NORTH POND WATERSHED SURVEY REPORT

APRIL 2017

PREPARED FOR:

The Lakes Association of Norway

ACKNOWLEGEMENTS

The North Pond Watershed Survey Project was organized and conducted on behalf of The Lakes Association of Norway (LAON). The project was planned by a steering committee and carried out by 15 volunteers with support from technical leaders. The draft report was prepared by team member, Amanda Troxell, and the steering committee reviewed and finalized the report.

North Pond Watershed Survey Volunteers:

Wayne Chandler
Tom Curtis
Laurie DeVito
Mike Dudley
Jim Gibson
Sal Girifalco
Tom Hoffelder
Rhonda Kenney
Brian Otterson
Jeanne Silverman
Marty Siwak
Ray Snedeker
Herb Somers
Robert Story
Warren Spencer
Steve Zeeman

Watershed Survey Technical Leaders:

Laura Crossley, Maine DEP
Wendy Garland, Maine DEP
Kristin Feindel, Maine DEP
Scott Williams, Lake and Watershed Resource Management
Michele Windsor, Oxford County SWCD
Amanda Troxell, Maine Conservation Corps

Report Prepared by:

Amanda Troxell, Maine Conservation Corps

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INTRODUCTION

This report was specifically designed for landowners and municipal officials in the North Pond watershed. It provides the results and analysis of a watershed survey conducted during the summer of 2016. The survey was conducted in response to concerns about the pond's water quality and a desire to improve and preserve the pond for future generations to enjoy. North Pond falls within the lakes covered by The Lakes Association of Norway (LAON), which was established in 1971 with a mission of protecting the water quality of its four lakes: North Pond, Lake Pennesseewassee, Hobbs Pond, and Sand Pond.

NORTH POND AND ITS WATER QUALITY

North Pond is located in the Town of Norway in Oxford County, Maine. North Pond covers 273 acres, has a maximum depth of 10 feet and average depth of 6 feet. The pond supports a warm fishery with 9 different species present. North Pond is bordered by a large wetland complex, is very productive, and predominantly hosts largemouth bass, white perch, and chain pickerel fish species. A small dam on the outlet maintains a constant shallow average depth in North Pond. Located adjacent to this outlet is a small dirt boat ramp for smaller boats and canoes.

Since 1976, North Pond water quality data has been collected regularly by the Maine Department of Environmental Protection (DEP), and LAON contactors and volunteers. Average water clarity is 2.9 meters. Historically, the Secchi disk (device used to measure water clarity) was nearly always visible on the bottom of North Pond, whereas in recent years it is sometimes not visible, indicating that the water quality of the pond may be changing.

Total phosphorus and chlorophyll-concentrations – both of which are linked to algae growth - are relatively high in North Pond. Recent data suggest that the lake has not statistically changed in the past decade. However, the shallow nature of the pond creates the potential for phosphorus to leave the bottom sediments and become available to algae in the water column.

NPS Priority Watersheds

Maine DEP maintains a list of watersheds where water quality is impaired or considered particularly threatened by polluted runoff.

North Pond is on this NPS Priority Watersheds list, which makes the pond eligible for 319 grant funding under the Clean Water Act.

While the total phosphorus value (TotP) in North Pond has been relatively stable over time, there are important reasons for wanting to lower the concentrations. The average TotP is 17.3 ppb, which contributes to the Maine DEP characterization of North Pond as having below average water quality. Lower phosphorus concentrations would be a significant way to improve water quality. Also, the range of phosphorus levels over the past 30 years is relatively high, ranging between 10 and 30 ppb. It is important to note that values above 25 ppb have only been recorded in the last decade. This would indicate that these spikes are of recent origin, possibly related to an increase in extreme weather events, which have likely exacerbated existing soil erosion problems, and have the potential to cause new problems associated with watershed development.

In fact, in the not too distant past, North Pond has experienced lake-wide algae blooms where water clarity was reduced to two meters or less, and there have been increased reports and concern over increased algae growth in very recent years.

As a result, North Pond is listed on the DEP's list of lakes "Most at Risk from New Development" under the Maine Stormwater Law. North Pond is also on DEP's list of **Nonpoint Source Priority Watersheds**.

The bottom line is that overall algae growth in North Pond appears to have increased during the past three decades, based on the clarity of the water, the concentration of phosphorus, and the density of algal growth (chlorophyll-a samples).

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NORTH POND'S WATERSHED

The North Pond watershed includes the network of feeder streams, ditches and land that flows into the pond (Figure 1). There are both public and private roads within the watershed, and most of them are located in close proximity to the pond. Many of the private roads have associations, some formal, some informal, that raise funds to conduct some road maintenance. Watershed development includes agricultural areas and 85 shoreline year-round and seasonal homes. It also contains trails, some for walking/hiking, some for ATVs and snowmobiles. The watershed remains mostly forested and is experiencing occasional new development.

WATERSHED

All the land that surrounds a lake that drains or sheds its water into the lake through streams, ditches, directly over the ground surface or through ground water.

