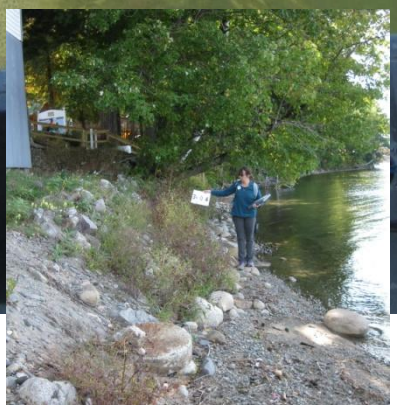
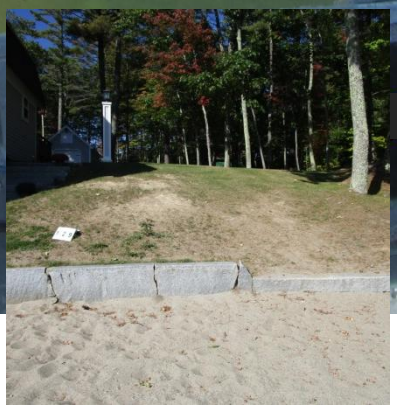
WATERSHED SURVEY REPORT

NORTH POND





JANUARY 2017

North Pond Association
P.O. Box 44
Smithfield, ME 04978
http://www.northpond.net

NORTH POND
WATERSHED SURVEY REPORT

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Cover photos: *North Pond from the air (Charlie Baeder) & site photos from the September 24, 2016 watershed survey.*

ACKNOWLEDGEMENTS

The following people and organizations were instrumental in helping with the 2016 North Pond Watershed Survey, and deserve special recognition for their efforts:

Watershed Survey Steering Committee Members

Charlie Baeder	Belgrade Regional Conservation Alliance
Don Bushnell	North Pond Association
Linda Rice	North Pond Association
Rick Watson	North Pond Association
Doug Woodsum	North Pond Association

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Jodie Mosher-Towle	Rick Watson
Louise Proulx	Doug Woodsum
Dave Proulx	

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Project partners: *North Pond Association the towns of Smithfield, Rome and Mercer, Belgrade Regional Conservation Alliance, Kennebec County Soil & Water Conservation District, and the Maine Department of Environmental Protection. Project management was provided by Ecological Instincts.*

Report prepared by: *Ecological Instincts with maps by WB GIS Services.*

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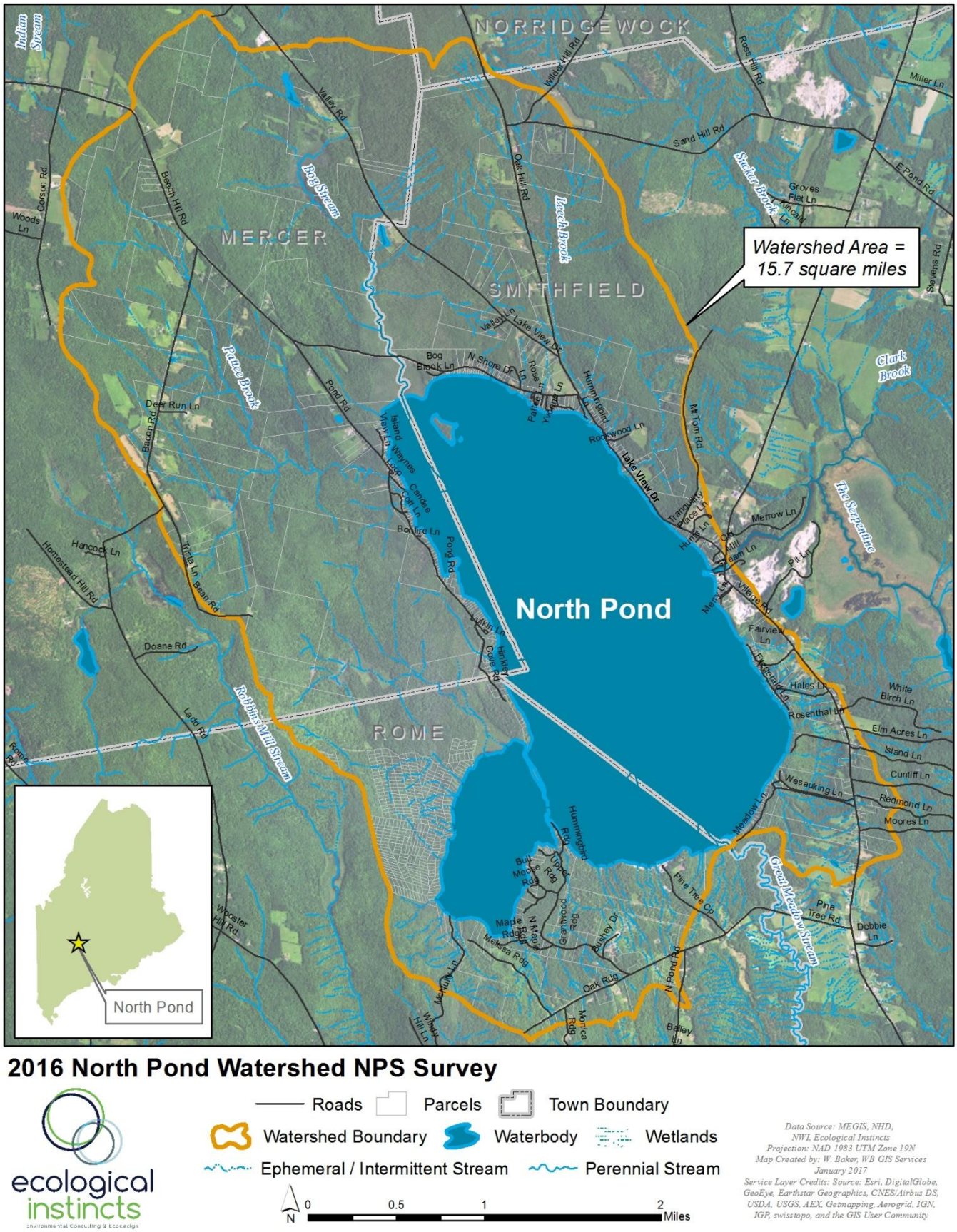


Figure 1. *Map of the North Pond watershed.*

INTRODUCTION

North Pond is located in the central Maine towns of Smithfield, Mercer and Rome in the Belgrade Lakes Region. The surface area of North Pond (a.k.a North Lake) covers approximately 2,531 acres, has a perimeter of 9.5 miles and a maximum depth of 20 feet[1]. The surface area of the lake includes Little Pond (a.k.a Little North Pond) on the southwest end of the lake which is connected by a shallow area known as "the Narrows". North Pond is the second lake in the seven-lake Belgrade Chain of lakes, receiving inflow from East Pond to the east via Serpentine Stream in Smithfield Village (Figure 2). The Serpentine watershed to the east includes a large area of freshwater wetlands of statewide significance between East and North ponds (Figure 3). North Pond also receives water from three other major tributaries in the watershed: Bog Stream, Leech Brook and Pattee Brook, all of which flow into the lake at the north end of the watershed (Figure 1, previous page). Water leaving North Pond flows through Great Meadow Stream to Great Pond which flows into Long Pond, then on to Messalonskee Lake, and eventually into the Kennebec River via Messalonskee Stream.

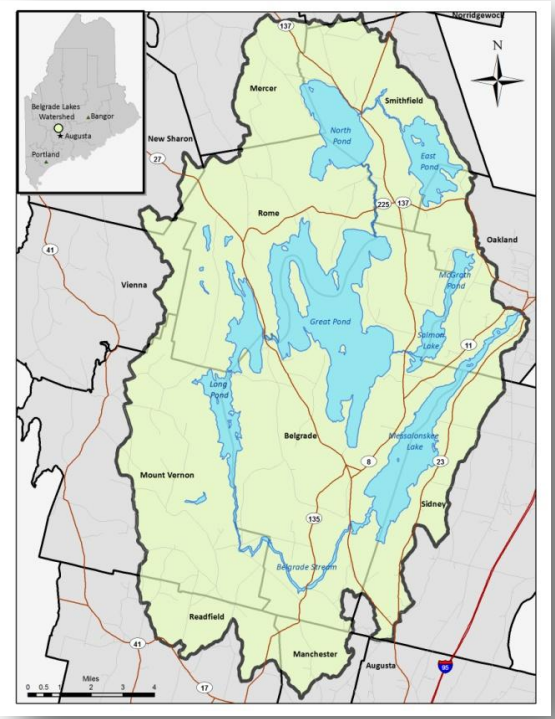


Figure 2. *Map of the Belgrade Lakes watershed (Colby.edu)*

The North Pond watershed covers 15.7 mi^2, in the towns of Mercer, Smithfield, Rome, and a small section on the north end of the watershed in the Town of Norridgewock (Figure 3). The topography of the watershed contains many small hills on the north end of the watershed including the highest elevations above sea level: Mt. Tom (742 ft.), Beech Hill (675 ft.), and Oak Hill (673 ft). The lowest elevations are located in stream valleys including: Bog Stream (258 ft) and at the inlet of the Serpentine in Smithfield (264 ft).

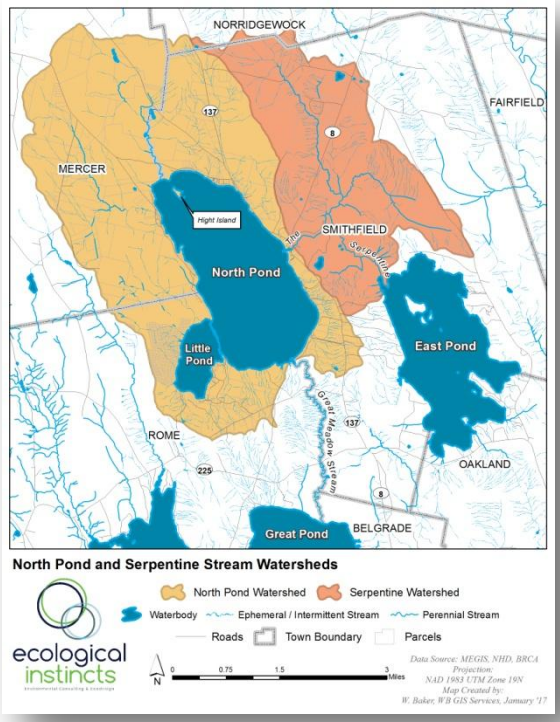


Figure 3. *Map of the North Pond and Serpentine Stream watersheds.*

Aerial imagery of the watershed shows a history of forestry activities throughout the watershed, and most recently in the Mt. Tom area. A 2016 aerial flight

[1] Lakes of Maine. North Lake (Little Pond), Rome, Mercer, Smithfield, Kennebec, Maine. Midas 5344. Online: http://www.lakesofmaine.org/lake-overview.html?m=5344

conducted by BRCA suggests that this area is currently in regrowth and not a significant water quality concern at this time despite local observations of sediment-laden water flowing into the lake via Leech Brook.[2]

Other features of North Pond include: a dam on the south end of North Pond on Great Meadow Stream- the dam, built in 1985 is used to control water level in the lake; a state-owned boat launch is located on the north end of the lake on Bog Stream; and Hight Island (formerly Pomleau Island) is a small, undeveloped, tree covered island located at the north end of the lake.

North Pond is surrounded by a network of state, town and private roads including two major state roads: Lake View Drive (Rt. 137) and Village Road (Rt. 8/137). North Shore Drive, a town-owned road, splits off Lake View Drive to the west along the north end of the lake. Many unimproved gravel roads and private roads run perpendicular to the shoreline servicing areas of high-density residential development on the north end of the lake. Commercial development in the watershed includes an narrow band of development in downtown Smithfield including Sunset Camps, a roller-rink, Smithfield Grange, an Auto Body Shop, the Old Fire Department, and a large gravel operation. Pine Tree Camp is another large facility, and is located on the south end of the lake in Rome. Development on Little Pond is primarily on the east side of the pond with some development in the subdivision known as Black Horse Acres on the west shore of Little Pond.

North Pond is used extensively for swimming, fishing, and boating and is important to the local economy. Maine Department of Inland Fisheries and Wildlife reports 14 species of fish in North

Topographic map of the North Pond watershed. (Topozone.com)

High-density residential development on North Shore Drive. (Google Maps)

WATERSHED

The area of land around a lake that drains (or sheds) its water into the lake through streams, ditches, as overland flow, or through groundwater.

[2] Personal communication, Charlie Baeder, BRCA. October 2016.

Pond[3] including warm water fish such as small and largemouth bass, white perch and chain pickerel.

Northern pike, an illegally introduced species can also be found in North Pond.

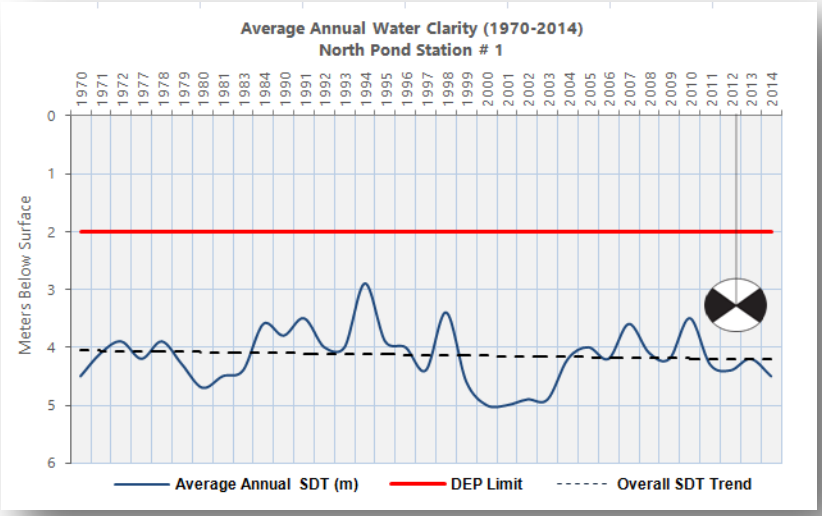
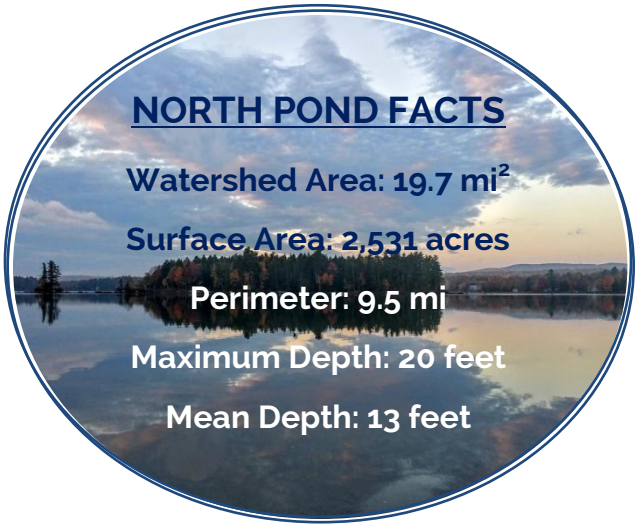


Figure 4. *Long-term water clarity trend for North Pond Station 1. (Ecological Instincts, data from LakesofMaine.org)*

Water quality data has been collected in North Pond since 1970. Based on these historic data, the water quality of North Pond is considered below average, the potential for nuisance algal blooms in the lake is moderate, and the potential for internal loading (phosphorus leaving bottom sediments and becoming available to algae) is moderate[4] (likely due to the shallow depth since dissolved oxygen depletion in deep areas of the lake is minimal). Due to the shallow depth of this lake (average depth 13 ft), it does not stratify. This means that the temperature and dissolved oxygen levels in the lake remain constant from top to bottom, and sunlight has the potential to reach the bottom over most of the lake. In fact, measurements of water clarity using a Secchi disk have been known to touch the bottom during certain times of the year. Variability in water clarity measurements over time may be influenced by weather (e.g. annual fluctuations in rain/snow), or land-uses changes in the watershed (e.g. period of heavy development or forestry activities or watershed improvements). The current trend shows a slight increase (improvement) in water clarity (Figure 4).

Volunteers from the North Pond Association (NPA) collect water quality data to track long-term changes in the water quality of the lake. More recently, NPA has been coordinating with Colby College, BRCA and Maine DEP on an intensive three-year Belgrade Lakes water quality sampling initiative which includes weekly Secchi disk measurements, sediment and phytoplankton sampling as well as water chemistry. Results of this work will be extremely beneficial for understanding lake processes.



