

Trickey Pond Watershed-Based Protection Plan 2021-2031



March 2021

Prepared By

Trickey Pond Environmental Protection Association

1. Background Information

A. Document Purpose and Scope

The purpose of this Watershed Based Plan, herein after referred to as the “plan”, is to lay out a strategy and schedule for NPS mitigation and water quality protection efforts for the Trickey Pond watershed over the next ten years (2021-2031). The Trickey Pond Environmental Protection Association (TPEPA) prepared the plan with assistance and input from FB Environmental, Lakes Environmental Association (LEA), and Maine DEP.

The plan was developed to satisfy national watershed planning guidelines provided by the EPA. EPA requires *nine-element* plans for impaired watersheds, but allows *alternative* plans in several cases including for protection of high quality or unimpaired waters. MDEP accepts alternative plans for unimpaired lakes that have completed a recent watershed survey provided that the plans follow EPA and MDEP guidance and include minimum planning elements. Trickey Pond meets these eligibility criteria, and the plan was written to include the EPA and MDEP required planning elements (sections 2 through 6 in the plan cover EPA’s five elements for alternative watershed-based plans).

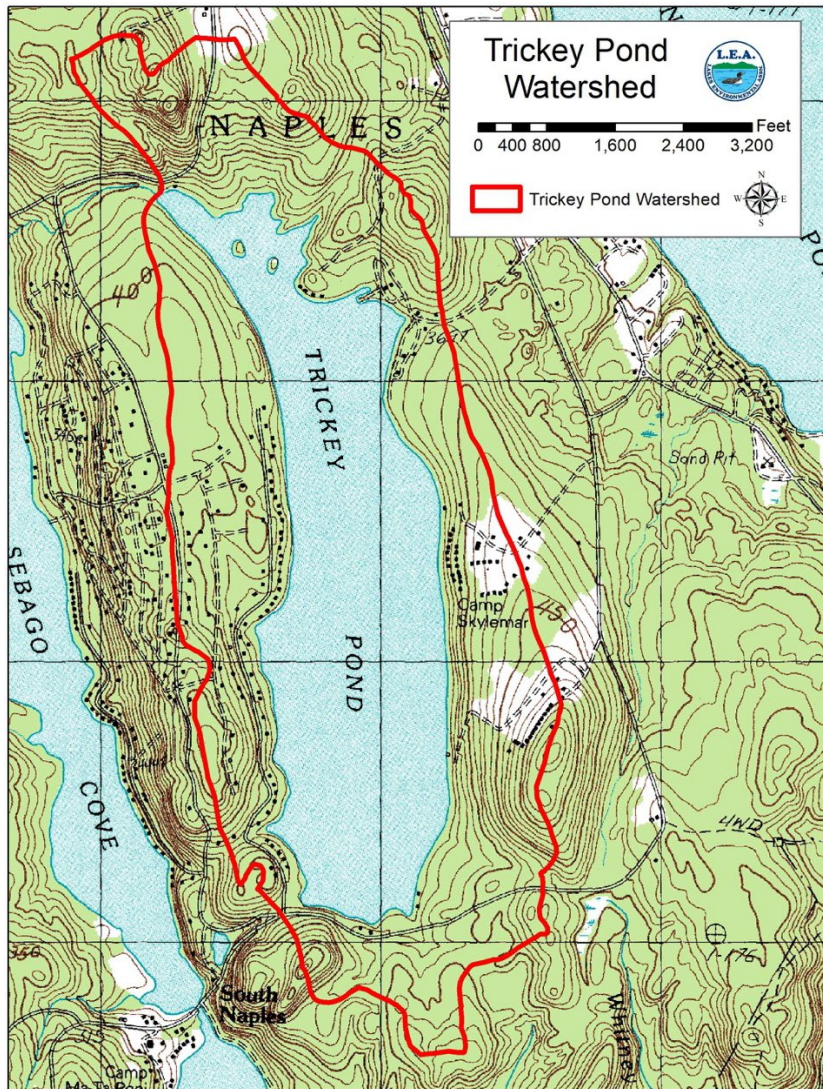
Note: Information collected during the 2019/2020 Trickey Pond watershed survey serves as the basis for much of the plan. As such, the ***Trickey Pond Watershed and Shoreline Report***, prepared by FB Environmental, is attached to the plan as Appendix A.

B. Watershed Background

Trickey Pond is part of the Greater Sebago Lake Watershed and lies entirely within the town of Naples. The 0.87 square mile Trickey Pond Watershed [Figure 1] drains into the Muddy River Bay of Sebago Lake, the drinking water source for approximately 200,000 people in the greater Portland area. The lake has a 4.8-mile shoreline dotted with approximately 65 seasonal and year-round homes, as well as two campgrounds and one summer camp. There are approximately an additional 35 homes in the watershed. Much of the residential development in the watershed is concentrated on Trickey Pond Road, which runs along the western shore of the pond. The eastern shore is less developed, and is home to the campgrounds and summer camp. A public boat launch is located on the southern end of the pond. Trickey Pond is known as one of the clearest lakes in the state and supports a popular coldwater fishery. Maine Inland Fisheries and Wildlife stocks the lake with brook trout, landlocked salmon, and splake.

In recent years, the Trickey Pond watershed has experienced significant development pressure, with the addition of a new subdivision, campground and the expansion and conversion of many of the seasonal summer camps to year-round residences. While water quality on the pond is currently excellent, monitoring has shown increasing chlorophyll and decreasing clarity trends on the pond which threaten future water quality.

Figure 1. Trickey Pond Watershed



C. Summary of Prior Watershed Work

Two primary organizations are involved in protecting Trickey Pond, TPEPA and LEA. TPEPA is a 501(c) (3) corporation founded in 2006, and has operated continuously since then providing a boat wash station and courtesy boat inspectors at the public boat ramp, invasive plant patrols, and funding annual water quality monitoring and analysis. Through a twice annual newsletter, the TPEPA shares information to assist property owners in understanding steps toward good lake stewardship. Recently the newsletter introduced the Lake Smart program to members. To date, one property has been awarded the Lake Smart designation and a TPEPA member has been trained to conduct Lake Smart evaluations.

LEA is a non-profit regional lake association that provides water monitoring, invasive plant control, education, and technical assistance on over 40 lakes in Western Maine, including Trickey Pond. LEA has provided technical assistance to several properties in the watershed over the years through its Clean

Lake Check Up program; a conservative estimate of 20 such visits occurred in recent years. Other LEA assistance includes enforcement issues, technical assistance, and joint LEA/Town site visits.

The TPEPA commissioned a watershed survey in 2019 that identified priority NPS sites in the watershed (See section 2c below, and Appendix A). The survey raised awareness in the lake community about NPS issues, and as a result, several landowners have addressed or are in the process of addressing erosion on their properties. TPEPA and LEA have worked with the campground, boys' camp, Trickey Pond Camp & Homeowners Association, and individual residential property owners to provide technical assistance and leverage existing funding sources to remediate erosion. Since the survey, a total of six sites have been addressed or are scheduled for work in the spring. BMPs include buffer plantings, covering bare soil with erosion control mulch, replacing culverts, installing rubber razors and a replaced septic system.

In addition, the public boat ramp on Trickey Pond accessed from state road Rt 114 was re-built by the Maine Department of Inland Fisheries and Wildlife in 2017 to correct runoff and potential NPS pollution issues. The new launch features paved boat access, riprap lined ditches, and a sediment pool for collecting parking area runoff.

2. Identification of the Causes or Sources of the NPS Threat

A. Water Quality Summary

DEP considers the water quality of Trickey Pond to be above average, based on measures of secchi disk transparency, total phosphorus, and chlorophyll-a. The potential for nuisance algal blooms is low. Trickey Pond is a clear lake with an average color of 13.25 in 2019. The long-term average Secchi disk (clarity) reading in Trickey Pond is 10.03 meters. The long-term average epilimnetic total phosphorus value is 5.3 ppb. The long-term average epilimnetic chlorophyll concentration is low at 1.8 ppb. Suitable fish habitat is generally present in the pond from June through September, however low oxygen conditions are often present in deep water from July through September. The potential for TP to leave the bottom sediments and become available to algae in the water column (internal loading) is low.

Trickey Pond is a spring fed lake with no major inlet and a very small watershed relative to its surface area of 315 acres, giving it a low flushing rate of only 0.14 times per year. The pond has a maximum depth of 17 meters and an average depth of 10 meters. These characteristics have made Trickey Pond one of the clearest in the state. Maine DEP and Lakes Environmental Association have collected water quality data on Trickey Pond regularly since 1980. According to LEA's water quality analysis, Secchi disk readings show the pond has become less clear over time, while phosphorus levels are stable and chlorophyll-a levels are increasing.

Two sediment samples have been collected from Trickey Pond to determine the risk of phosphorus being released from the pond's sediments. This analysis looks at the ratios of aluminum to iron and aluminum to phosphorus in the sediments, with Al:Fe >3 and Al:P >25 being considered low risk. The samples contained Al:Fe ratios of 3.3 and 9.1 and Al:P ratios of 70.8 and 78.1, indicating a low risk of phosphorus release from the pond's sediments.

B. Threatened Status

Trickey Pond currently meets state water quality standards. However, it is listed as threatened on the Maine Department of Environmental Protection's Non-Point Source Priority Watersheds list because its outstanding water quality is sensitive to additional inputs of phosphorus. The pond is also listed as a Lake Most at Risk from New Development in DEP's Chapter 502 Stormwater Law. Trickey Pond and the other unimpaired lakes were placed on these lists because it was identified by MDEP as being particularly sensitive to eutrophication based on current water quality, potential for internal recycling of phosphorus, potential as a cold water fishery, volume or flushing rate, or projected growth rate in the watershed. As a small lake, Trickey Pond struggles to absorb the impacts of development in its watershed and as such, it is the only sub-watershed in the greater Sebago Lake Watershed that exhibits a decreasing water quality trend.

C. Watershed NPS Threats

Like many other lakes in Maine, Trickey Pond's water quality is threatened by phosphorus enrichment. Phosphorus is the nutrient that controls the level of algae production in lakes. Small increases in phosphorus cause lake algae populations to increase and water clarity to decline. High levels can cause dense algae blooms, which can also create a biological and chemical reaction that depletes the oxygen from the bottom of the lake and results in the loss of cold-water fisheries.

