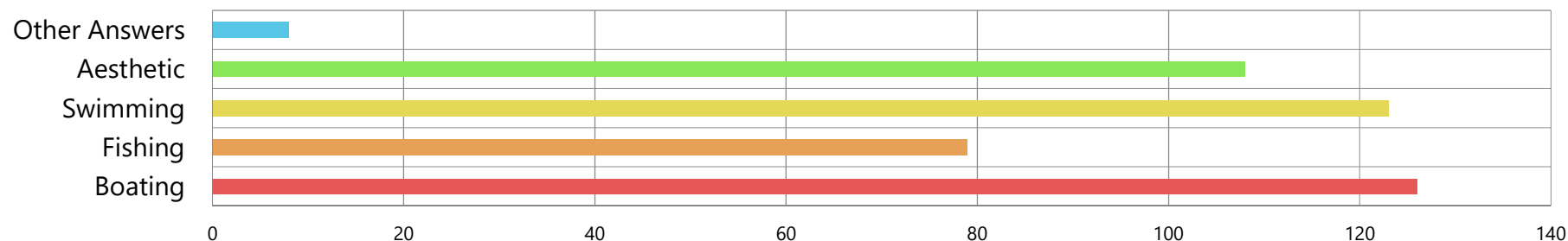


**What is your interest in the Lake? Check all that apply.**

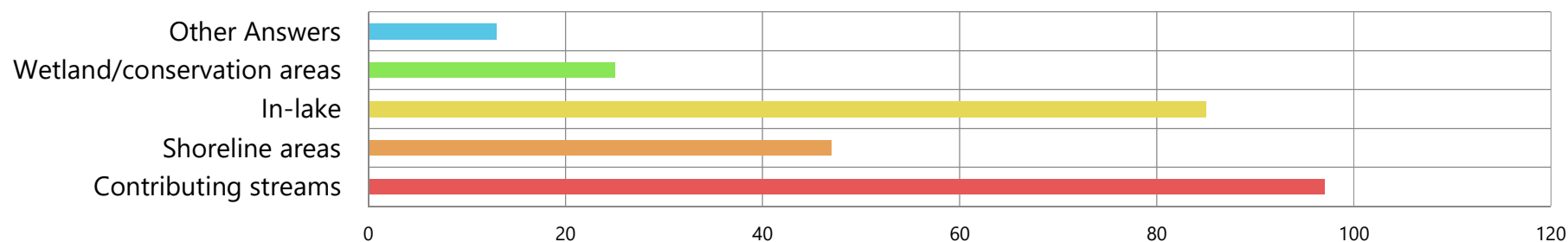


# Community Survey – Summary & Takeaways

## What are your primary uses of the Lake? Check all that apply.

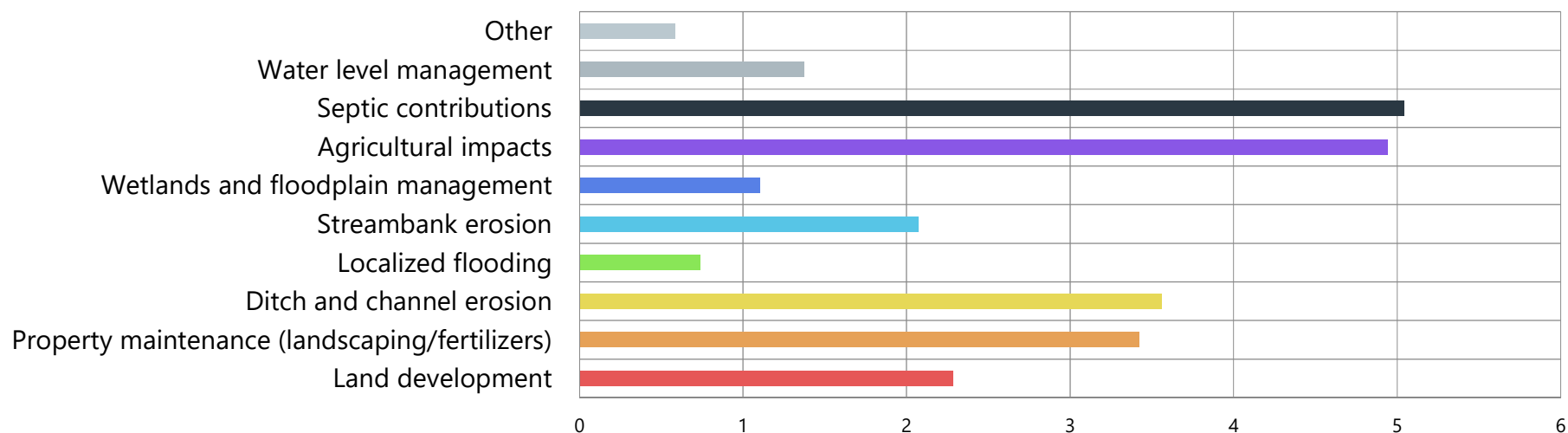