[3] North Pond, Mercer and Smithfield Twps., Somerset Co.; Rome Twp., Kennebec Co. USGS Norridgewock, Me. Revised 1989. Online: https://www1.maine.gov/ifw/fishing/lakesurvey_maps/kennebec/north_pond.pdf

[4] Lakes of Maine. North Lake (Little Pond). Water Quality Summary: North Pond, Rome and Smithfield. Midas: 5344, Sample Station # 1. Updated 4/11. Online: http://www.lakesofmaine.org/data/texts/5344.pdf

NORTH POND WATER QUALITY – WHY IS WATER QUALITY AT RISK?

The biggest pollution culprit in North Pond, as in other Maine lakes, is **polluted runoff** or nonpoint source (NPS) pollution. Stormwater runoff from rain and snowmelt picks up soil, nutrients and other pollutants as it flows across the land, and washes into the lake.

POLLUTED RUNOFF
Also called NPS or nonpoint source pollution. Soil, fertilizers, septic waste and other pollutants from diffuse sources across the landscape that are carried into a waterbody by rainfall.

In an undeveloped, forested watershed, stormwater runoff is slowed and filtered by tree and shrub roots, grasses, 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 the filtering treatment the forest once provided. Rain water picks up speed as it flows across impervious surfaces like rooftops, compacted soil, gravel camp roads and pavement, and it becomes a destructive erosive force.

Runoff from existing development and roads as well as any new development and/or seasonal conversions needs to be managed properly to prevent delivery of pollutants into North Pond; especially along the shoreline where soils can easily be washed into the lake. Of particular concern is the proximity of state and town roads to the lake. Roads and their counterparts- unpaved roads shoulders, winter sanding, ditches and culverts- flow directly into North Pond on the east and north shores.

WHY IS RUNOFF A PROBLEM?

The problem with runoff is not necessarily the water itself, but the sediment and nutrients that get carried by and delivered to lakes in stormwater runoff. **Phosphorus**, a naturally occurring element is considered a nutrient which provides food for algae and other aquatic plants. Phosphorus is found in soils, septic waste, animal waste and fertilizers.

Algae floating in the shallows of North Pond in the fall of 2016. (Ecological Instincts)

Under natural conditions, phosphorus is limited in freshwater systems, which helps limit algae growth. However, when a lake receives extra phosphorus from developed land, 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 our lakes.

Soil is the biggest source of phosphorus in Maine lakes. As every gardener knows, phosphorus and other nutrients are naturally present in the soil. So, we are essentially "fertilizing" our lakes and ponds with the soil that erodes from our driveways, roads, ditches, pathways and beaches. Studies have shown that runoff from developed areas has **5 to 10 times the amount of phosphorus** compared to runoff from forested areas. Runoff from forestry activities can also contribute significant inputs of nutrients and sediments if not managed properly. This may include limiting clear cutting, protecting natural vegetative buffers along waterbodies and wetlands, and limiting runoff from roads that serve as access to the forest resources.

WHY PROTECT OUR LAKES FROM POLLUTED RUNOFF?

- Phosphorus reductions from developed land are needed to help protect the water quality of North Pond.
- North Pond serves as valuable habitat for fish, birds and other wildlife including 14 different species of fish.
- North Pond is home to some important wildlife species including the Common Loon, the American eel (*Anguilla rostrata*) and Bald Eagles (*Haliaeetus leucocephalus*). Under the Maine Endangered Species Act, all eagle nests are protected as Essential Habitat.
- The 2016 Maine Audubon Loon count reports 40 adult loons on North Pond, [5]more than the 2014 count for neighboring East Pond, Long Pond, Salmon Lake or McGrath Pond[6]. NPA has built artificial rafts to support the loon population.
- North Pond is susceptible to algal blooms, having experienced blooms in the past (near-shore blooms were most recently reported in October 2016). Proper management and maintenance of roads, and minimizing the effects existing and new development and forestry activities are critical in this small watershed.
- Sediment deposited into lakes and ponds from erosion creates the ideal environment for invasive aquatic plant species. A combination of sediment deposits and phosphorus rich water could make North Pond even more susceptible to the establishment of invasive species. These species can be transported via boats to other lakes and ponds. North Pond is susceptible to invasive plants because of its shallow depth and popularity as a recreational fishery. Establishment of invasive aquatic plants would be extremely difficult to manage and very costly.
- Water from North Pond flows into Great Pond which is impaired as a result of excess nutrients (phosphorus). Reducing phosphorus inputs into North Pond benefits Great Pond.
- A 1996 University of Maine study found that lake water quality affects property values. For every three foot decline in water clarity, shorefront property values can decline as much as 10 to 20%! Declining property values affect individual landowners as well as the entire community.

[5] Personal communication, Linda Rice, North Pond Association, January 17, 2017.
[6] Maine Audubon. 2014 Maine Loon count Results. Online: http://maineaudubon.org/wp-content/uploads/2011/10/2014-Loon-Count-for-Web.pdf. (Note: data not available for 2015-2016).

WHAT IS BEING DONE TO PROTECT OUR LAKES?

The North Pond Association (NPA) has taken many steps to protect the water quality and wildlife of North Pond. A summary of these activities is provided below:

The Fairview Grange in Smithfield installed lake-friendly landscaping to become LakeSmart certified in 2014. (NPA)

- **1970-** First year of water quality monitoring on North Pond.
- **1985-** North Pond Association is formed to manage the newly built dam at the outlet of the lake. In addition to controlling lake water level, the dam helps keep milfoil from Grand Meadow Stream from entering North Pond.
- **1996-** BRCA begins installing Best Management Practices (BMPs) on properties in the North Pond watershed through the Youth Conservation Corps (YCC) program. Over the past 20 years, 127 BMPs have been installed in the watershed by BRCA.
- **1999-** First watershed survey of North Pond.
- **2000-** Courtesy Boat Inspections begin at the North Pond boat launch. The launch is staffed daily during the summer to keep invasive species out of the lake. Local towns help fund the program.
- **2002-** The first invasive aquatic plant survey was conducted on North Pond by volunteers. Since then nine formal surveys have been conducted by volunteers, Maine DEP and researchers. North Pond has four certified invasive plant patrollers, and NPA volunteers actively survey the lake.
- **2013-** NPA starts a LakeSmart program on North and Little ponds. To date, three landowners on North Pond (including the Fairview Grange) have been certified LakeSmart, as well as one landowner on Little Pond.
- **2014-** The Fairview Grange is recognized for its lake-friendly landscaping work and demonstration area, and recognized by the Maine Lakes Society as the first public property to receive a LakeSmart certification.
- **2015-** NPA holds its first annual "Are You Buff Enough? workshops. Sixteen people have attended these workshops to learn about the importance of shoreline buffers.
- **2015-** Colby College begins a 3-year intensive water quality sampling initiative in the Belgrade Lakes watershed which includes North Pond.
- **2016-** NPA conducts the North Pond watershed survey to document current sources of nonpoint source (NPS) pollution in the watershed. Twenty people were trained on how to identify NPS pollution and the different types of Best Management Practices (BMPs) to fix the problems.

SURVEY PURPOSE & METHODS

PURPOSE OF THE WATERSHED SURVEY

The primary purpose of the watershed survey is to:

- Identify and prioritize existing sources of polluted runoff, particularly soil erosion and stormwater runoff in the North Pond watershed.
- Raise public awareness about the connection between land use and water quality and the impact of soil erosion on the water quality of North Pond.
- Inspire people to become active watershed stewards.
- Use the information gathered to help inform the development of a Watershed-Based Protection Plan.
- Provide the basis to obtain funding to assist with addressing identified NPS sites.
- Provide recommendations to landowners so that they can voluntarily address NPS issues identified on their properties.

The purpose of the survey was NOT to point fingers at landowners with a documented NPS site, nor was it to seek enforcement action against landowners not in compliance with local ordinances. It is the hope that through future projects, the North Pond Association (NPA) can continue to work cooperatively with landowners, road associations, and towns to protect water quality.

More than 20 watershed survey volunteers gathered at the Smithfield Grange for a training the morning of the survey.

Local citizen participation was essential in completing the watershed survey and will be even more important in upcoming years. With the leadership of NPA and partners such as the Belgrade Regional Conservation Alliance (BRCA), Kennebec County Soil & Water Conservation District, the towns of Smithfield, Rome and Mercer, and the Maine Department of Environmental Protection (Maine DEP) there are ample opportunities for stewardship. The hope is that landowners will reflect on the results of the survey and the recommendations provided through the survey, and use some of the recommended conservation measures. Everyone in the watershed has a stake in helping protect the water quality of North Pond.

SURVEY METHODS

The North Pond watershed survey was conducted on September 29, 2016 with the help of 20 volunteers from the NPA, local residents, and interested individuals from the nearby Belgrade Lakes watersheds. Trained technical staff from Ecological Instincts, BRCA, Kennebec County Soil & Water Conservation District, and Maine DEP helped lead volunteers across six watershed survey areas (Figure 5). Prior to the survey, NPA sent out 516 letters and an informational handout to all of the property owners in the watershed. Thirty-one properties were not included in the survey at the landowner's request. Fifteen letters were returned to NPA due to an incorrect mailing address. If updated addresses could be located by NPA, the letters were resent. Parcels with returned mail were not surveyed unless the landowner was home at the time of the survey and they gave explicit permission.

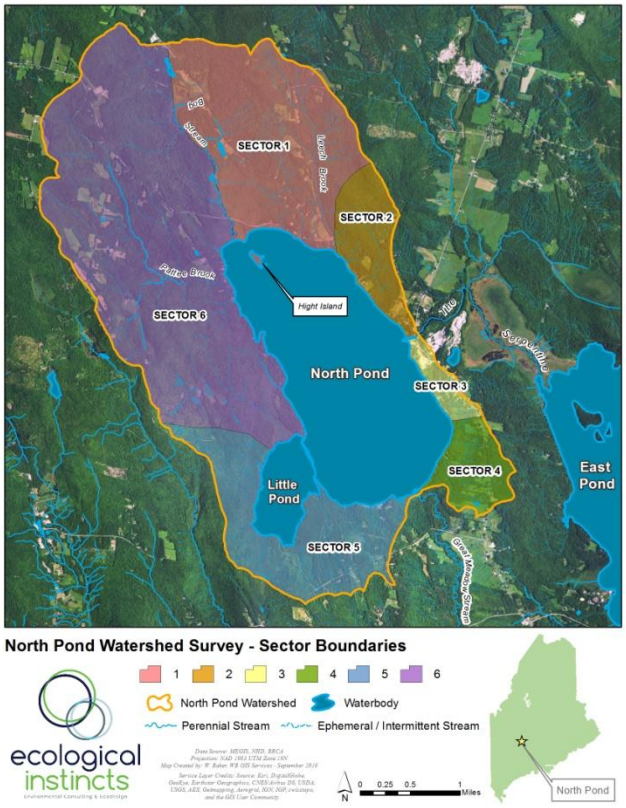
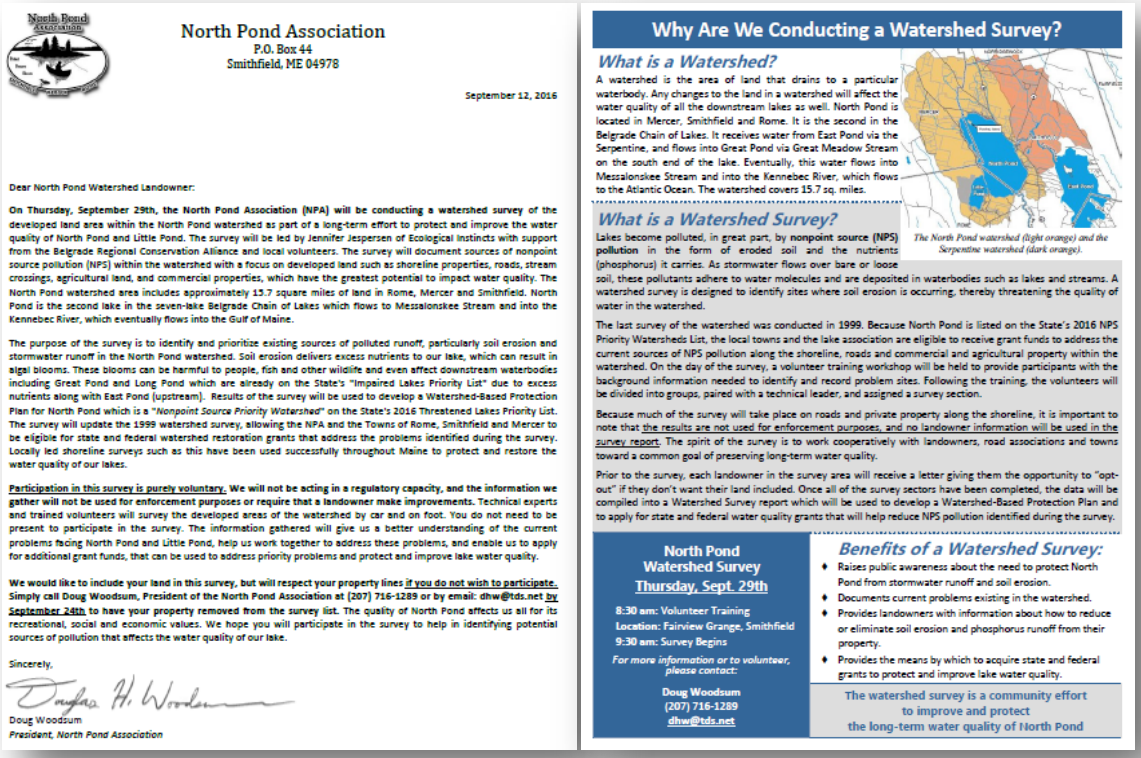


Figure 5. *Map showing the six designated survey sectors for the 2016 North Pond watershed survey.*

Twenty volunteers were trained in survey techniques during a 1 $^{1}/_{2}$ hour classroom workshop led by Ecological Instincts and Maine DEP on the morning of September 29, 2016 at the Fairview Grange in Smithfield. Following the training, volunteers and technical staff spent the remainder of the day documenting sources of NPS pollution across a number of land uses including roads and road crossings, commercial and residential properties and beach/boat access sites using digital cameras, GPS units and standardized watershed field survey forms (Attachment 1). Volunteers were assigned to one of the six survey sectors (see Figure 5, and sector descriptions next page).

The North Pond Watershed Planning Steering Committee met on September 2, 2016 to review maps and discuss survey objectives. Ecological Instincts and the NPA conducted a boat tour of the lake on September 12th to get a better sense of the extent of shoreland development in relation to the watershed. Follow-up survey work was conducted on October 6th and October 20th to complete survey areas that were not completed on September 29th. A one-on-one landowner meeting was conducted at Pine Tree Camp on October 6th to discuss existing and planned Best Management Practices (BMPs) at the camp.



North Pond Association
P.O. Box 44
Smithfield, ME 04978

September 12, 2016

Dear North Pond Watershed Landowner:

On Thursday, September 29th, the North Pond Association (NPA) will be conducting a watershed survey of the developed land area within the North Pond watershed as part of a long-term effort to protect and improve the water quality of North Pond and Little Pond. The survey will be led by Jennifer Jespersen of Ecological Instincts with support from the Belgrade Regional Conservation Alliance and local volunteers. The survey will document sources of nonpoint source pollution (NPS) within the watershed with a focus on developed land such as shoreline properties, roads, stream crossings, agricultural land, and commercial properties, which have the greatest potential to impact water quality. The North Pond watershed area includes approximately 15.7 square miles of land in Rome, Mercer and Smithfield. North Pond is the second lake in the seven-lake Belgrade Chain of Lakes which flows to Messalonskee Stream and into the Kennebec River, which eventually flows into the Gulf of Maine.

The purpose of the survey is to identify and prioritize existing sources of polluted runoff, particularly soil erosion and stormwater runoff in the North Pond watershed. Soil erosion delivers excess nutrients to our lake, which can result in algal blooms. These blooms can be harmful to people, fish and other wildlife and even affect downstream waterbodies including Great Pond and Long Pond which are already on the State's "Impaired Lakes Priority List" due to excess nutrients along with East Pond (upstream). Results of the survey will be used to develop a Watershed-Based Protection Plan for North Pond which is a "*Nonpoint Source Priority Watershed*" on the State's 2016 Threatened Lakes Priority List. The survey will update the 1999 watershed survey, allowing the NPA and the Towns of Rome, Smithfield and Mercer to be eligible for state and federal watershed restoration grants that address the problems identified during the survey. Locally led shoreline surveys such as this have been used successfully throughout Maine to protect and restore the water quality of our lakes.