It is significant that the pond's outlet stream flows from the northwest corner of the pond into a large bog complex (which will be managed as a separate watershed), and then into much larger Lake Pennesseewassee (Norway Lake), a key resource to Norway and its surrounding areas because of the important recreational resources and economic benefit it provides. It eventually flows into the Androscoggin River.

Since North Pond is a source of water for Lake Pennesseewassee, it means that additional phosphorus flowing into North Pond would contribute to the phosphorus loading in Lake Pennesseewassee. Excess phosphorus in either waterbody would lead to more algae growth. In Lake Pennesseewassee, this could, in turn, result in additional dissolved oxygen loss in the deepest area of the lake during the summer months. Oxygen loss may contribute to a geochemical process whereby phosphorus that has accumulated in the bottom sediments becomes biologically available to the algae in the overlying water. This could result in a rapid decline of water quality.

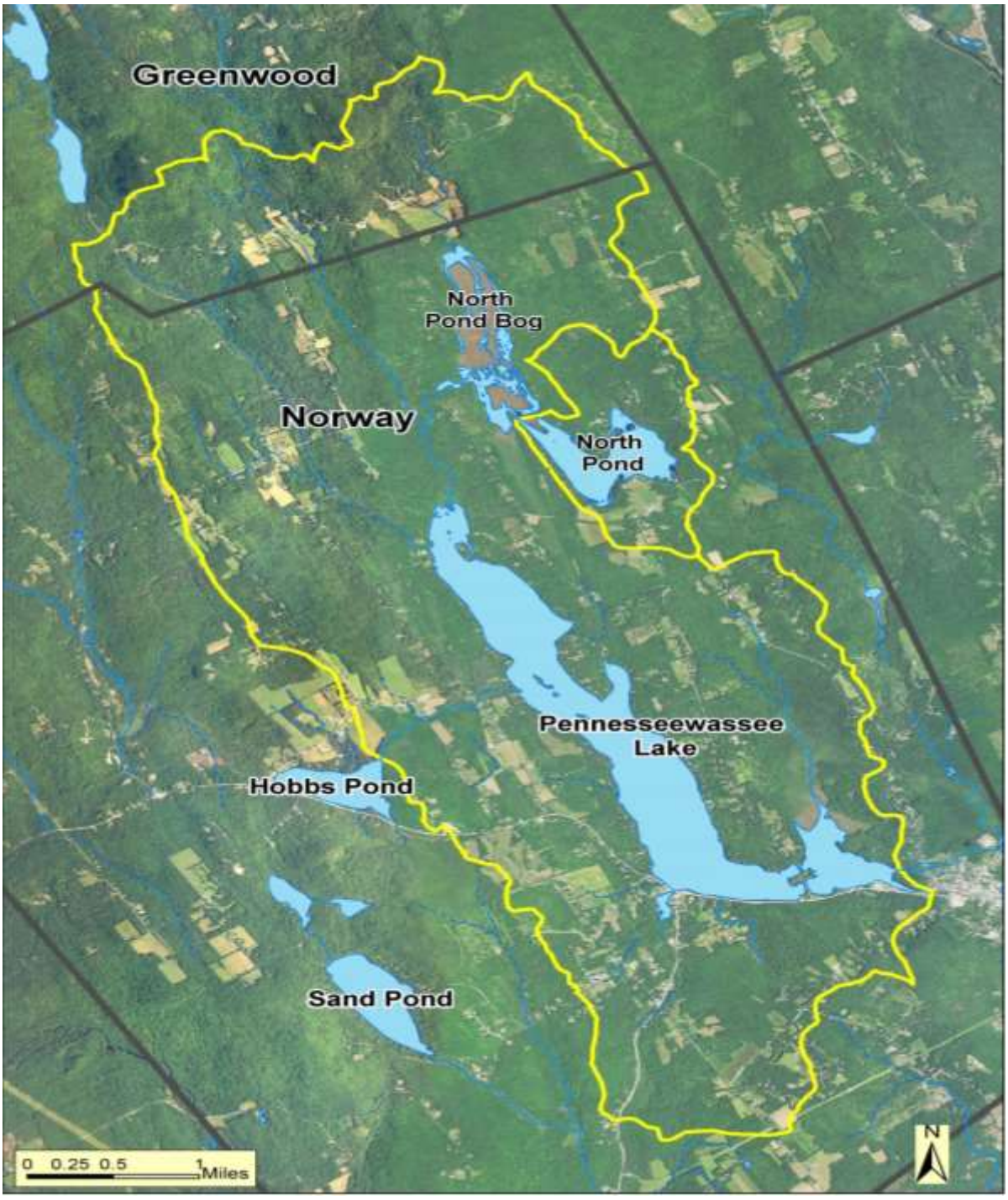

Figure 1- North Pond and Pennesseewassee Lake Watersheds

WHY IS NORTH POND'S WATER QUALITY AT RISK?

The biggest pollution culprit in North Pond and other Maine lakes is **polluted runoff.** Polluted runoff is found in storm water runoff. During and after rain storms and snowmelt, streams and overland flow wash soil into lakes from the surrounding landscape. Nutrients, such as phosphorus, become stormwater hitch-hikers and can easily be carried to the lake.