## What areas of the watershed show the greatest need for improvement? Check all that apply.



# Community Survey – Summary & Takeaways

## Rank the top 3 primary threats to Lake water quality (1 being the greatest contributor).

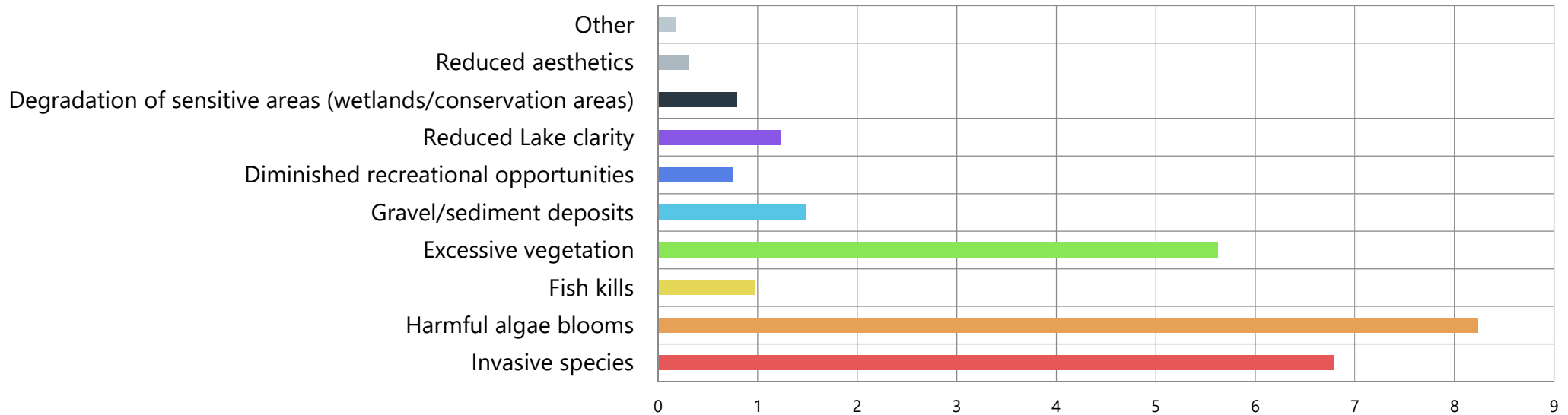




