



# DeRuyter Reservoir 9 Element Watershed Management Plan

PUBLIC MEETING #3

August 29, 2023

# Zoom Features Overview

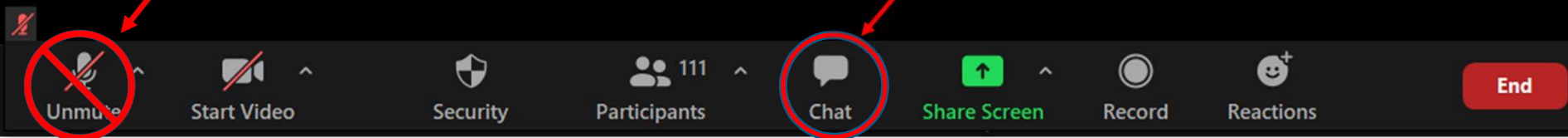


Zoom ▾

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Please **keep microphones muted** during the meeting

Please utilize chat button to submit questions



# Agenda

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- I. Welcome and Introductions
- II. Watershed Planning using the Nine Element Approach
- III. Findings and Recommendations
- IV. Next Steps





## Project Team Introductions

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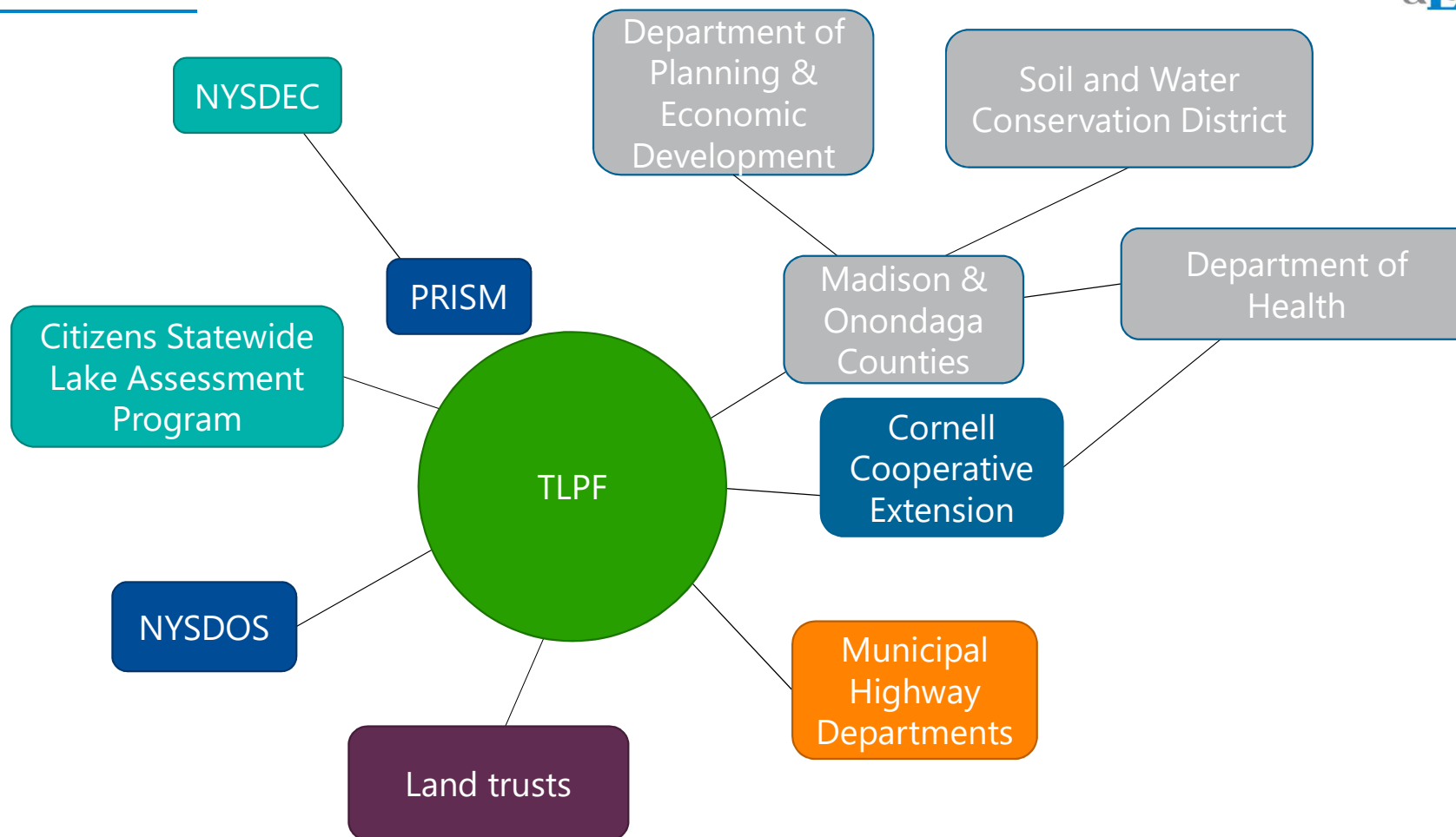
- Barton & Loguidice, D.P.C.
- Anchor QEA
- Upstate Freshwater Institute
- Stakeholders



# Project Schedule



# Project Stakeholders





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**.

