Truesdale Lake Study

Engineering study of wastewater issues and solutions around Truesdale Lake

Town of Lewisboro,
Westchester County, New York

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INSITE
ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.

NEIWPCC

Agenda

1. **Introduction**
   - Meet the team (Ramboll and Insite)
   - Objectives
2. **Existing conditions evaluation**
   - Environmental settings
     - Nutrient loading
     - Onsite septic disposal systems
   - Nutrient (phosphorus) loading
   - Water quality improvement alternatives
3. **Questions**

Introduction
Meet the team!

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Engineer,
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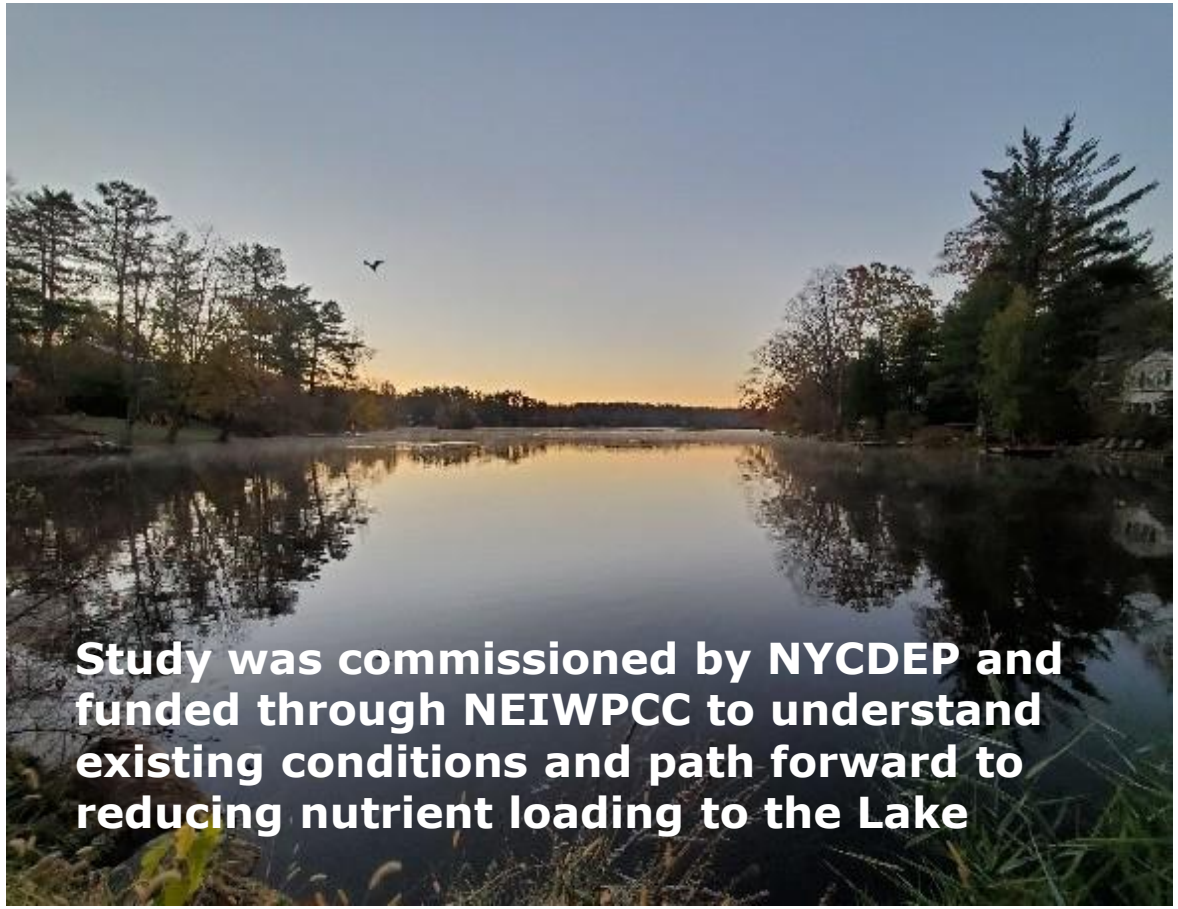
Objectives