# Community Survey – Summary & Takeaways

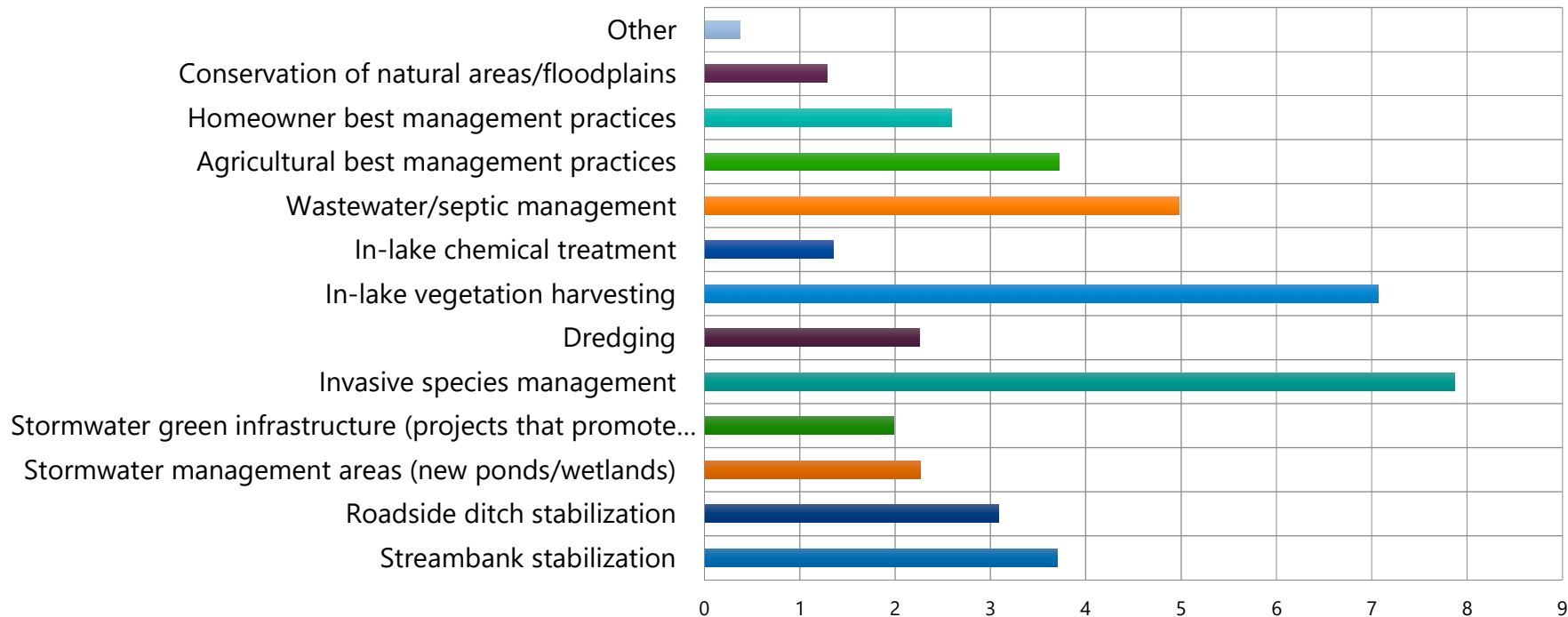


**Rank your 3 primary concerns for Lake protection (1 being the most important).**



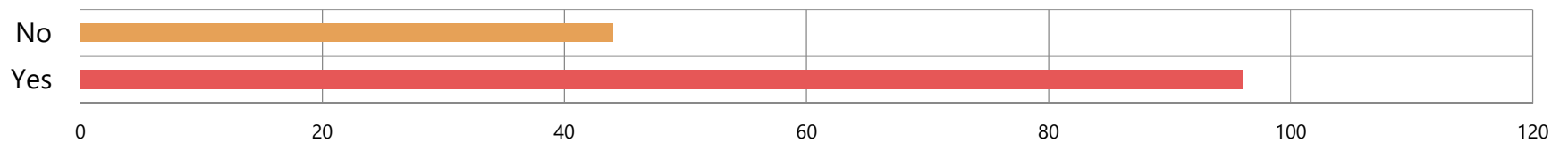
# Community Survey – Summary & Takeaways