In an undeveloped, forested watershed, stormwater runoff is slowed and filtered by tree roots, understory plants, leaves, and other natural debris on the forest floor. It then soaks into the uneven forest floor and filters through the soil. In a developed watershed, however, stormwater does not always receive this filtering treatment. Runoff shed from impervious surfaces, such as rooftops, compacted soil, and gravel camp roads collects and speeds up. The runoff becomes a destructive erosive force with greater velocity and volume than it would have in an undeveloped landscape

POLLUTED RUNOFF

Soil, fertilizers and other pollutants from diffuse sources across the landscape that are carried into the pond by runoff from rain or snowmelt.

Not only is the increase in stormwater volume and velocity problematic in a developed watershed, but also the nutrients and the sediment in the stormwater runoff can be bad news. Large volumes of sediment can settle out in the lake, creating an ideal substrate for nuisance and invasive aquatic plants such as variable-leaved water milfoil. **Phosphorus**, a nutrient that is common on land and in stormwater runoff, is a primary food for all plants, including **algae**. In natural conditions, the scarcity of phosphorus in a lake limits algae growth. However, when a lake receives extra phosphorus from the watershed, algae growth increases dramatically. Sometimes this growth causes choking blooms, but more often it results in small, insidious changes in water quality that, over time, damage the ecology, aesthetics and economy of lakes. In recent years, increased amounts of algae have been reported on North Pond.

WHY SHOULD WE PROTECT NORTH POND FROM POLLUTED RUNOFF?

- North Pond is utilized by many for various recreational activities.
- North Pond drains into Pennesseewassee Lake, the largest, and most extensively used lake in Norway, which provides major recreational and economic resources for the entire Norway area.
- The lake contains valuable habitat for fish, birds and other wildlife.
- North Pond has a moderate potential for nuisance algal blooms and moderate to high potential for internal loading problems which can impact recreational opportunities as well as decrease the biodiversity of life in the lake.
- Once a lake has declined, it can be difficult and prohibitively expensive to restore.
- A 1996 University of Maine study demonstrated that lake water quality affects property values. For every meter (3 ft.) decline in water clarity, shorefront property values can decline as much as 10 to 20 percent. This can affect individual landowners as well as the entire community.

WHAT IS BEING DONE TO PROTECT NORTH POND?

Several activities have taken place on North Pond in recent years to assess and protect the pond's water quality.

Water Quality Monitoring – North Pond has been regularly monitored since 1976 by the Maine DEP. For decades, LAON has hired contractors to do water quality testing. For the past 2 years the testing was done by LAON volunteers. The water quality data collected includes Secchi disk transparency readings as well as phosphorus and chlorophyll sampling. Additionally, late summer dissolved oxygen profiles have been monitored regularly to assess the degree of oxygen depletion. Each year LAON contracts with Lake and Watershed Resource Management Associates to do an extensive level 3 aquatic survey to look for invasive plants.

Watershed Planning Efforts – In the mid-1990s, the Androscoggin Valley Council of Governments (AVCOG) conducted town-wide watershed surveys and ditch inventories to identify erosion issues. From 1997-2003, the Phase I , Phase II and Phase III Norway Lakes Improvement Projects helped fix numerous erosion sites and provided technical assistance to landowners while raising awareness through demonstration projects and public awareness workshops. The purpose of the project was to reduce sediment and phosphorus loading to the four major lakes in Norway. Although many of the project sites were located in other watersheds, the Phase I project addressed three private roads sites and the Phase III project addressed one town road site in the North Pond watershed.

Watershed Survey - Watershed surveys have been found to be one of the most effective ways to protect lake water quality since they identify existing and potential sources of polluted runoff. In 2015, LAON approached DEP to discuss strategies for protecting Norway's lakes, and watershed surveys were identified as an important first step. North Pond was targeted as the first watershed survey for the town, and the survey was conducted in the summer of 2016.

PURPOSE OF THE WATERSHED SURVEY

The primary goals of the watershed survey were to:

- Identify and prioritize existing sources of polluted runoff, particularly soil erosion sites.
- Inform watershed residents and stakeholders that bare eroding soil is a primary source of water pollution. Raise awareness about the connection between land use and water quality, and the impact of polluted runoff.
- Make general recommendations to landowners for fixing erosion problems on their properties.
- Use the information gathered to develop a lake watershed-based protection plan that will help guide long-term lake protection efforts and open the door for possible funding through the 319 grant program.

Many activities and land uses can coexist with water quality protection and safe drinking water. The purpose of the survey is to provide grounds at the local level for balancing protection of a beautiful and valuable water resource and public with other activities and uses of the resource and

surrounding land. Pointing fingers at landowners with problem spots was **NOT** a purpose of the survey, nor was it to seek enforcement action against landowners not in compliance with ordinances. While it is important to be accountable for the problems that arise, there is no individual or single entity responsible for the water quality issues of North Pond. Rather it is the accumulation of all inputs, past and present that are responsible for water quality degradation. It is the hope that through future projects, landowners will work on their own or with the town, LAON and technical staff to solve erosion problems on their properties.

