Wilson Lake
Watershed Survey Report

2022

Acton Wakefield Watersheds Alliance

Wilson Lake Association

Acknowledgments

The following people and organizations were instrumental in the Wilson Lake Watershed Survey Project and deserve special recognition for their efforts:

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Supporting Organizations

Acton Wakefield Watersheds Alliance (AWWA)

Wilson Lake Association (WLA)

Maine Department of Environmental Protection (ME DEP)

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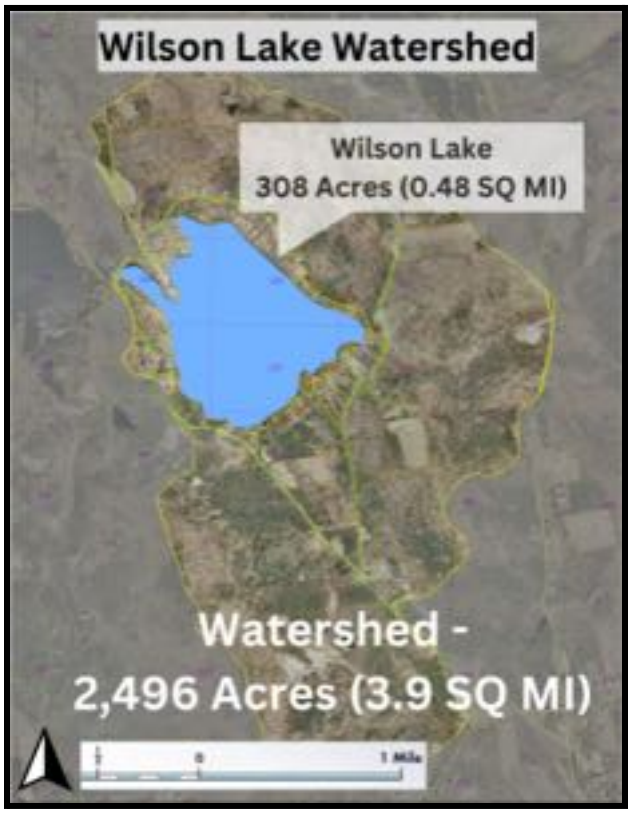
Introduction

This report serves to compile, summarize, and analyze the data collected during the Wilson Lake watershed survey conducted in Spring of 2022 and is intended for residents, landowners, and town officials within the Wilson Lake watershed.

Watershed surveys provide a snapshot of the condition of the watershed at the time the survey is conducted and document all evidence of sediment erosion. The information gathered during the Wilson Lake survey will be used by the Wilson Lake Association (WLA), the Acton Wakefield Watersheds Alliance (AWWA), and the Town of Acton to guide future efforts to preserve the lake's water quality for future generations to enjoy.

Wilson Lake Watershed

The area of Wilson Lake is 308 acres (0.48 square miles) while the area of the entire watershed is approximately 2,496 acres (3.9 square miles). The maximum water depth is 44 feet, with an average depth of 17 feet. The lake is located in the town of Acton, Maine and is a headwater lake for the Salmon Falls River. The shoreline of Wilson Lake is highly developed; all precipitation that falls in the watershed drains into the lake through a network of streams, ditches, and overland flow.



The outlet is at the Northwestern end of the lake at a culvert where it flows into Horn Pond and from there into the Salmon Falls River. Wilson Lake is part of the Salmon Falls Headwater Lakes Watershed that includes Lake Ivanhoe, Great East Lake, Lovell Lake, and Horn Pond. The Salmon Falls River flows through New Hampshire and Maine, acting as the state border, and ultimately drains into the Atlantic Ocean at the Gulf of Maine.

What is a Watershed?

A watershed is defined as all of the land that drains or "sheds" into a given water body. A large watershed is made up of many smaller watersheds. For example, the watershed of Wilson Lake is part of the watershed of the Salmon Falls River and the watershed of the Salmon Falls River is part of the watershed of the Gulf of Maine.

Activity in any part of the watershed can affect the quality of the water body as a result of the flow from rivers, streams, surface runoff, and groundwater, roads, ditches, pathways, and beaches. This is why protection of Wilson Lake must be addressed on a watershed level rather than simply focusing on shoreline activity.

Water Quality

Volunteers have been testing the water quality of Wilson Lake since 1977. The Lake Stewards of Maine Volunteer Lake Monitoring Program (VLMP) and the UNH Lay Lakes Monitoring Program (LLMP) have collaborated with WLA monitoring volunteers in order to evaluate water quality, track algae blooms, and determine water quality trends. This includes 45 years of Secchi disk transparencies, total phosphorus (TP) data, and chlorophyll-a data (some of these metrics have been staggered: only tested every 4 years or so in some cases), and 6 years of dissolved oxygen (DO) profiles.

> ***Phosphorus -***
> *A nutrient needed for plant growth. It is generally present in small amounts, and limits plant growth in lakes. As the amount of phosphorus increases in the lake, this allows algae and bacteria populations to expand.*

Maine categorizes its lakes based on size, depth and different eco-regions within the state. Wilson Lake falls in the coastal region and is greater than 10 meters deep which categorizes it as a "Coastal Deep Lake". These categories help lake scientists determine the natural range of water quality parameters in each unique lake category. A coastal deep lake in its natural state should have a TP level of 7.5-9 ppb. Wilson Lake has an average TP of 5.0 ppb, well below this average, as well as an SDT of 7.3 meters (24'), and an average Chl-a of 2.1 ppb. Analysis shows that TP has remained relatively consistent over the last 15 years, though testing should be conducted more frequently to produce a more reliable number. Transparency has slowly increased over time.

Wilson Lake is a Mesotrophic lake. There are three "trophic statuses" found in freshwater ecosystems. Oligotrophic lakes are nutrient-poor. They have rocky substrates and shorelines, deeper water, limited algae and aquatic plant growth, and an abundance of dissolved oxygen. Eutrophic lakes are nutrient-rich, which allows for abundant plant growth and tends to lead to lower DO levels over time. Mesotrophic lakes are in between these two trophic levels. Wilson Lake has exhibited dissolved oxygen depletion in the deepest parts of the lake during the height of summer, which makes it more difficult for cold-water fish and other aquatic fauna to thrive.

Wilson Lake has natural cycles of algae growth that occur in the hottest months of the year, but seldom experiences what would be considered a bloom. Furthermore, there have been no reported sightings of Cyanobacteria, bacteria blooms that can be toxic to humans, on the lake. These blooms are caused by excess amounts of Phosphorus entering the lake primarily from stormwater runoff, septic systems, and lawn fertilizer. A low TP level can explain the lack of blooms occurring on the lake, though it is important to test in multiple locations as it is possible to have isolated areas of high TP that are not reflected in the "Deep spot" or average TP.

In addition to water quality monitoring, WLA has weed watcher volunteers to look out for invasive species. WLA is one of the only lakes that has been consistently conducting watershed surveys since the 1990s and these early efforts to protect water quality likely explain why water quality has remained high over the years. Continuing to be proactive will be the key to keeping Wilson lake clean and healthy into the future. WLA and the Town and Acton also support the efforts of AWWA and its Youth Conservation Corps (YCC).

Threats to Wilson Lake

The largest threat to lakes in New England, including Wilson Lake, is polluted runoff or nonpoint source (NPS) pollution. Stormwater runoff from rain and snowmelt picks up pollutants such as soil, fertilizer, vehicle fluids, and more as it flows across the land, and flushes into the lake.

In an undeveloped, forested watershed, stormwater runoff moves slowly due to uneven terrain, tree and shrub roots, ground cover plants, leaves, and other natural debris on the forest floor. These features give runoff time to infiltrate into the ground, soaking into the uneven forest floor and filtering through the soil. The soil and mineral substrate below ground is the most effective form of filtration for stormwater runoff.

In a developed watershed, stormwater does not have the opportunity to infiltrate and does not receive the filtration provided by the forest floor. Rainwater picks up speed as it flows across impervious surfaces like rooftops, compacted soil, gravel camp roads, and pavement, and becomes a formidable, erosive force.

Although much of Wilson Lake's watershed is still forested, most of the shoreline is developed with seasonal and year-round residences as well as a network of town, state, and camp roads. While these residences and roads convey most of the runoff to the lake, public access points such as beaches and boat launches contribute as well. Camp roads are subject to frequent wash-outs during periods of heavy precipitation and spring thaws. Wash-outs can transport significant quantities of sediment and gravel into the lake increasing the nutrient levels and reducing clarity.

A number of the camps that surround the lake are many decades old and some may have ineffective septic systems. Leaching of these systems can release excess nutrients and potentially dangerous bacteria into the lake.

Why is Storm Water Runoff a Problem?

Though stormwater by itself can cause environmental issues when it gets into the lake, the primary issue with stormwater is the pollutants that it picks up and carries with it. The sediment and nutrients in the runoff can be bad news for freshwater lakes.

The nutrient known as phosphorus is food for algae and other plants and is found in soil, septic waste, pet waste and fertilizers. Algae in the lake react to the addition of phosphorus in the same way that plants in the home and garden react when nutrients like phosphorus, commonly in fertilizers, are fed to the plant—they grow. In natural conditions, the scarcity of phosphorus in a lake limits algae growth. Consequently, when a lake receives extra phosphorus, algae growth increases dramatically. Sometimes this growth causes choking blooms, but more often it results in small changes in water quality that, over time, damage the ecology, aesthetics, and economy of lakes.