**What types of Lake improvement projects would you like prioritized? Rank top 5, 1 being most important.**

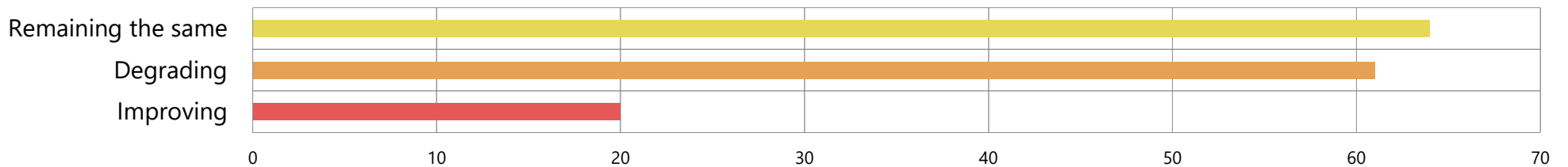


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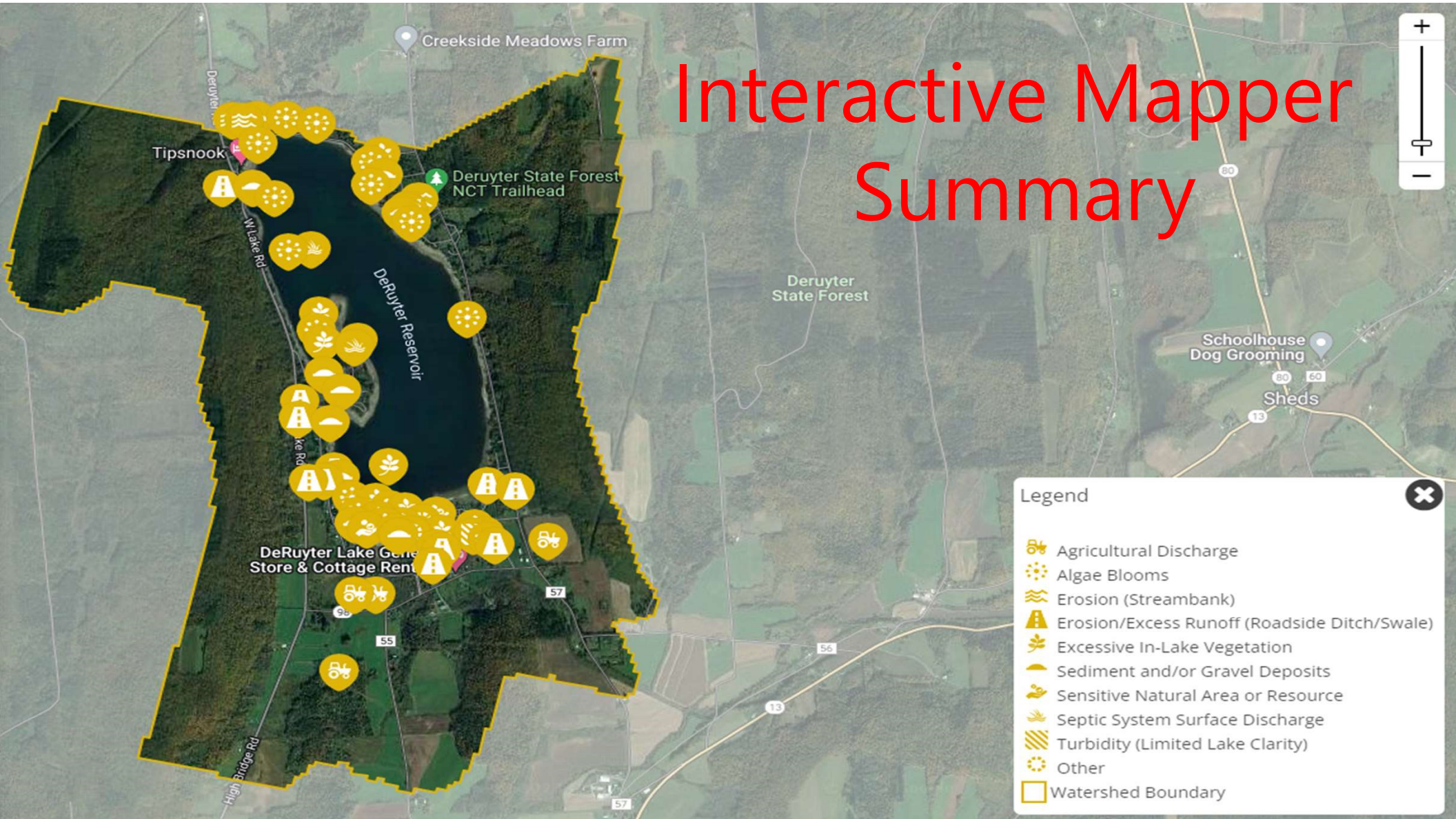
## Do you feel there is a need for increased public education and outreach to achieve water quality goals?