# Major Findings

## Current Conditions and Trends

### **Watershed Characteristics**

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

### **Water Quality Conditions**

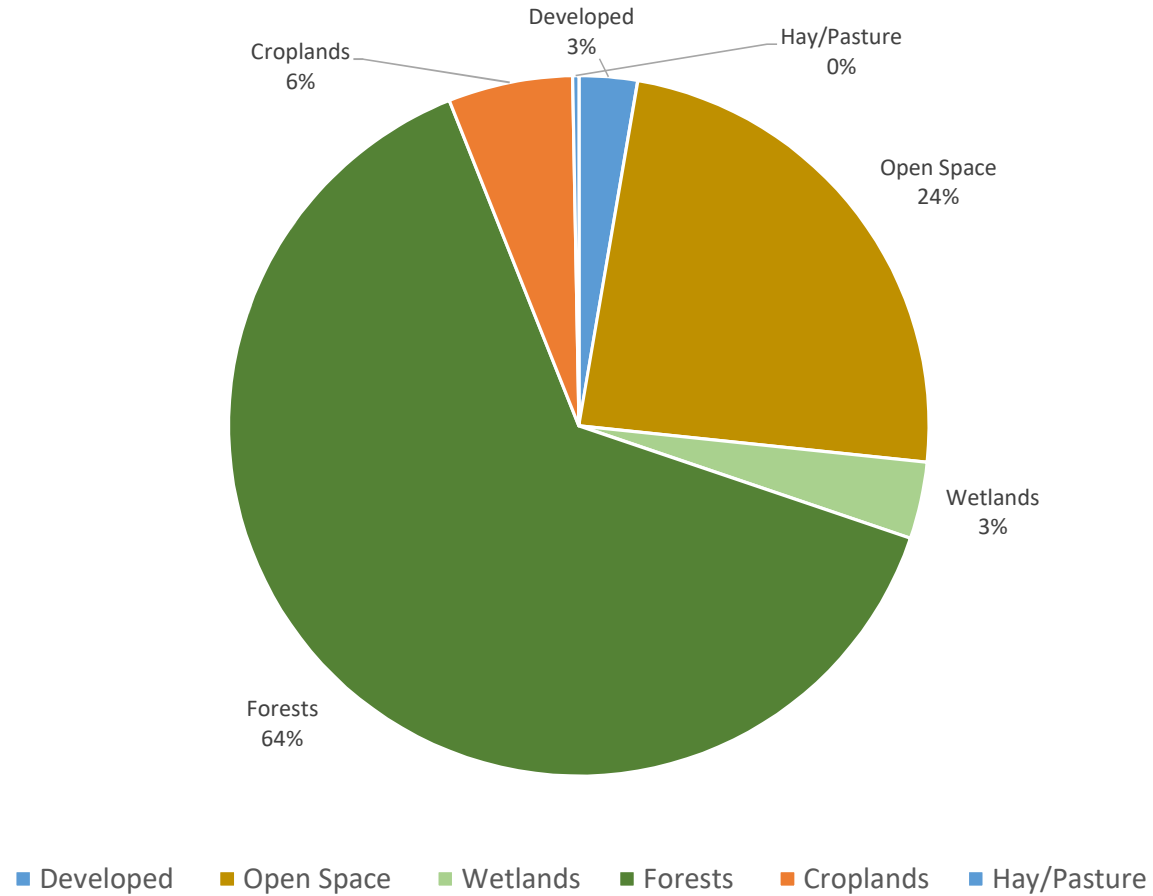
- Streams- baseflow and storms
- DeRuyter Reservoir (CSLAP)