Phosphorus, which is typically attached to soil particles and organic matter, mostly reaches the lake in the stormwater runoff from the lake's watershed. Phosphorus runoff increases significantly in developed landscapes. Stormwater flows across roads, driveways, residential properties and other developed areas and picks up phosphorus in soluble form or attached to eroded soil particles. MDEP monitoring of impaired watersheds found that phosphorus export from the developed watershed was up to 10 times greater than the forested one (Dennis, 1985).

Trickey Pond was included in a 2015 study by Cumberland County Soil & Water Conservation that prioritized sub-basins of the Sebago Lake watershed based on their relative contribution of phosphorus to Sebago Lake. The project included a Water Quality Index, which assessed current water quality conditions, water quality trends, development trends, and local partnerships in each sub-watershed. Each category was given a score of 1-5, with 5 being good and 1 being poor. The assessment showed that although Trickey Pond has great water quality (5), its trophic state is increasing (1). The development analysis showed that land use and land cover types have changed significantly between 1987 and 2013, resulting in a score of 1. For local partnerships, the pond scored 3 points. This resulted in Trickey Pond having a low overall score on the Water Quality Index, putting it into a "moderate-high" level of concern rating. Trickey Pond was ranked fifth lowest out of a total of 25 sub-watersheds.

In 2019, the Trickey Pond Environmental Protection Association contracted with FB Environmental to conduct a watershed and shoreline survey to identify potential sites to remediate in order to protect and improve water quality of Trickey Pond. Funding was provided by the TPEPA and the Town of Naples. In-kind support and technical assistance were provided by LEA, and volunteer support was provided by the TPEPA. Surveyors documented the location, nature and extent of each site's erosion and runoff problems, recommended maintenance and pollution fixes, and rated the impacts to the lake and the cost to remediate them. Survey findings were summarized in the ***Trickey Pond Watershed and Shoreline Survey Report*** (2020) which includes maps and spreadsheets of NPS sites (Appendix A).

Together, the watershed and shoreline surveys resulted in the identification of 108 NPS sites, of which 32 were watershed survey sites and 76 were shoreline survey sites (Table 1).

Table 1. Land Use and Impact Rating for all Watershed and Shoreline Survey Sites

Land Use	High Impact	Medium Impact	Low Impact	Total	Percentage
Watershed Survey					
Residential	2	1	1	4	4%
Road/Driveway	6	13	6	25	23%
Boat/Beach Access	1	2	0	3	3%
Shoreline Survey					
Shoreline	9	26	41	76	70%
Total	18	42	48	108	100%

The 32 watershed survey NPS sites identified were categorized into one of three land uses: Residential, Road/Driveway, or Boat/Beach Access (Figure 2). Road/Driveway sites were the most common, and include private roads, town/state roads, and private driveways. Each site was evaluated in terms of type (severity) of erosion, size of erosion area, and buffering/filtering potential to determine its impact rating. In total, 9 sites were considered high impact, 16 medium impact, and 7 low impact.

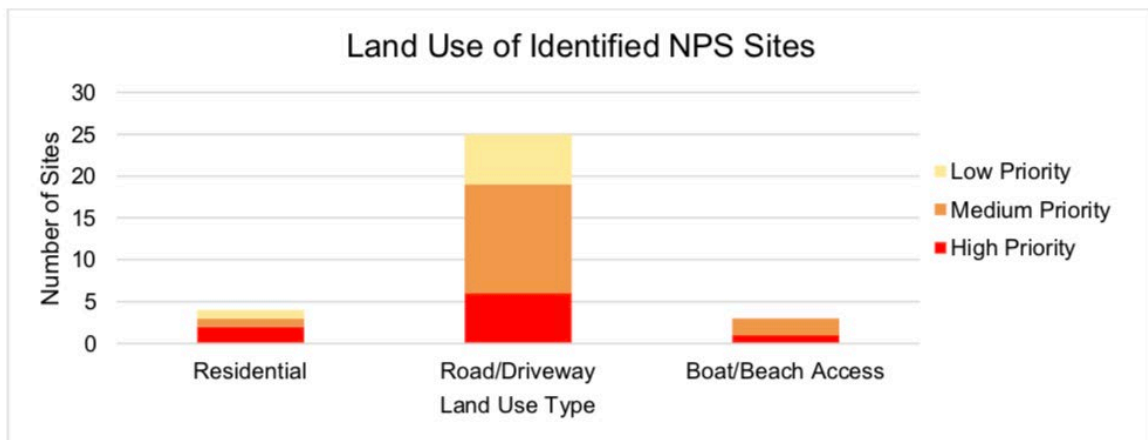


Figure 2. Land use of NPS sites identified during the watershed survey.

NPS pollution threats identified during the survey were 65% erosion issues (shoreline erosion, road surface erosion, driveway erosion, road shoulder erosion, sheet erosion, and concentrated flow erosion), 19% culvert issues (clogged, undersized, lack of armoring or vegetated buffer, or crushed), and 16% buffer issues (poor or lack of buffer) (Figure 3). Many sites had multiple NPS pollution threats identified at the site.

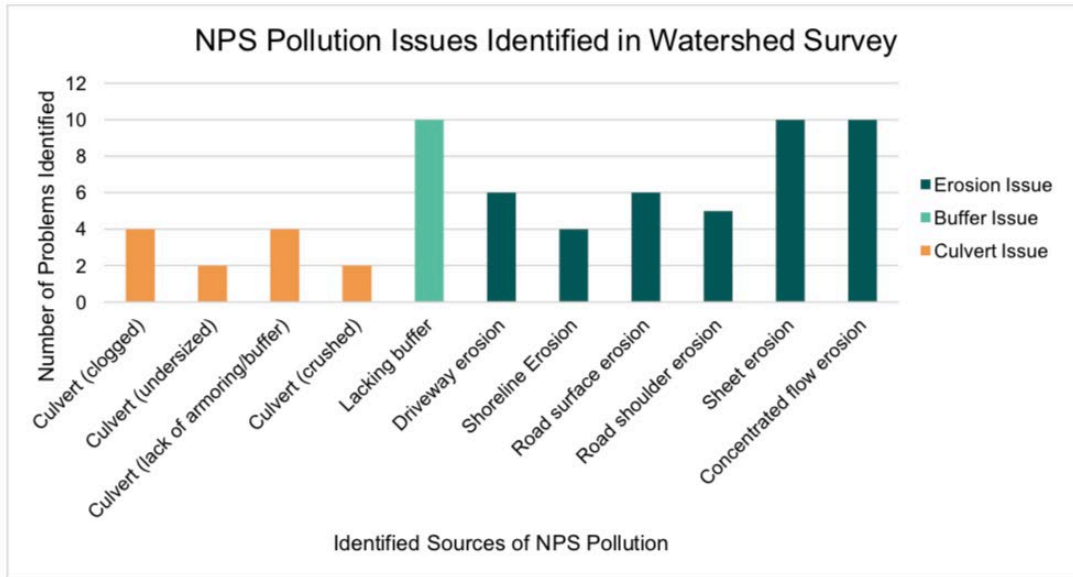


Figure 3. Sources of NPS pollution identified during the watershed survey.

The full results of the watershed survey, including specific recommended actions, are included in Appendix A.

For the shoreline survey, a total of 88 parcels with shoreline frontage were scored along Trickey Pond. Nine sites were considered high impact, 26 medium impact, and 41 low impact, with the remaining 12 sites having little or no erosion and runoff issues. Scores ranged from four to 16, with a score between 14 and 16 considered high impact; 10-13 medium impact; 6-9 low impact, and 4-5 little to no impact. Scores were based on five factors: buffer width, presence of bare soil, shoreline erosion, building setback distance, and parcel slope. Most parcels scored in the category of developed parcels with minimal erosion issues, indicating that human disturbance affecting water quality is likely spread among many parcels and NPS sites (Appendix A, Table 2). While distance from shore and slope are potentially unchangeable factors for shorefront property owners, higher scores indicate a property is more likely to negatively affect lake quality. For full list refer to Appendix A.

3. Watershed Plan Goals and Objectives

Overall Goal: The overall goal of the plan is to maintain or improve Class GPA water quality standards in Trickey Pond by reducing phosphorus and sediment loading to the lake. This will be achieved through the following actions over the coming ten-year period (2021-2031):

- **Reduce current sources of phosphorus loading** by fixing the 32 erosion sites identified in the watershed survey and addressing the 35 moderate and high erosion parcels identified in the shoreline survey. This will be achieved by providing targeted outreach, technical assistance and cost-sharing assistance to install conservation practices at NPS sites identified in the watershed survey.
- **Prevent new sources of phosphorus loading** by facilitating improved land use practices and ongoing maintenance activities. This objective will be met by conducting outreach and providing technical assistance to residents, road associations, youth camps and municipal officials.

- **Build local capacity** for watershed stewardship by promoting the TPEPA and raising funds for mitigation work.
- **Conduct ongoing assessment of lake and watershed conditions** by monitoring lake water quality and setting up and maintaining the NPS Site Tracker.

4. Schedule and Milestones to Guide Plan Implementation

A. Action Plan and Schedule

Action items, an estimated schedule and milestones were developed to prevent new NPS problems and address existing NPS sites with the highest impact and phosphorus loading to Trickey Pond. The number and types of sites targeted in the plan was based on priority sites identified in the Trickey Pond Watershed and Shoreline Survey. Other actions in the plan were included because they have proven to be cost-effective and successful in the region. The plan is designed to be implemented over a ten-year period, and an estimated schedule is provided for each action (Table 1). Potential funding sources and key partners were also identified for each action (Table 2). The plan will be carried out, in large part with Lake Stormwater Phosphorous Funding, state grants and local funding sources

Table 2 – Implementation Schedule

2021 – 2022	<ul style="list-style-type: none"> • Apply for EPA Section 319 Clean Water Act grant through MDEP. • Notify landowners about NPS sites on their properties. • Identify erosion sites in the watershed that qualify for Lake Stormwater Compensation Funding. • Use Lake Stormwater Compensation funds to mitigate previously identified NPS sites • Set up NPS Site Tracker.
2022 – 2024	<ul style="list-style-type: none"> • Conduct EPA 319 project (if funded) with targeted cost sharing and matching grants for high priority sites.
2021 – 2031	<ul style="list-style-type: none"> • LEA conducts Clean Lake Check-ups, monitoring and municipal assistance for new development projects. • TPEPA conducts annual meetings, outreach, maintains NPS Site Tracker and raises funds for ongoing stewardship. • Landowners fix NPS sites independently. • TPEPA uses NPS Site Tracker to identify maintenance needs and prompt ongoing road maintenance.