Soil/Sediment is the biggest source of phosphorus to Maine's lakes. As every gardener knows, phosphorus and other nutrients are naturally present in the soil. So, runoff is essentially "fertilizing" Wilson Lake with the soil that erodes from our driveways, roads, ditches, pathways, and beaches.

Reasons to Reduce Runoff

Wilson Lake's current water quality conditions make it a valuable asset to the community for multiple reasons; economic, recreational, ecological, and cultural.

- Once a lake has declined, it is difficult or impossible to restore. Prevention is the key.

- Economic studies show that declines in water quality are directly correlated with waterfront property value. A large portion of Acton's revenue is derived from waterfront property taxes, which are based upon property value. Therefore, maintaining a clean, clear lake is crucial to the town's financial viability as well as protecting the investments of property owners.

- The lake attracts anglers and boaters from across the region. The convenient location draws weekend visitors pursuing leisurely activities. The size of the lake makes it ideal for powerboat activities such as water skiing, wakeboarding, and tubing. Likewise, the lake is ideal for canoeing and kayaking. Easy access to the lake makes boating the primary use of the lake.

- Fishing is a popular activity thanks to the abundance of fish species. Primary fisheries in Wilson include brown trout, brook trout, smallmouth bass, and white perch, but many other species can be found including sunfish, shiner, chain pickerel, and American eel.

- In addition to the numerous fish species, bald eagles and other large birds of prey utilize the lake habitat for hunting, nesting, and breeding. Loons are a frequent sight and have become a symbol of the region. Declining water quality could force these majestic birds to find healthier waterbodies to call home.

- A clean lake with clear water is perceived as being a community asset. Healthy lakes are regarded as being more valuable and desirable. The lake becomes a source of community pride to its users and fosters a sense of stewardship.

- Sediment deposited into the lake from erosion creates the ideal environment for invasive aquatic plants, algae, and cyanobacteria to thrive.



Purpose of the Wilson Lake Watershed Survey

The purpose of this survey was to gain an in-depth understanding of the current conditions of the watershed in terms of surface sediment erosion through direct observation.

The watershed survey is used for the following purposes:

- Identify and prioritize existing sources of polluted runoff, particularly soil erosion sites in the Wilson Lake watershed.

- To raise public awareness about the connection between land use and water quality and the impact of soil erosion on Wilson Lake, and to inspire people to become active watershed stewards.

- Provide a basis to obtain grant funding to assist in remediation of identified erosion sites.

- Make general recommendations to landowners to remediate erosion problems on their properties.

- Identify sites for future Youth Conservation Corps/grant projects

- To update the Salmon Falls Watershed-Based Management Plan, which covers Wilson Lake, and use the information gathered as one component of a long-term lake protection strategy. Nearly all sediment erosion along the shoreline that reaches the lake was documented, thus the resulting watershed-based plan has a real-world perspective with hard data collected from first-hand observations.

- *Wilson Lake can use this survey to develop its own Watershed Based Protection Plan.*

Note: The purpose of the survey is *NOT* to blame landowners for erosion or seek enforcement action against landowners not in compliance with ordinances. This is an education, outreach, and science-based tool intended to help the Wilson Lake community work together with landowners and community partners to solve erosion problems on their property through technical assistance, Youth Conservation Corp projects, and grants.

Local citizen participation was essential in completing the watershed survey and will be even more important in years to come. With the leadership of WLA and AWWA and others concerned with lake water quality, the opportunities for stewardship are limitless.

Survey Method

The survey was conducted by WLA volunteers with the help of trained technical staff from, ME DEP, NH LAKES, and AWWA. 16 volunteers were trained in survey techniques during a two-hour virtual training session on April 28th, 2022. On Saturday, April 30th the volunteers met at Nadeau's Airfield, organized into 6 groups, and spent the day documenting erosion on the roads, properties, driveways, and shorelines in their assigned sectors using a tailored digital data collection app called Survey123. The volunteers completed the survey in a single day. Surveys are almost always conducted in the spring because this is when stormwater erosion is most apparent. Each survey group had one technical leader, a group leader who lived in that sector, and 2-3 additional volunteers. The Technical Leader was responsible for entering data into the app and providing quality control for each entry. Team leaders and volunteers were responsible for efficiently navigating their sector, numbering site photos, and engaging with homeowners. The entire group was responsible for seeking and identifying erosion sources.

When erosion was identified on a site, it was categorized in several ways:

- Degree of impact on lake water quality
- Estimated remediation cost
- Technical level required to remediate the erosion issue

Impact on Lake Water Quality: Each site was rated for its potential impact on lake water quality. The impact was based on slope, amount of soil loss, proximity to water, and the presence and size of a vegetated buffer.

- "Low" impact sites were those with limited soil transport off-site and little or no visible gullies.
- "Medium" impact sites had some sediment transport off-site with noticeable rills in the ground.
- "High" impact sites exhibited a large amount of sediment transported off-site with significant gullies eroded into the ground.

Estimated Remediation Cost: Recommendations were made for remediating erosion at each site and the associated cost of labor and materials was estimated for the homeowner.

- "Low" cost sites were estimated to cost less than $1,000
- "Medium" cost sites were estimated to cost between $1,000 and $3,000
- "High" cost sites were estimated to cost in excess of $3,000

Technical Requirements: In addition to cost, surveyors also determined what level of technical expertise would be required in order to correct an erosion issue. This often correlates with cost, but not always.

- "Low" tech recommendations can easily be installed by homeowners using hand tools and do not require landscape design knowledge or engineering.

- "Medium" tech recommendations require a site-specific landscape design using specific stormwater best management practices and could be completed by a landscape design company or by AWWA's Youth Conservation Corps Program.

- "High" tech recommendations will require large, complex installations and will likely require an engineered design.

Photos and additional site information were gathered for each site to get a full picture of the erosion. All site information was then submitted through the Survey123 App and downloaded into an excel spreadsheet for analysis. Estimates of soil loss to the lake and the associated phosphorus loading estimates were made using the EPA Region 5 Model. This model is the standard used by most organizations to estimate soil loss, including Maine DEP, NHDES, and the US EPA.

All information collected during the initial survey and subsequent soil loss estimations were entered into an excel database managed by AWWA. This data was standardized, validated, and organized to allow relationships and rankings to be determined. The sites that were identified by volunteers were prioritized for remediation based on rankings of their impact on the lake, required technical expertise, and estimated cost of remediation. The documented erosion sites were then marked on the Wilson Lake watershed map.

A description of sites and associated rankings are discussed in the next section of this report. Maps of the erosion sites are located in Appendix A, and a spreadsheet with data from the documented sites is located in Appendix B. ***Contact WLA or AWWA for additional site information or to find out if a site number corresponds with your property (contact info found on page 30).***

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Note: This Survey was conducted using the Maine DEP Lake Watershed Survey Protocol. View at: https://www.maine.gov/dep/land/watershed/materials/lakewsurveyguide.pdf

Summary of Watershed Survey Findings

Volunteers identified 68 erosion sites that were directly impacting Wilson Lake. Of these, 10 were high impact to the lake, 54 were medium impact, and 4 were deemed low impact (see figure 1). All three of these categories had a range of costs and technical complexity associated with remediating erosion. In addition to being categorized by water quality impact, erosion sites were also identified by land use type. The majority of erosion sites were identified as residential or shoreline erosion, followed by roads and culverts. Figure 2 depicts the types of land use and their water quality impact on the lake. This is also outlined in Table 1.

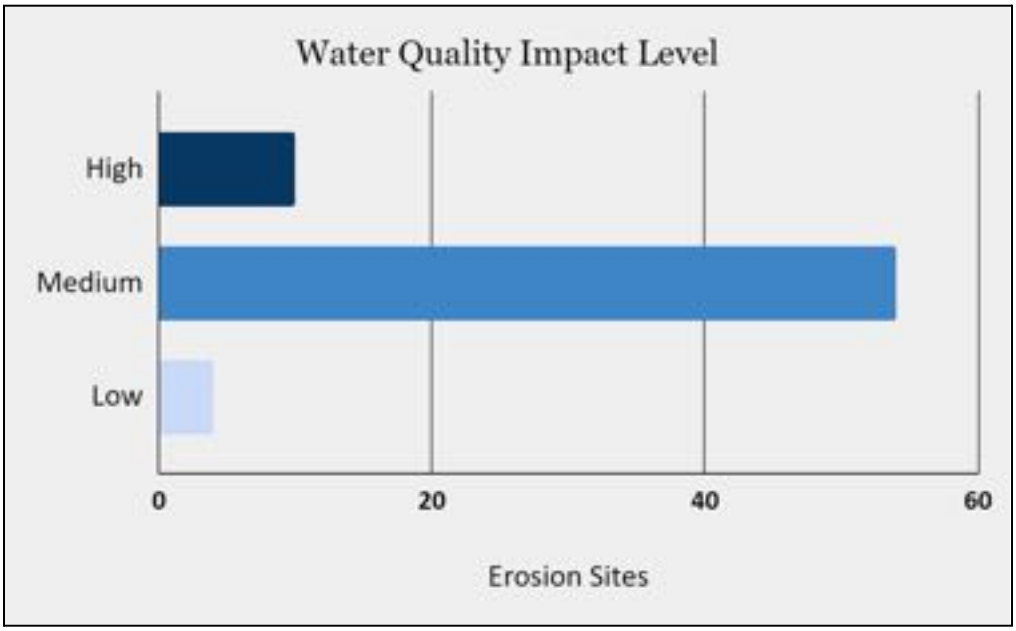


Figure 1. Identified Erosion sites based on estimated water quality impact.