THE SURVEY METHOD

The project's steering committee began planning for the survey in early spring 2016. Letters were mailed to all 125 watershed property owners in May to inform them about the survey and give them the opportunity to "opt-out" their property. Only one property owner requested their property not be included in the survey.

The survey was conducted by teams of trained volunteers and technical staff on June 13, 2016. Teams spent the day documenting erosion on the roads, properties, and driveways in in the watershed using cameras, GPS units and standardized field data forms. Nearly all of the watershed was surveyed in one day. Two separate areas were surveyed on a separate date.

The collected data was entered into a spreadsheet, and the documented erosion sites were plotted on maps. The sites were broken out into categories (such as residential and private roads) and ranked based on their probable impact on the pond, the technical ability needed to fix the problem, and the estimated cost of fixing the problem. A summary of sites and associated rankings are discussed in the next section of this report. The list of documented sites is located in Appendix A.

SUMMARY OF WATERSHED SURVEY FINDINGS

The watershed survey documented 37 problem sites (Figure 2). Land uses associated with the erosion sites included residential, private road, driveways and other In terms of water quality impact, 19 sites were rated low, 16 sites were rated medium and 2 sites were rated high. For the estimated cost to fix, 24 sites were rated low ($<500), 10 sites were medium ($500-$2,500) and 3 were high cost (>$2,500). The land uses with the greatest numbers of problems are highlighted on the following pages in greater detail.