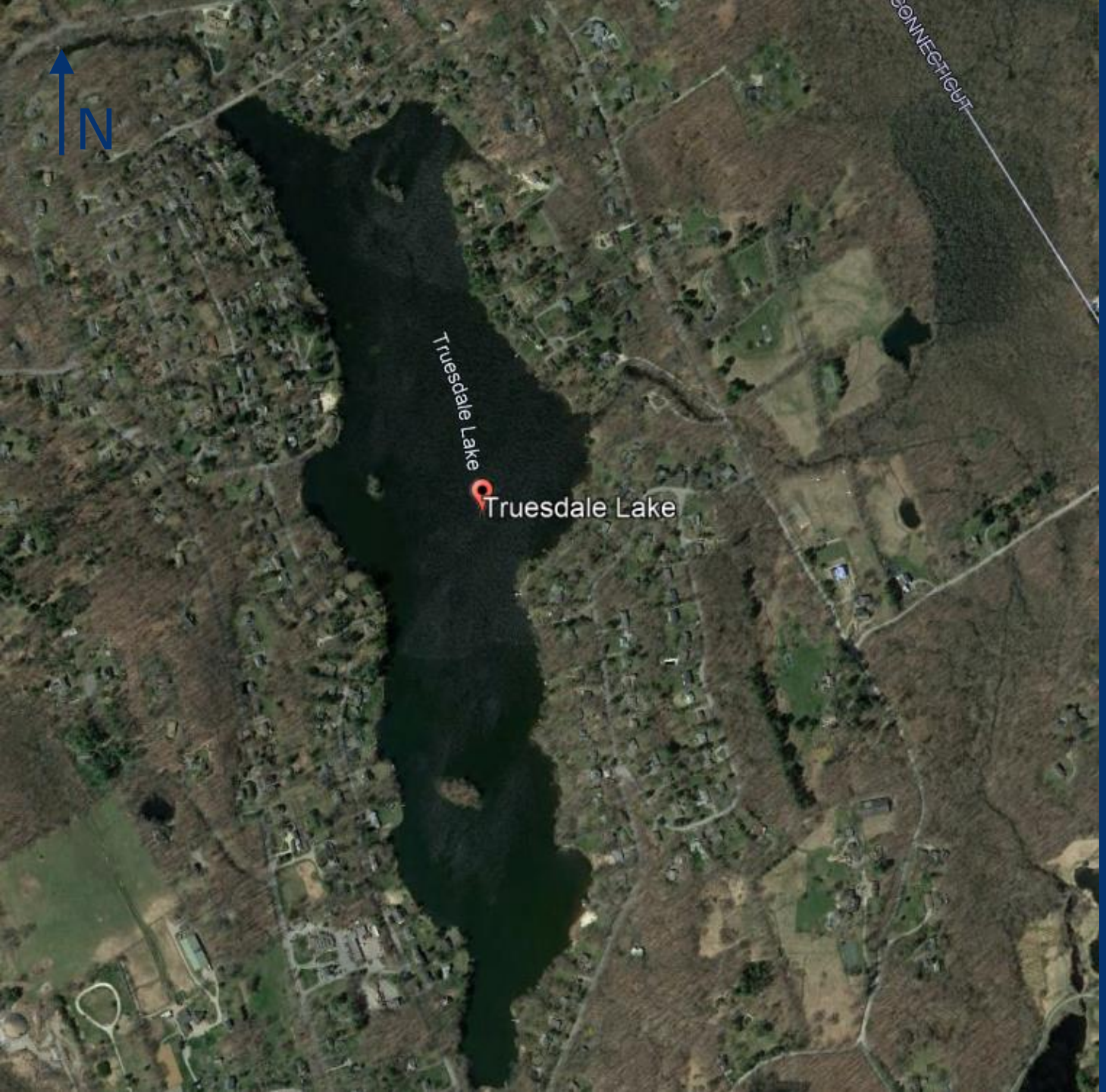
Project Drivers:

Truesdale Lake water quality has been ***deteriorating,*** and the Lake is listed on the NYSDEC listing of impaired water bodies – ***reduced aesthetic and recreational qualities***

Protection of water quality within NYCDEP Croton Watershed

Incomplete data of existing conditions

Development of infrastructure scenarios for management of residential wastewaters