Participation in this survey is purely voluntary. We will not be acting in a regulatory capacity, and the information we gather will not be used for enforcement purposes or require that a landowner make improvements. Technical experts and trained volunteers will survey the developed areas of the watershed by car and on foot. You do not need to be present to participate in the survey. The information gathered will give us a better understanding of the current problems facing North Pond and Little Pond, help us work together to address these problems, and enable us to apply for additional grant funds, that can be used to address priority problems and protect and improve lake water quality.

We would like to include your land in this survey, but will respect your property lines if you do not wish to participate. Simply call Doug Woodsum, President of the North Pond Association at (207) 716-1289 or by email: dhw@tds.net by September 24th to have your property removed from the survey list. The quality of North Pond affects us all for its recreational, social and economic values. We hope you will participate in the survey to help in identifying potential sources of pollution that affects the water quality of our lake.

Sincerely,

Douglas H. Woodsum

Doug Woodsum
President, North Pond Association

Why Are We Conducting a Watershed Survey?

What is a Watershed?

A watershed is the area of land that drains to a particular waterbody. Any changes to the land in a watershed will affect the water quality of all the downstream lakes as well. North Pond is located in Mercer, Smithfield and Rome. It is the second in the Belgrade Chain of Lakes. It receives water from East Pond via the Serpentine, and flows into Great Pond via Great Meadow Stream on the south end of the lake. Eventually, this water flows into Messalonskee Stream and into the Kennebec River, which flows to the Atlantic Ocean. The watershed covers 15.7 sq. miles.

The North Pond watershed (light orange) and the Serpentine watershed (dark orange).

What is a Watershed Survey?

Lakes become polluted, in great part, by **nonpoint source (NPS) pollution** in the form of eroded soil and the nutrients (phosphorus) it carries. As stormwater flows over bare or loose soil, these pollutants adhere to water molecules and are deposited in waterbodies such as lakes and streams. A watershed survey is designed to identify sites where soil erosion is occurring, thereby threatening the quality of water in the watershed.

The last survey of the watershed was conducted in 1999. Because North Pond is listed on the State's 2016 NPS Priority Watersheds List, the local towns and the lake association are eligible to receive grant funds to address the current sources of NPS pollution along the shoreline, roads and commercial and agricultural property within the watershed. On the day of the survey, a volunteer training workshop will be held to provide participants with the background information needed to identify and record problem sites. Following the training, the volunteers will be divided into groups, paired with a technical leader, and assigned a survey section.

Because much of the survey will take place on roads and private property along the shoreline, it is important to note that the results are not used for enforcement purposes, and no landowner information will be used in the survey report. The spirit of the survey is to work cooperatively with landowners, road associations and towns toward a common goal of preserving long-term water quality.

Prior to the survey, each landowner in the survey area will receive a letter giving them the opportunity to "opt-out" if they don't want their land included. Once all of the survey sectors have been completed, the data will be compiled into a Watershed Survey report which will be used to develop a Watershed-Based Protection Plan and to apply for state and federal water quality grants that will help reduce NPS pollution identified during the survey.

North Pond Watershed Survey
Thursday, Sept. 29th

8:30 am: Volunteer Training
Location: Fairview Grange, Smithfield
9:30 am: Survey Begins

For more information or to volunteer, please contact:

Doug Woodsum
(207) 716-1289
dhw@tds.net

Benefits of a Watershed Survey:

- Raises public awareness about the need to protect North Pond from stormwater runoff and soil erosion.
- Documents current problems existing in the watershed.
- Provides landowners with information about how to reduce or eliminate soil erosion and phosphorus runoff from their property.
- Provides the means by which to acquire state and federal grants to protect and improve lake water quality.

The watershed survey is a community effort to improve and protect the long-term water quality of North Pond

Copy of the landowner letter and informational sheet that was sent to 516 landowners in the North Pond watershed in September 2016.

Sources of nonpoint source pollution were identified within each sector and documented using digital cameras and GPS units on standardized field sheets (Attachment 1). If there was not a direct connection from the potential source of NPS pollution to a ditch, stream, wetland or the lake, then the site was not documented (e.g. an eroding hillslope in which the soil did not leave the site). Potential solutions were recommended, rough estimates were made for the cost of labor and materials for improving the sites, and the overall impact to water quality and the level of technical assistance needed to complete the recommendations were also determined in the field for each site.

The data collected during the survey was entered into an Excel database and the documented NPS sites were plotted on maps using Geographical Information Systems (GIS). Mapping coordinates were manually corrected if needed to account for poor satellite reception or human error in the field based on recorded address or tax map/lot number. A description of NPS sites, recommended actions, and associated costs are discussed in the next section.

NORTH POND SECTOR DESCRIPTIONS-

Sector 1- This sector is located on the north side of North Pond from Bog Stream, east to Leech Brook in Smithfield. Major roads in this sector include North Shore Drive and Oak Hill Road. This sector includes dense shoreline residential development on North Shore Drive as and private roads on the south side of North Shore Drive including Witham, Dearborn, Pattee, Greely, Yvonne and Mitchell Lanes.

Sector 2- This sector is located on the north east side of North Pond and includes the area from Leech Brook, south to the Serpentine Stream. Sector 2 includes areas of dense shoreline development on Lake View Drive (Rt. 137) and smaller camp roads including Rockwood Lane, Tranquility Place Lane, Hunts Lane, Harlow Lane, Mikes Lane and a portion of Village Road at the intersection with Lake View Drive near the Corner Store. The outer watershed area in this sector includes areas of agricultural land and forestry activities off of Mt. Tom Road.

Sector 3- This sector is located on the east side of North Pond in Smithfield and includes the area of the North Pond watershed from the Serpentine Stream, south to White Birch Lane in Smithfield. Land uses in this sector include State Route 8/137 (Village Road), residential development on both sides of Village Road, plus a number of small roads west of the road down to the lake, and commercial development in "downtown" including Sunset Camps, the Sunbeam Roller Rink, and the Grange. This sector also includes a gravel pit and areas of open land on Fairview Lane.

Sector 4- This sector is located on the south east corner of North Pond in Smithfield and includes the area from Great Meadow Stream, north to White Birch Lane. There is a fair amount of residential development along the shoreline, as well as agricultural land along Village Road (Rt. 8/137). This is the smallest of the six survey sectors.

Sector 5- This sector is located on the south side of North Pond in Rome. This includes the area from Great Meadow Stream, west around Little Pond to the northern end of Black Horse Acres subdivision and the large wetland on north end of Little Pond. Pine Tree Camp is also located in this sector.

Sector 6- This sector is located on the northwest side of the watershed in Mercer from Bog Stream at the North end of North Pond, south to the end of Hinkley Cove Rd. on the north end of Little Pond in Rome. This sector includes the boat launch on the north end of the lake, dense shoreline residential development off Pond Rd. and rural residential and agricultural land uses outside of the immediate shoreline. Bog Stream and Pattee Brook, two main tributaries flowing into North Pond in this sector.

WATERSHED SURVEY RESULTS

SUMMARY OF SURVEY FINDINGS

Volunteers and technical staff identified 135 sites across the watershed that are currently, or have the potential to negatively affect the water quality of North Pond (Attachment 2). The greatest number of sites were documented in Sector 1 (39 sites), Sector 6 (33 sites), and Sector 2 (28 sites) on the north end of the lake. Some key conclusions from the survey include:

A Total of 135 Individual NPS Pollution Sites were Documented in the North Pond Watershed.

- **Everyone has a stake in improving water quality**. That's because NPS sites were identified across a variety of different land uses throughout the watershed. The state, towns, and residential landowners will all need to work together to reduce the impact that NPS pollution has on the lake.

- **Residential Development:** In rural lake watersheds, residential development is typically located along the shoreline serviced by both major roadways and private gravel roads. North Pond is no exception, with dense residential development (year-round and seasonal) located off North Shore Drive, Pond Rd. and Lake View Drive. The number of NPS sites stemming from residential development far exceeds any other land-use type surveyed in the watershed (61%). High (13 sites) and medium impact sites (31 sites) should be considered high priority for lake protection. Programs such as the NPA LakeSmart program can help provide guidance to landowners about designing and installing Best Management Practices (BMPs), including shoreline buffers, rain gardens and roof dripline trenches.

Unstable shorelines result in delivery of sediment and nutrients to the lake.

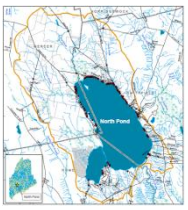
- **Roads:** In rural watersheds, development is typically focused along major roads servicing residential homes. Culverts, road shoulders and build-up of winter sand can have a significant impact on water quality if not well maintained. Combined, state, town and private road sites made up just 16% of all survey sites, with the greatest number of sites on state roads (10 sites). High impact road sites (5 sites), should be considered high priority for lake protection.

Example of a narrow stretch of land between the state road and the lake used for beach/boat access.

- **Beach & Boat Access:** Easy access to our lakes is an important consideration for shoreland residents and recreational enthusiasts alike. However, the soil in these areas can become compacted over time as a result of vehicle and foot traffic over many years and can result in a direct route for soil erosion to get into the lake. Combined, beach and boat access sites on North Pond ranked third behind residential and road sites (17 sites or 13% of the total), and nine of the 13 sites ranked high or medium impact. Portions of North Shore Dr. and Lake View Dr. are challenging from a management perspective due to a split between the house (on the north side of the road), and boat access within a steep, narrow right-of-way between the road and the lake.

Survey results, including the less dominant of the documented land uses are presented in more detail below. Survey data is provided in Attachment 2.

RESULTS NORTH POND WATERSHED



A total of 135 NPS sites were documented in the North Pond watershed across ten different land-use types (Figure 6). (Note: residential homes and driveways were documented separately in the field for tracking purposes.) The number of residential properties far outweighed the other land-use types.

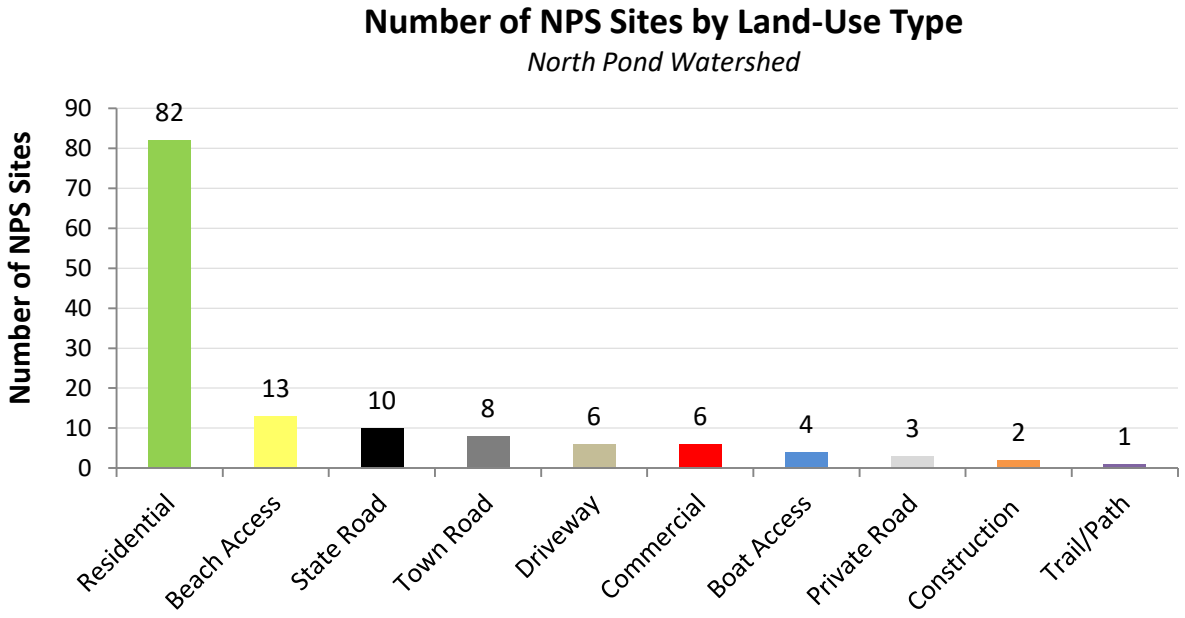
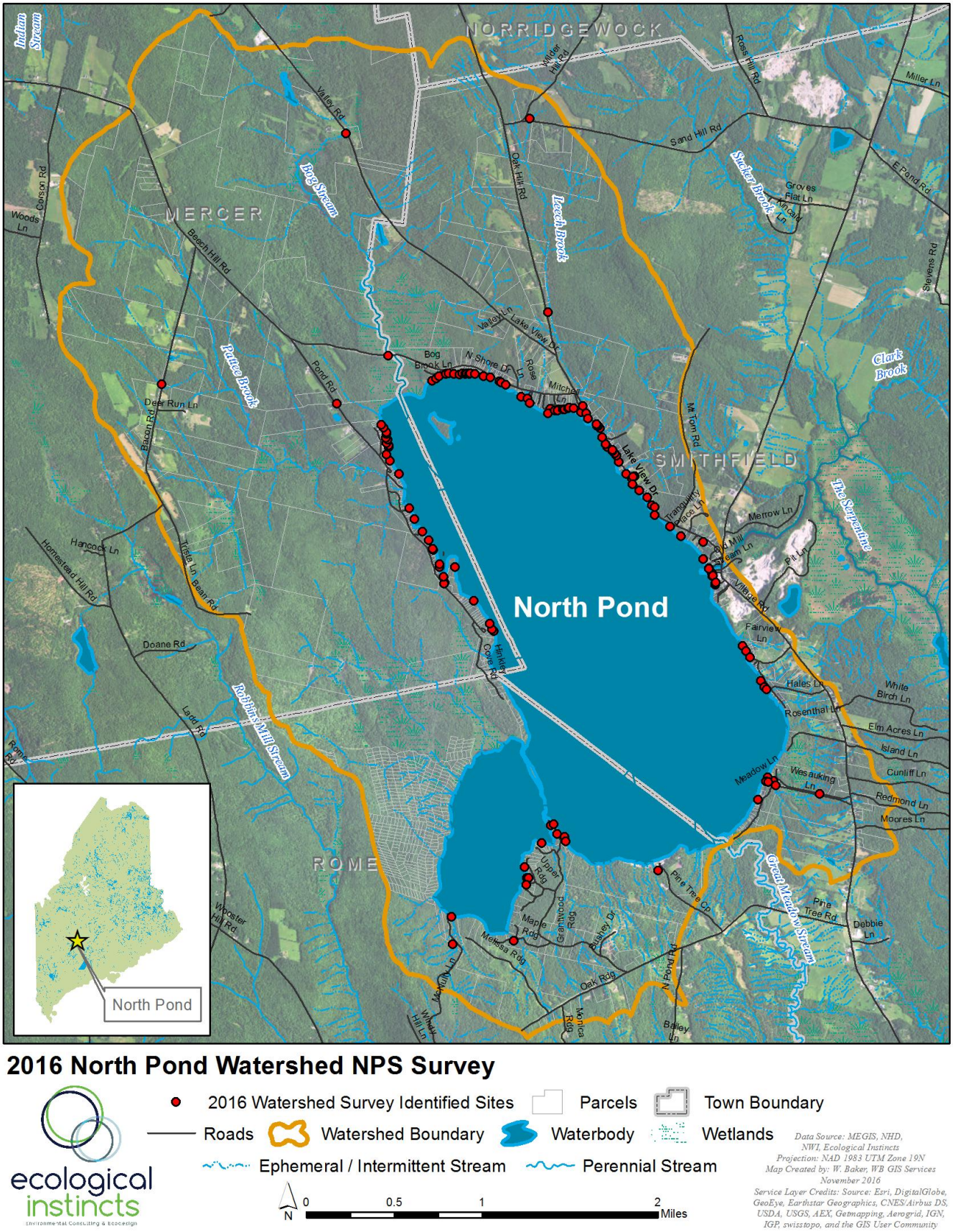


Figure 6. *NPS sites in the North Pond watershed by land-use type.*

Geographically, the majority of NPS Sites in the North Pond watershed are located near the shoreline on the north end of the lake, with a handful of sites associated with roads and stream crossings in the outer watershed (Figures 7 & 8). Approximately a dozen sites were located near Little North Pond.