Table 3 – Action Items and Milestones	Schedule	Who	Potential Funding Sources
<i>Reduce current sources of phosphorus loading to the lake by addressing NPS sites and parcels identified in watershed & shoreline survey</i>			
<i>Provide Opportunity for cost sharing assistance to install BMPs at NPS sites (see watershed survey sites, med & high priority)</i>			
Driveway sites (7 sites)	2021-2026	landowners	Private, Lake stormwater compensation fund, TPEPA, EPA (319)
Residential sites (3 sites)	2021-2026	landowners	Private, Lake stormwater compensation fund, TPEPA, EPA (319)
Private road (9 sites)	2021-2026	Road association	Private, Lake stormwater compensation fund, TPEPA, EPA (319)
Beach/Boat Access sites (3)	2021-2026	landowners	Private, Lake stormwater compensation fund, TPEPA, EPA (319)
Town Road (1 site)	2021-2023	Town	Private, Lake stormwater compensation fund, TPEPA, EPA (319), Town
State Road (2 sites)	2021-2031	Maine DOT	Maine DOT, EPA (319)
Notify landowners about sites on their property; with a goal to have low impact sites (7 sites) repaired independently by landowners.	2021-2022	TPEPA, landowners	Private, TPEPA
<i>Provide opportunity for cost sharing assistance to install BMP at NPS sites (see shoreline survey parcels with ratings of 10 or higher)</i>			
Address NPS issues on shoreline parcels (35 medium and high impact parcels);	2021-2028	landowners	Private, Lake stormwater compensation fund, TPEPA, EPA (319)
Plant 25 feet of shoreline buffer per year	2021-2028	landowners	Private, TPEPA, EPA (319)
Conduct clean lake check-ups for lake residents (outreach & tech assistance)	ongoing	LEA	LEA, PWD
Notify landowners who scored highly in the shoreline survey	2021-2022	TPEPA	TPEPA
<i>Prevent new sources of phosphorus loading to the lake</i>			
Construction site inspections and buffer delineation	ongoing	LEA, Town	LEA, Town
Hold tours to highlight conservation practices	2021-2027	TPEPA	EPA (319)
Work with road associations to promote ongoing maintenance	2021-2030	TPEPA, LEA	private
Continue to promote the Lake Smart program with a goal of adding 2-3 properties per year which merit the Lake Smart designation	2021-2031	TPEPA, LEA	TPEPA, LEA, Landowners
Create Road Technical Assistance Report for Trickey Pond Road Association	2022	TPEPA, CCSWCD, Trickey Pond Rd Assoc.	EPA (319), Trickey Pond RD Assoc.
Work with the Town of Naples to explore ordinance changes to protect water quality.	2022-2031	TPEPA, LEA, Town of Naples	Town of Naples
<i>Build local capacity for watershed stewardship</i>			
Apply for 319 Watershed Implementation Grant	2021	CCSWCD	EPA (319)
Conduct TPEPA annual meetings	ongoing	TPEPA	TPEPA
Raise funds to support ongoing lake stewardship	ongoing	TPEPA	TPEPA
Create a series of watershed awareness videos to share on the TPEPA web site and social media	2022-2031	TPEPA	EPA (319)
Enhance and expand the education/resource section of the TPEPA website	2021-2031	TPEPA	TPEPA
<i>Conduct ongoing lake and watershed assessment</i>			
Conduct lake water quality monitoring	ongoing	LEA, MDEP	LEA, MDEP
Set up NPS Site Tracker and train TPEPA to use	2021-2022	MDEP	private
NPS Site Tracker annual use and maintenance	ongoing	TPEPA	private

B. Plan Oversight and Partner Roles

Trickey Pond Environmental Protection Association will assume responsibility for plan oversight and implementation. LEA, MDEP, private road associations, landowners, the Town of Naples, Cumberland County Soil & Water Conservation District and the Portland Water District will assist in the implementation.

- **LEA** will support with Plan implementation; provide technical assistance through its Clean Lakes Checkup program; conduct water quality monitoring; promote watershed stewardship through its website, newsletters and presentations; and work with the Town to provide property inspections and buffer delineation services for new development.
- **Cumberland County SWCD** will support the TPEPA in applying for and managing future 319 grants and providing technical assistance.
- **Private road associations and landowners** will address NPS issues on their properties and conduct ongoing maintenance of BMPs.
- **TPEPA** will provide Plan oversight, conduct outreach activities and raise funds for stewardship work. They will also set up and use the NPS Site Tracker to identify new NPS sites and prompt ongoing maintenance.
- **Town of Naples** will provide funding support for the Plan and LEA's water quality monitoring and also work to address NPS problems and conduct regular maintenance on town road sites.
- **Portland Water District (PWD)** will provide technical assistance and potentially cash match for grant projects.
- **MDEP** will conduct water quality monitoring and technical assistance and provide the opportunity for financial assistance through the NPS Grants Program.
- **EPA** may provide CWA Section 319 funds and guidance.

C. Plan Outputs and Milestones

Organizational Outputs

- Cumberland County Soil & Water Conservation District applies for 319 grant for Phase I project
- NPS Tracker created and local coordinator trained to use
- Contact made with all property owners and road associations with sites identified in watershed survey

NPS Mitigation Outcomes

- 7 NPS sites fixed by voluntary landowner initiative
- 25 high and medium impact NPS sites fixed with cost sharing assistance
- 35 high and medium impact shoreline sites addressed independently or with cost sharing assistance
- 50 technical assistance visits
- Estimated pollutant load reductions achieved by installed BMPs

Water Quality Outcomes

- Meets lake GPA standards in MDEP's biennial 303d reports
- Stable or improved trend for lake water clarity and chlorophyll-a

5. Proposed Management Measures

The *Trickey Pond Watershed & Shoreline Survey Report* [Appendix A] lists specific management measures recommended for each of the NPS erosion problems identified during the survey. Typical problems and management measures for the most common land uses identified in the watershed survey are described in the sections below. Recommendations follow guidelines found in MDEP publications including the *Gravel Road Maintenance Manual*, *Conservation Practices for Homeowners* fact sheet series, and *Erosion and Sediment Control Manual*. The recommended BMPs accomplish the plan goal of reducing phosphorus and sediment loading to the lake by stabilizing bare soil and erosion and diverting, infiltrating or filtering polluted runoff before it reaches the lake.

In addition to structural BMPs recommended for each problem, public education and outreach efforts will also be needed to promote responsible stewardship and ongoing maintenance activities. The NPS Site Tracker will be created and used by the TPEPA with support from MDEP on an ongoing basis to identify new problems and to prompt maintenance on sites fixed through the plan.

A. Residential and Shoreline Development

The watershed survey identified 4 residential erosion sites. Of these, there are 2 high impact, 1 medium impact and 1 low impact site. Common problems include lack of vegetated buffers, bare soil, erosion on roads and driveways, and clogged or crushed culverts. Based on the survey results, the most common BMPs will include:

- vegetated buffers;
- erosion control mulch;
- runoff diverters on paths; and
- maintain or replace culverts.

The shoreline survey evaluated 88 parcels. Of these, 9 indicated significant erosion issues and 26 indicated moderate erosion issues. Common problems include lack of vegetated buffer, bare soil, and close proximity of structures to the shoreline. Based on the survey results, the most common BMPs will include:

- vegetated buffers/rain gardens;
- erosion control mulch
- runoff diverters on paths
- ensuring septic systems are fully functioning to mitigate development close to shoreline.

The plan aims to address all high and medium priority sites from both the watershed and shoreline surveys. Approximately eight sites (high and medium impact) will be remediated by using Lake Stormwater Phosphorus Compensation Funds. Most of the remaining medium and high priority sites, both on the shoreline and in the watershed will be remediated by providing landowners with matching grants from 319 funds. For those sites that do not qualify for 319 funds, the TPEPA will establish a matching funds grant process. The low impact sites are low cost and easy to fix; it is expected that those sites will be fixed independently by the landowners after the problem and recommended solutions are brought to their attention through targeted outreach and/or technical assistance visits.

B. Private Roads and Driveways

The watershed survey identified 14 private road sites and 8 driveway sites. For private roads, there were 3 high impact, 6 medium impact and 5 low impact sites. For driveways, there were 1 high impact, 6 medium impact and 1 low impact site. Common problems included crushed and clogged culverts, road surface and shoulder erosion and lack of buffer. The most common BMPs recommended in the survey included:

- clean and armor culverts;
- armor shoulders and ditches;
- install water bars to divert water;
- improve vegetated buffer; and
- grade and re-crown road.

The plan aims to address all high and medium impact driveway sites by providing cost sharing funds to road associations and landowners. Similar to the low impact residential sites, targeted outreach and technical assistance will be provided to landowners for the remaining low impact driveway sites. It is anticipated that voluntary action will result in 75% of these problems being fixed.

C. Town and State Roads

One town road site was identified in the watershed survey (site #9). This one site is comprised of the town road shoulder and a private parcel. It is anticipated that Lake Stormwater Phosphorus Compensation funds will be used to address site #9 once the landowner has agreed to participate. The Town will be able to provide in kind support for remediating the Town road portion of this site.

Two state road sites are identified in the watershed survey (site #14 and site #15). Site 14, adjacent to a private parcel, qualified for Lake Stormwater Phosphorus Compensation funds and is on track to be remediated in spring 2021. Site #15 will be addressed either by MDOT or matching funds from a grant.

D. Boat and Beach Access Sites

Three boat/beach access sites were identified in the survey, one high impact and two medium impact. Common issues include shoreline and surface erosion and bare soil. Recommended fixes include rubber razors and buffer plantings. These sites will be addressed by providing cost-sharing funds to landowners.

6. Pollutant Load Reductions

Pollutant load reductions will be estimated for many NPS sites to help demonstrate the value of BMPs to reduce the amount of sediment and phosphorus entering the pond. Pollutant load reductions will be estimated and reported to MDEP for any work funded by 319 grants. Pollutant load reduction will be made using methods approved and recommended by the MDEP and EPA.