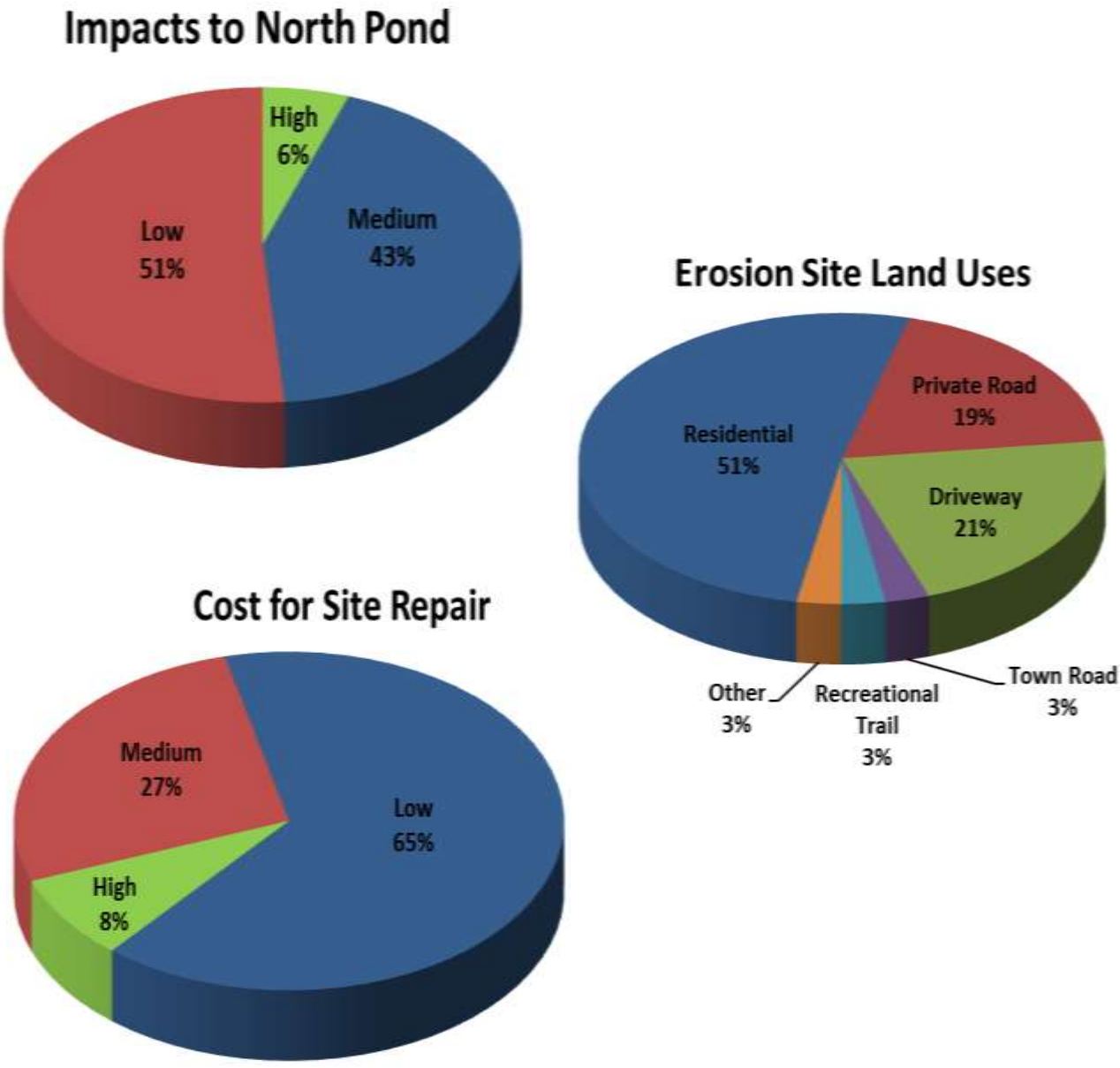

Figure 2 Land Use, Impact and Costs of Erosion Sites

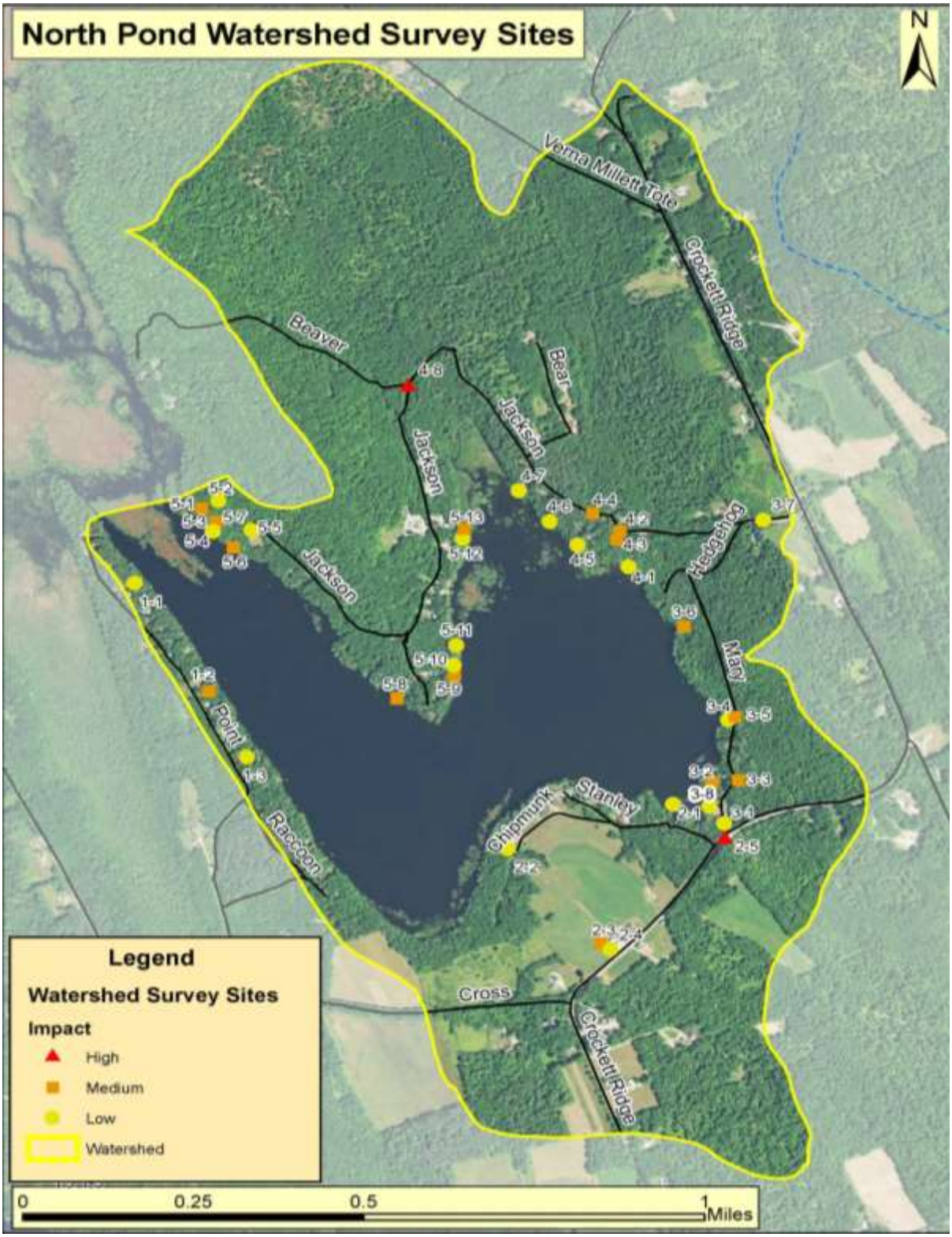

Figure 3 Watershed Survey Erosion Sites[1]

[1] Survey site locations shown on the map are approximate. Contact LAON for more information about specific site locations.

RESIDENTIAL AREAS

Residential areas accounted for more than half (51%) of identified erosion sites in the watershed. 15 out of 19 of the residential sites were determined to be low impact and the remaining 4 sites were ranked medium impact. All of the residential sites were determined to be low cost. The most frequent problem on residential properties in the watershed is sheet erosion, often with bare soil, flowing directly into the lake. Rill erosion (i.e., with observable small channels carved into the soil) was another common problem along with inadequate shoreline vegetation, and unstable shoreline access. Depicted below are some examples of the most common problems on residential sites and general recommendations that landowners can follow to prevent erosion and improve the water quality in North Pond.