2016 North Pond Watershed NPS Survey

2016 Watershed Survey Identified Sites | Parcels | Town Boundary
Roads | Watershed Boundary | Waterbody | Wetlands
Ephemeral / Intermittent Stream | Perennial Stream

N 0 0.5 1 2 Miles

ecological instincts
environmental Consulting & Ecodesign

Data Source: MEGIS, NHD, NWI, Ecological Instincts
Projection: NAD 1983 UTM Zone 19N
Map Created by: W. Baker, WB GIS Services
November 2016
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Figure 7. *Map of NPS sites in the North Pond watershed.*

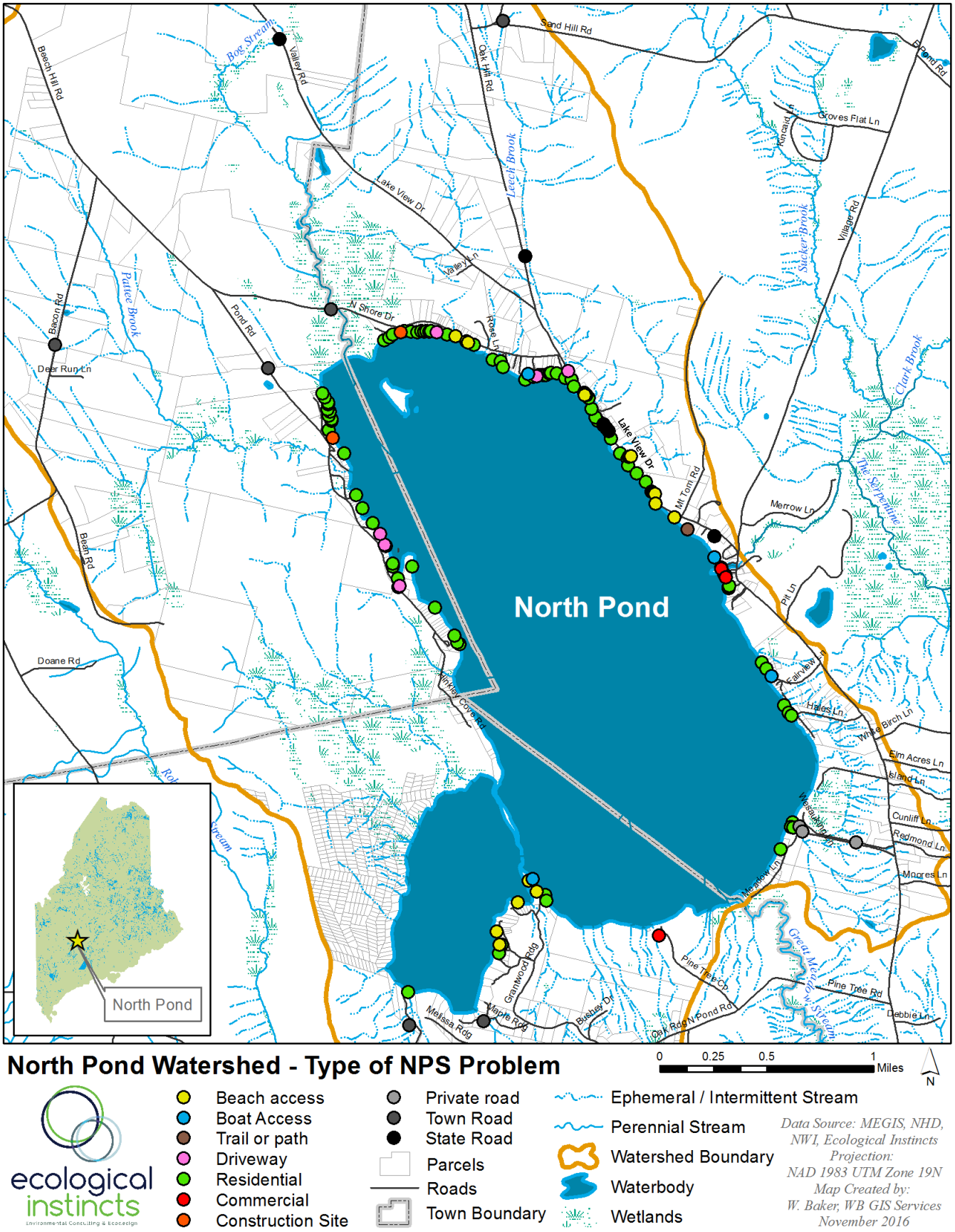


Figure 8. *Map of NPS sites in the North Pond watershed by land-use type.*

Impact of NPS Sites: The impact that documented NPS sites may have on water quality was determined in the field based on the proximity to a waterbody, and the magnitude of the problem. Factors such as slope, soil type, amount of eroding soil, and buffer size were also considered. A closer look at the estimated impact of these sites shows that while the total number of sites seems high, a small number of the total sites were ranked high impact (21 sites), compared to medium (63) and low impact (50 sites) sites (Table 1). More than half of the high impact sites are associated with residential properties. Not surprisingly, based on the total number of sites, residential NPS sites made up the majority of high, medium and low impact sites, with low impact residential sites accounting for close to one-third of all sites surveyed, and 74% of all low impact sites.

Table 1. *Summary of NPS sites in the North Pond watershed by land use and impact.*

Land Use	High Impact	Medium Impact	Low Impact	Unknown	Total	% of Total
Residential	13	31	37	1	82	61%
Beach Access	2	5	6	0	13	10%
State Road	2	7	1	0	10	7%
Town Road	2	5	1	0	8	6%
Driveway	1	3	2	0	6	4%
Commercial	1	5	0	0	6	4%
Boat Access	0	2	2	0	4	3%
Private Road	0	3	0	0	3	2%
Construction	0	1	1	0	2	1%
Trail/Path	0	1	0	0	1	1%
TOTAL	**21**	**63**	**50**	**1**	**135**	**100%**

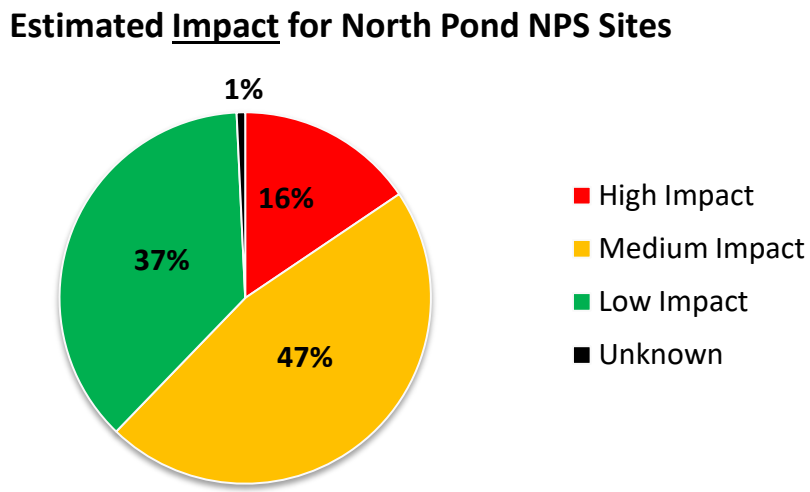


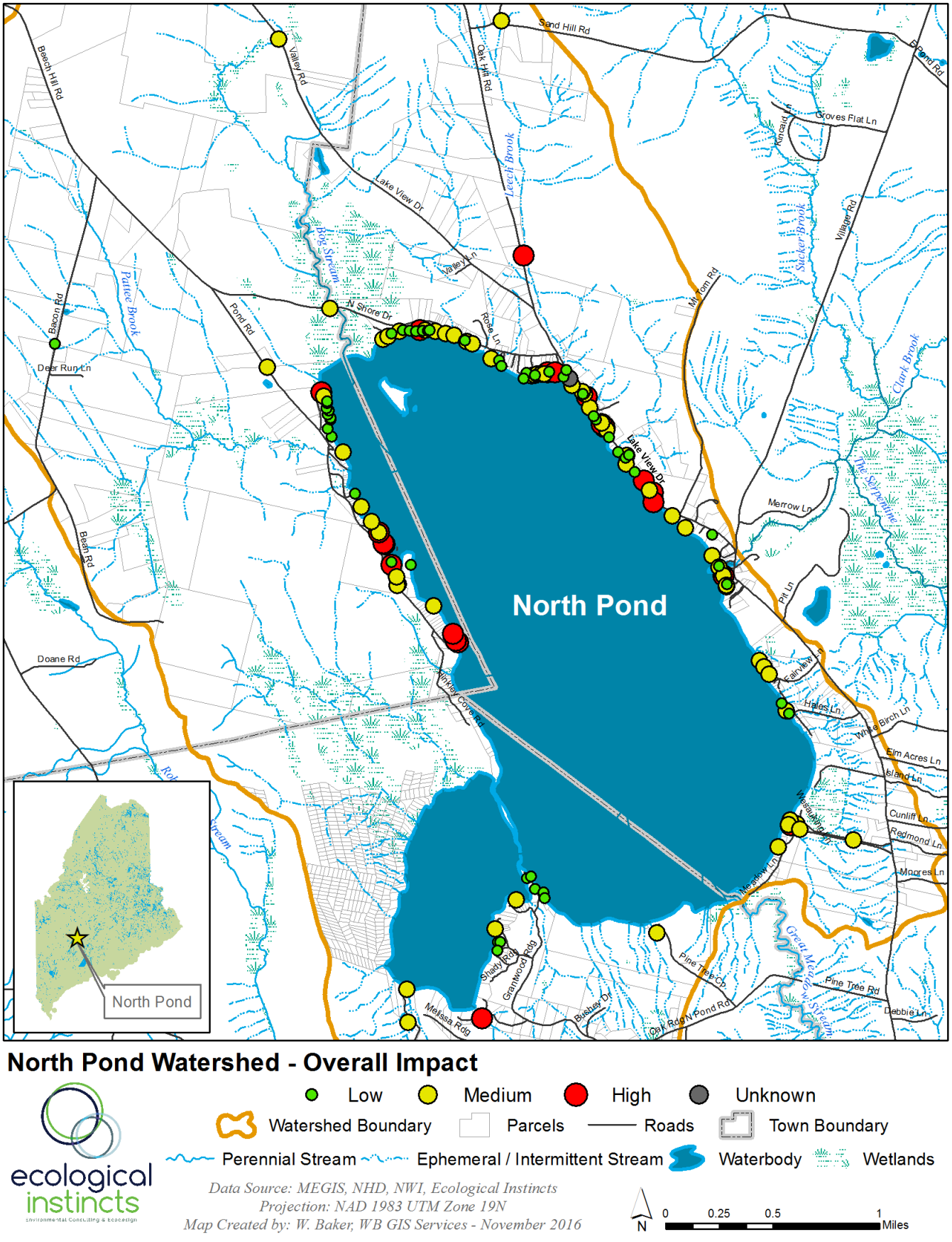
Figure 9. *Estimated impact of NPS sites in the North Pond watershed.*

Low impact sites are those with limited transport of soil off-site.

Medium impact sites exhibit sediment transportation off-site, but the erosion does not reach high magnitude.

High impact sites are those with large areas of significant erosion and direct flow to water.

Near shore algal bloom October 2016
(Photo: Mary Ellen Dennis)



North Pond Watershed - Overall Impact

Low Medium High Unknown

Watershed Boundary Parcels Roads Town Boundary

Perennial Stream Ephemeral / Intermittent Stream Waterbody Wetlands

ecological instincts
Environmental Consulting & Ecodesign

Data Source: MEGIS, NHD, NWI, Ecological Instincts
Projection: NAD 1983 UTM Zone 19N
Map Created by: W. Baker, WB GIS Services - November 2016

N 0 0.25 0.5 1 Miles

Figure 10. *Map of NPS sites in the North Pond watershed by impact ranked low to high.*

All told, the majority of sites are ranked medium or low impact (84%), while only 16% of sites are ranked high impact. A residential site in Sector 1 was ranked unknown for impact and requires follow-up. High impact sites were fairly evenly split between the east and west shores of the lake (Figure 10).

Example of a high impact residential site in Sector 6.

Residential: Eighty-two (82) residential sites were documented in the North Pond watershed. These sites were concentrated along the shoreline in Mercer and Smithfield, with a handful of sites in Rome around Little Pond. Thirteen (13) of the 82 documented sites were ranked high impact. Other NPS sites associated with residential development including beach access, boat access, driveways and trail/path were documented separately, but accounted for another 24 sites (see "other" below). Note that a few residential sites have more than one NPS site (e.g. eroding driveway and beach access).

Roads & Driveways: Road sites generally have larger erosion problems, which in turn result in a more significant impact on the water quality of the lake and can be more costly than other fixes. Two of the 13 state road sites and two of the eight town road sites ranked high impact and should be prioritized for remediation in the near future. There were no high impact private road sites.

Example of a high impact town road site on Bacon Road in Sector 6.

- Including state roads, town roads, private roads and driveways, there are 27 road-based sites (20%). The greatest number of problems were identified on **state roads**, followed by town roads, driveways and private roads (Figure 8, Table 1).
- All of the **state road** sites are located on Lake View Drive and are associated with unstable culverts (including safety hazards) and severe shoulder erosion and shoreline erosion.
- Five of the six **town road** sites are located in Sector 6, and are also associated with poorly maintained or undersized culverts, shoulder erosion and build up of winter sand.
- Two of the three **private road** sites were associated with unstable and perched culverts on Cross Road in Sector 4. The third site is associated with a culvert on Wesauking Lane in Sector 4, but requires follow-up to determine if there is a direct connection to a waterbody at this site.
- Six **driveway** sites were associated with both unpaved and driveways in Sectors 1 and 6, with half the driveway sites off Pond Road in Sector 6. Problems with driveways include

eroding surface material, runoff flowing directly to the lake and unstable culverts. Four of the six sites were ranked either high or medium impact.

Other (Boat/Beach Access, Commercial, and Construction): An additional 26 sites were documented for problems associated with beach access (13), commercial properties (6), boat access (4), construction (2) or trails/paths (1). Three of these sites ranked high impact, while 14 ranked medium impact, and nine (9) ranked low impact. High impact sites were related to beach access (2) and a commercial site (1).

Example of a high impact beach access site in Sector 2.

Cost of NPS Sites: Recommendations were made for improving each site, along with the estimated cost of labor and materials for all 135 sites (Figures 11 & 12). Only 10 of these sites are estimated to incur a high cost (over $2,500), while the remainder of sites were split between low (less than $500) and medium cost ($500- $2,500). One site in Sector 1 was ranked unknown and requires follow-up. Five of the 10 high-costs sites are associated with residential properties (failing retaining walls, steep slopes that require engineering, etc.), as well as two beach access sites one commercial site, a private road and a state road site. Only four of the 21 high impact sites are also high-cost. High impact sites that are low (2) or medium cost (16) may be prioritized for remediation first.