### **Community Initiatives**

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



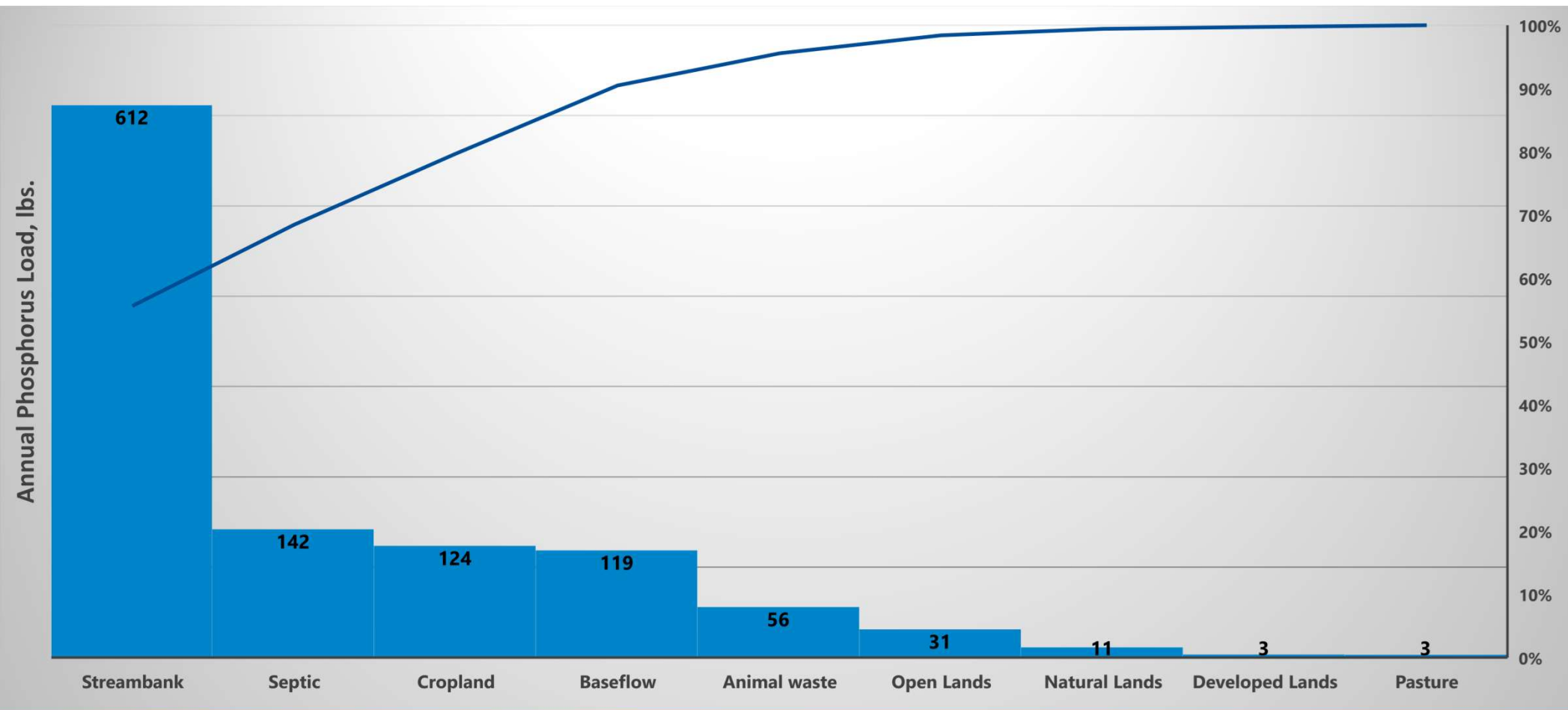
# DeRuyter Reservoir Land Cover



## Modeling Approach

- Application of three well-established modeling tools
  - **Model My Watershed**
    - Phosphorus loading estimates for **land cover and land management activities**
  - **NYSDEC Loading Estimator of Nutrients Sources (LENS)**
    - Modeling completed by NYSDEC
    - Phosphorus loading estimates for **household waste treatment septic systems**
  - **EPA's Spreadsheet Tool for the Estimation of Pollutant Load (STEPL)**
    - Phosphorus loading estimates for **streambank erosion**
    - Utilized site-specific assessment and field monitoring data from 2019 Stormwater Study

# DeRuyter Reservoir Estimated Phosphorus Load – Current Conditions







## Extreme Storm Event Resiliency

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- Evaluation of pollutant loading increases from increased rainfall protection
- Meant to simulate hydrologic resiliency to adapting climate conditions
- 15% increase to daily precipitation totals
  - Applied to storms falling between 1-year (1.95") and 100-year (5.68") extreme precipitation events

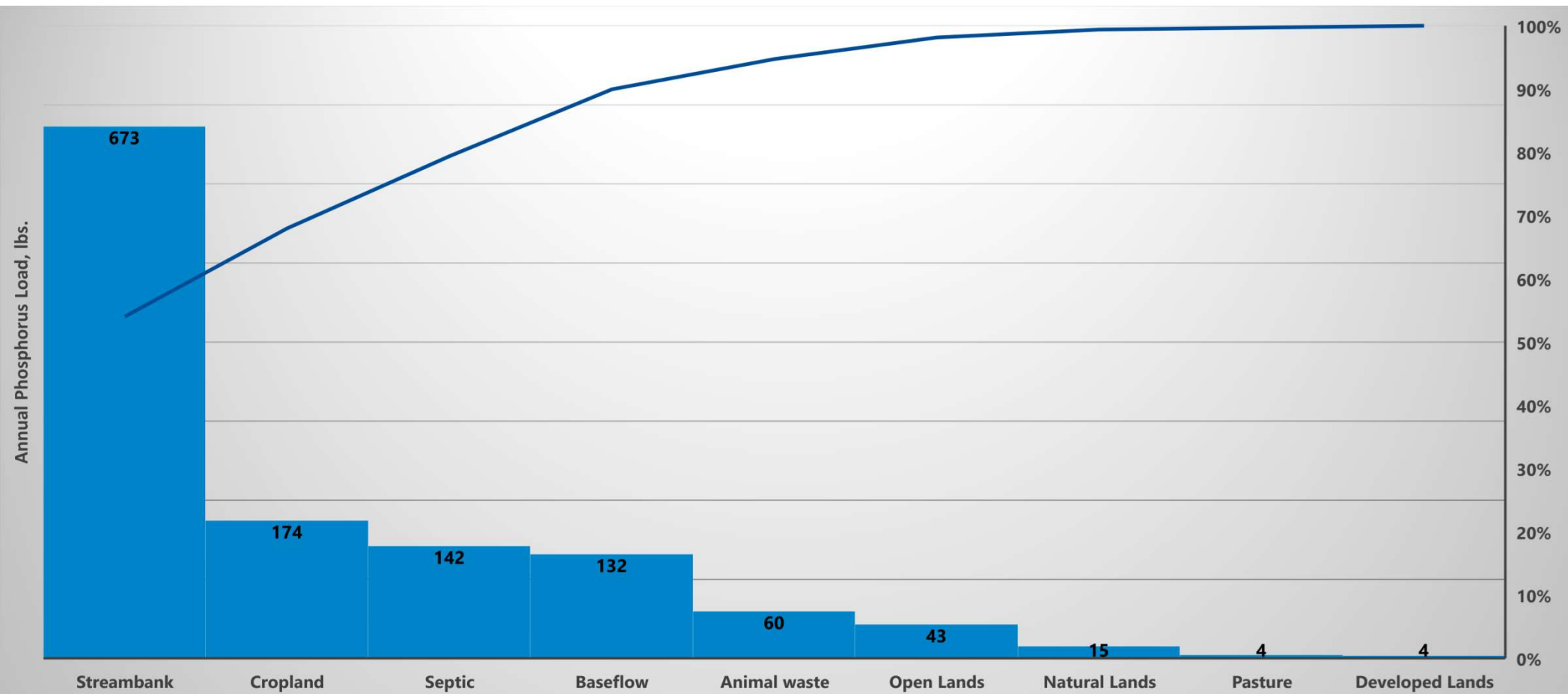
# Climate Projections: Increased Rainfall Scenario