Heavy foot traffic and lack of vegetation along the shoreline make residential shoreline areas very susceptible to erosion.

General Recommendations for Residential Improvements:

- Install runoff diverters/ rubber razors.
- Define and stabilize footpath. Build infiltration steps.
- No raking pine needles. Add mulch / erosion control mix to paths and trails.
- Reseed any bare soil and thinning grass, especially along shoreline.
- Establish buffer and add to buffer along shoreline.
- Build infiltration trench at roof dripline.

DRIVEWAYS

Driveway sites accounted for 21% of identified sources of polluted surveyed in the North Pond watershed. Eight driveway sites were documented during the survey, two of which were determined to be low impact and the remaining six sites were ranked medium impact. Six driveway sites were determined to be in the medium cost category ($500-$2500), and two driveway sites fit into the low cost category (under $500). There were no high cost category driveway sites. The most common driveway problems and recommended solutions are shown and described below.

Runoff concentrates on these driveways, and the eroded material washes to the pond.

General Recommendations for Driveway Improvements:

- Add new surface material, such as gravel.
- Reshape and crown driveway surface.
- Install runoff diverters (open top culvert, rubber razor or waterbar).
- Define parking area and vegetate temporary driveways.
- Build a rain garden and establish vegetated buffer.
- Install gutters and drywell for roof runoff.
- Armor inlet/ outlet of culvert and install a plunge pool.
- Reshape ditches and armor with stone.

PRIVATE ROADS, TOWN ROADS, AND RECREATIONAL TRAILS

Private and town roads and a recreational trail accounted for 25% of identified sources of polluted runoff in the watershed. 2 out of 9 of the road sites were determined to be low impact and low cost; 5 sites were medium impact and medium cost; and 2 sites were high impact and high cost.

The most frequent problem on private roads and the recreational trail in the watershed was gully (i.e., severe) erosion. Additionally, there were crushed and broken culverts and unstable inlets and outlets to some culverts. There were also a few instances of roadside plow/ grader berm, especially on town roads. Less frequently, rill surface erosion, rill road shoulder erosion, and rill ditch erosion with bank failure was observed. The more common problems and general recommendations for repairing these issues are shown and described below.

The shoulder along this steep town road erodes into a stream that flows into North Pond.

Erosion in the ditch and road surface of this private road washes into a stream and then North Pond.

General Recommendations for Private Road Improvements:

- Replace failing or undersized culverts. Armor both ends of culvert with stone.
- Remove plow and grader berms that prevent runoff from getting off roads.
- Stabilize road shoulders with gravel or stone.
- Stabilize road surface with hard-packing gravel and grade/crown to shed water.
- Reshape ditches and armor with stone.
- Employ Maine DEP certified contractors for road work.
- Utilize Maine DEP's guidance documents for forming road association and road maintenance.

WHERE DO WE GO FROM HERE?

LAON intends to utilize the information from the survey report to develop a lake watershed-based protection plan. The plan will be developed in partnership with other North Pond stakeholders and submitted for approval to Maine DEP. This plan will include action steps towards:

- Organizing a long-term group effort to provide input and develop a watershed-based plan and oversee plan implementation.
- Fundraising for remediation projects.
- Applying for federal 319 grant funding under the Clean Water Act to help carry out the plan.
- Continuous monitoring and updating a database of survey sites.
- Expanding outreach and education efforts.
- Working with the Towns of Norway to promote and upgrade protection.

TABLE 1 - EROSION SITES

North Pond Watershed Remediation Sites							
Survey Sector: Site	**Land Use**	**Type of Problem**	**Location**	**Area**	**Recommendations**	**Impact**	**Cost**
1:01	Residential	Sheet surface erosion with bare soil flowing on a moderate slope, through minimal vegetation, into the lake; inadequate shoreline vegetation	Point Lane	1200 Sq. ft. (composite)	Install runoff diverters (waterbars) in driveway; define and stabilize footpath with mulch/ erosion control mix; build infiltration trench at roof dripline; establish buffer and add to buffer along shoreline	Low	Low
1:02	Residential	Surface and ditch rill erosion flowing directly into the lake on a moderate slope; inadequate shoreline vegetation	Point Lane	75' x 8'	Stabilize foot path; install runoff diverter (waterbar) on footpath/trail and establish buffer along shoreline	Medium	Low
1:03	Residential	Sheet surface erosion flowing directly into the lake on a moderate slope; inadequate shoreline vegetation	Point Lane	20' x 30'	Install runoff diverter on path/ trail and add to buffer	Low	Low
2:01	Residential	Sheet surface erosion flowing directly into the lake on a flat slope; runoff from roof	Stanley Lane	30' x 70'	Establish buffer, no raking pine needles, put in erosion control mix and a drywell at gutter downspout; limit parking area or add rock to the area	Low	Low
2:02	Residence	Rill surface erosion on a steep slope	Chipmunk Way	30' x 40'	Add stone/ stabilize access	Low	Low
2:03	Agriculture	Manure storage area and level lip spreader practices installed for manure management. Runoff from this area and pasture flows to stream.	Crockett Ridge Rd.	NA	Level spreader needs maintenance. Roof over concrete pad would prevent runoff from reaching stream. Evaluate possibility of adjusting fencing to create additional stream buffer.	Medium	High