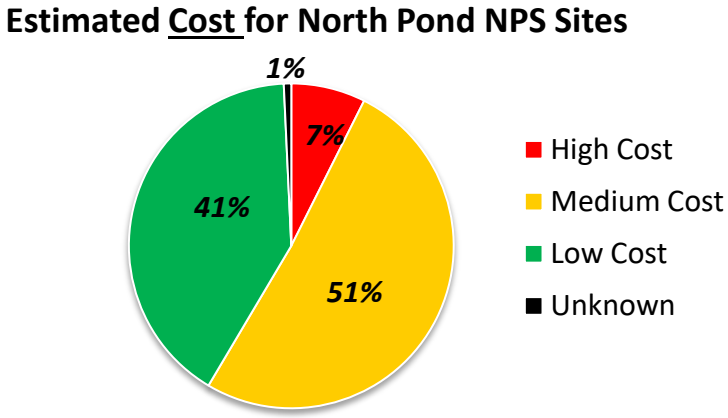
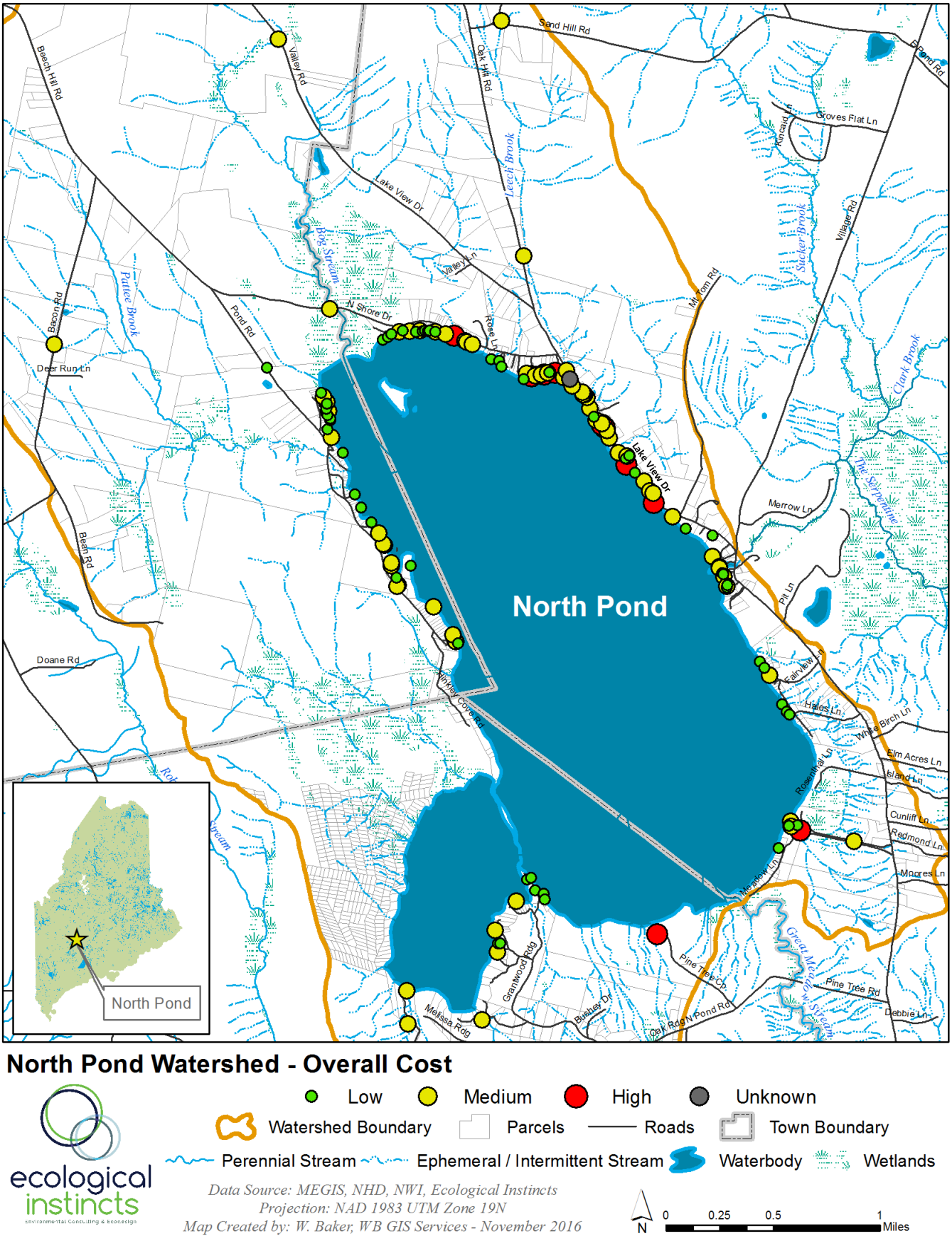


Figure 11. *Estimated cost of NPS sites in the North Pond watershed.*

Low cost sites were estimated to cost less than $500.

Medium cost sites range from $500 to $2,500.

High cost refers to sites estimated to cost more than $2,500.



North Pond Watershed - Overall Cost

ecological instincts
Environmental Consulting & Ecodesign

Low Medium High Unknown
Watershed Boundary Parcels Roads Town Boundary
Perennial Stream Ephemeral / Intermittent Stream Waterbody Wetlands

Data Source: MEGIS, NHD, NWI, Ecological Instincts
Projection: NAD 1983 UTM Zone 19N
Map Created by: W. Baker, WB GIS Services - November 2016

N 0 0.25 0.5 1 Miles

Figure 12. *Location and cost of NPS sites in the North Pond watershed.*

Sector Overview

Sector 1

Sector 1 had the greatest number of documented NPS sites, with 39 sites. The majority of sites are located on residential properties (28). The remaining 11 sites are spread across six different land uses. However, there were no documented commercial, private road or trail/path sites in this sector. Four (4) of the sites were ranked high impact, 18 medium impact, 16 low impact, and one unknown. Low water due to dry weather conditions in 2016 resulted in exposure of the shoreline and an eroding "stepped" shorefront at many of the residential properties. Steep beach/boat access sites on North Shore Drive should be considered holistically rather than as a series of unrelated problems. A significant amount of invasive Japanese knotweed was documented throughout this sector along the shoreline.

One of many steep eroding beach access sites in Sector 1 on North Shore Drive.

Sector 2

Sector 2 had the third greatest number of NPS sites of the six sectors, with a total of 28 sites. Much like Sector 1, residential sites ranked first among the documented land uses with 13 sites. This sector had the greatest number of state road sites (8), as well as beach access (5), boat access (1) and trail/path (1). Six (6) sites in this sector ranked high impact, while only four (4) ranked high cost. The most number of sites ranked both medium impact (12) and medium cost (18) in this sector.

Bank erosion and lack of shoreline vegetation off Mike's Lane where the Serpentine Stream flows into North Pond.

Sector 3

Fourteen (14) NPS sites were documented in Sector 3. This included eight (8) residential sites, five (5) commercial sites, and one (1) boat access site. Bare soil and bank erosion along the shoreline were common at many of the sites. Commercial sites were associated with Sunset Camps and the Sunbeam Roller Rink. Follow-up work is needed for the catch basin at the "Old Fire Station". It appears that the catch basin collects a large area of runoff from uphill, Rt. 8 and the parking lot which may discharge directly to the lake. If confirmed, then recommendations should be made to reduce the effects of these inputs.

Bare soil in Sector 3 results in sheet and rill erosion into the lake.

Sector 4

Sector 4 had the fewest number of documented NPS sites (7), with five (5) residential sites, and the only private road sites (2). Yet, this sector had the highest number of high impact sites (3) and the fewest number of low impact sites (2). There are six (6) medium impact sites in this sector and one (1) high impact site associated with a paved swale (Site 4-5) that flows directly into the lake.

Bare soil & roof runoff in Sector 4.

Sector 5

Sector 5 had 14 documented NPS sites across five (5) land uses. Among the 14 sites, one (1) ranked high impact, five (5) ranked medium impact, and eight (8) ranked low impact. The majority of sites were located on residential (5) and beach access (5) sites, town roads (2) and boat access (1). The total number of sites may be slightly under represented in this sector as a large private camp in this sector had multiple NPS sites (beach access, roof runoff, trail/path, etc.) which only counted for one site in the survey results.

Private summer camp in Sector 5.

Sector 6

Sector 6 had the second greatest number of NPS sites (33) behind Sector 1. The majority of these sites were located on residential properties (24) and town roads (5). Three (3) sites were associated with driveways, and one (1) with a construction site. Thirteen sites ranked low impact, while 15 sites ranked low cost. There were no high cost sites in this sector which means that the high impact sites are either medium or low cost. Residential sites were mostly located on Pond Rd. and Island View Lane and were the result of inadequate shoreline vegetation, shoreline erosion, undercut shorelines, roof runoff and surface erosion from bare soil.

Road shoulder erosion near the boat launch in Sector 6.

Figures 13 and 14 (next page) show a breakdown of impact and cost by survey sector. These figures show that Sector 6 has the most number of high impact sites, whereas Sector 1 has the most number of both medium and low impact sites. However, despite having the greatest number of high impact sites, Sector 6 (as well as Sector 3) has no high cost sites. Sector 1 has the most number of medium impact sites and is tied with Sector 6 for the most number of low impact sites. Figure 15 shows a breakdown of NPS sites by land-use type and sector. Residential sites were documented in all six sectors and clearly shows the cumulative impact of residential development in the watershed.

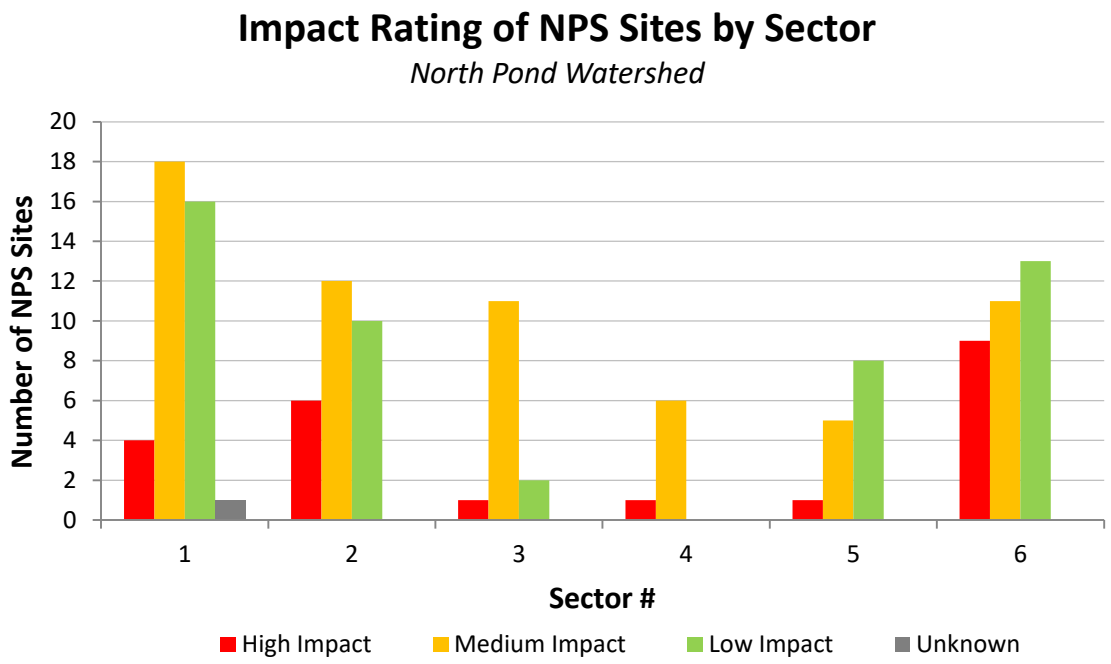


Figure 13. *NPS sites in the North Pond watershed by impact rating and sector.*

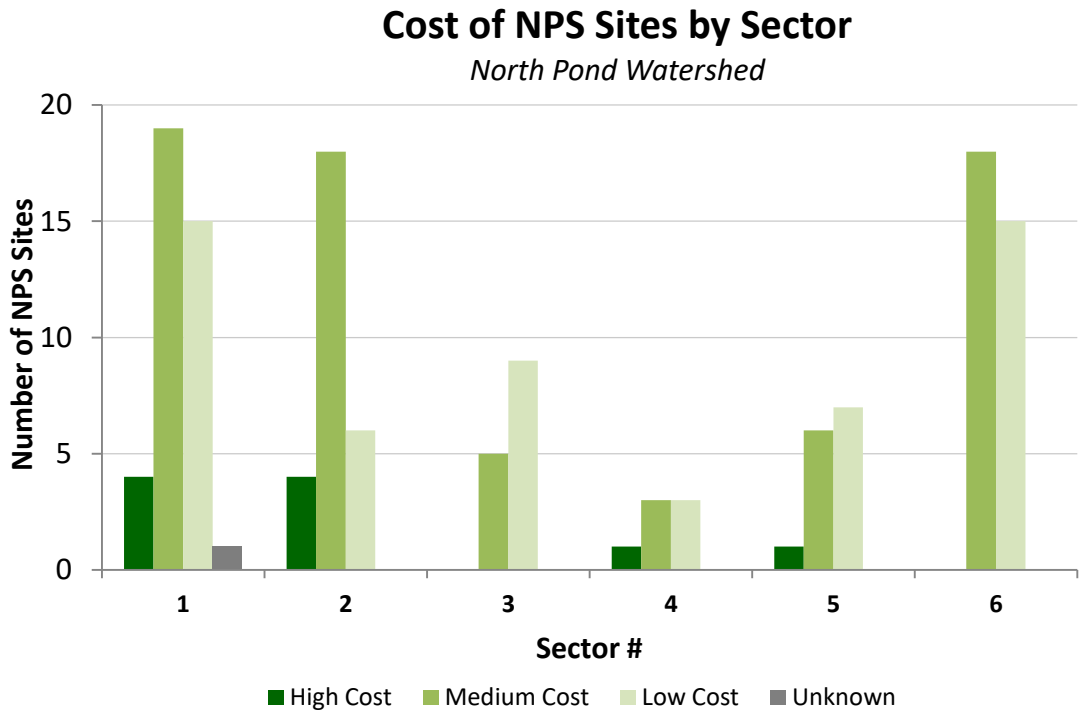
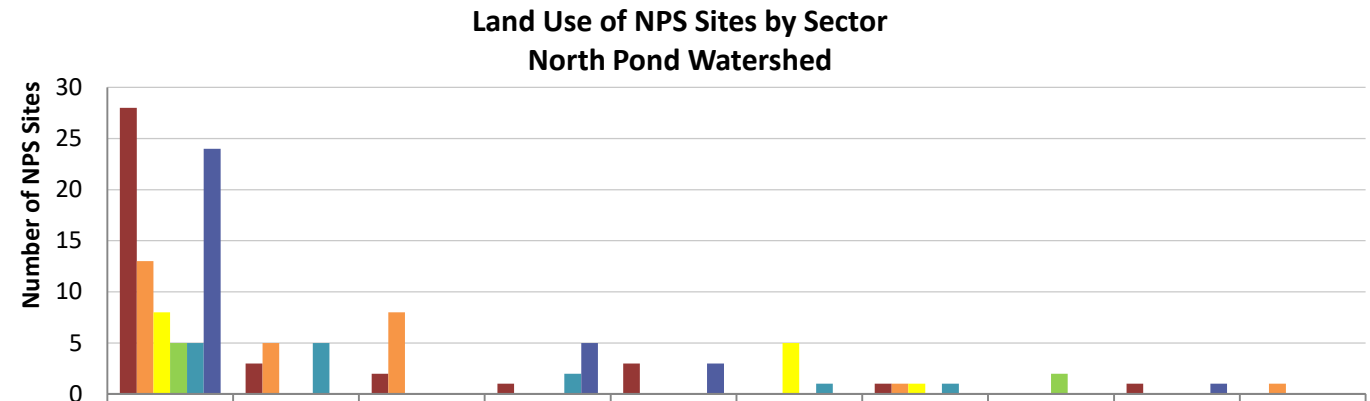


Figure 14. *NPS sites in the North Pond watershed by cost and sector.*



	Residential	Beach Access	State Road	Town Road	Driveway	Commercial	Boat Access	Private Road	Construction	Trail/Path
Sector 1	28	3	2	1	3	0	1	0	1	0
Sector 2	13	5	8	0	0	0	1	0	0	1
Sector 3	8	0	0	0	0	5	1	0	0	0
Sector 4	5	0	0	0	0	0	0	2	0	0
Sector 5	5	5	0	2	0	1	1	0	0	0
Sector 6	24	0	0	5	3	0	0	0	1	0

Figure 15. *NPS sites in the North Pond watershed by land use and sector.*

Fertilizer use in the shoreland zone (Sector 3) can act to "fertilize the lake".

RESIDENTIAL AREAS

Problem: BARE SOIL, SURFACE EROSION, INADEQUATE SHORELINE VEGETATION
Solution: Control runoff from impervious surfaces. Use erosion control mulch in areas with exposed soil, and plant vegetation along the shoreline to stabilize banks and filter runoff. Consider planting vegetation before using rip rap. Or use a combination of both.

Sector 1: Site 35

Erosion Control Mulch & Vegetative Plantings
(Photo: AWWA)

Vegetated buffers filter out pollutants
(Photo: Maine DEP)

Problem: ROOF DRIPLINE EROSION & UNSTABLE BEACH ACCESS
Solution: Install gravel dripline trenches at roof edge or drywell at gutter down spouts. Install infiltration steps on slopes and use erosion control mulch on bare soil areas.

Sector 6: Site 17

Dripline Trench & Erosion Control Mulch
(Photo: AWWA)

Infiltration Steps Protect Steep Slopes w/Foot Traffic

ROADS

Problem: ROAD SHOULDER EROSION & WINTER SAND
Solution: Install erosion controls such as rip rap to protect bare soil and install infiltration drainage swales and plunge pools to help manage stormwater on roadways to capture pollutants prior to discharging to streams and lakes. Clean up winter sand in the spring.

Sector 2: Site 3

Erosion control blankets, coir logs & vegetation to stabilize slopes

Armor for a steep road shoulder

Problem: DITCH EROSION, UNSTABLE OR UNDERSIZED CULVERTS, DITCH, ROAD & DRIVEWAY EROSION
Solution: Line ditches with rock and vegetate for stability; replace failing, plugged, crushed or undersized culverts and stabilize inlets/outlets with rip rap; regrade gravel roads, add new surface material and install ditching where needed, add runoff diverters.