## **Model projection assumption:**

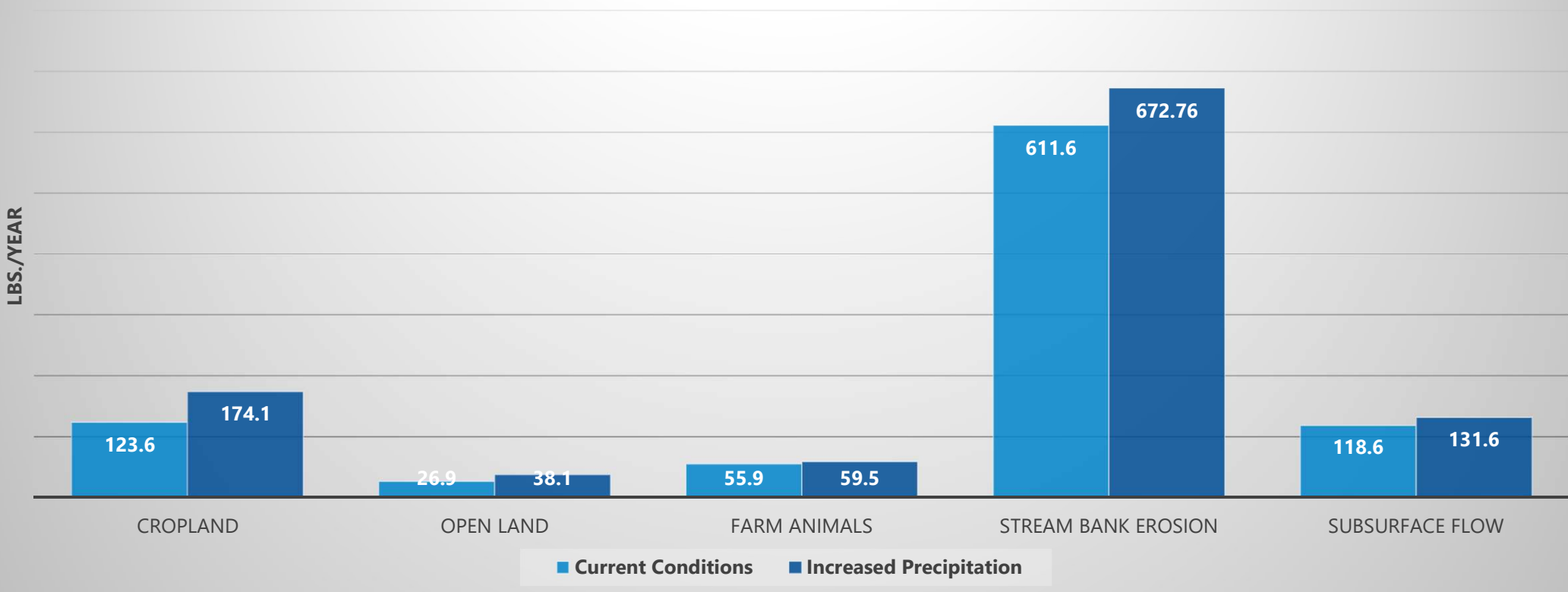
*15% increase in extreme storm events (defined as storms between 1- year and 100-year return frequency)*

Source	Current TP Load (lbs/yr)	Future TP Load (lbs/yr)	% Phosphorus Increase
Streambanks	612	673	10%
Septic	142	142	0
Cropland	124	174	41%
Baseflow	119	132	11%
Animal Waste	56	60	6.4%
Open Lands	31	43	37%
Forests and Wetlands	11	15	35%
Developed Lands	3	4	6%
Pasture and Hay	3	4	35%
<b>TOTAL</b>	<b>1,101</b>	<b>1,246</b>	<b>+ 13.2%</b>

# DeRuyter Reservoir Estimated Phosphorus Load – Future Conditions



## P Loads by Source: Current Conditions vs. Increased Precipitation





## Key Takeaways

- Primary phosphorus inputs
  - Eroding streambanks
  - Septic systems
  - Croplands
  
- Current estimated TP load ~1,101 lbs./year
  
- Projected future TP load (climate scenario) ~1,246 lbs./year
  - › additional 145 lbs.
  - › +13%

## Watershed Goal and Target

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- **Watershed Goal Hydrologic Resilience**
  - Minimize risk of increasing phosphorus input during a changing climate
- **Watershed Target**
  - Reduce annual phosphorus load by **145 lb**