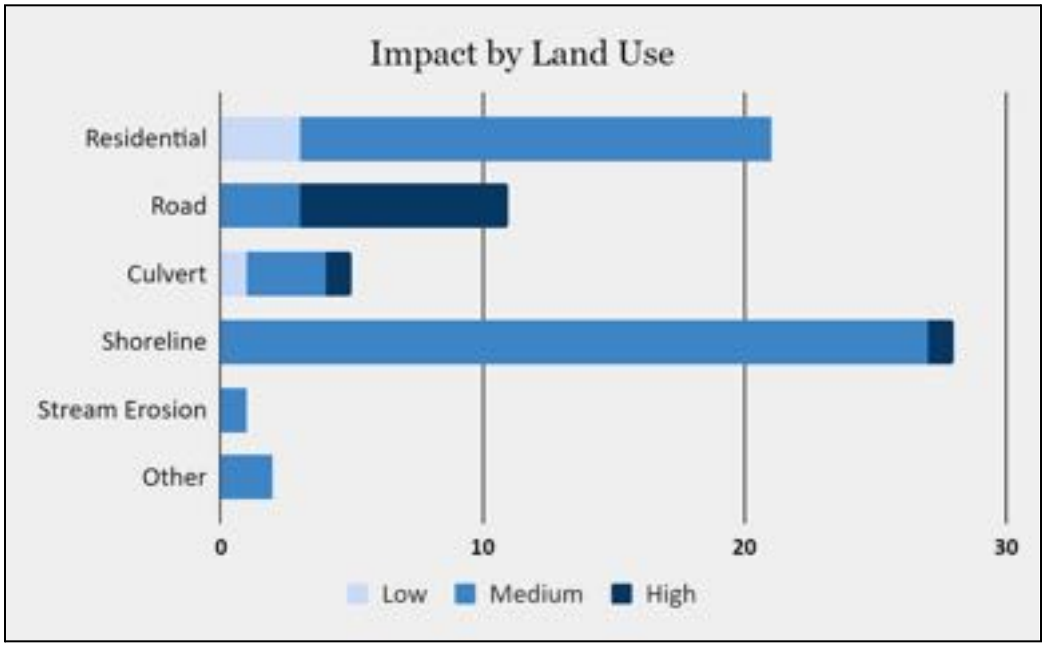


Figure 2. Impact to water quality separated by land-use type.

After assessing water quality impact, volunteers also estimated the cost and technical requirements to remediate each erosion site. These are important considerations when prioritizing erosion control efforts given that inexpensive, simple projects can be completed in greater abundance and in less time thus maximizing the benefit to water quality. Figures 3 and 4 compare the water quality impact of a site to both cost and technical requirements. Note the similarities between the two graphs. There were only a handful of sites where cost estimates and technical level to repair differed.

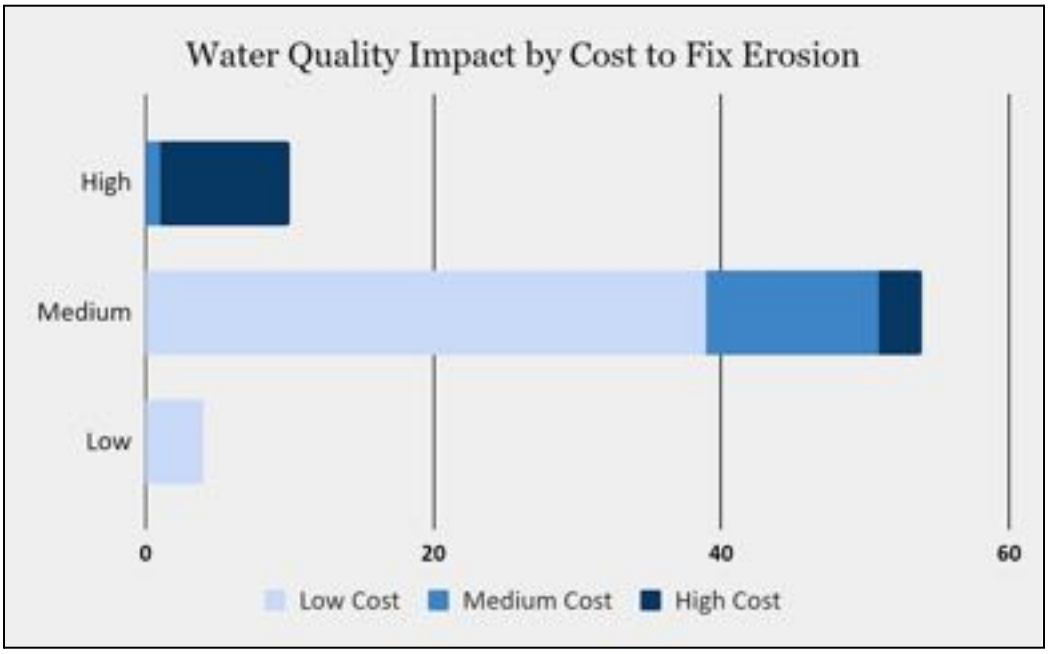


Figure 3. Water quality impact of erosion is separated by repair cost.

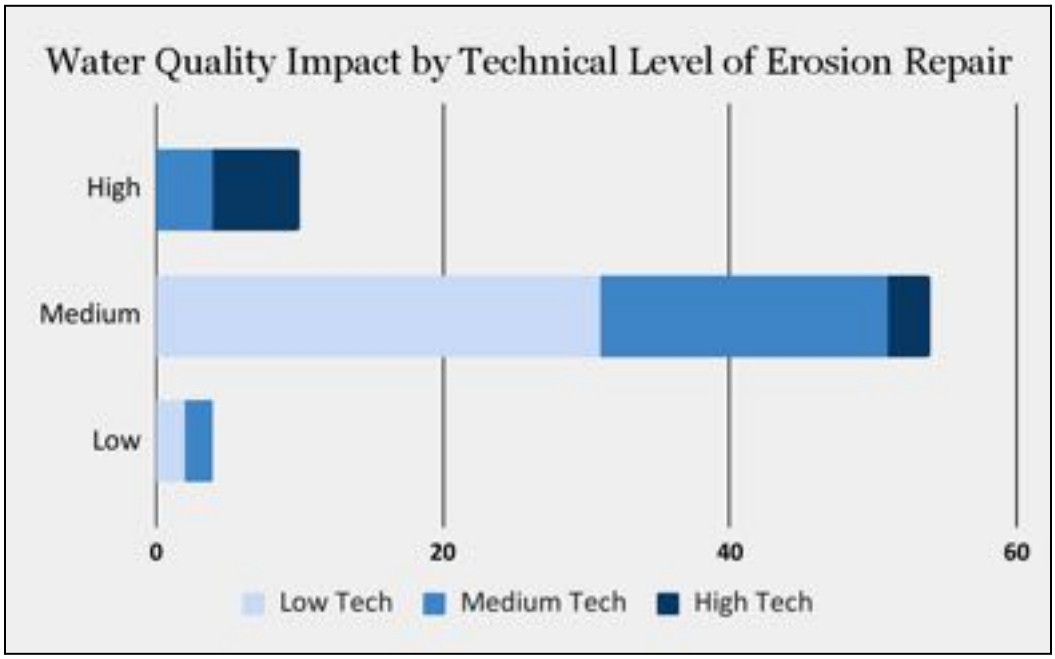


Figure 4. Water quality impact of erosion separated by complexity of repair.

Discussion

While discussing the impacts of the survey's findings it is important to remember that polluted runoff is a nonpoint source pollution problem, meaning that *no single source has a major impact on water quality*. When added up, however, these small impacts have a significant accumulative effect on water quality. The majority of erosion sites identified by volunteers do not have a high impact on water quality. These ratings (high, medium, and low), are relative to each other and help to prioritize which sites should be addressed by the community, but any erosion that can be addressed should be. For example, one high-impact site may represent 5% of the overall erosion. A site that represents only 1% of the lake's erosion is a lower priority, however, if 10 similar low-priority sites are repaired, the effect will be 10% of erosion eliminated, twice as much as repairing the previously mentioned high-priority site. **Every erosion source that we eliminate contributes to an overall reduction of pollution getting into the lake.**

By prioritizing sites by impact, cost, and technical level (see Appendix B), we can focus our resources on high-priority, complex sites, while encouraging homeowners to address the much larger category of inexpensive, low-impact sites. The highest priority sites have a high impact on water quality but are inexpensive and easy to remediate. The lowest priority is low-impact sites which would be expensive and complex. This prioritization allows us to use our limited resources efficiently while having the greatest impact on the lake. *If your own property is ranked higher on the priority list, this does not mean you have more responsibility to protect water quality than others.* Everyone is responsible for doing whatever they can to minimize their impact on water quality. This data will be a resource to the Wilson Lake community for accomplishing that goal.