North Pond Watershed Remediation Sites							
Survey Sector: Site	**Land Use**	**Type of Problem**	**Location**	**Area**	**Recommendations**	**Impact**	**Cost**
2:04	Driveway	Runoff from barn roof and town road causes rill erosion on driveway. Washes through pasture and into stream.	Crockett Ridge Rd.	50' x 10'	Install gutters and drywell for barn roof. Place new surface material on driveway.	Low	Medium
2:05	Town Road	Severe rill erosion along road shoulders with direct flow into stream.	Crockett Ridge Rd.	800' x 20'	Remove grader/plow berms, regrade shoulders and add new hard-packing surface material on road shoulders.	High	High
3:01	Private Road	Rill surface erosion flowing on a moderate slope into the lake via a ditch	Mary Lane	15' x 32'	Add new surface material, gravel; reshape crown; install runoff diverters, rubber razors on road	Low	Low
3:02	Driveway	Rill surface erosion flowing through minimal vegetation, on a moderate slope, into the lake.	Mary Lane	80' x 40'	Add new surface material and define parking area; install runoff diverters and mulch construction site.	Medium	Medium
3:03	Private Road	Gully surface erosion flowing on a flat slope, through minimal vegetation, into the lake; crushed broken culvert	Mary Lane	15' x 20'	Replace culvert, armor Inlet/ Outlet and install plunge pool; Build up road, adding gravel, and reshape crown	Medium	Medium
3:04	Residential	Sheet surface erosion flowing on a moderate slope directly into the lake	Mary Lane	20' x 10'	Add mulch/ erosion control mix to paths and trails. Add another cedar retainer/ diverter.	Low	Low
3:05	Private Road	Gully surface erosion flowing on a flat slope, through minimal vegetation, into the lake	Mary Lane	10' x 15'	Install culvert and plunge pool	Medium	Medium
3:06	Private Road	Gully surface erosion flowing on a steep slope, through minimal vegetation, into the lake	ATV Trail (Hedgehog Way)	15' x 450'	Install runoff diverters (waterbars) or turnouts along trail.	Medium	Medium

North Pond Watershed Remediation Sites							
Survey Sector: Site	**Land Use**	**Type of Problem**	**Location**	**Area**	**Recommendations**	**Impact**	**Cost**
3:07	Private Road	Roadside plow/ grader berm with erosion flowing from a steep slope into the lake via ditch	Jackson Lane (Hedgehog Lane -> Crocket Ridge Road	3' x 100'	Remove grader/ plow berms	Low	Low
3:08	Residential	Sheet surface erosion with bare soil, on a flat slope flowing into the lake on path to dock.	Mary Lane	10' x 6'	Stabilize footpath, add mulch/ erosion control mix to it	Low	Low
4:01	Residential	Rill surface erosion flowing on flat surface directly into the lake	Jackson Road	15' x 5'	Install runoff diverters/ rubber razors in driveway	Low	Low
4:02	Private Road	Unstable inlet/ outlet to culvert; rill ditch erosion and bank failure; rill road shoulder erosion flowing into the lake via stream on a moderate slope	Jackson Road	15' x 35'	Armor inlet/ outlet of culvert and install a plunge pool; armor the ditch with stone	Medium	Medium
4:03	Driveway	Rill and gully surface erosion as well as ditch rill erosion flowing on a moderate slope into the lake via ditch	Jackson Road	15' x 100'	Armor inlet/ outlet of culvert and install a pluge pool; reshape ditch and armor it with stone; reshape crown of driveway, install runoff diverters (rubber razors)	Medium	Medium
4:04	Private Road	Unstable inlet/ outlet; roadside plow/ grader berm; erosion flowing on a moderate slope	Jackson Road	15' x 100'	Replace culvert; install turnouts to ditch; remove grader / plow berms along road	Medium	Medium
4:05	Residential	Sheet surface erosion, with bare soil, flowing on a moderate slope directly into the lake; unstable access along shoreline	Jackson Lane	3' x 5'	Stabilize foot path and build infiltration steps; add mulch/ erosion control mix	Low	Low