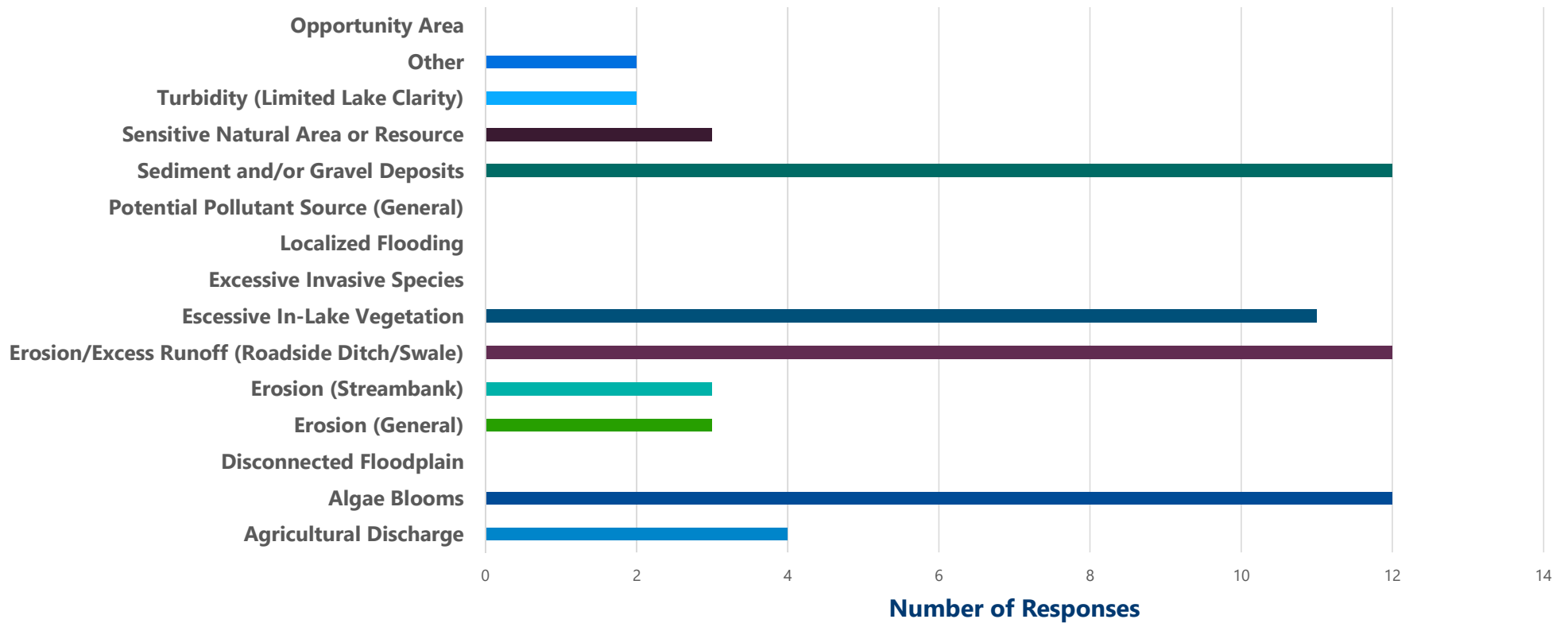
## Do you feel that Lake water quality is improving, degrading, or remaining the same?



# Interactive Mapper Summary



## Interactive Mapper Response Summary







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The Power to **Solve**.