Tables

Land Use	Low	Medium	High	Total
Residential	3	18	0	21
Road	0	3	8	11
Culvert	1	3	1	5
Shoreline	0	27	1	28
Stream Erosion	0	1	0	1
Other	0	2	0	2

Table 1. Water quality impact level separated by land use

Impact	Low Cost	Medium Cost	High Cost
High	0	1	9
Medium	39	12	3
Low	4	0	0

Table 2. Water Quality impact separated by cost to address erosion.

Impact	Low Tech	Medium Tech	High Tech
High	0	4	6
Medium	31	20	3
Low	2	2	0

Table 3. Water quality impact separated by technical level needed to address erosion.

Next Steps

Remediating the erosion issues identified in this survey will require efforts by WLA, AWWA, community members, road associations, and municipal officials.

WLA & AWWA

- Contact property owners, road associations, and town officials with identified erosion to offer technical assistance. Encourage them to make improvements and provide the resources to do so.
- Make this report available to all residents of the Wilson Lake Watershed.
- Partner with ME DEP, NH Department of Environmental Services, and towns to seek grant funding, such as CWA Section 319 grants, and implement grant-funded projects to protect lake water quality.
- Promote the Courtesy Boat Inspection, Weed Watch, and water quality monitoring programs and encourage lake stewardship.
- Increase awareness; provide educational materials and guidance to members of the Wilson Lake watershed community.
- Organize workshops and volunteers to start remediating identified erosion problems and teach citizens how to repair similar problems on their own properties.
- Educate municipal officials about lake issues and work cooperatively to find solutions.

Individual Landowners

- Repair areas of your property where erosion is occurring if possible. Contact AWWA at info@awwatersheds.org for technical assistance and educational materials about erosion best management practices.
- Contact WLA to get involved with current water quality programs and efforts.
- Encourage the growth of native vegetation on your property; stop mowing and raking where possible and avoid exposing bare soil. Seed and mulch bare soil areas.
- Call your local Code Enforcement Officer (CEO) before doing any tree cutting or soil disturbance projects. (see contact info on Pg 30)
- Maintain septic systems properly. Pump your tank every 1 to 3 years.

Municipal Officials

- Enforce shoreland zoning and other ordinances to ensure the protection of Wilson Lake.
- Conduct regular maintenance on town roads in the watershed, and address town road issues identified in this survey where feasible.

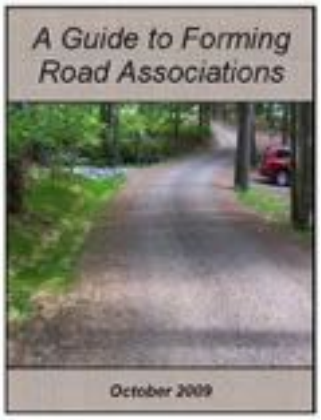
Forming a Road Association

- Proper maintenance of camp roads is crucial to the long-term health of Wilson Lake.
- A road association is a way for landowners on a private camp road to share responsibility, make decisions, and split costs for road maintenance and repairs.
- While small roads can make do with informal associations, it is becoming more common to establish road associations as 501(c)3 non-profit organizations. These associations are run through a straightforward, democratic process and have the ability to collect dues, receive legal protections, and may qualify for grant funding to remediate erosion issues.

Why form a road association on Wilson Lake?

- Eleven erosion sites identified during the watershed survey are on private roads, *8 of which were high impact*. Maintaining these roads helps protect Wilson Lake from the impacts of soil erosion.
- A road association provides an avenue for private camp road users to formally manage roads in a fair, organized, and cost-effective manner.
- Regular maintenance can reduce road expenses over time. The Maine Camp Road Maintenance Manual estimates that $1 spent on routine maintenance saves $15 in repairs.

For information on forming road associations:



- Maine DEP's 'Guide to Forming a Road Association - www.maine.gov/dep/land/watershed/roadassociation.html.
- Maine Laws on camp roads and road associations - www.maine.gov/dep/land/watershed/camp/road/index.html

Other useful resources:

- How to form a Non-Profit: learning.candid.org/resources/knowledge-base/starting-a-nonprofit
    - Maine Bureau of Corporations - www.maine.gov/sos/cec/corp/determining.html

Common Erosion Issues and Best Management Practices for Homeowners

Below are common examples of erosion and the Best Management Practices (BMPs) that are recommended to prevent it. Erosion takes many forms and can occur naturally, but in all cases, the end result is that running water (stormwater runoff) picks up soil and transports it into the lake. These practices are designed to trap stormwater and allow it to infiltrate into the ground before it reaches the lake, while also operating as functional and aesthetic landscaping features on a property. Some BMPs are useful for residential properties and some are specifically for use on private and town-owned roads. Residential BMPs are relatively simple to install and can be done by homeowners and landscapers. Road BMPs often require heavy machinery and in some cases require engineering (i.e. culvert installation).

For additional information on Stormwater Runoff and Erosion BMPs, please use the following resources:

- BMP Manuals (Maine DEP) - https://www.maine.gov/dep/land/watershed/materials.html
- Gravel Road Manual: www.maine.gov/dep/land/watershed/camp/road/gravel_road_manual.pdf
- NH Homeowner's Guide to Stormwater Management: https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/2020-01/homeowner-guide-stormwater.pdf
- Conservation Practices for Homeowners - awwatersheds.org/conservation-practices-for-homeowners

Common Erosion Issues

Gully Erosion - forms when fast moving water forms a channel on bare soil and begins to pick up and transport sediment downhill to the lake. Most visually obvious form of erosion. Smaller gullies are referred to as rills.

Shoreline Erosion - Shoreline can erode both from stormwater runoff and intense wind and wave action. The root systems of plants on the shoreline work to stabilize soil on the slope and protect it from eroding. In the absence of permanent, woody vegetation, the bank soils have no structure and can easily erode into the lake.

Sheet Erosion - Less apparent than a gully. Occurs when soil erodes in equal amounts across the landscape and the soil level lowers. Exposed roots are evidence of this. Roots naturally grow underground, so the amount of soil loss equals at least the height of the exposed roots. Sheet erosion often goes unnoticed and can lead to significant soil loss.

Best Management Practices: *Infiltration*

Infiltration Path - a trench filled with crushed stone that traps stormwater. Can replace dirt paths susceptible to runoff.

Dripline Trench - Traps roof runoff and directs it into the ground. An alternative to gutters.

Infiltration Steps - Crushed stone steps that trap stormwater instead of allowing it to flow downhill.

Best Management Practices: *Diversion*

Rubber Razor - strips of hard rubber are partially buried in the driveway, placed on an angle to divert stormwater into an adjacent trench or natural area.

Water Bars - 6"x 6" lumber is installed on a slope with crushed stone on the uphill side to trap and divert stormwater. Water bars are left slightly raised to slow water down an can be used as seen above, or placed in a pathway in shorter lengths to function as steps.

Firehose Diverter - In paved driveways, burying rubber and wood are not an option. Old firehose, or other durable material, can be filled with sand or stone and placed on an angle to divert stormwater. These have the added benefit of being movable.

Best Management Practices - *Retention*

Rain Garden - pervious detention basin designed to store stormwater during a rain event and allow it to infiltrate. Typically a trench directs water into the rain garden. Water tolerant plants are put in to uptake additional water and absorb excess nutrients.

Vegetated Buffer - The shoreline is the last line of defense from stormwater. Dense, woody vegetation slows down stormwater and the root system binds sediment together and keeps it from eroding.

Erosion Control Mulch - This chunky mulch is made of tree and stump grindings of various sizes, this allows it to bind together and trap stormwater without washing away. This is the simplest way to protect bare soil and will last for many years before breaking down.

Best Management Practices - *Roads*

Hard Pack - This is an aggregate stone material that does not wash away as easily as sand and gravel. The lack of fine materials means less sediment erosion.

Crowning - A dirt road must be slightly pitched so water will run off of it instead of forming potholes and gullies. The high point can be in the middle to direct water in both directions, or on a far side to direct all water in one direction.

Ditching - Once water is directed off the road, it should flow into a pervious ditch to allow it to infiltrate. There are various methods such as vegetation and check dams which can be used to slow stormwater down in a ditch.

Permitting & Regulations - Maine

Protection of Maine's watersheds is ensured through the goodwill of lake residents and through laws and ordinances created and enforced by the State of Maine and local municipalities. The following laws and ordinances require permits for activities adjacent to wetlands and water bodies.

Shoreland Zoning Law—Construction, clearing of vegetation, and soil movement within 250 feet of lakes, ponds, and many wetlands, and within 75 feet of most streams, falls under the Shoreland Zoning Act, which is administered by the Town through the Code Enforcement Officer and the Planning Board.

Natural Resources Protection Act (NRPA) - Soil disturbance & other activities within 75 feet of the lakeshore or stream also fall under the NRPA, which is administered by Maine DEP.