Sector 4: Site 2

Reshape gravel roads, and add new surface material and install runoff diverters

Replace undersized and perched culverts, remove clogs, armor inlet/outlet and install plunge pools

SUMMARY OF FINDINGS & NEXT STEPS

SUMMARY OF SURVEY FINDINGS

The 2016 North Pond watershed survey identified 135 individual nonpoint source (NPS) pollution sites. The survey focused on all developed land that drains to or has the potential to drain to the lake, carrying stormwater and other pollutants of concern. Survey results indicate that a significant portion of NPS sites are located on residential properties, and are associated with access to the shoreline. Other land uses such as state, town and private road sites, driveways, and commercial properties also contribute to the excess phosphorus being delivered to the lake. In addition to shoreline erosion and lack of shoreline buffers on North Pond, several areas of the shoreline contain dense patches of invasive plants including Japanese knotweed (*Fallopia japonica)*, especially in Sector 1, and common reed (*Phragmites australis),* in Sectors 1, 2 and 3. Invasive plants can result in unstable banks due shallow root systems, and unsuitable habitat for native wildlife. With leadership from the North Pond Association's LakeSmart Program and help from the BRCA's Youth Conservation Corps, landowners in the watershed can be better informed about the impact that their property has on the lake, and have access to the right tools to address these sites.

PRIORITIZING NPS SITES

Five members of the watershed planning steering committee met at the Smithfield Grange on December 14, 2016, to begin the process of prioritizing the 135 sites identified during the 2016 watershed survey (Table 2). Further prioritization and specific recommendations for these sites will be included in the 2017 North Pond Watershed Protection Plan (in progress).

Table 2. *Prioritized list of NPS sites in the North Pond watershed.*

Site ID*	Location	Site Notes
Multiple Road Sites Sector 1	North Shore Drive	Multiple sites within the steep, narrow right-of-way between North Shore Dr. and North Pond
Multiple Road Sites Sector 2	All road sites on Lake View Drive	Poorly maintained ditches and culverts on this state road pose a significant threat to the water quality in North Pond
1-36	Mitchell Lane	High impact site- follow-up field work required to track source of water from above
1-39	Hummingbird Lane	Follow-up needed to investigate unknown above-ground cement structure
2-22	Lake View Drive	High impact site- define foot path; stabilize footpath; infiltration steps

Site ID*	Location	Site Notes
5-17	Pine Tree Camp	Multiple sites. Send write-up from site visit to the Board of Directors
3-1, 3-2, 3-3	Sunset Camps, Village Rd.	Stabilize shoreline (rock & vegetation), establish vegetative buffer & install ECM on all bare soil areas
6-1 & Associated Road Area	Section of road between boat launch and Rt. 137 (N. Shore Dr.)	Work with Town of Mercer and the State to address shoulder, ditch and culvert erosion.
n/a	Culvert near Bog Brook	Sink hole found documented by BRCA following the survey
n/a	Road & parking lot runoff from catch basin at the Old Fire Dept.	Investigate sources of runoff to the catch basin and develop solutions to reduce the volume and quality of water flowing into this basin
Multiple	All high and medium impact residential sites	Multiple sites- utilize BRCA YCC to address these sites

** List of sites are not in order of priority.*

NEXT STEPS - WHERE DO WE GO FROM HERE?

Improving the NPS sites identified during the watershed survey will require efforts by state and local municipal officials, NPA and its partners including BRCA, individual landowners, and road associations. Developing a plan for addressing these sites should be a high priority for the NPA and watershed towns. Prioritizing sites in each watershed is a good first step, but a Watershed Protection Plan is needed to ensure that high and medium impact sites are addressed within a reasonable timeframe, and that a plan is developed for the low impact sites. The plan will also help to identify potential funding sources and identify the roles and responsibilities of partners and local stakeholders. Action steps in the North Pond Watershed Protection Plan may include:

1. Presenting the results of the survey to the public, distributing summaries of the survey results to key stakeholders, and posting copies of the survey report on the NPA, BRCA, and town websites;
2. Sending letters to all property owners with a documented NPS site with guidance and recommendations for addressing the problems;
3. Setting up meetings with state and town officials to review survey results and to develop a schedule for addressing high priority sites;
4. Developing a detailed funding and implementation plan and schedule;
5. Submitting a 319 grant in 2017 to address some of the high priority NPS sites and fund YCC for shoreline properties;
6. Identifying potential LakeSmart properties and developing a strategic outreach strategy to address the numerous low-impact shoreline sites.

In addition to the actions identified by the steering committee, there are many things that individual landowners and municipal officials can start doing now to help with this effort.

Individual Landowners

Remember – the long-term health of North Pond depends on you! Help protect and improve the water quality of our lake for future generations!

- If you have a documented NPS site on your property, contact the NPA today for advice about how to get started.
- Become LakeSmart! Join together with your neighbors to certify your property through the Maine Lakes Society's LakeSmart program by establishing best practices on your properties. Call the NPA LakeSmart Coordinator today at (207) 313-2494 to get started!
- Install native vegetation along the shoreline to stabilize the soil, improve wildlife habitat and help keep shoreline areas shaded and cool.
- Stop mowing and raking your shoreline and other parts of your property to bare soil. Let lawn and raked areas revert back to natural vegetation. Deep shrub and tree roots help hold the soil in place and help prevent erosion.
- Avoid exposing bare soil. Seed and mulch bare areas. Use erosion control mulch.
- Manually remove invasive terrestrial plants that are growing on the shoreline. Contact the Kennebec County Soil & Water Conservation District for advice on managing these plants. Never use herbicides or pesticides in the shoreland zone unless you have a permit.
- Avoid using fertilizer within 250 ft. of the lake, and always get a soil test before applying fertilizer outside the shoreland zone to determine the correct application rate.
- Read "Permitting ABCs" (below) and call your local Code Enforcement Officer and Maine DEP before starting any cutting or soil disturbance projects.
- Maintain septic systems properly. Pump septic tanks (every 2 to 3 years for year-round residences; 4-5 years if seasonal) and upgrade marginal systems or old systems (>20 years).
- Support NPA by becoming a member today, and get involved with their programs and activities including annual meetings, LakeSmart, and Are you Buff Enough? workshops.

Municipal Officials

- Conduct regular maintenance on town roads in the watershed, and address the high priority and high impact town sites identified in this survey.
- Enforce shoreland zoning and other ordinances to ensure the long-term protection of North Pond.
- Participate in, and support long-term watershed management projects by serving on watershed committees, serving as a sponsor for grant applications and setting aside funding for long-term water quality monitoring and lake protection projects.
- Promote education and training for road crews, code enforcement officers, selectmen, planning board members and other decision makers.

CONSERVATION PRACTICES FOR HOMEOWNERS

After reading this report or requesting a LakeSmart evaluation, you probably have a general idea about how to make your property more lake-friendly. However, making the leap from concept to construction may be a challenge.

Fact sheets are available to help you install conservation practices on your property. Download at: https://www.pwd.org/publications

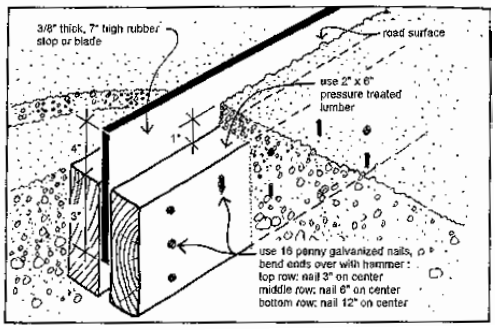
A series of fact sheets are available that answer many common how-to questions about installing Best Management Practices (BMPs). The fact sheets profile 20 common conservation practices and include detailed instructions, diagrams and color photos about installation and maintenance. The series includes the following:

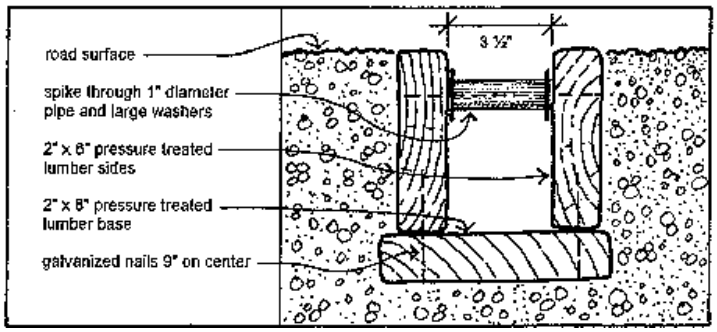
Construction BMPs	Native Plant Lists	Rain Gardens
Dripline Trench	Open-Top Culverts	Rubber Razors
Drywells	Paths and Walkways	Shoreline Riprap
Erosion Control Mix	Permitting	Turnouts
Infiltration Steps	Pervious Pathways	Waterbars
Infiltration Trench	Planting & Maintaining Buffers	Selecting Plants for Shade
Live Staking	Rain Barrels	Selecting Plants for Sun

Each one is tailored to different site conditions (e.g., full sun and dry soils). The lists include plant descriptions from the DEP's *Buffer Handbook* and small color photos of each plant to make plant selection easier.

Below are a few examples of Best Management Practices (BMPs), including how to install a rubber razor and open top culvert; both of which are used for getting water off of gravel roads and driveways. A drywell is useful for collecting runoff from gutters. Similarly, a gravel dripline trench can be used on homes that do not have gutters. These are typically 18 - 24" wide and slightly longer than the roof.

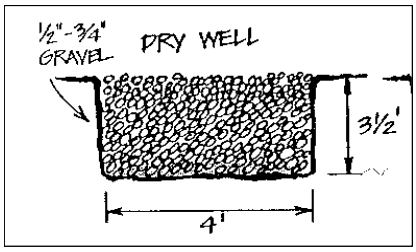
Rubber Razor Blade: Use this structure in a gravel driveway or camp road. It can be plowed over only if the plow operator is aware of its presence and lifts the plow blade slightly. Place it at a 30 degree angle to the road edge and direct the outlet toward a stable vegetated area.





Open Top Culvert: Use this structure in a gravel driveway or camp road that does not get plowed in the winter. Place it at a 30 degree angle to the road edge and point the outlet into stable vegetation. Remove leaves and debris as needed.

Drywell: Use a drywell to collect runoff from roof gutter downspouts. Drywells can be covered with sod, or left exposed for easy access and cleanout. Drywells and infiltration trenches work best in sandy or gravelly soils.



PERMITTING ABC'S

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 waterbodies.

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 the Maine DEP.

Contact the Maine 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 the town to be sure.

HOW TO APPLY FOR A PERMIT BY RULE WITH THE MAINE 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 (shown here) 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, Maine DEP offices, or online at http://www.state.me.us/dep/land/nrpa/pbrform.pdf.
- The permit will be reviewed by 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.
- Follow all standards required for the specific 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.


DEPARTMENT OF ENVIRONMENTAL PROTECTION
PERMIT BY RULE NOTIFICATION FORM
Jane Waters
18 Watershed Ave.
Waterford
ME 04002
(207) 222-2222
Waterford
Big Pond
Head north on Route 26 and take a right on Watershed Ave.
18 Watershed Ave. is 5 houses down on the left.
Installation of a rain garden and infiltration steps to allow infiltration of runoff.
Bare soil will be stabilized with Erosion Control Mulch.

CONTACT INFORMATION

North Pond Association
Doug "Woody" Woodsum, President
(207) 716-1289 or dhw@tds.net
Web: http://www.northpond.net

Linda Rice, LakeSmart Coordinator
(207) 362-1023 (office) or (207)313-2494 (cell)
lindarice74@yahoo.com

Belgrade Regional Conservation Alliance
Charlie Baeder, Executive Director
137 Main St. Belgrade Lakes, ME 04918
(207) 495-6039 or brcacb@belgradelakes.org
Web: https://belgradelakes.org

Nathan Durant, YCC Coordinator
brcacc@belgradelakes.org

Kennebec County Soil & Water Conservation District
Dale Finseth, Executive Director
21 Enterprise Drive Augusta, ME 04
(207) 622-7847 x 3 or dale@kcswcd.org ~ Web: kcswcd.org

Maine Lakes Society ~ LakeSmart Program
Maggie Shannon
137 Main Street, Belgrade Lakes, ME 04918
Phone: (207) 495-2301 ~ Web: http://mainelakessociety.org

Maine Department of Environmental Protection
17 State House Station, Augusta, Maine 04333
Toll Free in Maine (800) 452-1942 **or** (207) 287-7688
Web: http://www.maine.gov/dep/land/watershed/index.html

PUBLICATIONS & OTHER RESOURCES

A Guide to Forming Road Associations. Maine DEP. July 2014. DEPLW-1071. 21 pgs. http://www.maine.gov/dep/land/watershed/road_assoc_guide_2014%207-24-14.pdf

Conservation Practices for Homeowners. Portland Water District and Maine DEP. Conservation Fact Sheet Series. https://www.pwd.org/publications

Contractors Certified in Erosion Control Practices. Maine DEP. http://www.maine.gov/dep/land/training/ccec.html

Environmental Fact Sheets, Brochures, and Posters. Portland Water District. https://www.pwd.org/publications

Gravel Road Maintenance Manual: A Guide for Landowners on Camp and Other Gravel Roads. Kennebec County SWCD and Maine DEP. April 2016. http://www.maine.gov/dep/land/watershed/camp/road/gravel_road_manual.pdf

LakeSmart Tips. Maine Lakes Society. http://mainelakessociety.org/lakesmart-2/lakesmart-tips/

Maine Shoreland Zoning—A Handbook for Shoreland Owners. Maine DEP. 2008. DEPLW0674-D08. 37 pgs. http://www.maine.gov/dep/land/slz/citizenguide.pdf

The Lake Book: A Handbook for Lake Protection. Maine Lakes Society. 61 pgs. http://mainelakessociety.org/resources/the-lake-book/

Town of Mercer, Maine Website. http://www.mercerme.us

Town of Rome, Maine Website. http://www.romemaine.com

Town of Smithfield, Maine Website (code enforcement). http://www.smithfieldmaine.us/departmentsservices/code-enforcement

ATTACHMENTS

ATTACHMENT 1: WATERSHED SURVEY FIELD DATA SHEET

Final Site #_____ Checked by _____ Date _____

North Pond Watershed Survey

Smithfield, Mercer & Rome, Maine

REMINDER: Only write up if there is likely transport of sediment or phosphorus into the lake.

Sector & Site _____ Date_____ Surveyor Initials _____

Location *(house #, road, utility pole #)* _____

Building Color _____ Landowner Name _____

Tax Map & Lot _____ Talked to Landowner? _____

Flow into Lake via (check ONE): ❒ Directly into Lake ❒ Stream ❒ Ditch ❒ Minimal Vegetation

Note: If flow does not make it into lake, do not fill out a form. It would not be considered a site.

GPS Coordinates in **UTM**

(no degrees or decimal points)

0						

Land Use/Activity (Circle ONE)	**Description of Problems** Circle ALL that apply	
State Road*	**Surface Erosion**	**Soil**
Town Road*	Slight	Bare
Private Road*	Moderate	Uncovered Pile
Driveway*	Severe	Delta in Stream/Lake
Residential	**Culvert**	Winter Sand
Commercial	Unstable Inlet / Outlet	**Roof Runoff Erosion**
Municipal / Public	Clogged	**Shoreline**
Beach Access	Crushed / Broken	Undercut
Boat Access*	Undersized	Lack of Shoreline Vegetation
Trail or Path	**Ditch**	Inadequate Shoreline Vegetation
Logging	Slight Erosion	Erosion
Agriculture	Moderate Erosion	Unstable Access
Construction Site	Severe Erosion	**Agriculture**
OTHER:	Bank Failure	Livestock Access to Waterbody
Potential Septic Issue	Undersized	Tilled Eroding Fields
Fertilizer Use in SLZ	**Road Shoulder Erosion**	Manure Washing off Site
Hazardous Materials	Slight	**OTHER:**
* *Is it: paved, gravel or other/unknown?*	Moderate	
	Severe	
	Roadside Plow/Grader Berm	

Slope: ❒ Flat ❒ Moderate ❒ Steep **Size of Area Exposed or Eroded** (length & width): _____

Site is linked to another: Cause of Site # _____ Result of Site # _____

Recommendations		
Culvert	**Roads / Driveways**	**Paths & Trails**
Armor Inlet/Outlet	Remove Grader/Plow Berms	Define Foot Path
Remove Clog	Build Up	Stabilize Foot Path
Replace	Add New Surface Material	Infiltration Steps
Enlarge	• Gravel	Install Runoff Diverter (waterbar)
Lengthen	• Recycled Asphalt	**Roof Runoff**
Install Culvert	• Pave	Infiltration Trench @ roof dripline
Install Plunge Pool	Reshape (Crown)	Drywell @ gutter downspout
Ditch	Vegetate Shoulder	Rain Barrel
Vegetate	Install Catch Basin	**Other**
Armor with Stone	Install Detention Basin	Install Runoff Diverter (waterbar)
Reshape Ditch	Install Runoff Diverters	Mulch / Erosion Control Mix
Install Turnouts	• Broad-based Dip	Rain Garden
Install Ditch	• Open Top Culvert	Infiltration Trench
Install Check Dams	• Rubber Razor	Water Retention Swales
Remove debris/sediment	• Waterbar	**Vegetation**
Install Sediment Pools	**Construction Site**	Establish Buffer
Other Suggestions:	Mulch	Add to Buffer
	Silt Fence / EC Berms	No Raking
	Seed / Hay	Reseed bare soil & thinning grass
	Check Dams	

Impact: Circle one choice in each column, add the three selected numbers together, and then circle the site's corresponding impact rating (high, medium, or low).