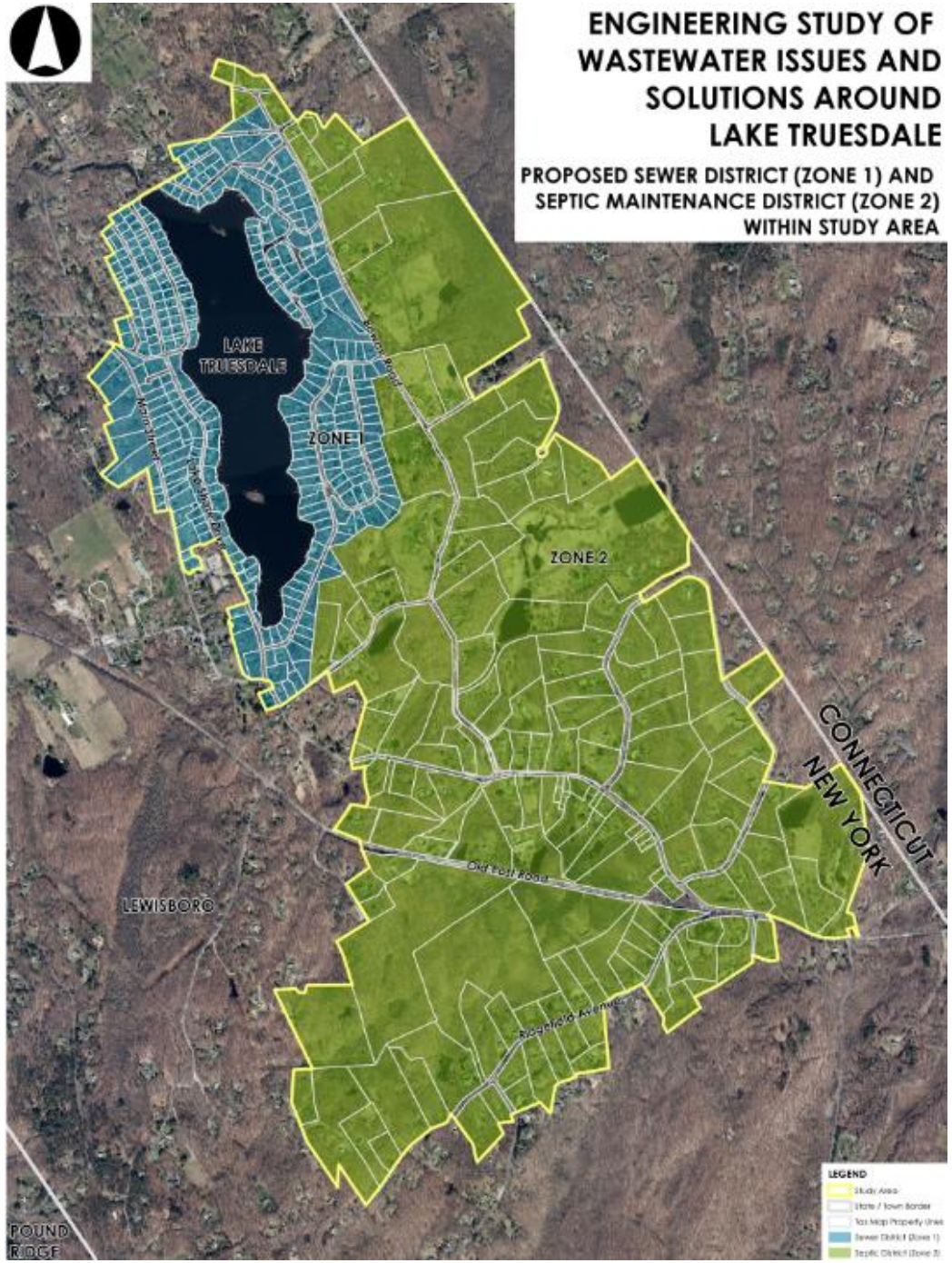


Lake Facts

- 83-acre, manmade lake in 1927, bordering Connecticut
- Dam on north end controls water elevation
- Up to 14-feet deep
- Eastern edge of NYCDEP Croton Watershed

Background

Study area demographics	Study area zones
Developed parcels: 419	**Zone 1:** Parcels less than 1 acre within 800-feet (+/-) of Lake shore (blue) 274 residences
Population: 1,131 (per 2020 Census)	**Zone 2:** Larger parcels (green) 145 residences