Contact the DEP and Town Code Enforcement Officer if you have any plans to construct, expand or relocate a structure, clear vegetation, create a new path or driveway, stabilize a shoreline, or otherwise disturb the soil on your property. Even if projects are planned with the intent of enhancing the environment, contact the DEP and town to be sure.

How to apply for a Permit by Rule with DEP:

To ensure that permits for small projects are processed swiftly, the DEP has established a streamlined permit process called **Permit by Rule**. These one-page forms are simple to fill out and allow the DEP to quickly review the project.

- Fill out a notification form before starting any work. Forms are available from your town code enforcement officer, the Maine DEP office in Portland, or online at www.maine.gov/dep/land/nrpa/nrpa-pbr-notification.pdf

- A permit-by-rule will be reviewed by the DEP within 14 days. If you do not hear from DEP in 14 days, you can assume your permit is approved and you can proceed with work on the project. *With a standard application for larger projects, you must wait for approval.*

- Follow all standards required for the specifically permitted activities to keep soil erosion to a minimum. It is important that you obtain a copy of the standards so you will be familiar with the law's requirements.

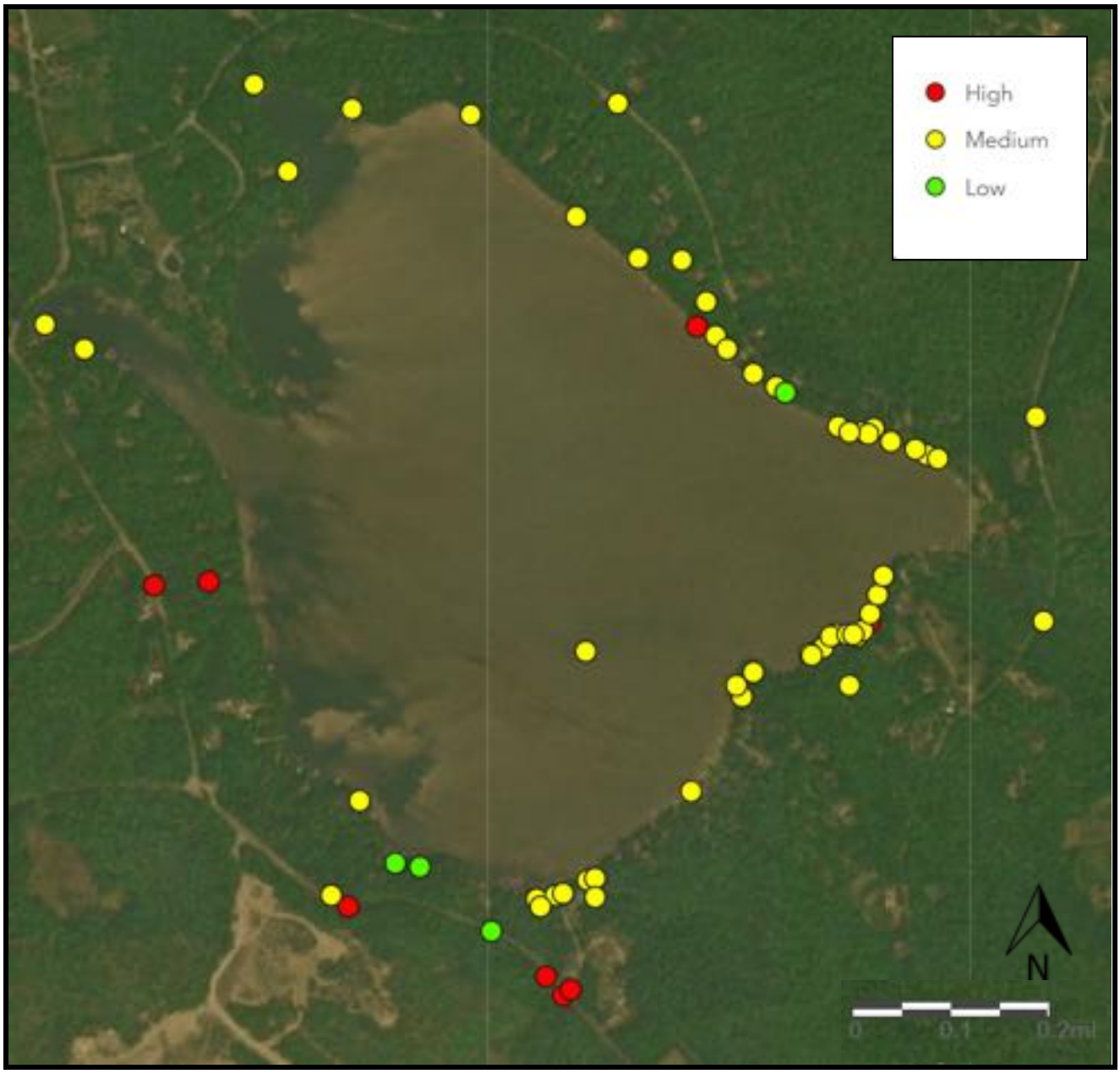
For an in-depth description of shoreland laws in Maine visit the Maine DEP website at these links:

- Natural Resource Protection Act - https://www.maine.gov/dep/land/nrpa/

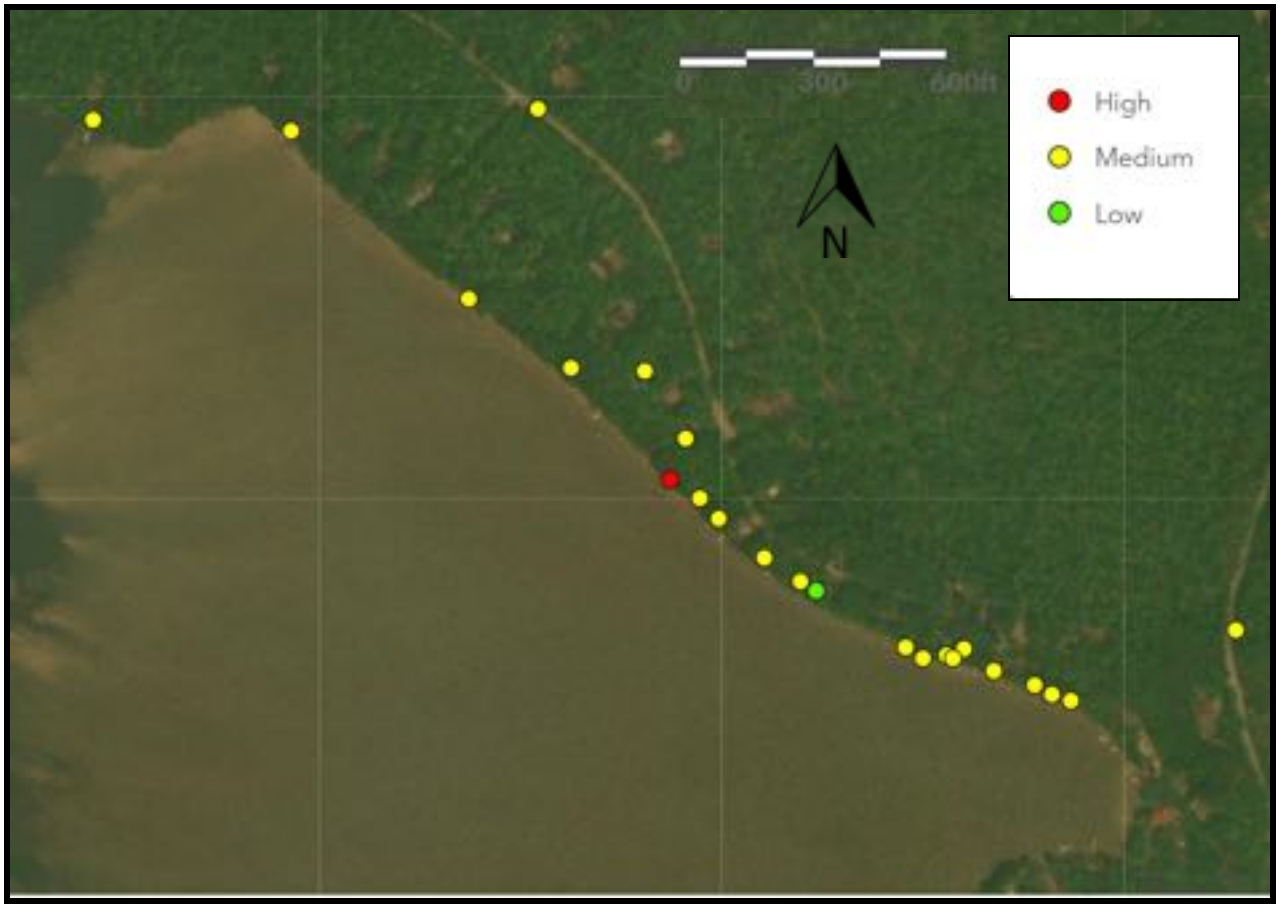
- Mandatory Shoreland Zoning - https://www.maine.gov/dep/land/slz/index.html