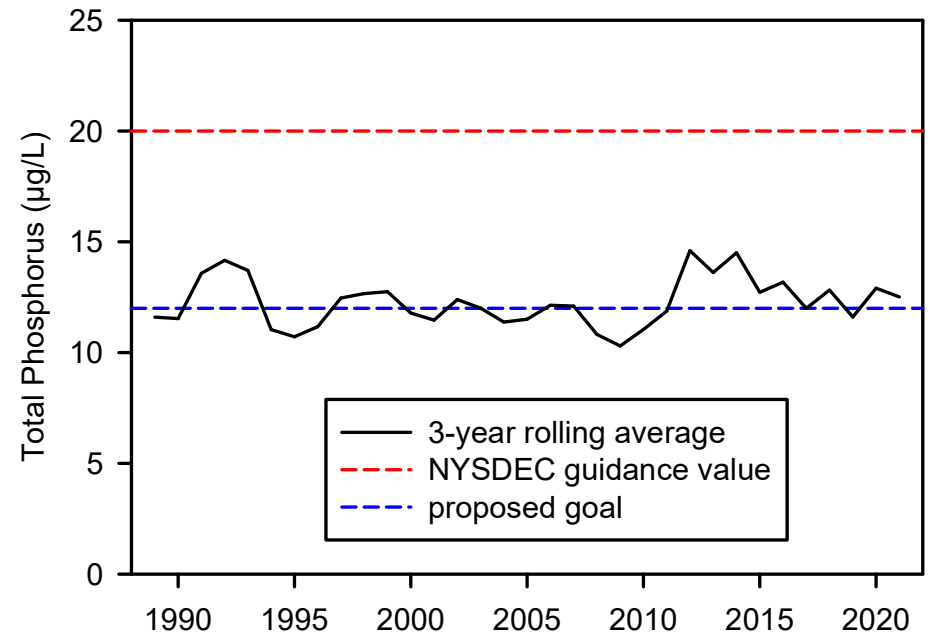
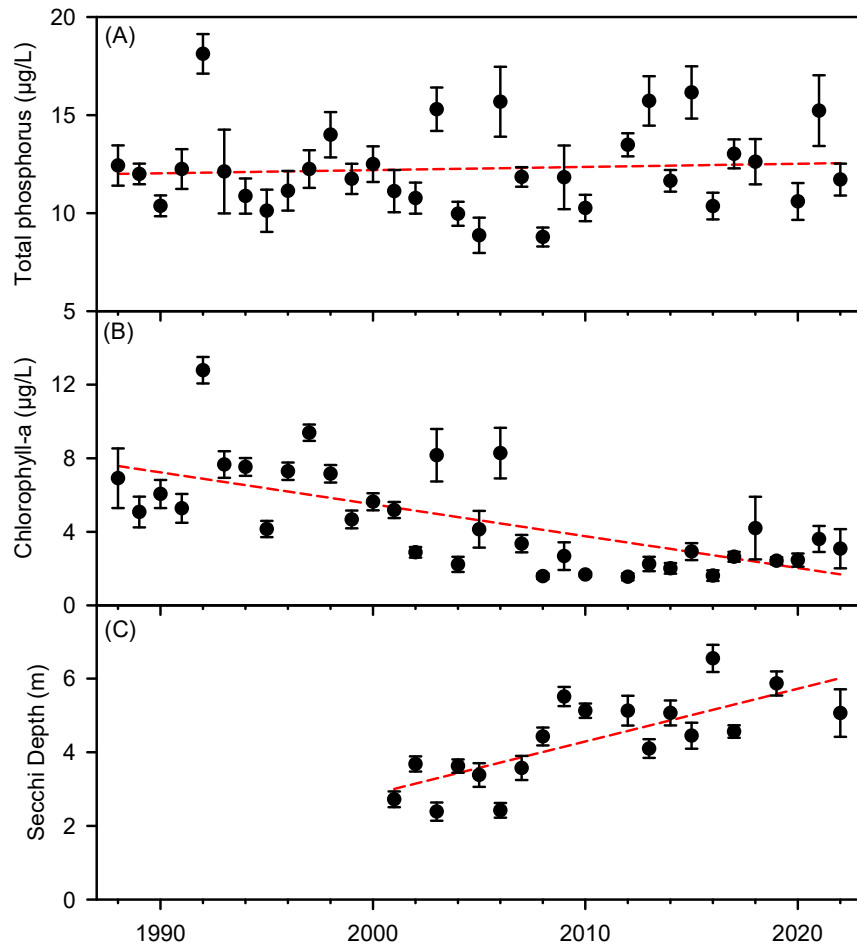
## Lake Goals and Target

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



# DeRuyter Reservoir Water Quality Trends



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



## 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.”***

## How Do We Get There?

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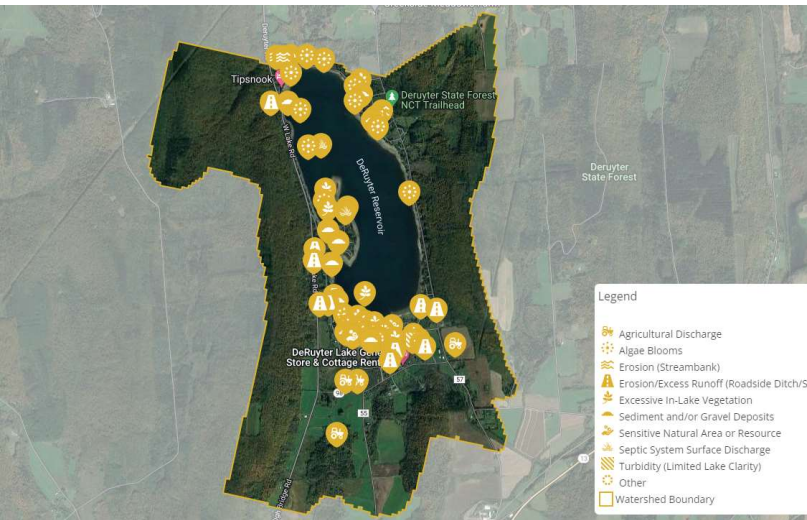
1. Identify feasible and fundable mitigation alternatives
2. Identify applicable funding sources
3. Identify lead stakeholders and agencies



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

# What we Heard

# 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

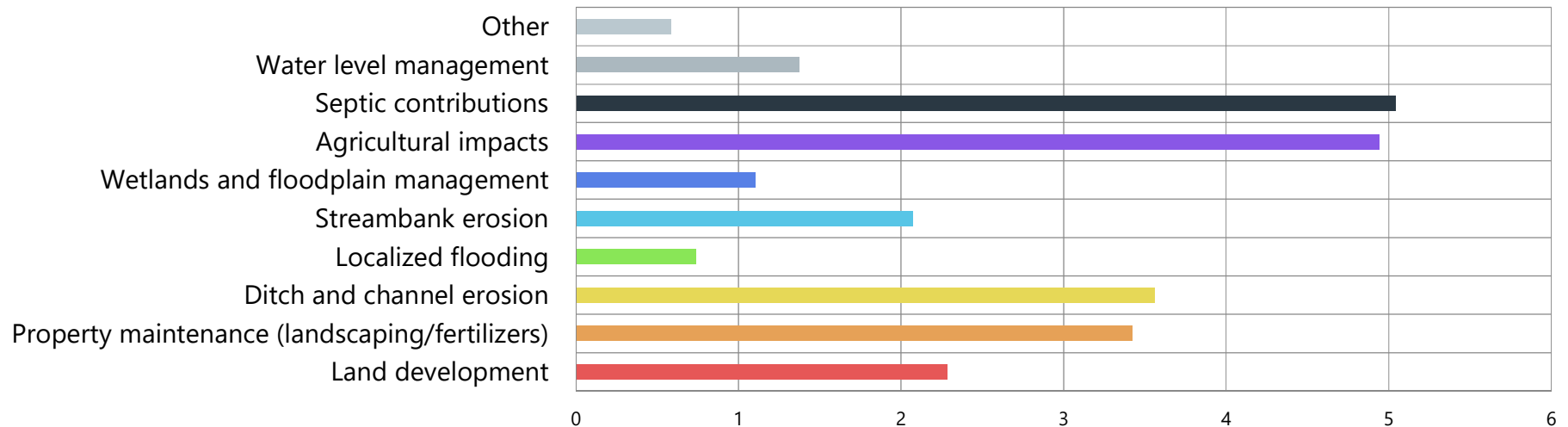
- [TLPF Website](#)
- [Interactive Mapper](#)
- [Community Survey](#)