Background
Lake health

Nutrient loading	• Soluble reactive phosphorus, nitrate + nitrite N and TKN levels have increased over the past decade • Phosphorus is greatest concern • Lake does not meet recommended level for many recreational uses
Effects of high phosphorus concentrations	• Algal blooms • Low water visibility • Ecosystem impacts
Main sources of phosphorus loading	• Urban stormwater runoff • ***Septic loading*** • Fertilizers • Wildlife

Existing Conditions Evaluation

Service Area Data Collection

Data collection and review

- Historical studies
- Residence bedroom count, parcel location and age
- Census data

Result:

Development of flows

Operational

- Documented septic tank clean outs
- Documented septic system repairs

Result:

Extent of known/suspected underperforming onsite disposal systems (OSDS)

Environmental

- Site conditions

Result

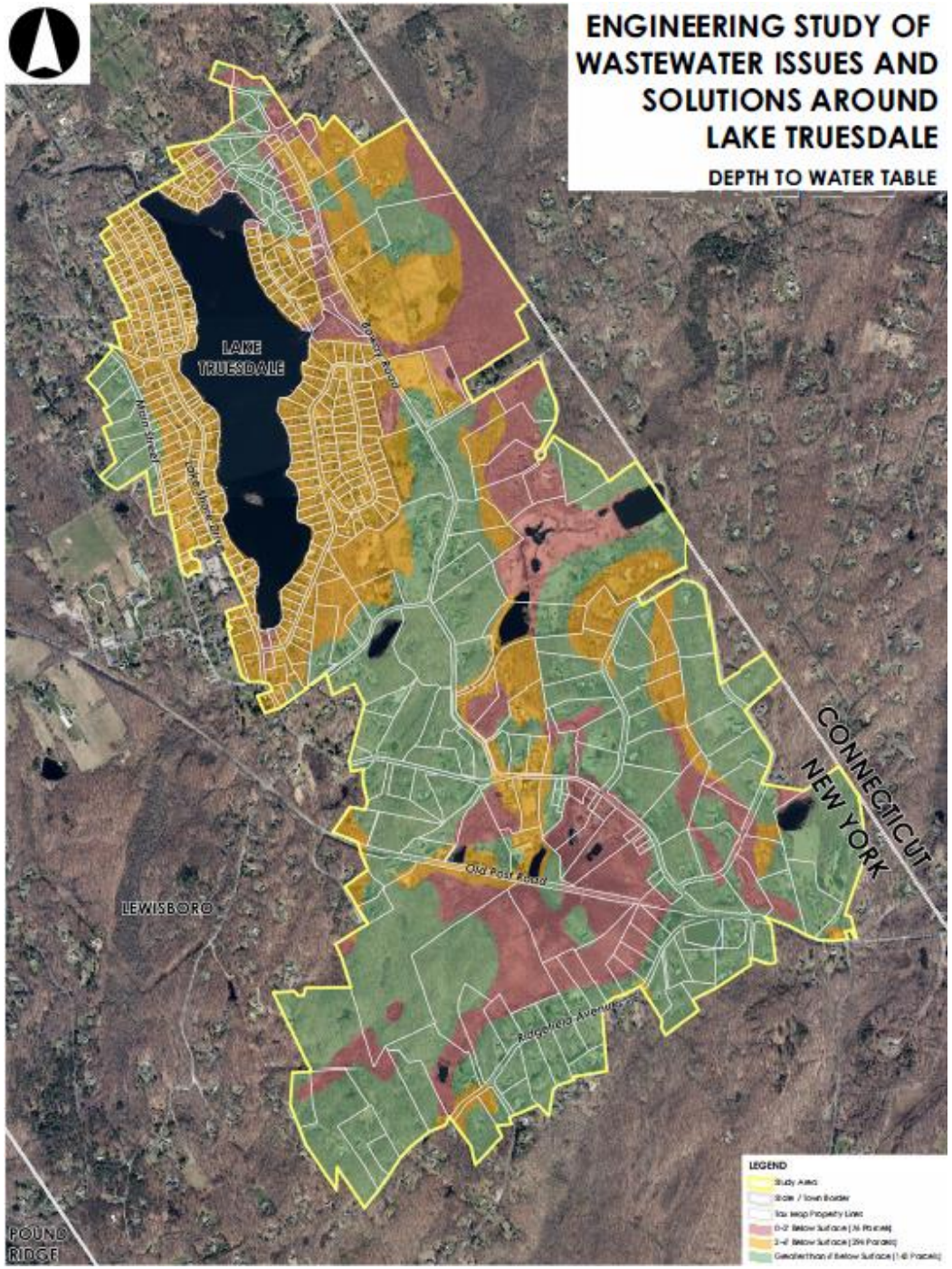
Summary of site conditions that are favorable or unfavorable for onsite treatment