Appendix A: Watershed Survey Maps -Water Quality Impact Rating

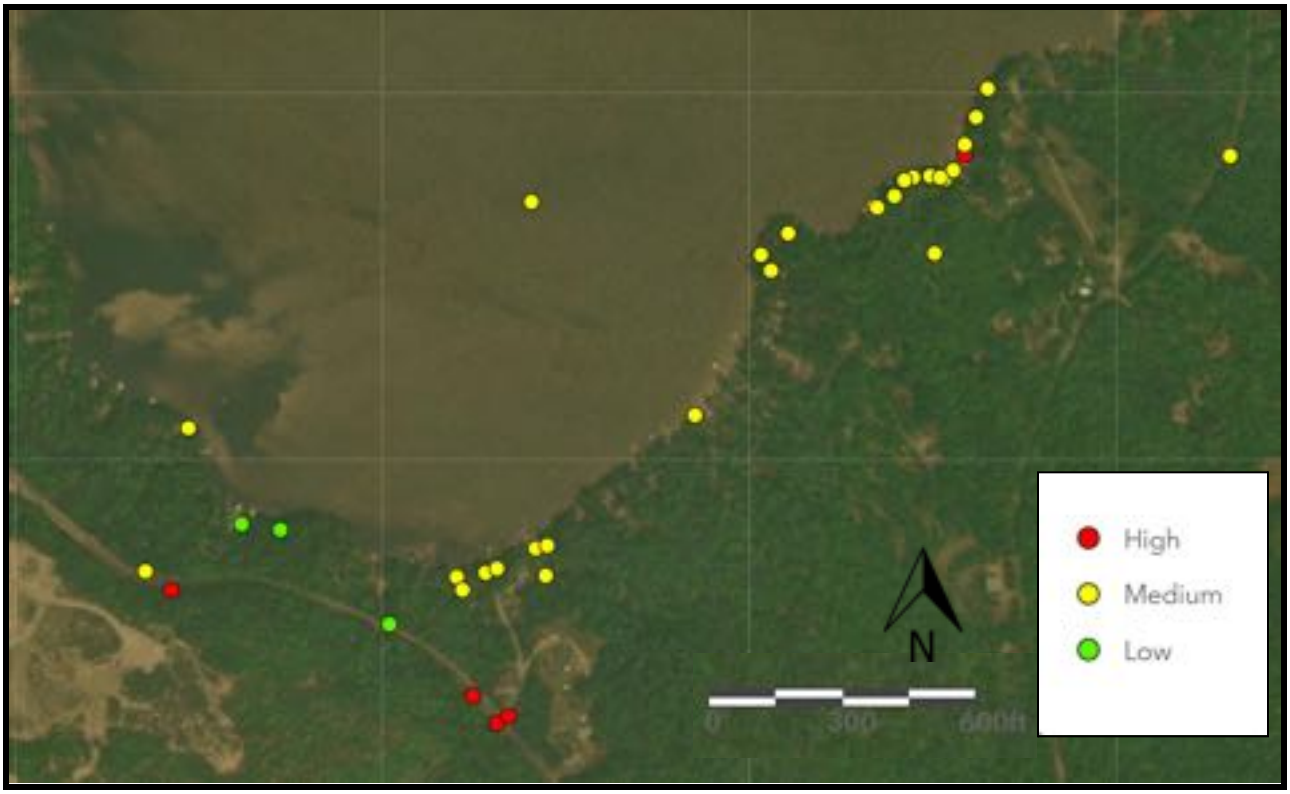
Wilson Lake - Whole



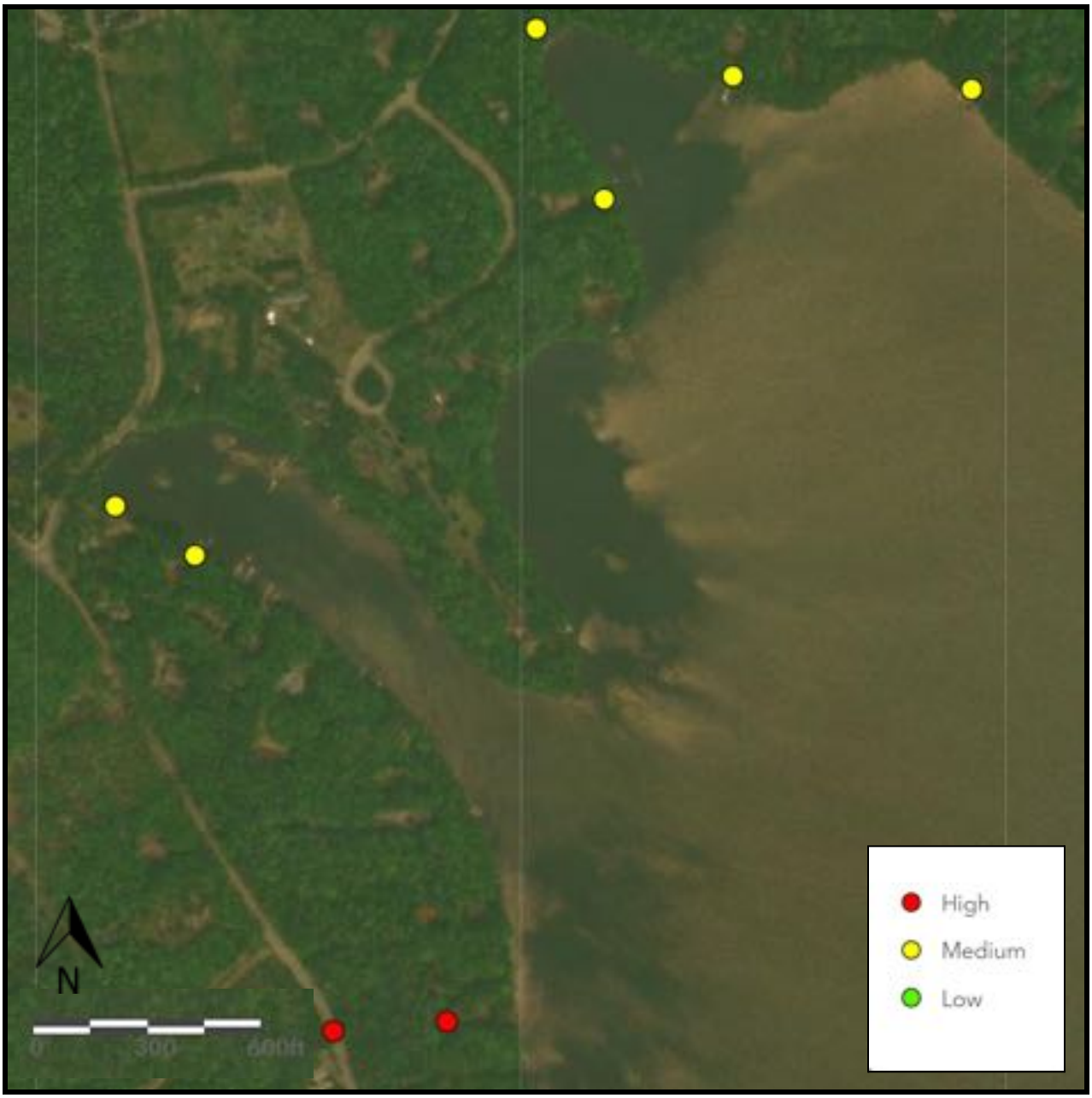
Wilson Lake - North



Wilson Lake - South

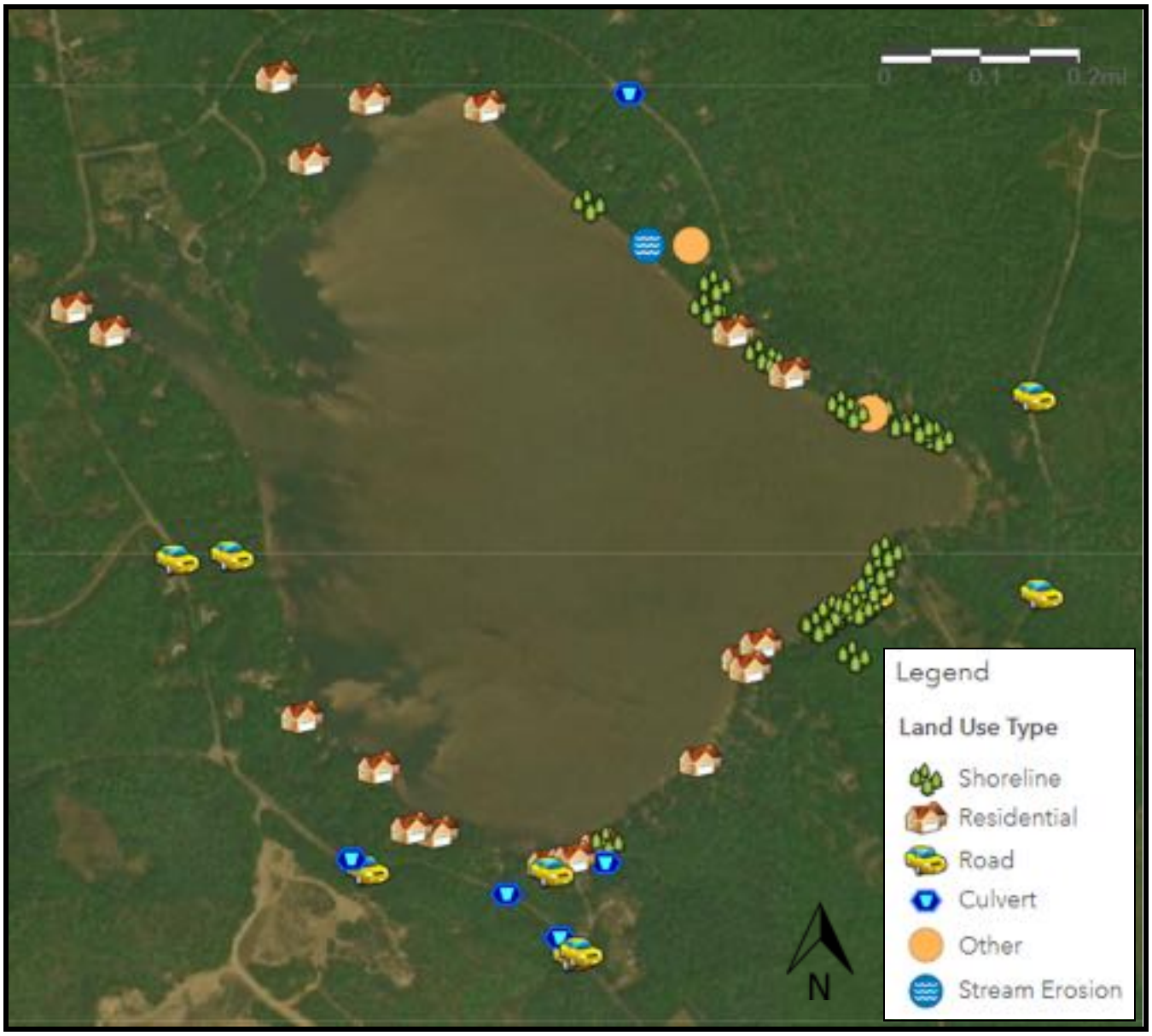


Wilson Lake - West

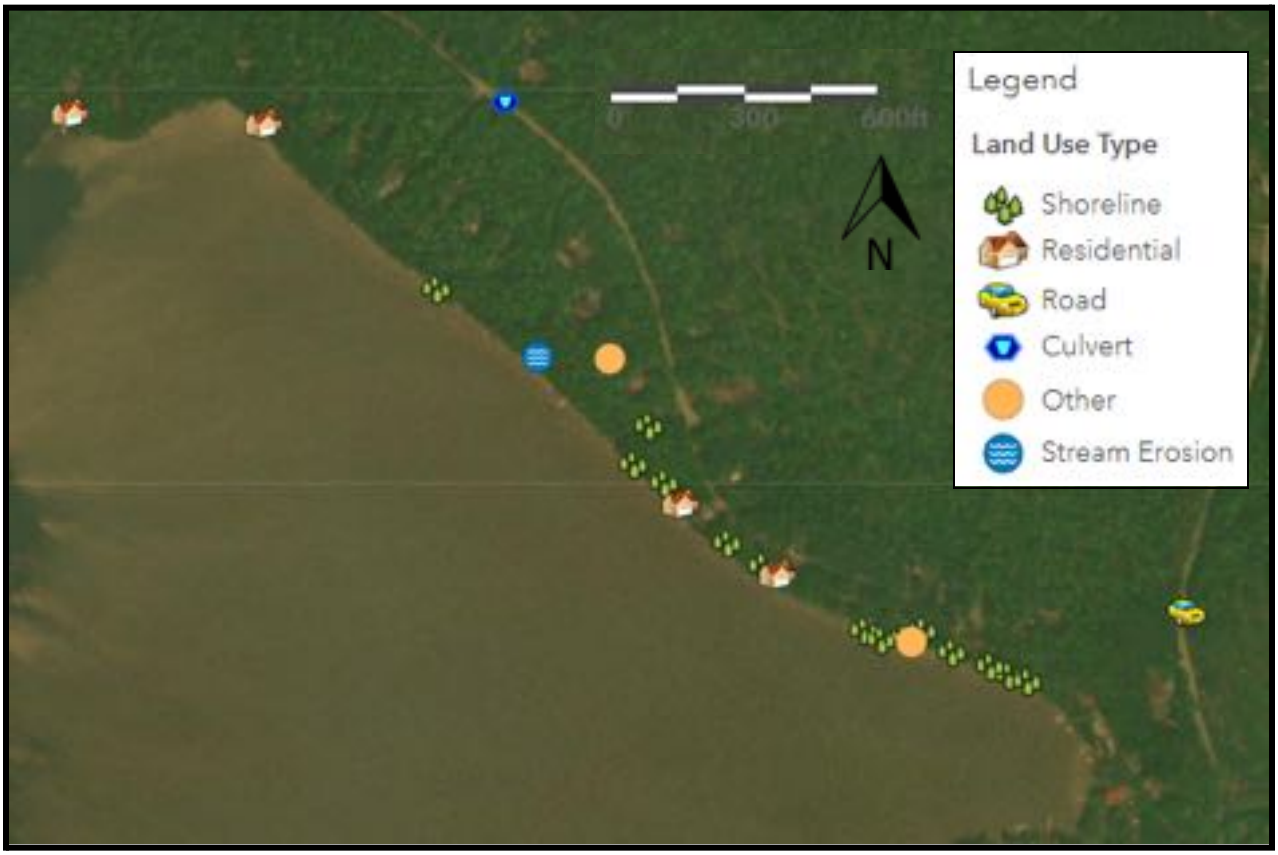