Type of Erosion	Area	Buffers and Other Filters
Gully - **3**	Large - **3**	No filter, all channelized direct flow into lake or stream - **3**
Rill - **2**	Medium - **2**	Some buffer or filtering, but visible signs of concentrated flow and/or sediment movement through buffer and into lake - **2**
Sheet - **1**	Small - **1**	Significant buffer or filtering* - **1**

IMPACT

High: 8-9 pts

Med: 6-7 pts

Low: 3-5 pts

** Confirm there is likely sediment/runoff delivery. If not, do not write up as a site.*

Cost to Fix

High:	Greater than $2,500
Medium:	$500-$2,500
Low:	Less than $500

Technical Level to Install

High:	Site requires engineered design
Medium:	Technical person should visit site & make recommendations
Low:	Property owner can accomplish with reference materials

Certified LakeSmart Property? ❒ Yes ❒ No **Interested in LakeSmart?** ❒ Yes ❒ No ❒ Potential

Attachment 2. List of North Pond NPS Sites

Site	Location	Flow into lake via	Land Use	Problems	Slope	Size of Exposed/ Eroded Area	Recommendations	Impact	Cost	Technical level
1-01	16 Bog Brook Lane	Directly into lake	Residential	Shoreline - undercut (ice erosion), lack of shoreline vegetation, shoreline erosion	Flat (lot), Steep (bank)	30' x 5'	Stabilize eroding at shoreline; establish vegetation buffer; add vegetation to buffer	Medium	Low	Medium
1-02	12 Bog Brook Lane	Directly into lake	Residential	Shoreline - undercut (ice erosion), lack of shoreline vegetation, shoreline erosion	Flat	30' x 5'	Establish vegetation buffer; stabilize shoreline (ice damage?); sand pile uncovered - not draining into lake	Medium	Low	Low
1-03	8 Bog Brook Lane	Directly into lake	Residential	Slight surface erosion (sheet); bare soil; roof runoff erosion (dripline); inadequate shoreline vegetation (knot weed)	Flat	30 x 20	Remove knot week (manual) reveg.; add vegetation to buffer; mulch/erosion control mix; infiltration trench @ roof dripline	Low	Low	Low
1-04	160 North Shore Drive	Directly into lake	Construction site (residential)	Slight surface erosion; bare soil; lack of shoreline vegetation; new septic	Flat	10 x 10	Mulch / erosion control mix; establish vegetation buffer; no raking; reseed bare soil and thinning grass	Medium	Medium	Medium
1-05	158 North Shore Drive	Directly into lake	Residential	Paved area runoff	Flat	30 x 7	Install open top culvert/speed bump runoff diverters; install runoff diverter (water bar); rain garden	Low	Low	Medium
1-06	146 North Shore Drive	Directly into lake	Residential	Bare soil; inadequate shoreline vegetation; shoreline erosion; unstable shoreline access	Flat	20 x 10	Get soil test for fertilizer use; infiltration steps; mulch / erosion control mix; add vegetation to buffer; no raking	Low	Medium	Medium
1-07	142 North Shore Drive	Minimal vegetation	Residential	Bare soil; roof runoff erosion; shoreline undercut; barberry	Flat	20 x 10'	Infiltration trench @ roof dripline; mulch / erosion control mix - or - reseed bare soil and thinning grass; stabilize undercut bank	Low	Low	Low
1-08	138 North Shore Drive	Directly into lake	Residential	Bare soil; shoreline undercut; inadequate shoreline vegetation; unstable shoreline access	Flat	40 x 5	Mulch / erosion control mix - or - reseed bare soil and thinning grass; establish vegetation buffer; stabilize shore - plant into rip rap conservation bank	High	Medium	Medium

Attachment 2. List of North Pond NPS Sites

Site	Location	Flow into lake via	Land Use	Problems	Slope	Size of Exposed/ Eroded Area	Recommendations	Impact	Cost	Technical level
1-09	136 North Shore Drive	Directly into lake	Residential	Slight surface erosion; lack of shoreline vegetation; shoreline erosion; unstable shoreline access	Flat	20 x 20	Mulch / erosion control mix; establish vegetation buffer; define and establish barrier between beach and seating area / picnic table	Low	Low	Low
1-10	134 North Shore Drive	Directly into lake	Residential	Lack of shoreline vegetation; shoreline erosion; unstable shoreline access	Flat	50 x 10	Define beach area; establish vegetation buffer	Medium	Low	Low
1-11	133 North Shore Drive	Directly into lake; minimal vegetation	Residential	Bare soil; inadequate shoreline vegetation; cover bare sod near access; beef up rocks at fire pit	Flat	10 x 5	Reseed bare soil and thinning grass (near fire pit)	Low	Low	Low
1-12	128 North Shore Drive	Minimal vegetation	Residential	Bare soil; unstable shoreline access	Flat	10 x 15	Mulch / erosion control mix; reseed bare soil and thinning grass	Low	Low	Low
1-13	122 North Shore Drive	Minimal vegetation	Residential	Inadequate shoreline vegetation; shoreline erosion; unstable shoreline access; knotweed at shoreline	Flat	30 x 5	Establish vegetation buffer; bank stabilization; rock / plant	Medium	Low	Medium
1-14	122 North Shore Drive	Minimal vegetation	Driveway	Moderate surface erosion	Moderate	75 x 20	Add new surface material (gravel); install open top culvert diverters; drywell with runoff diverter	Medium	Medium	Medium
1-15	110 North Shore Drive	Directly into lake	Residential	Bare soil; shoreline undercut; inadequate shoreline vegetation; shoreline erosion; unstable shoreline access; knotweed	Moderate	20 x 15	Add vegetation to buffer; reseed bare soil and thinning grass; stabilize bank - rock / vegetation	Medium	Medium	Medium
1-16	101 North Shore Drive (right of way)	Directly into lake	Beach access (R.O.W.)	Moderate surface erosion; bare soil; shoreline undercut; shoreline erosion; unstable shoreline access	Steep	50 x 30	Add vegetation to buffer; reseed bare soil and thinning grass (ground cover / sheets); retaining wall erosion control; blanket under stairs	Medium	High	High

Attachment 2. List of North Pond NPS Sites

Site	Location	Flow into lake via	Land Use	Problems	Slope	Size of Exposed/ Eroded Area	Recommendations	Impact	Cost	Technical level
1-17	93 North Shore Drive (?)	Directly into lake	Beach access	Shoreline erosion; unstable stairway access; attempts made to stabilize steep slope, needs maintenance of extending erosion control	Steep	75 x 30	Maintenance of steep slope; EC blanket; increase existing vegetation	Low	Medium	High
1-18	87 North Shore Drive	Directly into lake	Beach access	Moderate surface erosion; moderate road shoulder erosion; bare soil; winter sand; unstable stairway access; knotweed	Steep	30 x 25	EC blanket on steep slope with built in sed. coir logs at intervals terraced	Medium	Medium	Medium
1-19	72 North Shore Drive	Minimal vegetation	Residential	Slight surface erosion; bare soil; inadequate shoreline vegetation; shoreline erosion; potential for eroding bank to wash	Steep	25 x 5	Mulch / erosion control mix; retaining wall; stabilize steep bank area to right of camp and directly behind camp	Medium	Medium	Medium
1-20	64 (60?) North Shore Drive	Directly into lake	Residential	Shoreline undercut; inadequate shoreline vegetation; shoreline erosion; knotweed	Moderate	40 x 5	Stabilize shore with rock and veg.; knotweed removal; add vegetation to buffer	Medium	Low	Medium
1-21	4 & 6 Witham Lane (4 N. Shore Dr)	Directly into lake	Residential	Bare soil; lack of shoreline vegetation; natural gully with sediment going into lake	Moderate	Gully 150' / 50 x 20	Mulch / erosion control mix (common areas); add vegetation to buffer; no raking; reseed bare soil and thinning grass; gully - monitor for h2o flow, leave free of yard waste (leaves)	Low	Low	Medium
1-22	11 Witham Lane	Directly into lake	Residential	Slight surface erosion; bare soil; shoreline erosion; unstable shoreline access	Flat	10 x 5	Mulch / erosion control mix; add vegetation to buffer	Low	Low	Low
1-23	Leech Brook - Gully - Lake View Drive	Stream	State Road	Unstable culvert outlet; clogged culvert; crushed/broken culvert; bare soil; slight road shoulder erosion	Steep	5' x 100'	Armor inlet/outlet culvert; remove clog; possible plunge pool; rip-rap gully	High	Medium	Medium

Attachment 2. List of North Pond NPS Sites

Site	Location	Flow into lake via	Land Use	Problems	Slope	Size of Exposed/ Eroded Area	Recommendations	Impact	Cost	Technical level
1-24	Intersection of Wilder Hill Rd and on Sand Hill	Stream	Town Road	Moderate surface erosion; unstable culvert outlet; undersized culvert (?); moderate road shoulder erosion	Moderate	20' x 20'	Armor outlet (culvert); enlarge culvert (?); install plunge pool; install turnouts; remove grader / plow berms	Medium	Medium	Medium
1-25	271A Lake View Drive	Stream	State Road (paved)	Moderate surface erosion; Moderate road shoulder erosion (culvert); bare soil	Moderate	25 x 15'	Vegetate ditch (rip rap); stabilize road shoulder; mulch / erosion control mix; add vegetation to buffer	Medium	Medium	Medium
1-26	23 Yvonne Lane	Directly into lake	Boat Access (Residential)	Slight surface erosion; bare soil; roof runoff erosion; inadequate shoreline vegetation; shoreline erosion	Steep	30' x 15	Add runoff diverter to boat access; add new surface material (gravel); reshape (crown); install rubber razor runoff diverters (install, repair and replace existing rubber); infiltration steps; infiltration trench @ roof dripline; erosion control mix (walkway boat access); add vegetation to buffer; no raking	Low	Medium	Medium
1-27	23 Yvonne Lane	Minimal vegetation	Residential	Slight surface erosion; bare soil; roof runoff erosion; pet waste	Moderate	20 x 10'	Pick-up pet waste; infiltration steps; infiltration trench @ roof dripline (wide part); mulch / erosion control mix	Low	Low	Low
1-28	14 Yvonne Lane	Directly into lake	Residential	Lack of shoreline vegetation; sink hole at retaining wall	Moderate	30 x 5"	Repair retaining wall; establish vegetation buffer	Medium	High	High
1-29	13 Yvonne Lane	Directly into lake	Residential	Bare soil; fertilizer use?	Steep	20 x 20	Terrace hill between grass site and trees - add plants; add infiltration steps; establish vegetation buffer; use P free fertilizer & get soil test	Medium	Medium	Medium
1-30	9 Mitchell Lane	Directly into lake	Residential	Moderate surface erosion; bare soil; roof runoff erosion	Moderate		Infiltration steps; infiltration trench @ roof dripline; establish vegetation buffer (let grow in natural)	Medium	Medium	Medium

Attachment 2. List of North Pond NPS Sites

Site	Location	Flow into lake via	Land Use	Problems	Slope	Size of Exposed/ Eroded Area	Recommendations	Impact	Cost	Technical level
1-31	13 Yvonne Lane	Minimal vegetation	Driveway (paved)	Large volume of water toward lake from paved driveway	Moderate	70' x 15'	Install open top culvert x 2 runoff diverters	Low	Medium	Medium
1-32	11 Mitchell Lane (?)	Directly into lake	Residential	Slight surface erosion; bare soil; lack of shoreline vegetation; shoreline erosion; erosion under stairs to water	Steep	50 x 20'	Infiltration trench @ roof dripline; erosion control mix (under stairs); establish vegetation buffer + mulch	Medium	Medium	Medium
1-33	11 Mitchell Lane	Directly into lake	Residential	Moderate surface erosion; bare soil; inadequate shoreline vegetation; shoreline erosion; failing retaining wall (sand beach)	Steep	30 x 15'	Drywell @ gutter downspout (fix); establish vegetation buffer; add vegetation to buffer; repair retaining wall and plant	Medium	High	Medium (will need permit)
1-34	15 Mitchell Lane	Directly into lake	Residential	Moderate surface erosion; bare soil; roof runoff erosion; lack of shoreline vegetation; shoreline erosion; gully land	Steep	30 x 20'	Armor ditch with stone; infiltration trench @ roof dripline; drywell @ gutter downspout; erosion control mix; establish vegetation buffer on steep slope; reseed bare soil and thinning grass or terrace	High	Medium	Medium
1-35	19 Mitchell Lane	Directly into lake	Residential	Moderate surface erosion; bare soil; roof runoff erosion; inadequate shoreline vegetation; shoreline erosion; unknown white pipe for shorefront			Infiltration steps; infiltration trench @ roof dripline; drywell @ gutter downspout; erosion control mix; establish vegetation buffer	Low	Low	Medium
1-36	19 Mitchell Lane	Directly into lake	Residential - Fertilizer	Runoff - severe erosion - eroded ditch from underground source; fertilizer use in SLZ	Steep	1 x 100'	Install plunge pool (move); armor ditch with stone; shape ditch; establish vegetation buffer to right side; stop fertilizer use; track down source of water	High	High	High

Attachment 2. List of North Pond NPS Sites

Site	Location	Flow into lake via	Land Use	Problems	Slope	Size of Exposed/ Eroded Area	Recommendations	Impact	Cost	Technical level
1-37	21 Hummingbird Lane	Directly into lake	Residential	Slight surface erosion; bare soil; shoreline undercut (bank - retaining wall); inadequate shoreline vegetation; shoreline erosion	Steep	50' x 20 + 20 undercut bank	Infiltration steps - replace existing; erosion control mix; establish vegetation buffer; add vegetation to buffer	Low	Medium	Medium
1-38	Hummingbird Lane (see 1-37) - parking at edge of stream	Stream - minimal vegetation	Driveway (parking) - (gravel)	Slight surface erosion; bare soil	Steep	30 x 30 - includes parking and bank to stream	Build-up road/driveway(retaining - define driveway + parking); add new surface material (gravel); vegetate shoulder; mulch / erosion control mix	Low	Medium	Medium
1-39 (1-40)	32 Hummingbird Lane	Stream/ Minimal vegetation?	Residential - potential septic issue	Within 50 of stream - leech brook	Moderate		Saw algae in stream - inadequate holding tank / no access / septic?	Unknown	Unknown	Unknown
2-01	170 Lake View Drive/Rt 137 Smithfield	Directly into lake	Residential	Slight surface erosion; bare soil (very sandy soil; shade)	Moderate	35' x 15'	Paths & Trails - to granite steps: infiltration steps; mulch / erosion control mix; rain garden; add vegetation to buffer; no raking	Low	Medium (Low)	Low
2-02	170 Lake View /Rt 137	Directly into lake	State Road	Unstable culvert outlet; clogged (every year on uphill side); winter sand	Moderate	4' x 3'	Armor culvert outlet; install plunge pool	Medium	Medium	Medium
2-03	170 Lake View /Rt 137	Directly into lake	State Road	Severe surface erosion; severe road shoulder erosion; bare soil; winter sand; undercut shoreline; lack of shoreline vegetation; inadequate shoreline vegetation; shoreline erosion; unstable shoreline access	Steep!!	105' x 10'	Shoreline boulders 10' deep 6' high - rip rap; vegetate shoulder; add berm @ roadside	High!	High	High
2-04	192 Lake View Drive/Rt 137 Smithfield	Directly into lake	Residential	Severe surface erosion; bare soil; winter sand; shoreline undercut; lack of shoreline vegetation; shoreline erosion	Very Steep	20' x 15' (A); 50' x 20' (B)	Vegetate shoulder; boulder-size rip rap 10-15'horiz / 6+ ft vertical; mulch / erosion control mix; rain garden?; infiltration trench; establish vegetation to buffer; no raking; add berm / terrace	High	High	High