7. Water Quality Results Monitoring

Maine water quality criteria require that lakes and ponds have a stable or improving trophic state and be free of culturally induced algal blooms. LEA will continue to monitor Trickey Pond twice a month from May through September for parameters including Secchi disk transparency, temperature, Chlorophyll-a, dissolved oxygen and total phosphorus. MDEP also conducts baseline monitoring on Trickey Pond about every five years for these and other parameters.

MDEP conducts Secchi disk trend analysis every two years as part of their Integrated Water Quality Monitoring and Assessment report. Trend reporting (positive, negative or stable) will assist in determining whether the plan meets its goal of having stable or improving water quality over time.

Appendix A - Trickey Pond Watershed and Shoreline Survey Report

TRICKEY POND

WATERSHED AND SHORELINE SURVEY REPORT

OCTOBER 2020



Photo Credit: trickeypond.org

PREPARED BY:

FB ENVIRONMENTAL ASSOCIATES

97A Exchange Street, Suite 305

Portland, Maine 04101

(207) 221-6699

www.fbenvironmental.com

IN COLLABORATION WITH:



TABLE OF CONTENTS

BACKGROUND1

WATERSHED SURVEY RESULTS.....3

 SURVEY TECHNIQUES.....3

 SURVEY RESULTS3

 HIGH PRIORITY NONPOINT SOURCE POLLUTION SITES.....6

SHORELINE SURVEY RESULTS..... 11

 SURVEY TECHNIQUES..... 11

 SURVEY RESULTS 12

RECOMMENDATIONS AND NEXT STEPS..... 15

APPENDIX A: WATERSHED SURVEY DATA..... 16

APPENDIX B: SHORELINE SURVEY DATA 19

TABLE OF FIGURES

Figure 1. The Trickey Pond watershed is located in Naples, Maine. 2

Figure 2. Land use of NPS sites identified during the watershed survey..... 4

Figure 3. Sources of NPS pollution identified during the watershed survey. 4

Figure 4. Potential nonpoint source pollution sites identified in the 2019 - 2020 watershed survey..... 5

Figure 5. Distribution of shoreline disturbance scores for Trickey Pond..13

Figure 6. Map of shoreline disturbance scores for individual shorefront properties on Trickey Pond..14

TABLE OF TABLES

Table 1. Evaluation criteria for shoreline parcels.12

Table 2. Frequency of shoreline disturbance scores, with lower scores indicating lower impact (minimal erosion or runoff issues) and higher scores indicating greater impact (significant erosion or runoff issues).13



BACKGROUND

Trickey Pond is part of the Greater Sebago Lake Watershed and lies within the town of Naples (Figure 1). The 555 acres of the Trickey Pond Watershed drain into the Muddy River Bay of Sebago Lake, the drinking water source for approximately 200,000 people in the greater Portland area. Trickey Pond is listed as threatened on the February 2019 Maine Department of Environmental Protection (MEDEP) Nonpoint Source (NPS) Priority Watershed List. It is a priority waterbody because it has outstanding water quality and is under threat from development and nonpoint source pollution. In the 2015 “Subwatershed Assessment and Prioritization” report prepared by the Cumberland County Soil and Water Conservation District, Trickey Pond was highlighted as a good candidate for an NPS survey and updated Watershed-based Protection Plan due to significant declines in water quality and predicted quantity of high impact NPS pollution sites. The report stated that Trickey Pond should be prioritized for considerable investment in pond protection programs in order to maintain its current level of good pond health.

Trickey Pond’s water quality has been decreasing over time. Water testing by Lakes Environmental Association (LEA) has found worsening clarity and chlorophyll trends, as well as high deep-water phosphorus readings. As a result, Trickey Pond warrants a “high” degree of concern from LEA.

To identify potential sites to address to protect and improve water quality, LEA and FB Environmental (FBE) conducted a watershed survey of Trickey Pond and a shoreline survey in collaboration with the Trickey Pond Environmental Protection Association (TPEPA). This report details the findings of the watershed survey of the land and roads, and shoreline survey, and lists sites that could be targeted to protect Trickey Pond’s water quality and to strengthen protection of the greater Sebago Lake watershed.



The Trickey Pond public boat launch exhibits well designed and maintained stormwater controls including rip rap (pictured here) for shoreline stabilization and a catch basin to remove sediment and debris from stormwater runoff. Photo Credit: FBE



Figure 1. The Trickey Pond watershed is located in Naples, Maine.

WATERSHED SURVEY RESULTS

In October 2019 and April 2020, FBE and LEA completed a locally funded watershed survey to identify, document, and prioritize sources of NPS pollution in the Trickey Pond watershed.

SURVEY TECHNIQUES

The watershed survey was conducted on October 29, 2019, and April 20, 2020 by FBE and LEA technical staff following Maine Department of Environmental Protection watershed survey guidance documentation. All developed portions of the watershed were surveyed, with the exception of the Quinbys Campground, and NPS pollution sites were documented for location, extent of erosion, runoff problems, and impacts to Trickey Pond. In addition, each site was analyzed for recommended maintenance and potential best management practice (BMP) installations. Documentation at each site included describing the problem, making recommendations for fixing the problem, logging the sites geolocation, and taking photographs. Recommended BMPs utilize existing local guidance from MEDEP watershed survey guide, as well as professional judgement by technical survey staff.

Field assessments were completed using maps with public and private roads, topographic lines to indicate slope, Trickey Pond outlets, conserved land, and locations of the four camps or campgrounds located along the east side shore of Trickey Pond. Assessments were completed using handheld smartphones with GPS and GIS software for data collection through the Survey123 application and photography to document the location and existing conditions of specific sites. Survey teams drove all roadways in the watershed area and evaluated sites that posed a threat to downstream waterbodies. As part of the field work, the project team noted the location (based on GPS coordinates) and the extent of the stormwater impact or source areas, made preliminary recommendations about the type of stormwater management that would benefit the site, rated the severity of the problem, documented any observed site constraints for implementing the stormwater management option, and recorded any other relevant field observations.

SURVEY RESULTS

In total, 32 erosion sites were identified in the watershed, of which 13% were of residential land use, 78% were road or



LEA and FBE staff document a perched culvert using handheld devices (above) and assess a lake public access point (below). Photo credit: FBE



driveway, and 9% were boat or beach access land use (Figure 2).¹ Site prioritization was calculated from site impact ratings on buffering and filtering, erosion severity, and erosion area size. NPS pollution threats identified during the survey were 65% erosion issues (shoreline erosion, road surface erosion, driveway erosion, road shoulder erosion, sheet erosion, and concentrated flow erosion), 19% culvert issues (clogged, undersized, lack of armoring or vegetated buffer, or crushed), and 16% buffer issues (poor or lack of buffer) (Figure 3). Many sites had multiple NPS pollution threats identified at the site.

The locations of the 32 sites are shown in Figure 4, of which nine are rated as high priority due to erosion severity, erosion area size, and lack of buffering. The high priority sites are described below. The full results of the watershed survey, including specific recommended actions, are included in Appendix A.

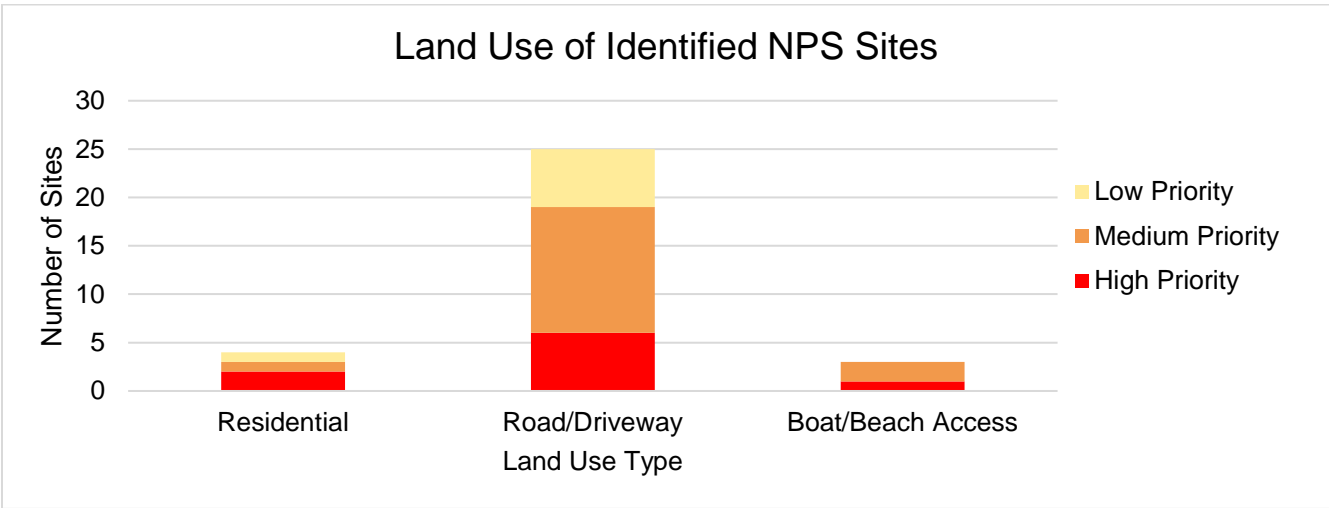


Figure 2. Land use of NPS sites identified during the watershed survey.