Watershed Survey Maps - Land Use Type of Each Erosion Site

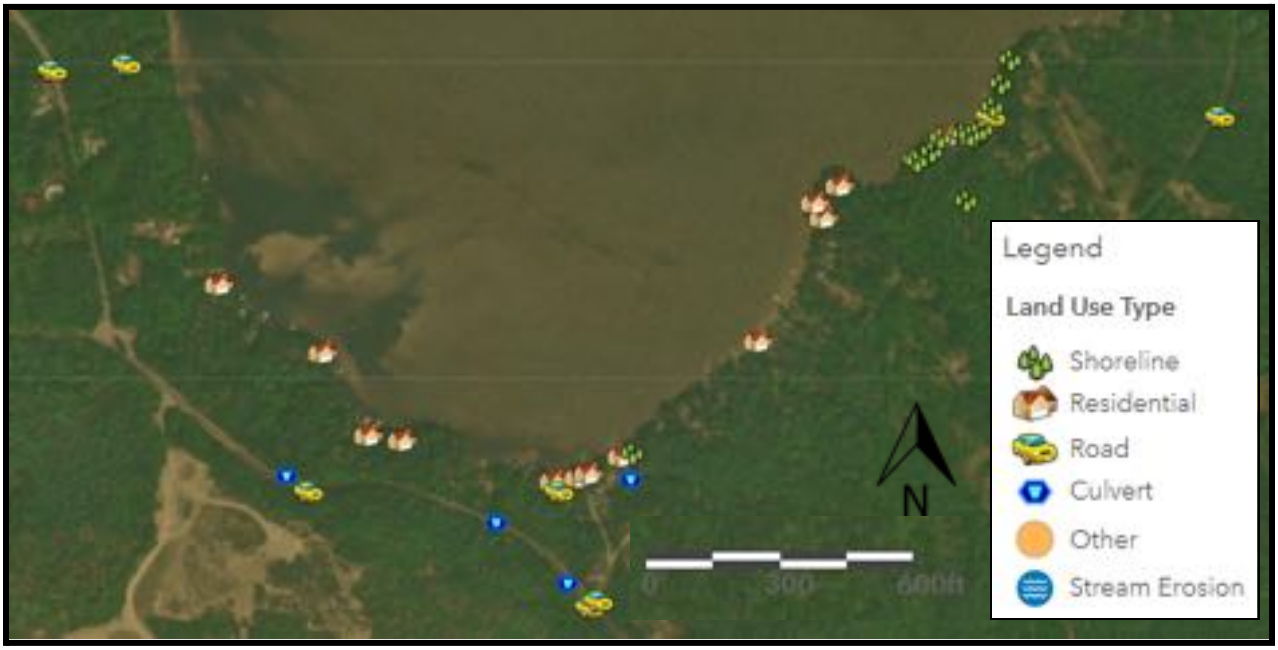
Wilson Lake - Whole



Wilson lake - North



Wilson Lake - South



Wilson Lake - West

Appendix B: Site Descriptions

Note: Homeowners will receive a notification letter with their site # if erosion was found.