North Pond Watershed Remediation Sites							
Survey Sector: Site	**Land Use**	**Type of Problem**	**Location**	**Area**	**Recommendations**	**Impact**	**Cost**
4:06	Residential	Sheet surface erosion, with bare soil, on a steep slope flowing directly into the lake; gully erosion in ditch	Jackson Lane	15' x 30'	Define footpath; add mulch/ erosion control mix; establish vegetation buffer, no raking, and reseed bare soil and thinning grass. Fill in beaver hole with geotextile and soil	Low	Low
4:07	Residential	Sheet surface erosion flowing on a moderate slope directly into the lake	Jackson Lane	75' x 3'	Define footpath; install runoff diverter (waterbar) to paths/trails	Low	Low
4:08	Private Road	Gully surface and ditch erosion flowing into the lake on a moderate slope via stream	Beaver Way and Jackson Lane	5' x 150'	Armor inlet/outlet of culvert and a plunge pool; armor ditch with stone, install turnouts and install check dams; reshape (crown) on road	High	High
5:01	Driveway	Rill surface erosion and bare soil flowing on a moderate slope directly in the lake	Jackson Lane	10' x 40'	Add new gravel/ surface material to the driveway; open top culvert; install runoff diverts (open top culvert, rubber razor or waterbar) in driveway	Medium	Low
5:02	Residential	Sheet surface erosion, with bare soil, flowing on a flat slope directly into the lake	Jackson Lane	10' x 20'	Define and stabilize footpath, add mulch/ erosion control mix	Low	Low
5:03	Driveway	Rill surface erosion, with bare soil, flowing into minimal vegetation on a moderate slope	Jackson Lane	20' x 60'	Build up road, add gravel/ new surface material; reshape (crown) road; install rubber razor or waterbars in driveway	Medium	Medium
5:04	Residential	Sheet surface erosion, with bare soil, flowing on a moderate slope directly into the lake; erosion along shoreline	Jackson Lane	5' x 12'	Define and stabilize footpath, add mulch/ erosion control mix; add vegetation to buffer	Low	Low

North Pond Watershed Remediation Sites							
Survey Sector: Site	**Land Use**	**Type of Problem**	**Location**	**Area**	**Recommendations**	**Impact**	**Cost**
5:05	Residential	Sheet surface erosion, with bare soil, flowing on a moderate slope directly into the lake	North Pond (Jackson)	10' x 10'	Define and stabilize foot path and build infiltration steps; add mulch / erosion control mix	Low	Low
5:06	Driveway	Gully surface erosion flowing on a steep slope directly into the lake	Jackson Lane	15' x 40'	Install runoff diverters (broad-based dip and waterbars) in driveway; vegetate temporary driveway	Medium	Medium
5:07	Residential	Sheet surface erosion, with bare soil, flowing on a moderate slope directly into the lake	Jackson Lane	40' x 30'	Define and stabilize foot path and add mulch / erosion control mix to path	Medium	Low
5:08	Driveway	Sheet surface erosion, with bare soil, flowing on a moderate slope directly into the lake	Muskrat Way	20' x 40'	Install runoff diverters (rubber razor bars or waterbars) in driveway	Medium	Low
5:09	Residential	Rill surface erosion, with bare soil, on a flat slope	Muskrat Way	6' x 6'	Stabilize footpath, add mulch/ erosion control mix to it, and add vegetation to buffer	Medium	Low
5:10	Driveway	Rill surface erosion flowing on a flat slope directly into the lake; undercut shoreline with inadequate shoreline vegetation	Muskrat Way	10' x 30'	Install runoff diverters (rubber razor bars or waterbars) in driveway; Build a rain garden and establish vegetated buffer	Low	Low
5:11	Residential	Undercut shoreline with a lack of shoreline vegetation, erosion and an unstable access on a flat slope flowing directly into the lake	Jackson Lane	8' x 6'	Stabilize foot path to dock and add rip rap near dock/ shoreline	Low	Low

North Pond Watershed Remediation Sites							
Survey Sector: Site	**Land Use**	**Type of Problem**	**Location**	**Area**	**Recommendations**	**Impact**	**Cost**
5:12	Residential	Sheet surface erosion, with bare soil flowing on a flat slope directly into the lake; lack of shoreline vegetation, erosion and an unstable access along shoreline	Jackson Lane	10' x 20'	Build a rain garden, add vegetation to buffer and reseed bare soil and thinning grass along shoreline; less mowing	Low	Low
5:13	Residential	Sheet surface erosion, with bare soil, on a flat slope flowing directly into the lake; lack of shoreline vegetation and an unstable access	Jackson Lane	8' x 30'	Add mulch/ erosion control mix to paths and trails. Establish vegetated buffer along shoreline, no raking and reseed bare soil and thinning grass	Medium	Low

WHERE DO I GET MORE INFORMATION?

Lakes Association of Norway
PO Box 505
Norway ME 04268
laon@norwaylakes.org
http://norwaylakes.org/

Wendy Garland
Maine DEP
(207) 615-2451
wendy.garland@maine.gov
www.maine.gov/dep

Michele Windsor
Oxford County Soil and Water Conservation District
oxfordcountyswcd@outlook.com

Scott Williams
Lake and Watershed Resource Management Associates
(207) 576-7839
lwma@megalink.net

PUBLICATIONS

Conservation Practices for Homeowners Factsheets
www.maine.gov/dep/land/watershed/materials.html

Gravel Road Maintenance Manual
www.maine.gov/dep/land/watershed/camp/road/gravel_road_manual.pdf

Norway Lakes Improvement Project, Phase III #2002-08
http://www.gulfofmaine.org/kb/uploads/14119/2002-08%20Norway%20Lakes.pdf