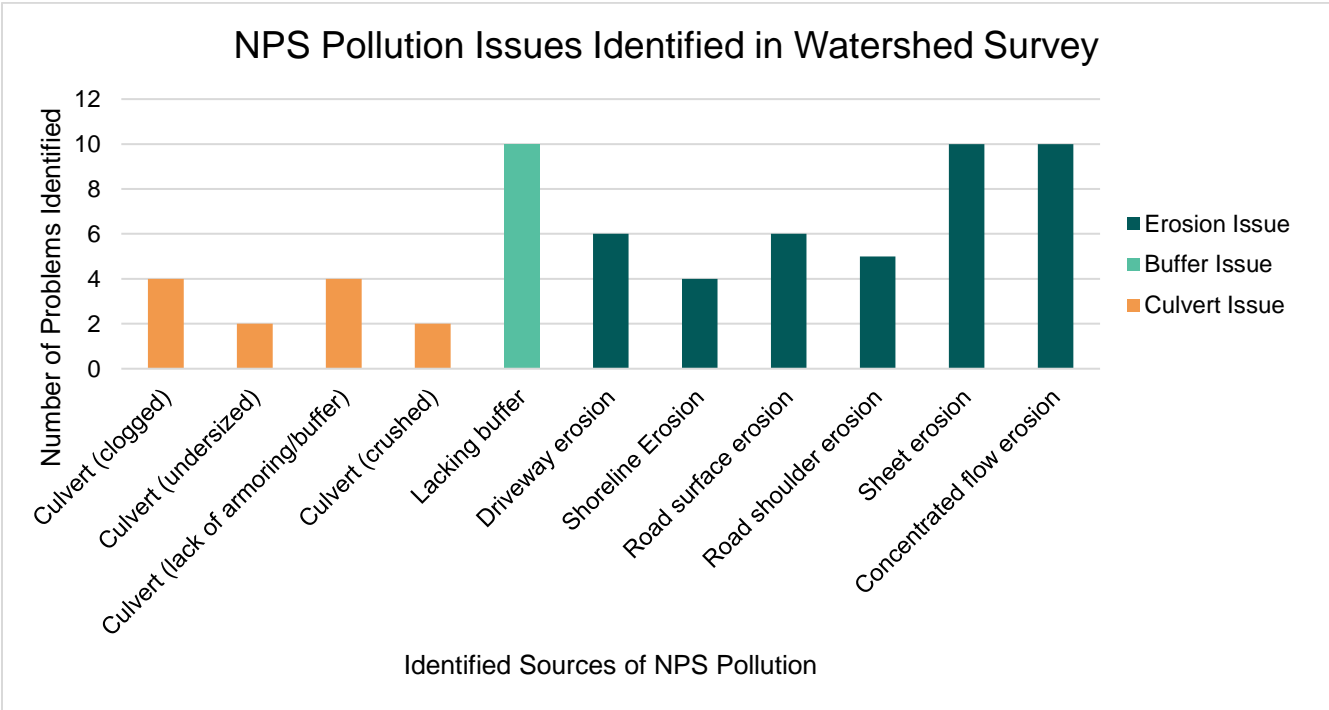


Figure 3. Sources of NPS pollution identified during the watershed survey.

¹ 36 sites were identified, of which four were not within the Trickey Pond watershed once the identified sites were displayed spatially.



Figure 4. Potential nonpoint source pollution sites identified in the 2019 - 2020 watershed survey.

HIGH PRIORITY NONPOINT SOURCE POLLUTION SITES

Natural Outlet on Lake House Road (Site 9)

Observations: Road shoulder erosion is occurring alongside Lake House Road at the public access point and pond outlet adjacent to the road. Rill and gully erosion directly to the pond indicate severe concentrated flow and sediment transport. There is little to no buffer along the shoreline.

Recommendations: Install a water bar (or similar structure) to intercept runoff and direct water off the access road. Consider installing a catch basin or settling basin to remove debris and sediment from runoff prior to it reaching the pond or pond outlet. Additionally, improve the vegetated buffer between the access road and the pond to increase filtering capacity.



Lake House Road shoulder (left) and water access road to shoreline (right).

Camp Skylemar Shoreline (Site 1)

Observations: The shoreline and water access along the Camp Skylemar beach is experiencing significant runoff and shoreline erosion. The area has signs of concentrated flow and lacks a vegetated shoreline buffer. The culverts are clogged and need maintenance and cleaning.

Recommendations: We recommend trenching to control runoff and to prevent sheet and concentrated flow erosion. Perform regular culvert maintenance. Consider erosion control mulch to reduce sediment transport over unvegetated areas.



Slope to water access (left) and Camp Skylemar beach (right).

Boat Ramp at Loons Haven Campground (Site 5)

Observations: The gravel road to the discontinued boat ramp at Loons Haven Campground is experiencing a road crown failure, resulting in road surface erosion into the adjacent pond. Sediment is being transported directly to the water, as evidenced by rill and gully concentrated flow erosion. The area lacks a vegetated buffer.

Recommendations: We recommend re-crowning the road and improving the vegetated buffer between the road and the shoreline. Consider installing a rain garden.



Shoreline at old boat launch (left) and gravel road (right).

Property #243 on Trickey Pond Road (Site 34)

Observations: Sheet erosion is occurring on the driveway and adjacent area at residential property #243 on Trickey Pond Road. The area is moderately sloped and lacks a buffer between the eroding area and the pond.

Recommendations: Install a water diverter to control stormwater runoff. Vegetate the area to filter sediment and slow water speed.



Driveway and adjacent land on property #243.

Boat Launch on Trickey Pond Road adjacent to #243 (Site 35)

Observations: The water access point boat launch on Trickey Pond road adjacent to property #243, serving as a boat launch, is experiencing road surface erosion, and resulting in shoreline erosion. The launch is moderately sloped, and water can flow directly to the lake transporting sediment.

Recommendations: We recommend installing multiple rubber razors on the launch to divert water off the roads surface. Consider installing vegetation or armoring on the road’s edge to slow and filter water.



Boat launch road adjacent to property #243.

Perched culvert on Trickey Pond Road adjacent to #105 (Site 3)

Observations: The culvert on Trickey Pond Road adjacent to property #105 is clogged with debris and partially crushed. The outlet is hanging by six to 10 inches and is unstable. The slope to the water is steep.

Recommendations: We recommend armoring the culvert inlet and outlet and installing a splash pool to reduce erosion and sediment transport directly to the water. Consider replacing the culvert with the appropriate size. Perform regular maintenance at the culvert inlet to prevent clogging and potential road overtopping. Armor and vegetate the path to the shoreline to reduce erosion and sediment transport.

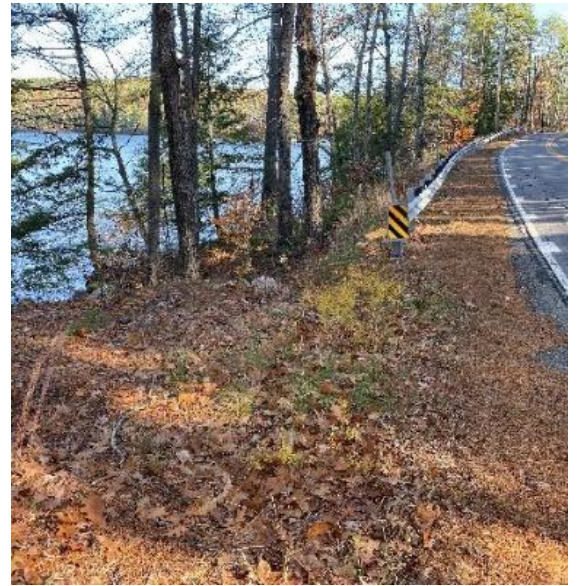


Culvert inlet (not visible among debris) (left) and perched culvert outlet (right).

Route 114 adjacent to Trickey Pond Road Entrance (Site 14)

Observations: Route 114 is experiencing road shoulder erosion. Stormwater runoff is transporting sediment to the lake, evident from gully concentrated flow erosion down the steep slope to the shoreline.

Recommendations: We recommend increasing vegetation on the slope and establishing runoff diverters to slow the speed of stormwater runoff.



Erosion on slope to water (left) and Route 114 road shoulder (right).

Driveway on Trickey Pond Road Property #93 (Site 24)

Observations: Property #93’s driveway on Trickey Pond Road is experiencing road surface erosion and concentrated flow erosion. The steeply sloped area leads to the water with minimal vegetation.

Recommendations: We recommend rubber water bar diverters to control the flow and speed of stormwater runoff and to filter the water through vegetation prior to flowing into the pond.

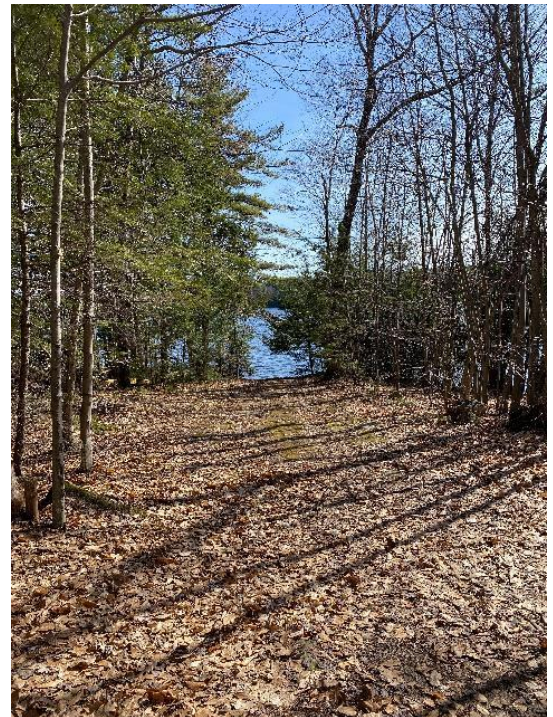


Driveway for property #93.

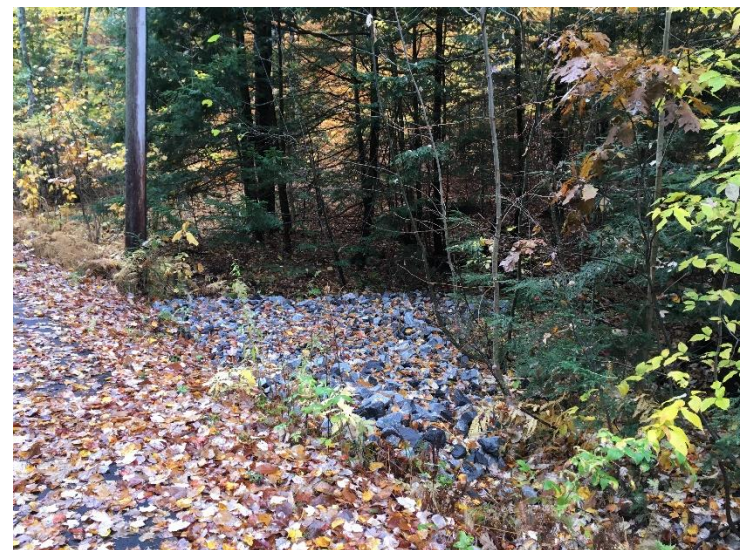
Water access point on Trickey Pond Road (Site 25)

Observations: The water access point located midway along Trickey Pond Road is experiencing road surface erosion, concentrated flow erosion, and shoreline erosion. The access road is moderately sloped and has signs of rill and gully erosion.