Site	Impact	Cost	Technical Level	Land Use	Erosion Type	Recommendations	P Load lbs/yr
5-09	High	Medium	Medium	Road	Sheet	Add road base material, Open Top Culvert, Rubber Razor, Turn outs, Ditch & Check Dams	17
2-09	High	High	Medium	Road	Rill, Gully	Add road base material, Crown, Open Top Culvert, Rubber Razor, Turn outs, Vegetate Shoulder, Ditch & Check Dams	8.5
1-01	High	High	Medium	Road	Rill	Crown	0
1-01	High	High	Medium	Road	Gully	Turn outs, Ditch & Check Dams	12.75
1-15	High	High	High	Road	Gully	Pave, Add road base material, Crown	21.25
1-02	High	High	High	Culvert		Armor Inlet Outlet	5.1
5-10	High	High	High	Road	Rill	Ditching and turn out needed before Finch road	NA
5-04	High	High	High	Road	Rill	Turn outs, Install Catch Basin	0.57
1-03	High	High	High	Road	Gully	Remove Grader Plow Berms, Vegetate Shoulder, Ditch & Check Dams: State road has ditch but road berm is preventing runoff from going into ditch. Ditch has clogged culvert and clogged plunge pool. Needs new culvert, regrade shoulder and riprap ditch. Riprap hawk road shoulder as well.	2.55
3-06	High	High	High	Shoreline	Inadequate Shoreline Vegetation, Excessive Clearing	Establish Vegetated Buffer	NA
5-08	Medium	Low	Low	Residential	Sheet	Erosion Control Mulch	31.88
1-12	Medium	Low	Low	Residential	Sheet	Erosion Control Mulch, Native Vegetation, Infiltration Path, Water Bars	1.28
4-02	Medium	Low	Low	Residential	Sheet	Erosion Control Mulch, Native Vegetation, Reseed bare soil	2.13
4-04	Medium	Low	Low	Residential	Sheet	Erosion Control Mulch, Native Vegetation	3.4
4-01	Medium	Low	Low	Residential	Sheet, Rill, Bare Soil	Erosion Control Mulch, Dripline Trench, Native Vegetation, Reseed bare soil	1.7
1-05	Medium	Low	Low	Residential	Sheet	Erosion Control Mulch, Native Vegetation, Reseed bare soil	1.7
1-13	Medium	Low	Low	Residential	Sheet	Erosion Control Mulch, Native Vegetation	1.28
4-05	Medium	Low	Low	Residential	Sheet	Erosion Control Mulch, Infiltration Path or ECM and field stones	0.51
2-05	Medium	Low	Low	Residential	Sheet	Erosion Control Mulch, Native Vegetation, Reseed bare soil	8.5

Site	Impact	Cost	Technical Level	Land Use	Erosion Type	Recommendations	P Load lbs/yr
1-08	Medium	Low	Low	Residential	Sheet, Gully	Erosion Control Mulch, Native Vegetation, Reseed bare soil	1.7
4-06	Medium	Low	Low	Residential	Sheet, Rill	Erosion Control Mulch, Native Vegetation, Infiltration Path	0.26
1-10	Medium	Low	Low	Shoreline	Excessive Clearing	Establish Vegetated Buffer, Leave pine layer/ecm/take leaf litter away from lake front	0.05
3-17	Medium	Low	Low	Shoreline	Inadequate Shoreline Vegetation	Establish Vegetated Buffer: Plantings: juniper, elderberry, pepperbush	NA
3-19	Medium	Low	Low	Shoreline	Inadequate Shoreline Vegetation, Unstable Access	Establish Vegetated Buffer, Mulch or infiltration path	NA
3-20	Medium	Low	Low	Shoreline	Inadequate Shoreline Vegetation, Erosion	Establish Vegetated Buffer, Mulch	NA
2-01	Medium	Low	Low	Shoreline	Erosion, Inadequate Shoreline Vegetation	Establish Vegetated Buffer	1.28
2-04	Medium	Low	Low	Shoreline	Undercutting	Shoreline Stabilization, Remove tree?	0.17
2-03	Medium	Low	Low	Shoreline	Erosion, Inadequate Shoreline Vegetation	Establish Vegetated Buffer, Shoreline Stabilization	0.09
1-04	Medium	Low	Low	Shoreline	sheet	Remove pipe	NA
1-06	Medium	Low	Low	Shoreline	Inadequate Shoreline Vegetation, Unstable Access	Establish Vegetated Buffer	0.64
2-08	Medium	Low	Low	Shoreline	Inadequate Shoreline Vegetation	Establish Vegetated Buffer	0
2-10	Medium	Low	Low	Shoreline	Undercutting, Erosion, Inadequate Shoreline Vegetation	Establish Vegetated Buffer	0.21
2-11	Medium	Low	Low	Shoreline	Erosion	Establish Vegetated Buffer, Shoreline Stabilization	NA
3-03	Medium	Low	Low	Stream Erosion	Bank Erosion	Vegetated Stream Buffer, consider chemical free pest control.	NA
3-04	Medium	Low	Low	Other	Other	Excessive de-icer - clean up sand/salt at end of season.	NA
1-06	Medium	Low	Low	Residential	Sheet	Erosion Control Mulch, Native Vegetation, Reseed bare soil, live staking	4.25
3-09	Medium	Low	Low	Shoreline	Inadequate Shoreline Vegetation	Establish Vegetated Buffer, keep shoreline plants 2-3 feet tall.	NA
2-02	Medium	Low	Low	Shoreline	Erosion	Establish Vegetated Buffer, Shoreline Stabilization	0.13
2-03	Medium	Low	Low	Shoreline	Erosion	Establish Vegetated Buffer	NA

Site	Impact	Cost	Technical Level	Land Use	Erosion Type	Recommendations	P Load lbs/yr
1-09	Medium	Low	Medium	Culvert	Clogged	Armor Inlet Outlet - Berm caused by plow- covers rip rap and top of culvert- recommend talking to town to plow away from culvert. Location: where town rd meets private road across from 141-020	0.54
1-11	Medium	Low	Medium	Residential	Gully	Erosion Control Mulch, Native Vegetation, Rain Garden, Water Bars,Water bar for diverting water	0.10
4-03	Medium	Low	Medium	Residential	Sheet	Erosion Control Mulch, Water Bars, Dripline Trench	1.91
3-02	Medium	Low	Medium	Shoreline	Unstable Access	Shoreline Stabilization	0.21
3-14	Medium	Low	Medium	Shoreline	Inadequate Shoreline Vegetation	Establish Vegetated Buffer, ECM and plants	NA
3-16	Medium	Low	Medium	Shoreline	Erosion, Inadequate Shoreline Vegetation	Establish Vegetated Buffer, ECM and plants	NA
3-18	Medium	Low	Medium	Shoreline	Inadequate Shoreline Vegetation	Establish Vegetated Buffer	NA
2-06	Medium	Low	Medium	Shoreline	Erosion, Inadequate Shoreline Vegetation, Unstable Access	Establish Vegetated Buffer	0.51
2-13	Medium	Low	Medium	Shoreline	Unstable Access	Shoreline Stabilization	NA
3-07	Medium	Low	Medium	Shoreline	Unstable Access, Erosion	Mulch, infiltration steps	NA
2-14	Medium	Medium	Low	Road	Rill	Remove Grader Plow Berms, Vegetate Shoulder	NA
3-08	Medium	Medium	Medium	Residential	Sheet	Erosion Control Mulch, Infiltration Path, Eliminate Raking leaf blowing, Reseed bare soil	NA
2-07	Medium	Medium	Medium	Shoreline	Inadequate Shoreline Vegetation	Establish Vegetated Buffer	NA
3-15	Medium	Medium	Medium	Other		Ramp, Wide infiltration steps or water bars backfilled with gravel	NA
1-07	Medium	Medium	Medium	Residential	Gully	Stabilize dock access, Erosion Control Mulch	0.43
5-07	Medium	Medium	Medium	Residential	Sheet	Erosion Control Mulch, Reseed bare soil, Infiltration steps, rubber razors	53.13
1-14	Medium	Medium	Medium	Residential	Sheet	Erosion Control Mulch, Water Bars, Rubber Razors, Native Vegetation	10.63
3-05	Medium	Medium	Medium	Shoreline	Inadequate Shoreline Vegetation, Excessive Clearing	Establish Vegetated Buffer	NA
3-12	Medium	Medium	Medium	Shoreline	Inadequate Shoreline Vegetation	Establish Vegetated Buffer	NA

Site	Impact	Cost	Technical Level	Land Use	Erosion Type	Recommendations	P Load lbs/yr
3-10	Medium	Medium	Medium	Shoreline	Inadequate Shoreline Vegetation, Erosion	Establish Vegetated Buffer, ECM, infiltration path	NA
2-15	Medium	Medium	High	Road	Rill	Ditch & Check Dams	NA
3-01	Medium	Medium	High	Culvert	Clogged, Undersized	Remove Clog, Replace, Enlarge	NA
3-13	Medium	High	Low	Shoreline	Inadequate Shoreline Vegetation, Excessive Clearing	Establish Vegetated Buffer	NA
1-04	Medium	High	Medium	Road	Gully	Pave, Add road base material, consider recycled asphalt.	2.55
5-05	Medium	High	High	Culvert	Clogged	Remove Clog, Armor Inlet Outlet, Lengthen, Install Plunge Pool	1.28
5-01	Low	Low	Low	Culvert	Clogged	Armor Inlet Outlet, Remove Clog, Sediment removal plunge pool, armor outlet	1.59
5-02	Low	Low	Low	Residential	Dripline	Maintain existing drip line trench	0
5-03	Low	Low	Medium	Residential	Dripline	Gutter intercepting drip line trench on east side of boathouse, dripline erosion on west side of boathouse	0.09
3-11	Low	Low	Medium	Residential	Dripline	Dripline Trench, Erosion Control Mulch	0.03

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Publications

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