Septic System Environmental Conditions

Septic systems (aka OSDS) are most effective when properly constructed, maintained, and located

Factors that influence OSDS performance and impact the nearby watershed:

- Depth to groundwater (5-foot separation from absorption field)
- Soil type
- Depth to bedrock (5-foot separation from absorption field)
- Proximity to lakes, water courses, and wetlands
- Slope (<15%)
- Separation distance from adjoining drinking water wells



Depth to Water Table

- One of several critical design considerations
- Adequate vertical separation between absorption fields and groundwater is essential for optimal performance
- WCDOH requirements: 5 feet
- Typical septic system depth: 2.5 feet

Summary

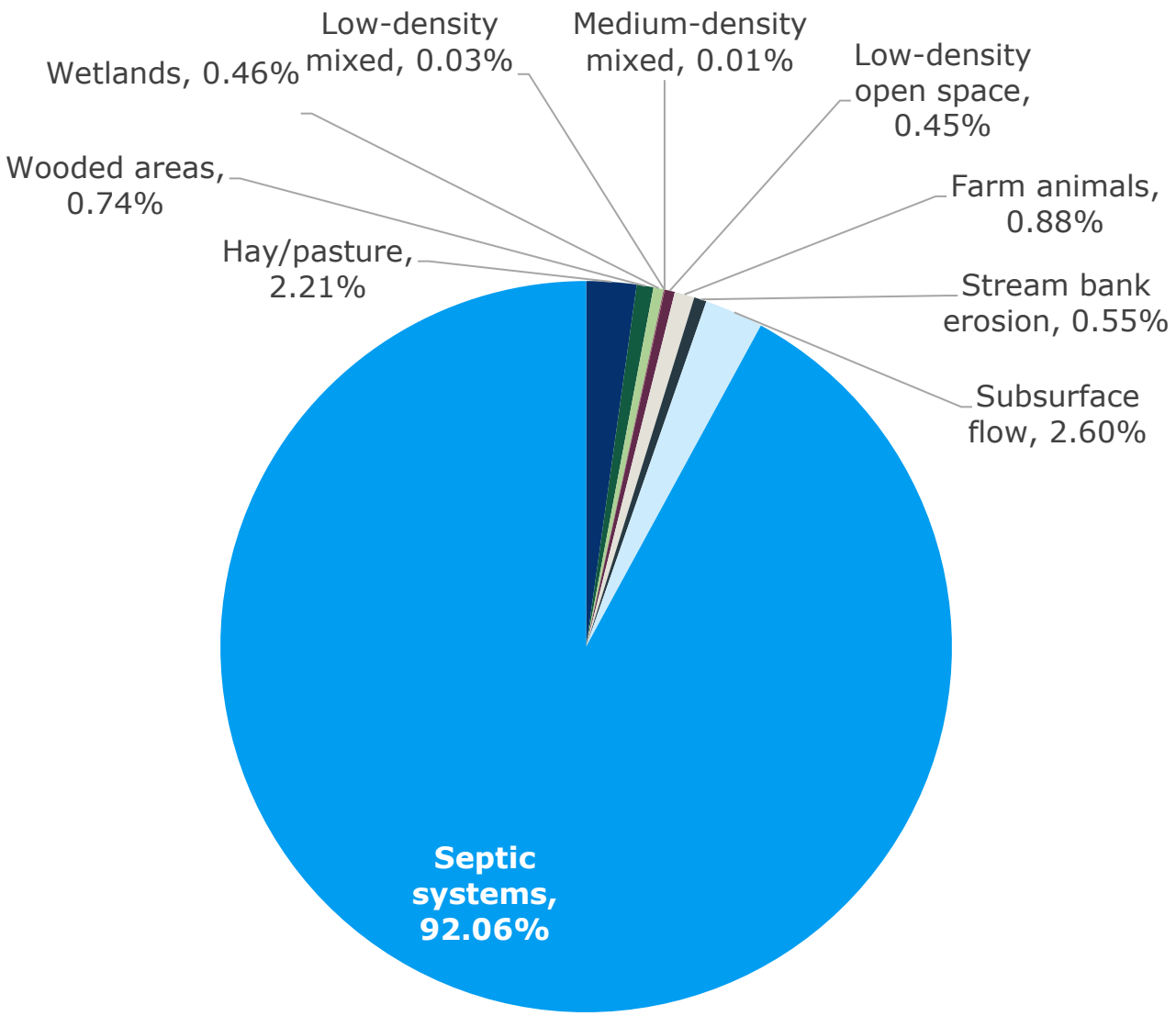
Poor septic system conditions are contributing nutrients to the Lake via the following avenues:

Septic systems were installed in poor soils without adequate water table clearance, or shallow depth to bedrock, or on parcels too small or too sloped to support proper treatment

Septic systems are antiquated and need service and/or replacement

Septic systems have not been inspected, pumped or maintained

Most failures are subsurface and impossible to identify



Phosphorus Loading Sources*

*Note that several scenarios of septic failures were modeled for this analysis, the data presented in this pie chart is from the worst-case scenario:

A. 2 septic failures per Zone
Underestimation of loading at 100 lb/year

B. All systems within 200-feet of a water course or well, or those systems located in a shallow water table (presented worst-case)
Overestimation of loading at 1,200 lb/year

C. EPA Cited 15% failure
Median estimation of loading at 403 lb/year

D. Zero failures
Unrealistic, shows wildlife contributes 90lb/year loading to the lake

Description of Wastewater Management Alternative Technologies Explored

- Residential Onsite Sewage Disposal Systems
- Enhanced Treatment Units (ETUs)
- Gravity Collection System
- Low-pressure Sewer Collection System with Grinder Pump
- Vacuum Sewer Collection System
- Effluent Sewer Collection
- Septic Tank Effluent Pump (STEP)
- Septic Tank Effluent Gravity (STEG)
- Cluster Collection/Treatment System
- Treatment at Existing Local WWTP

- All of the above listed wastewater management alternatives were evaluated in depth for the Town of Lewisboro. The most feasible and cost-effective alternatives are described on the following slide.

Water Quality Improvement Alternatives

01

Upgrade existing onsite septic systems

- Enhanced nutrient reduction upgrades
- Rigid inspection and repair program
- Includes development of septic maintenance district

02

Treatment at regional WWTP

- Low pressure sewers and conveyance to a local wastewater facility
- Few potential options within a reasonable distance (10 miles)

03

Construction or expansion of an existing WWTP

- Low pressure sewers and conveyance to a local wastewater facility
- Closest facility is the Lewisboro Elementary School WWTP (8,000 GPD)
- Expansion of existing MBR process to 140,000 GPD avg.
- New discharge point at Waccabuc River as existing discharge may not support additional flow

Proposed alternatives will result in a potential 87%* reduction of phosphorus loading to the Lake

****Based off worst-case scenario evaluations***

Recommended Alternatives for Further Review

Zone 1

Area immediately surrounding lake

- Low pressure sewers with treatment at the expanded Lewisboro-Katonah Elementary School WWTP
- New effluent outfall at the Waccabuc River
- Serves 274 parcels

Zone 2

Upland area within project limits

- Continued onsite treatment with addition of enhanced treatment units (nutrient removal) and inspection and repair of existing systems
- Lot sizes and location will support long term commitment to onsite systems (145 systems)
- Includes development of septic maintenance district and a septic maintenance program: evaluate systems, system repairs and remediations, long-term maintenance program

Reduction in Phosphorus Loading to the Lake

Scenario B

Phosphorus load and benefit to Lake	Zone 1 loading (lb/yr)	Zone 2 loading (lb/yr)	Total Lake loading (lb/yr)
Septic phosphorus loading	1,000	100	1,100
Nonpoint source loading	20	80	100
Estimated phosphorus loading (septic and nonpoint source)	**1020**	**180**	**1200**
Estimated phosphorus WWTP effluent loading*	220	N/A	N/A
Estimated OSDS upgrade effluent loading	N/A	40	N/A
Total estimated reduction of TP	800	60	
Total Phosphorus load to Lake	**20**	**120**	**140**

Existing modeled loading

Potential resulting modeled loading

* WWTP effluent discharges to Waccabuc River, removing septic loading in Zone 1 to the Lake

Questions?

Thank you!

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