Recommendations: We recommend installing rubber water bar diverters to control the flow and speed of stormwater runoff. Considering encouraging vegetation to allow sediment in runoff to be filtered prior to leading to the pond.



Water access point.



Examples of effective stormwater controls: catch basin and rip rap at the Trickey Pond public boat launch (left) and road shoulder armoring on Trickey Pond Road (right). Photo credit: FBE

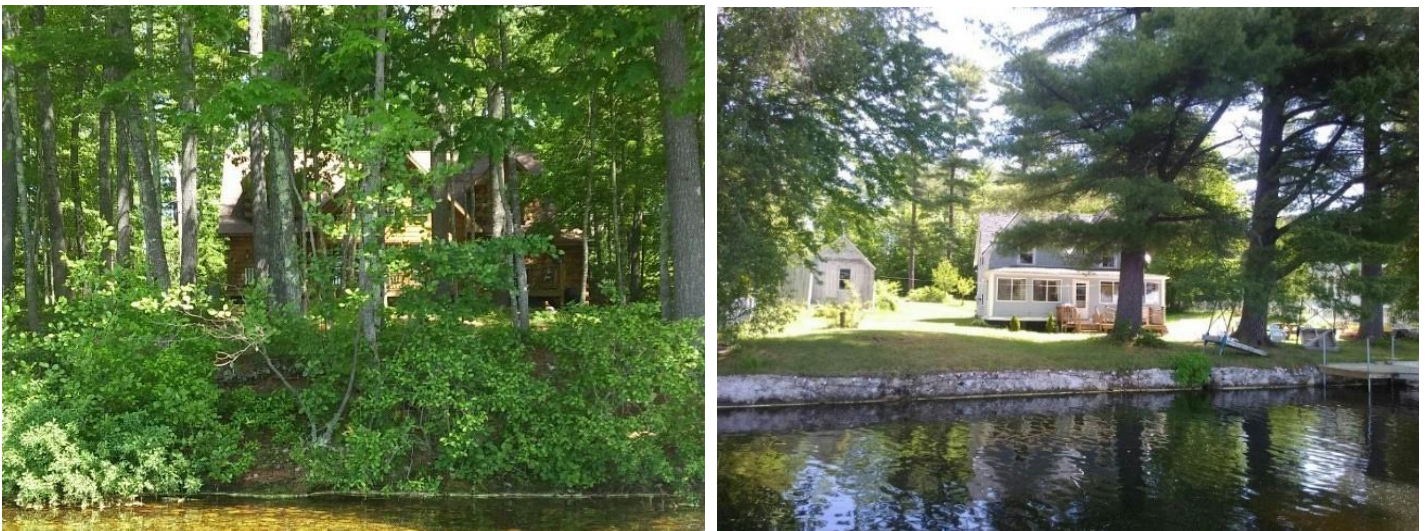
SHORELINE SURVEY RESULTS

In September 2020, FBE, LEA, and TPEPA completed a locally funded shoreline survey to identify and document shoreline areas of Trickey Pond that may be sources of nonpoint source pollution in the watershed.

SURVEY TECHNIQUES

The shoreline survey was conducted on September 17th, 2020 by FBE and LEA technical staff with support from Trickey Pond Environmental Protection Association board members Martina Witts and Bruce Witts. The watershed was divided into two sections for survey completion.

Initially developed by FBE in collaboration with the MEDEP Lakes Unit, the survey protocol documents the condition of the shoreline for each parcel with pond frontage using a scoring system that evaluates vegetated buffer, presence of bare soil, extent of shoreline erosion, distance of structures to the lake, and slope. These shoreline survey methods are used throughout Maine and New Hampshire and are recognized by MEDEP. Vegetated buffer was scored from one to five, with one being an excellent natural buffer with a mix of trees and shrubs, and five being all lawn or bare ground with no buffer. Presence of bare soil was scored from one to four, with one being no bare soil and four being large amounts of exposed soil present. Extent of shoreline erosion was scored from one to three, with one being no erosion visible and three being moderate to severe shoreline erosion. Distance to shore was scored from one to three, with one being a structure more than 150 feet from the shoreline, and three being a structure closer than 75 feet to the shoreline. Slope was scored from one to three, with one being little to no slope, and three being a steep slope. Table 1 provides a full scoring breakdown.



A property with trees and shrubs between the shoreline and structure creating a natural buffer (left), and a parcel vulnerable to stormwater runoff because of limited shoreline buffer (right).

Examples not from Trickey Pond shoreline survey to protect landowner privacy. Photo credit: FBE

Table 1. Evaluation criteria for shoreline parcels.

Buffer:	1=Excellent Buffer (all-natural vegetation – trees of mixed sizes and shrubs)
	2=Good (some trees and shrubs, some bare areas)
	3= Moderate (a few small trees/shrubs, some lawn)
	4=Minimal (mostly lawn, some shrubs)
	5=No buffer (all lawn/bare)
Bare Soil:	1=No exposed soil
	2=Minimal exposed soil
	3=Fair amount of exposed soil
	4=Large amounts of exposed soil
Shoreline Erosion:	1=No erosion visible
	2=Some erosion visible
	3=Moderate to severe shoreline erosion
Structure Distance	0=No structure
	1=More than 150’
	2=75-150’
	3= Less than 75’
Slope:	1=Little to no slope (0-15%)
	2=Moderate slope (15-30%)
	3=Steeply sloped (>30%)
Shoreline Disturbance Score:	Total of all columns

SURVEY RESULTS

A total of 88 parcels with shoreline frontage were scored along Trickey Pond. Scores ranged from four to 16, with lower scores indicating lower impact (minimal erosion or runoff issues) and higher scores indicating greater impact (significant erosion or runoff issues) (Figure 6). Most parcels scored in the category of developed parcels with minimal erosion issues, indicating that human disturbance affecting water quality is likely spread among many parcels and NPS sites (Table 2). While distance from shore and slope are potentially unchangeable factors for shorefront property owners, higher scores indicate a property is more likely to negatively affecting lake quality. These scores for each parcel were summed to create individual parcel shoreline disturbance scores and entered into a database (refer to Appendix B for the full database).

Figure 6 displays the mapped distribution of parcel scores. The spatial distribution highlights areas possibly contributing to polluted runoff and can be used to prioritize areas of shoreline frontage for restoration. Shorefront landowners can implement many best management practices individually that reduce the potential for NPS pollution and still allow for an aesthetically pleasing shorefront.

Best management practices to address common nonpoint pollution site issues seen along the shoreline survey include: 1) planting vegetated buffers with native plants to improve inadequate buffers, 2) planting rain gardens, using erosion control mix, and removing artificial sand to reduce the presence of bare soil, 3) filtering path and driveway runoff into the ground using runoff control diverters and check steps to prevent shoreline and bank erosion or destabilization, and 4) ensuring the septic system is fully functioning to mitigate potential harmful effects on Trickey Pond’s water quality due to development close to the shoreline.

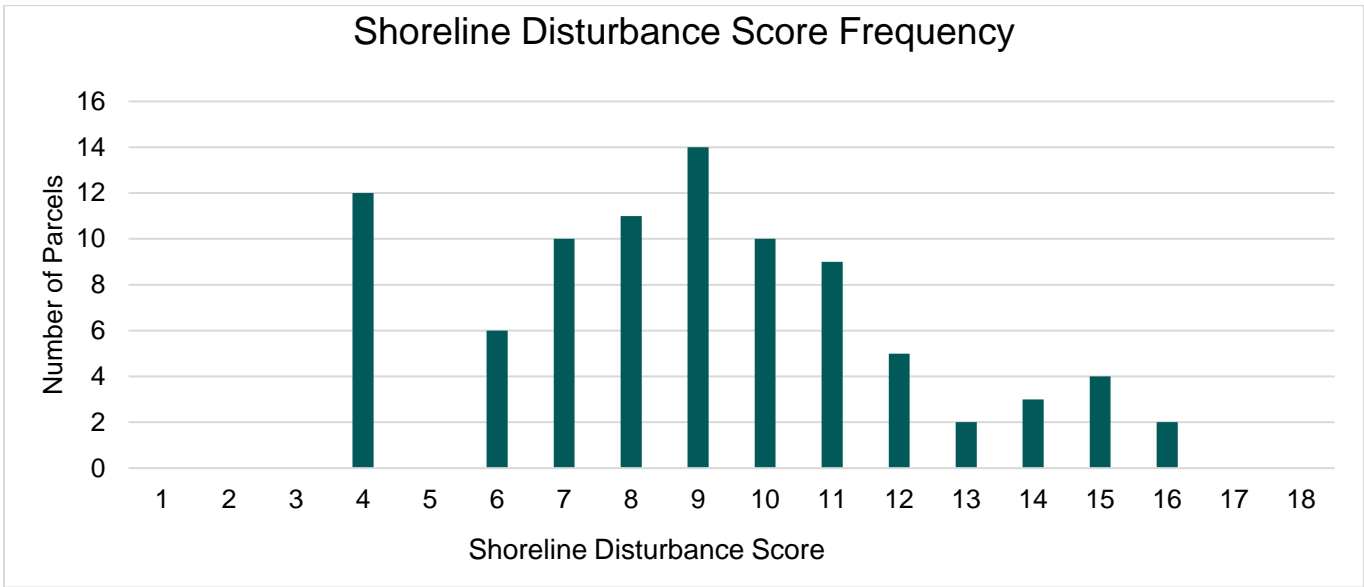


Figure 5. Distribution of shoreline disturbance scores for Trickey Pond. A total of 88 parcels were scored.

Table 2. Frequency of shoreline disturbance scores, with lower scores indicating lower impact (minimal erosion or runoff issues) and higher scores indicating greater impact (significant erosion or runoff issues). Scores 4-5 are undeveloped parcels (light green); scores 6-9 are developed but with minimal erosion issues (dark green); scores 10-13 are developed with moderate erosion issues (orange); and scores 14-18 are developed with significant erosion issues (red).