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

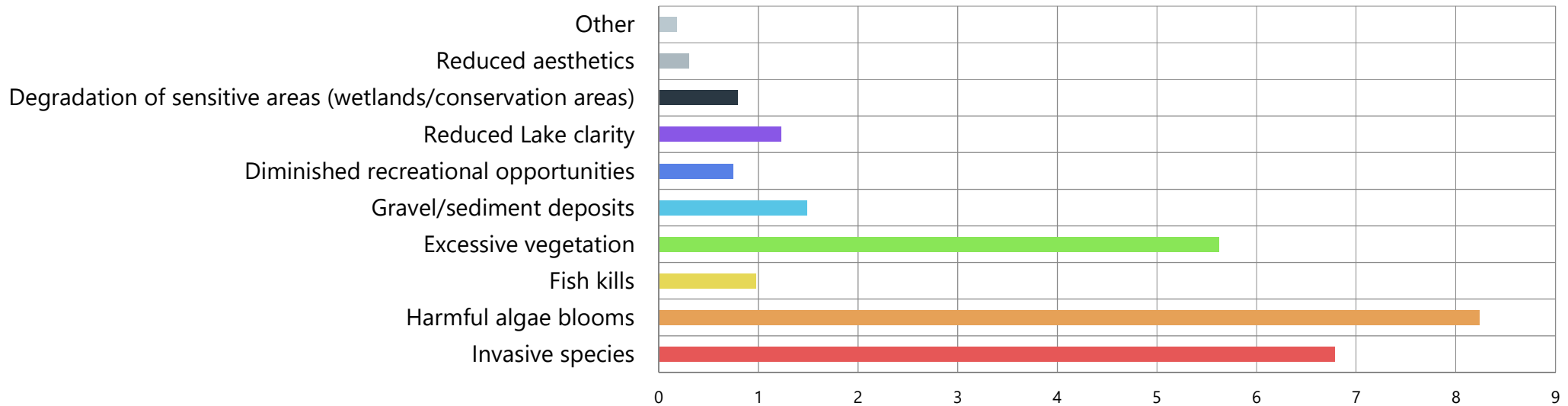
# Community Survey – Summary & Takeaways

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



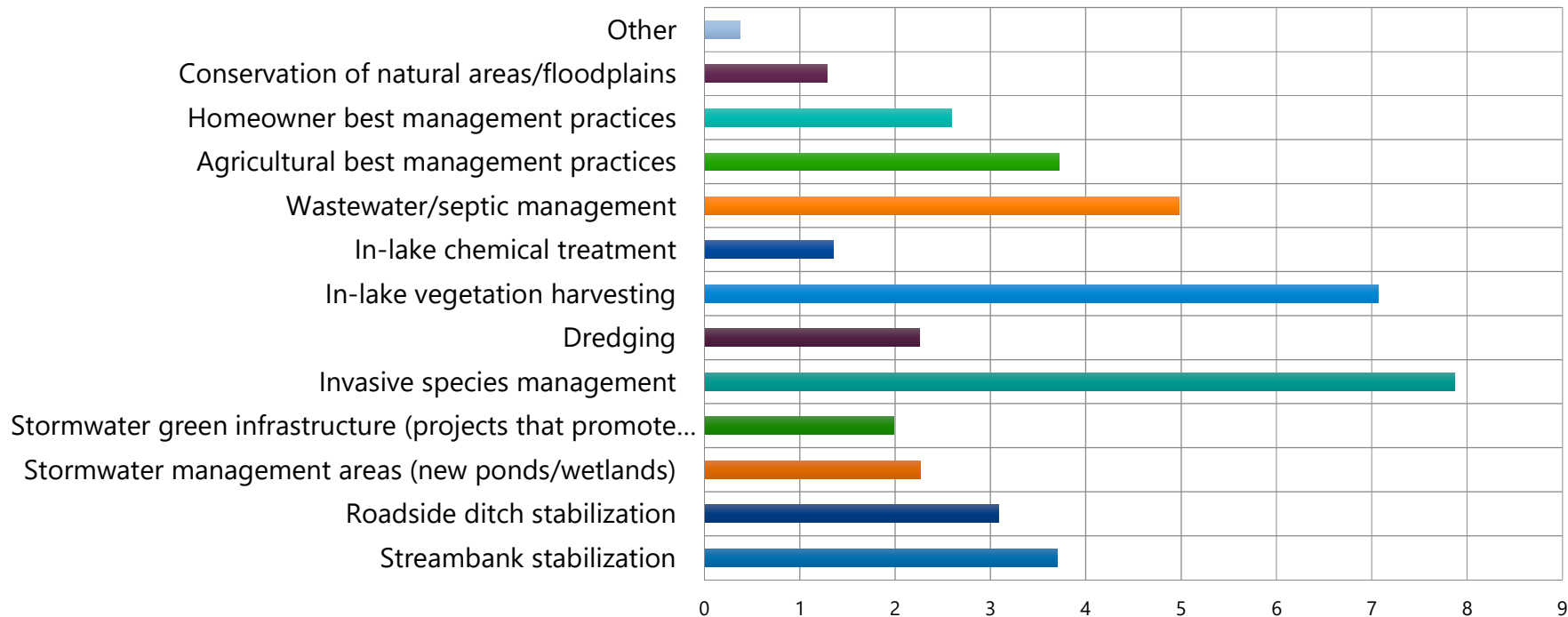
# Community Survey – Summary & Takeaways