# Vision & Opportunities

## Vision: Where do We Want to Be?

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***“The DeRuyter Reservoir Watershed is a healthy and resilient ecosystem that provides clean water, habitat for a diverse assemblage of terrestrial and aquatic native species, recreational opportunities, economic benefits, and aesthetic enjoyment for current and future generations. Realization of this vision requires the sustained actions of the Tioughnioga Lake Preservation Foundation and other stakeholders to manage the lake and its watershed.”***

## Potential Watershed Based Scenarios to Increase Hydrologic Resilience

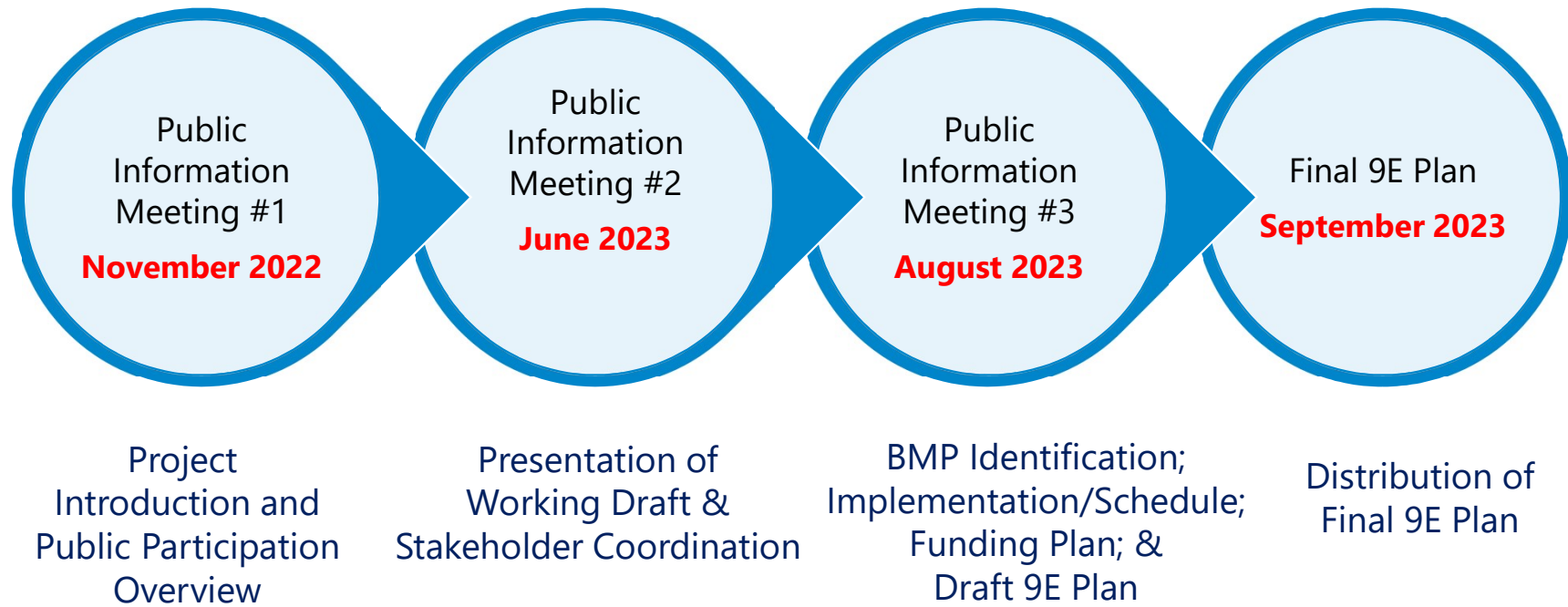
- Streambank and Road Ditch Stabilization
- Agricultural Best Management Practices
- Stormwater Retrofits and Detention
- Riparian Buffers and Floodplain Enhancement
- Wetland Creation
- Capture and Infiltration of Stormwater – Green Infrastructure
- Household Waste System Management



The Experience to **Listen**.  
The Power to **Solve**.

# Next Steps

# Project Schedule





## *Questions & Discussion*



## Contact Information

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Keith Ward

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Kathleen Sherlock

[kathsherlock@msn.com](mailto:kathsherlock@msn.com)



**foundationatderuyterlake.org**  
*Let's Keep DeRuyter Lake Beautiful*

**[Project Website \(survey and interactive mapper\)](https://www.foundationatderuyterlake.org/watershedmanagement)**

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# Contact Information

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Liz Moran, Anchor QEA  
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Dave Matthews, Upstate Freshwater Institute  
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