Shoreline Disturbance Score	Number of Parcels with Score	Percentage	Group Percentage
4	12	14%	14%
5	0	0%	
6	6	7%	47%
7	10	11%	
8	11	13%	
9	14	16%	
10	10	11%	30%
11	9	10%	
12	5	6%	
13	2	2%	
14	3	3%	10%
15	4	5%	
16	2	2%	
17	0	0%	
18	0	0%	
Total	88	100%	100%

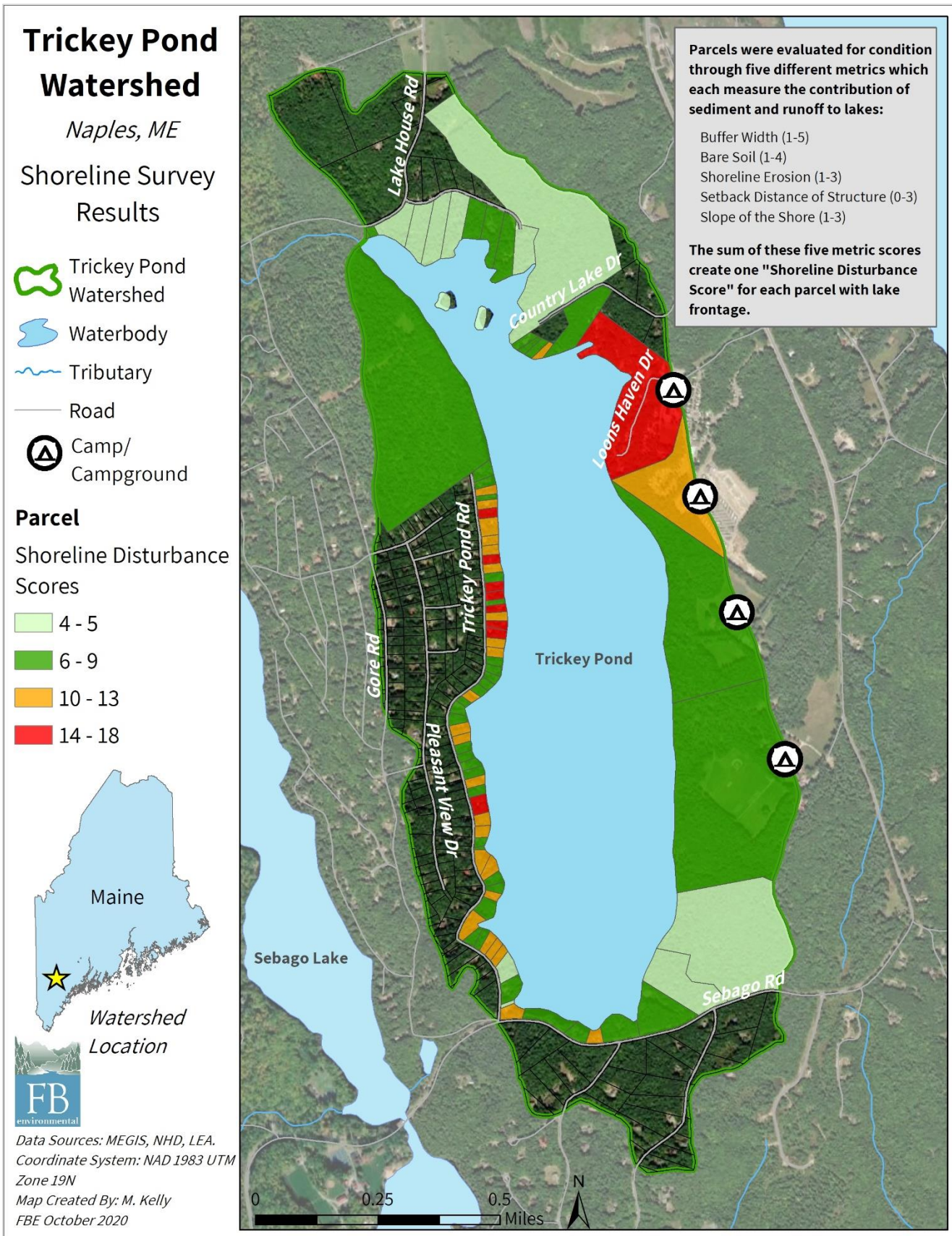


Figure 6. Map of shoreline disturbance scores for individual shorefront properties on Trickey Pond. Refer to Table 2 caption for description of color coding.

RECOMMENDATIONS AND NEXT STEPS

We recommend the Trickey Pond Environmental Protection Association and Town of Naples pursue a lake protection plan. As an unimpaired pond threatened by nonpoint source pollution and with a watershed survey completed within the prior five years, Trickey Pond is eligible to complete a Maine Department of Environmental Protection Lake Watershed-Based Protection Plan (WPP).² A WPP will assist Trickey Pond citizens with establishing watershed goals, identifying action items needed to make advancements towards water quality goals, creating a schedule for future implementation efforts, and developing milestones to guide plan implementation. A WPP is a good avenue to access future state funding and assistance, as an approved plan allows a watershed to become eligible to apply for a U.S. Environmental Protection Agency Section 319 grant through MEDEP's NPS program.³

To continue advancing watershed protection efforts, we recommend that TPEPA and the Town of Naples continue to perform maintenance on existing best management practices within the watershed, partner with LEA to perform baseline water quality monitoring on an annual basis, engage watershed citizens on issues of NPS pollution, and raise funds to ensure future progress on lake protection actions. In addition, we recommend lake protection partners use identified hotspots from the watershed and shoreline survey to prioritize watershed restoration areas and leverage momentum to continue taking action. Ultimately, ongoing protection efforts against runoff from surrounding development and pollution from human activity will help preserve Trickey Pond and the surrounding watershed.



Trickey Pond. Photo credit: FBE

² https://www.maine.gov/dep/land/watershed/nps_priority_list/NPS%20Priority%20List%20-%20Lakes.pdf

³ <https://www.maine.gov/dep/water/grants/319.html>

APPENDIX A: WATERSHED SURVEY DATA

Date	Site*	Location	Identified NPS Issue(s)	Flow into lake via	Land Use Type	Slope	Priority Level**	Cost to fix	Recommendations	Latitude	Longitude
10/29/19	1	Skylemar Beach	Shoreline Erosion, lacking buffer, concentrated flow erosion	Direct	Residential	Moderate	High	Med.	Trenching, clean culverts, erosion control mulch.	43.93449	-70.603609
10/29/19	3	Perched culvert near 105 Trickey Pond Rd; Trickey Pond Rd	Culvert (clogged, crushed)	Ditch	Private Rd; paved	Steep	High	Med.	Armor culvert inlet and outlet, install splash pool at outlet, consider enlarging culvert.	43.93614	-70.612208
10/29/19	4	Near #76 ; Trickey Pond Rd	Culvert (clogged, lack of armoring/buffer)	Minimal vegetation	Private Rd; paved	Moderate	Low	Low	Enlarge culvert, armor inlet/outlet, maintenance as needed.	43.93423	-70.611953
10/29/19	5	Old boat ramp; Loons Haven	Road surface erosion (crown failure), concentrated flow erosion, lacking buffer	Direct	Private Rd; gravel	Flat	High	High	Re-crown road improve vegetated buffer. Consider rain garden.	43.94868	-70.605372
10/29/19	7	Log cabin lawn; Trickey Pond Rd	Lacking buffer (bare soil), concentrated flow erosion	Minimal vegetation	Residential	Moderate	Med.	Low	Vegetate bare soil to improve buffer and use erosion control mulch.	43.93403	-70.611777
10/29/19	8	Country lake Drive	Culvert (undersized, lack of armoring/buffer)	Minimal vegetation	Private Rd; gravel	Moderate	Low	Low	Refit culvert and armor inlet and outlet. Reshape ditch to help drainage at the outlet.	43.95109	-70.608571
10/29/19	9	Area by natural outlet; Lake House Rd	Road shoulder erosion, concentrated flow erosion	Direct	Town Rd; paved	Steep	High	Med.	Grade road install water bars, vegetated ditch, catch basin. Consider narrowing path to water.	43.95312	-70.616946
10/29/19	10	End of pleasant view road; Pleasant View Rd	Road surface erosion, sheet erosion	Minimal vegetation	Private Rd; gravel	Steep	Med.	Low	Armor road shoulder, continued maintenance as needed.	43.93364	-70.613233
10/29/19	11	Mason Ave and pleasant Rd intersection; Mason Ave	Road shoulder erosion, concentrated flow erosion	Minimal vegetation	Private Rd; gravel	Moderate	Med.	Low	Improve armoring around ditch.	43.9418	-70.61409
10/29/19	12	Stream crossing; Trickey Pond Rd	Culvert (lack of armoring/buffer)	Stream	Private Rd; paved	Moderate	Low	Low	Armor and vegetated culvert inlet.	43.93969	-70.612039

Date	Site*	Location	Identified NPS Issue(s)	Flow into lake via	Land Use Type	Slope	Priority Level**	Cost to fix	Recommendations	Latitude	Longitude
10/29/19	13	Near house #148; Trickey Pond Rd	Culvert (clogged, lack of armoring/buffer)	Minimal vegetation	Private Rd; paved	Moderate	Low	Low	Stabilize inlet with armoring, maintenance as needed to remove debris.	43.93849	-70.613148
11/06/19	14	Near entrance to Trickey Pond Rd; Route 114	Road shoulder erosion, concentrated flow erosion	Direct	State Rd; paved	Moderate	High	Med.	Encourage vegetation, install runoff diverters to slow water speed and prevent concentrated flow.	43.92974	-70.609812
11/06/19	15	Near fire lane #86; Route 114	Road shoulder erosion, concentrated flow erosion	Minimal vegetation	State Rd; paved	Flat	Med.	Low	Mulch road margins and vegetate. Form a mulch berm to prevent concentrated flow.	43.92929	-70.605001
11/06/19	18	Gravel driveway of Bosworth neighboring property; Country Lake Rd	Road shoulder erosion, sheet erosion	Ditch	Driveway; gravel	Flat	Low	Low	Encourage vegetation.	43.94995	-70.609339
11/06/19	19	Outhouse on Bosworth property; Country Lake Rd	Sheet erosion, uncovered soil	Ditch	Residential	Moderate	Low	Low	Continued maintenance as needed, consider encouraging vegetation on uncovered soil.	43.94988	-70.609804
11/06/19	20	Access road near Bosworth property; Country Lake Rd	Culvert (undersized, perched), sheet erosion	Ditch	Private Rd; grave	Moderate	Low	Low	Reseat/ enlarge culvert.	43.95005	-70.60944
04/20/20	21	Near Property #148; Trickey Pond Rd	Culvert (crushed), sheet erosion	Ditch	Private Rd; paved	Flat	Med.	Low	Replace culvert, armor and vegetate inlet and outlet.	43.9387	-70.613245
04/20/20	22	Beach property; Trickey Pond Rd	Lacking buffer, shoreline erosion	Direct	Beach Access	Moderate	Med.	Low	Install vegetated buffer.	43.93425	-70.611842
04/20/20	23	Walkway to water; Trickey Pond Rd	Shoreline erosion, sheet erosion, lacking buffer	Direct	Beach/Boat Access	Steep	Med.	Low	Install rubber razors to divert water, improve buffer.	43.93479	-70.611995
04/20/20	24	Drive of #93; Trickey Pond Rd	Driveway erosion, concentrated flow erosion	Direct	Driveway; gravel	Steep	High	Low	Install rubber razors to divert water.	43.93537	-70.612056
04/20/20	25	Water access; Trickey Pond Rd	Road surface erosion, concentrated flow erosion, shoreline Erosion	Direct	Private Rd; gravel	Moderate	High	Med.	Install rubber razors to divert water.	43.93754	-70.612823
04/20/20	26	Boat launch right of way; Trickey Pond Rd	Road surface erosion (tire ruts), sheet erosion, lacking buffer	Direct	Private Rd; gravel	Moderate	Med.	Low	Install rubber razors to divert water, improve buffer.	43.93929	-70.612544