**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.**

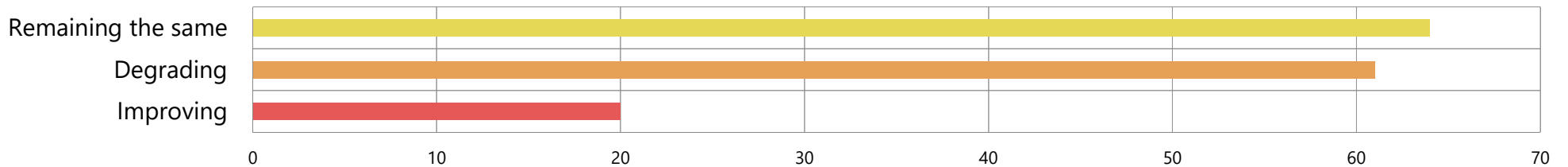


# Community Survey – Summary & Takeaways

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

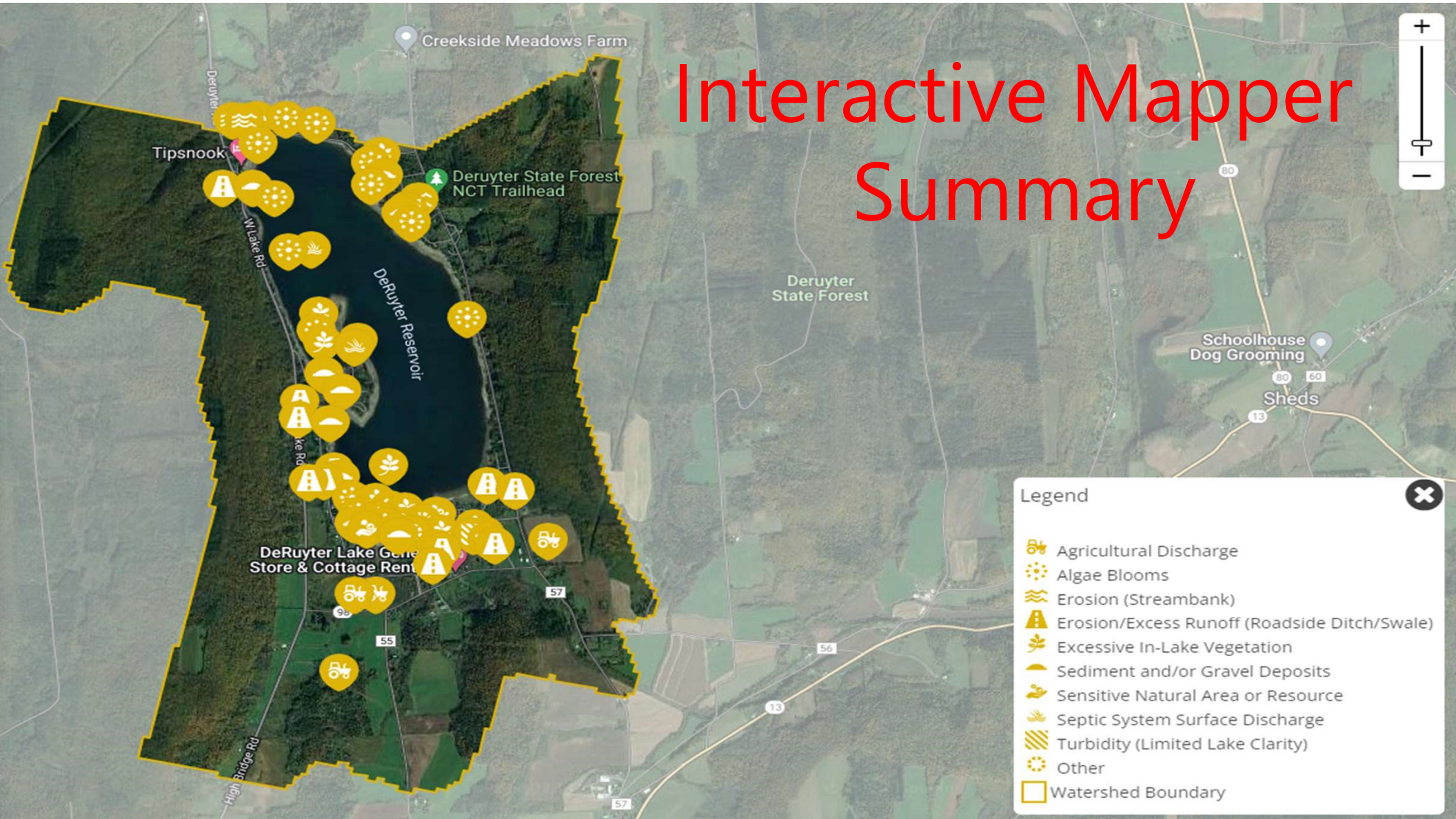


## Do you feel that Lake water quality is improving, degrading, or remaining the same?

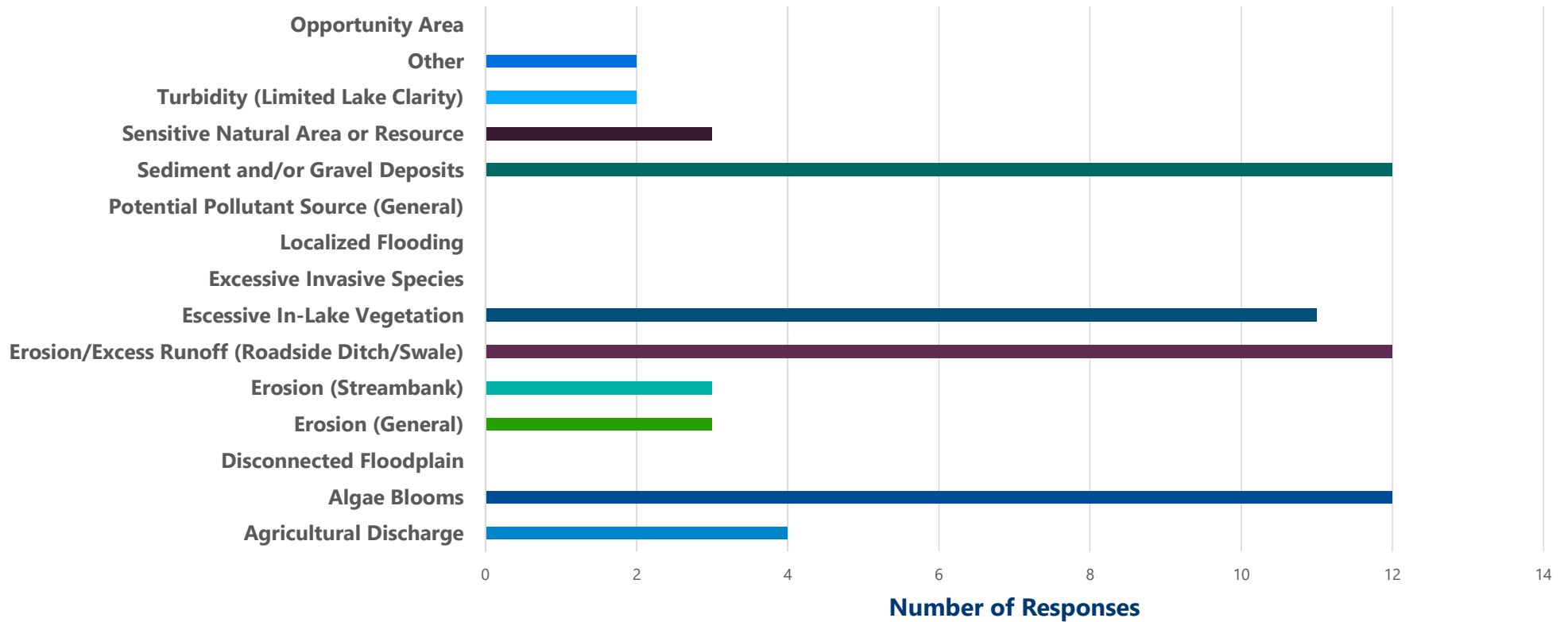




# Interactive Mapper Summary



## Interactive Mapper Response Summary





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

# Next Steps

## Opportunities to Increase Resiliency

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



## Priority Actions

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- Streambank Stabilization
- Agricultural BMPS
- Riparian Buffers
- Septic system monitoring and maintenance programs
- Roadside ditch stabilization

## Phosphorus Reduction Strategies – Example Alternatives

- Goal: Reduce  $> 145$  lbs./year of external phosphorus loading
  - Example Alternative 1:
    - Stream Restoration @ Lake Input 32 (1,542 LF) = 247 lbs./year P reduced

**OR**

- Stream Restoration @ Lake Input 1 (1,350 LF) = 216 lbs./year P reduced



## Phosphorus Reduction Strategies – Example Alternatives

- Goal: Reduce > 145 lbs./year of external phosphorus loading
  - Example Alternative 2
    - Stream restoration @ Lake Inputs 10, 11, 12, 21, and 31 (2,150 LF Total) = 118 lbs./year P reduced
    - Riparian buffers @ Lake Inputs 18 and 20 (8.75 acres) = 16 lbs./year P reduced
    - Application of cover crop across 20 acres of crop land = 12 lbs./year P reduced
    - **TOTAL = 146 lbs./year reduced**



## Phosphorus Reduction Strategies – Example Alternatives

- Goal: Reduce > 145 lbs./year of external phosphorus loading
  - Alternative 3
    - Stream Restoration @ Lake Input 31 (1,200 LF) = 77 lbs./year P reduced
    - Riparian buffers @ Lake Input 19B (5 acres) = 71 lbs./year P reduced
    - **TOTAL = 148 lbs./year reduced**





## Example Implementation Plan



- Short-Term Objectives
  - Procurement of grant funding
  - Review existing planning initiatives (ex. septic monitoring program)
  - Initial BMP implementation
  - Public education

## Example Implementation Plan



- Intermediate Objectives
  - Implementation of larger BMPs and projects (ex. large scale stream restoration)
  - Continued monitoring of Reservoir and tributaries
  - 50% achievement of initially adopted reduction target
  - Reevaluate modeling and targets

## Example Implementation Plan



- Long-Term Objectives
  - 100% achievement of initial or revised reduction target
  - Continued surveillance of existing and new threats to water quality

## Funding is Key!

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- Benefits of 9E Plan:

1. Identifies specific projects that align with watershed impairments, targets and goals.
2. Provides priority points for multiple funding resources
  - › **Approved 9E Plan = Greater likelihood of funding**

## Monitoring & Evaluation

- 9E Plans **are dynamic**
  - Require monitoring and observation to evaluate effectiveness
  - React to changes in landscape, social setting, and climate
  - Revisit modeling, goals, and reduction strategy, and **adapt**
- 9E Plans **are not regulatory documents or agreements**
  - Voluntary and incentive based
  - Outreach, education, and coordination are critical
  - Well-defined vision and structure = **SUCCESS**



**DRAFT** August 10th, 2023

**Barton  
& Loguidice**

## DERUYTER RESERVOIR NINE ELEMENT (9E) WATERSHED PLAN



### Final Draft Plan Availability

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- Posted online
  - Anticipated by October 1, 2023
  - <https://www.foundationatderuyterlake.org/watershedmanagement>
  
- Final will incorporate any additional public comment

## *Discussion*



## Contact Information

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**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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