Date	Site*	Location	Identified NPS Issue(s)	Flow into lake via	Land Use Type	Slope	Priority Level**	Cost to fix	Recommendations	Latitude	Longitude
04/20/20	27	Drive of #169; Trickey Pond Rd	Driveway erosion, lacking buffer, sheet erosion	Direct	Driveway; gravel	Moderate	Med.	Low	Install vegetated buffer.	43.93989	-70.611767
04/20/20	28	Drive of #189; Trickey Pond Rd	Driveway erosion, lacking buffer, sheet erosion	Direct	Driveway; gravel	Moderate	Med.	Low	Install vegetated buffer.	43.94133	-70.611542
04/20/20	29	Drive# 193; Trickey Pond Rd	Driveway erosion, lacking buffer, sheet erosion	Direct	Driveway; gravel	Moderate	Med.	Low	Install vegetated buffer.	43.9415	-70.611526
04/20/20	30	Right of Way; Trickey Pond Rd	Road surface erosion, sheet erosion, lacking buffer	Direct	Private Rd; gravel	Moderate	Med.	Low	Install rubber razors to divert water, improve buffer.	43.94206	-70.611655
04/20/20	31	Densmore Property; Trickey Pond Rd	Driveway erosion, lacking buffer, sheet erosion	Direct	Driveway; gravel	Moderate	Med.	Low	Install vegetated buffer on lakeside.	43.94294	-70.611815
04/20/20	32	Near Property #222; Trickey Pond Rd	Lacking buffer, sheet erosion	Ditch	Driveway; paved	Moderate	Med.	Low	Install erosion control mulch.	43.94333	-70.611993
04/20/20	33	Near Property #223; Trickey Pond Rd	Driveway erosion, concentrated flow erosion	Direct	Driveway; gravel	Flat	Med.	Low	Install vegetated buffer.	43.94361	-70.61186
04/20/20	34	Near Property #243; Trickey Pond Rd	Lacking buffer, sheet erosion	Direct	Residential	Moderate	High	Med.	Install vegetated buffer and rubber razors to divert water.	43.94481	-70.612111
04/20/20	35	Boat launch near #243; Trickey Pond Rd	Shoreline erosion, road surface erosion	Direct	Boat Access	Moderate	High	Med.	Install rubber razors to divert water.	43.94509	-70.612151
04/20/20	36	Culvert near boat launch near #243; Trickey Pond Rd	Culvert (clogged)	Ditch	Private Rd; paved	Flat	Med.	Low	Replace culvert, remove debris.	43.94514	-70.612171

*Sites 2, 6, 16, and 17 have been removed because they are located outside the watershed boundary.

**Site priority level is assigned based on the sum of ratings from one to three for buffering, erosion severity, and erosion area size, 1 being best and 3 being worst. Resulting priority scores range from three to nine, with 3-4 being low priority, 4-6 being high priority, and 7-9 being high priority.

APPENDIX B: SHORELINE SURVEY DATA

Parcel ID (Map-Block-Lot)	Structure Present	Buffer	Bare Soil	Shoreline Erosion	Distance	Slope	Parcel Score	Comments
R05-0030	No	1	1	1	0	1	4	
R05-0029	No	1	1	1	0	1	4	
R05-0028	Yes	2	2	2	1	2	9	Good buffer with exception of swimming area which has exposed soil and sand.
R05-0025	No	2	2	1	0	2	7	
R05-0022	Yes	3	2	1	3	1	10	
R05-0017	Yes	4	4	3	3	1	15	
R05-0018	Yes	3	2	2	2	2	11	
R05-0019	Yes	1	1	1	3	1	7	
R05-0020	Yes	2	2	1	2	2	9	
R05-0016	No	2	2	1	0	1	6	
R05-0013	No	1	1	1	0	1	4	
R05-0021	Yes	1	1	1	2	2	7	
R05-0005-0007	No	1	1	1	0	1	4	
R05-0005-0006	Yes	1	1	1	2	2	7	
R05-0005-0005	Yes	1	1	1	2	2	7	
R05-0005-0004	Yes	1	1	1	2	2	7	
R05-0005-0003	No	1	1	1	0	1	4	
R05-0005-0002	No	1	1	1	0	1	4	
R05-0005-0001	No	1	1	1	0	1	4	
R05-0007	Yes	1	1	1	3	2	8	
R05-0008	Yes	2	2	2	1	2	9	
R05-0005-A	No	1	1	1	0	1	4	
U32-0022	Yes	1	1	1	2	2	7	
R05-0008-A	No	1	1	1	0	1	4	
R05-0008-B	No	1	1	1	0	1	4	
U30-0014	Yes	1	1	1	3	2	8	This parcel contains both the public boat launch and a house.
U30-0014-A	Yes	1	2	1	2	1	7	Undercutting erosion present.
U30-0013	Yes	3	2	2	3	2	12	
U30-0012	Yes	2	1	1	2	2	8	
U30-0011	No	2	2	2	0	3	9	Right-Of-Way: steeply sloped, directly adjacent to major state road (site was identified in watershed survey).
U30-0010	Yes	4	1	1	2	2	10	
U30-0008	Yes	1	1	1	2	1	6	
U30-0006	Yes	1	1	1	0	1	4	
U30-0005	Yes	3	3	1	2	1	10	
U30-0004	Yes	4	3	1	2	1	11	

Parcel ID (Map-Block-Lot)	Structure Present	Buffer	Bare Soil	Shoreline Erosion	Distance	Slope	Parcel Score	Comments
U30-0003	Yes	3	3	2	2	2	12	
U30-0002	Yes	1	2	1	2	2	8	
U30-0001	Yes	1	2	1	3	1	8	
U31-0030	Yes	3	3	2	2	1	11	
U31-0029	Yes	2	2	1	2	1	8	
U31-0028	Yes	3	2	1	3	1	10	
U31-0027	Yes	1	1	1	2	1	6	
U31-0026	Yes	2	2	2	2	1	9	Previously a boat launch, plans to mitigate exposed area
U31-0025	Yes	3	2	2	2	2	11	
U31-0024	No	3	3	2	0	3	11	
U31-0023-A	Yes	2	2	2	0	3	9	
U31-0023-B	Yes	1	1	1	1	3	7	
U31-0023-C	Yes	2	3	2	2	2	11	
U31-0005-A	Yes	3	2	1	1	3	10	
U31-0022	Yes	4	4	2	2	3	15	
U31-0021	Yes	2	1	1	2	3	9	
U31-0020	Yes	3	3	2	2	1	11	Lawn/bare soil present but divert is also present 20 feet from shoreline.
U31-0019	Yes	2	1	1	1	1	6	Catch basin on driveway.
U31-0018	Yes	2	1	1	2	1	7	
U31-0017	No	3	2	2	0	2	9	Lake Association Right-Of-Way: erosion control mulch and gravel present and trying to plant shrubs.
U31-0016	No	3	2	2	0	2	9	Planned rubber razors/crushed stone at this site.
U31-0015	Yes	4	3	2	1	1	11	
U31-0014	Yes	3	3	1	3	1	11	
U32-0051	Yes	1	1	1	2	1	6	
U32-0050	Yes	3	1	1	2	1	8	
U32-0049	No	2	3	2	0	1	8	Right-Of-Way
U32-0048	Yes	3	3	2	3	1	12	
U32-0047	Yes	2	2	1	3	1	9	
U32-0046	Yes	3	1	1	3	1	9	Bare area has been mulched or has crushed stone.
U32-0045	Yes	2	2	1	3	1	9	
U32-0044	Yes	2	2	1	3	1	9	
U32-0043	Yes	2	1	1	3	2	9	
U32-0042	Yes	3	2	1	3	1	10	
U32-0041	Yes	3	3	2	3	2	13	Steeply sloped by water.
U32-0040	Yes	3	3	2	3	3	14	
U32-0039	Yes	3	4	3	3	3	16	

Parcel ID (Map-Block-Lot)	Structure Present	Buffer	Bare Soil	Shoreline Erosion	Distance	Slope	Parcel Score	Comments
U32-0038	Yes	1	2	1	3	3	10	
U32-0037	Yes	4	3	2	3	3	15	
U32-0036	No	3	1	1	0	3	8	New plantings, wooden diverters, erosion control mulch.
U32-0035	Yes	3	3	2	3	3	14	
U32-0034	Yes	3	3	2	3	3	14	
U32-0033	Yes	1	1	1	3	2	8	
U32-0032	Yes	3	3	3	2	2	13	
U32-0031	Yes	4	4	3	3	2	16	Erosion control, construction.
U32-0030	Yes	2	2	1	3	2	10	
U32-0029	Yes	4	2	1	2	3	12	
U32-0028	Yes	4	4	1	2	1	12	
U32-0027	Yes	5	4	2	3	1	15	
U32-0026	Yes	3	2	1	3	1	10	
U32-0025	No	3	1	1	0	1	6	Right-Of-Way
U32-0024	Yes	4	1	1	3	1	10	
U32-0023	Yes	3	1	1	2	1	8	
U30-0009	No	1	1	1	0	1	4	Old drainage ditch to mill. Now blocked by Gore Rd.