Attachment 2. List of North Pond NPS Sites

Site	Location	Flow into lake via	Land Use	Problems	Slope	Size of Exposed/ Eroded Area	Recommendations	Impact	Cost	Technical level
2-05	194 Lake View Dr	Directly into lake	Residential	Slight surface erosion; bare soil; shoreline erosion; unstable shoreline access	Moderate	Buffer + Berm 50' x 5'; 20' infiltration steps	Infiltration steps; mulch / erosion control mix; add vegetation to buffer; no raking; add/build up berm	Low	Medium	Medium (Low?)
2-06	198 Lake View Dr	Directly into lake	Residential	Slight surface erosion; bare soil; lack of shoreline vegetation; shoreline erosion	Moderate	10' x 5'	Mulch / erosion control mix; establish vegetation buffer; add boulders + crushed stone to stabilize slope; contact Andy Marble for permit-by-rule	Low	Low	Low
2-07	210 Lake View Dr	Directly into lake	Residential	Moderate surface erosion; shoreline undercut; lack of shoreline vegetation; shoreline erosion; 2 gully's	Steep	15' x 10'	Drywell @ gutter downspout; stabilize shore; add vegetation to buffer; no raking; boulders along shore (? berm above boulders)	Medium	Medium	Medium
2-08	220 Lake View Dr	Directly into lake	Residential	Shoreline undercut; lack of shoreline vegetation; shoreline erosion	Steep	30' x 20' (bare soil above deck); 30' x 10	Mulch / erosion control mix; establish vegetation buffer; no raking; berms / terrace boulders at shore vegetation	High	Medium	Medium
2-09	CMP telephone pole #400 (34)	Directly into lake	State Road	Severe road shoulder erosion; culvert outlet needs to be stabilized	Moderate	15' L x 1' W x 1' D (3 times)	Armor culvert inlet/outlet; install plunge pool; vegetate shoulder; does require culvert outlet rip rap; may require shoulder rip rap	Medium	Medium	Low - Medium?
2-10	Opposite of 225 Lake View Drive (ROW to lake)	Directly into lake	Beach access (ROW to dock)	Moderate surface erosion; bare soil	Moderate	20' x 4'	Stabilize foot path; infiltration steps; no raking	Low	Medium	Medium
2-11	CMP telephone pole #41 STC 35	Directly into lake	State Road	Unstable culvert inlet; severe road shoulder erosion; SAFETY ISSUE: broken pavement	Flat	2' W x 3' Deep	Armor culvert inlet; install plunge pool; repair asphalt; stabilize shoulder with rip rap	Medium	Medium	High

Attachment 2. List of North Pond NPS Sites

Site	Location	Flow into lake via	Land Use	Problems	Slope	Size of Exposed/ Eroded Area	Recommendations	Impact	Cost	Technical level
2-12	238 Lake View Dr (South border of Leech Brook)	Stream (Leech Brook)	Residential	Inadequate shoreline vegetation and shoreline erosion of Leech Brook (stream); 6x6 timbers/rebar are failing on both sides and falling into stream	Flat	100' L x 3' per bank	Tear out timbers and stabilize both sides of stream shores with rip rap; add vegetation to buffer; no raking	Medium	Medium	Medium
2-13	185 Lake View Dr	Ditch	State Road	Clogged culvert; crushed/broken culvert; undersized culvert; moderate ditch erosion; moderate road shoulder erosion; *winter sand!; annually floods road and culvert under driveway (both ends); clogs and washes out driveway every year; **SAFETY HAZARD** blocked culvert has caused erosion of pavement	Flat		Remove culvert clog; remove debris / sediment from ditch; regular maintenance PLEASE	Medium	Medium	Medium
2-14	160 Lake View Dr	Directly into lake / stream	Residential	Moderate surface erosion; bare soil; delta in lake; inadequate shoreline vegetation; shoreline erosion	Flat	60' x 10'	Add vegetation to buffer; rip rap ice berm and stream outlet	Low	Medium	Medium
2-15	160 Lake View Dr	Directly into stream / minimal vegetation	Residential (beach access)	Slight surface erosion; bare soil; inadequate shoreline vegetation; shoreline erosion	Flat	100' x 12'	Establish vegetation buffer; no raking	Low	Low	Medium
2-16	144 Lake View Dr	Directly into stream / minimal vegetation	Beach access (Residential)	Slight surface erosion; bare soil; lack of shoreline vegetation	Moderate	30' x 5'	Continue rip-rap; establish vegetation buffer; no raking	Low	Low	Medium

Attachment 2. List of North Pond NPS Sites

Site	Location	Flow into lake via	Land Use	Problems	Slope	Size of Exposed/ Eroded Area	Recommendations	Impact	Cost	Technical level
2-17	Pole #27 / TDS 8000 / Attach 21 (inlet side) and Pole #271 (outlet side)	Directly into lake	State Road	Unstable inlet/outlet culvert; winter sand; moderate road shoulder erosion	Moderate		Armor inlet/outlet culvert; install plunge pool	Medium	Medium	Medium
2-18	144 Lake View Dr	Directly into lake	Residential	Severe surface erosion; bare soil	Steep	50' x 10'	Boulder size rip rap on shore & vegetate	Medium	High	High
2-19	130 Lake View Dr	Directly into lake	Residential	Slight surface erosion; bare soil; inadequate shoreline vegetation; shoreline erosion	Steep	30' x 20'	Mulch / erosion control mix; add vegetation to buffer; no raking - or join rip rap from both neighbors	Low	Low	Low
2-20	114 Lake View Dr	Directly into lake	Residential	Moderate surface erosion; bare soil; shoreline erosion	Steep	40' x 5 and 30' x 5'	Extend rip rap up bank (above existing rocks) & vegetate	High	Medium	Medium
2-21	Pole #15	Directly into lake	State Road	Unstable culvert outlet; shoreline undercut; shoreline erosion	Moderate		Armor outlet culvert (to lakeshore); rocks and vegetation at shore end of culvert stream	Medium	Medium	High
2-22	Pole #13 opposite eroded trail	Directly into lake	Beach access / trail or path	Severe surface erosion; bare soil; shoreline erosion; unstable shoreline access	Steep	30' x 3'	Define foot path; stabilize foot path; infiltration steps	High	Medium	Medium
2-23	Pole #13 eroded ice berm at trail outlet - both sides	Directly into lake	Beach access	Severe surface erosion; bar soil; sandy beach; shoreline undercut; shoreline erosion; unstable shoreline access; note invasive tall feathered grass @ N end of site (Phragmites?)	Steep	260' total plus 200' beyond	500' rip rap	High	High	Medium
2-24	Pole #115 Lake View Dr	Directly into lake	Beach access / trail or path	Severe surface erosion; bare soil; **foul odor** - septic?; more invasive grass at shore	Moderate	80' x 8'	Define foot path; stabilize foot path; add vegetation to buffer	Medium	Medium	Medium

Attachment 2. List of North Pond NPS Sites

Site	Location	Flow into lake via	Land Use	Problems	Slope	Size of Exposed/ Eroded Area	Recommendations	Impact	Cost	Technical level
2-25	56 Lake View Dr	Directly into lake	Trail or path	Moderate surface erosion; bare soil	Moderate	30' x 3'	Stabilize foot path; infiltration steps	Medium	Low	Low
2-26	Pole #6	Directly into lake	State Road	Clogged plunge pool at culvert inlet	Moderate	6' x 6'	Remove clog from culvert	Low	Low	Low
2-27	11 Helen Lane Smithfield	Directly into lake	Boat access (sand) (Beach access (gravel)/ Residential)	Bare soil; shoreline erosion; unstable shoreline access; tire tread marks entering lake	Moderate	10' x 8'	Add new gravel; establish vegetation buffer; no raking	Medium	Medium	Medium
2-28	Mike's Lane / Serpentine outlet	Directly into lake / stream	Residential	Severe surface erosion; bare soil; shoreline undercut; shoreline erosion	Steep	10' x 2'	Rip rap	Low	Medium	Medium
3-01	Sunset Camps - 834 Village Rd	Directly into lake	Commercial (Beach Access)	Slight surface erosion; bare soil	Flat	25 x 40	Mulch / erosion control mix; establish vegetation buffer	Medium	Low	Low
3-02	Sunset Camps - 834 Village Rd	Directly into lake	Commercial (Beach Access)	Moderate surface erosion; unstable shoreline not protected by buffer	Moderate	10 x 30	Stabilize shoreline; establish vegetation buffer	Medium	Low	Low
3-03	Sunset Camps - 834 Village Rd	Directly into lake; stream	Commercial	Undercut shoreline; lack of shoreline vegetation; shoreline erosion	Moderate	100 x 3 ft	Stabilize shoreline - rip rap; establish vegetation buffer	Medium	Medium	Medium
3-04	828 Village Road / 830 Village Road	Directly into lake	Commercial (& Residential)	Inadequate shoreline vegetation; shoreline erosion	Moderate	80' x 10'	Stabilize shoreline - rip rap; establish vegetation buffer	High	Medium	Medium
3-05	828 Village Road / 830 Village Road	Directly into lake	Commercial (& Residential)	Severe surface erosion; roof runoff erosion	Steep	100 x 3	Infiltration trench @ roof dripline	Medium	Medium	Medium
3-06	14 Knotty Pine Lane	Directly into lake	Residential	Slight surface erosion; bare soil; bare roots!	Flat	75' x 50	Mulch / erosion control mix; establish vegetation buffer; reseed bare soil and thinning grass	Medium	Low	Low

Attachment 2. List of North Pond NPS Sites

Site	Location	Flow into lake via	Land Use	Problems	Slope	Size of Exposed/ Eroded Area	Recommendations	Impact	Cost	Technical level
3-07	14 Knotty Pine Lane	Directly into lake	Residential	Moderate surface erosion; undercut shoreline; inadequate shoreline vegetation; shoreline erosion	Steep	20 x 50	Rip rap at toe; mulch / erosion control mix; add vegetation to buffer	Medium	Medium	Medium
3-08	824 Village Road	Minimal vegetation	Residential	Slight surface erosion; bare soil	Flat	75 x 50	Mulch / erosion control mix; add vegetation to buffer; reseed bare soil and thinning grass	Medium	Low	Low
3-09	72 Fairview Lane	Directly into lake; minimal vegetation	Residential	Bare soil; inadequate shoreline vegetation; shoreline erosion	Steep	20 x 25	Stop cutting sapling and vegetation; infiltration trench @ roof dripline (going to lake); mulch / erosion control mix; add vegetation to buffer	Medium	Low	Low
3-10	66 Fairview Lane	Directly into lake	Residential	Moderate surface erosion; bare soil; roof runoff erosion; inadequate shoreline vegetation; shoreline erosion; roof runoff toward lake	Steep	20 x 20	Infiltration trench @ roof dripline; drywell @ gutter downspout; mulch / erosion control mix; rain garden; infiltration trench; add vegetation to buffer	Medium	Low (to Medium depending on options)	Medium
3-11	Fairview Lane (no street #)	Directly into lake	Boat Access (Residential)	Moderate surface erosion (shoulder of bony edge); bare soil	Moderate	2 sides TOTAL: 12 x 30	Vegetate boat launch; armor launch with stone (razor or water bar); install runoff diverter (water bar); mulch / erosion control mix (rip rap sides)	Medium	Medium	Medium

Attachment 2. List of North Pond NPS Sites

Site	Location	Flow into lake via	Land Use	Problems	Slope	Size of Exposed/ Eroded Area	Recommendations	Impact	Cost	Technical level
3-12	14 Fitzgerald Lane	Directly into lake	Residential	Slight surface erosion; shoreline erosion; shoreline side of berm is eroded	Steep	5 x 10'	Establish vegetation buffer	Low	Low	Low
3-13	6 Fitzgerald Lane	Directly into lake	Residential	Slight surface erosion; bare soil; dog droppings; path to dock is steeper and more eroded	Moderate	50 x 30'	Establish vegetation buffer; no raking; reseed bare soil and thinning grass	Medium	Low	Low
3-14	4 Fitzgerald Lane	Directly into lake	Residential	Slight surface erosion; bare soil; north side of house and in front	Flat	15 x 15'	Mulch / erosion control mix; no raking; reseed bare soil and thinning grass	Low	Low	Low
4-01	(gravel road) Wesauking Lane - near telephone pole #4	no connectivity to lake	Private road	Moderate ditch erosion; roof runoff erosion; outlet to wooded area but large catchment connectivity? No connectivity to lake	Moderate	800' x 40'	Armor ditch with stone and reshape ditch (upper part where steep); Add new surface material (gravel); reshape (crown) - ditch turnouts	Medium	Medium	Medium
4-02	Cross Road culvert	Directly into lake	Private road	Unstable inlet / outlet culvert - 48" in size - protection rocks have fallen into streambed; NRPA stream	Flat	15' on each side	Armor inlet / outlet - NRPA Stream	Medium - this is a small medium	Low	Low

Attachment 2. List of North Pond NPS Sites

Site	Location	Flow into lake via	Land Use	Problems	Slope	Size of Exposed/ Eroded Area	Recommendations	Impact	Cost	Technical level
4-03	16 Cross Road	Directly into lake	Residential	Slight surface erosion (50 x 18 surface - BUT severe bank erosion - bank is 15 ' tall 50 ' long); bare soil; steep bank; shoreline erosion	Flat / steep	50' x 18' bare soil	Infiltration trench at roof dripline; drywell @ gutter downspout; rain barrel; mulch / erosion control mix; reseed bare soil and thinning grass	Medium	Medium	Medium - bank erosion
4-04	14 Cross Road?	Directly into lake	Residential	Slight surface erosion (sheet erosion); bare soil (40'x20and 30'x25')	Flat / steep	40' x 20' on one side and 30' x 25' on the other; 4" have been washed off	Infiltration trench at roof dripline (2 sides); mulch / erosion control mix (on 2 sides); reseed bare soil and thinning grass	Medium	Low +	Low
4-05	12 Cross Road	Directly into lake	Residential	Slight surface erosion; bare soil	Flat / steep	60' x 50 (bare soil)	Infiltration trench at roof dripline; mulch / erosion control mix; reseed bare soil and thinning grass	High	Medium	Medium
4-06	Cross Road - 80' North of Junction with Meadow Road	Directly into lake	Private road	Unstable inlet / outlet culvert (perched); 12-20' above stream bed	Flat	N/A	Armor inlet / outlet culvert; replace culvert?	Medium	High	Medium
4-07	CMP #3-1 #119 Meadow Lane	Directly into lake	Residential	Slight surface erosion; bare soil; roof runoff erosion (backside); shoreline undercut (cut in ice berm for boat access); shoreline erosion	Moderate	20' x 50'	Infiltration trench at roof dripline (backside); mulch / erosion control mix; reseed bare soil and thinning grass	Medium	Low	Low
5-01	501 McNutty Rd	Stream	Town Road	Moderate surface erosion	Moderate	25 x 3	Build up road; add new surface material (gravel)	Medium	Medium	Medium

Attachment 2. List of North Pond NPS Sites

Site	Location	Flow into lake via	Land Use	Problems	Slope	Size of Exposed/ Eroded Area	Recommendations	Impact	Cost	Technical level
5-02	McNutty Rd	Directly into lake	Residential	Severe surface erosion; shoreline erosion; unstable shoreline access	Flat	60 x 4'	Establish vegetation buffer; rip rap	Medium	Medium	Medium
5-05	36 Hummingbird Ridge	Directly into lake	Beach access	Lack of shoreline vegetation; unstable access	Flat	50 x 20'	Stabilize foot path; rain garden; establish vegetation buffer	Low	Low	Low
5-06	36 Hummingbird Ridge	Directly into lake	Boat access	Unstable access	Moderate	15 x 6'	Stabilize foot path; 3/4" rock	Low	Low	Low
5-07	Hummingbird Ridge	Directly into lake	Beach access	Slight surface erosion; bare soil	Flat	12 x 15'	Establish vegetation buffer; reseed bare soil and thinning grass	Low	Low	Low
5-08	21 Hummingbird Ridge	Directly into lake	Residential	Slight surface erosion; bare soil; inadequate shoreline vegetation	Moderate	6 x 2'	Stabilize foot path; establish vegetation buffer	Low	Low	Low
5-09	15 Hummingbird Ridge	Directly into lake	Residential	Lack of shoreline vegetation	Flat	60 x 20'	Establish vegetation buffer	Low	Low	Low
5-11		Directly into lake	Beach access	Slight surface erosion; bare soil	Flat	40' x 10'	Establish vegetation buffer	Medium	Medium	Medium
5-12	Little North Pond Rd	Directly into lake	Beach access	Moderate surface erosion; bare soil; inadequate shoreline vegetation	Moderate	70 x 20'	Define foot path; establish vegetation buffer	Medium	Medium	Medium
5-13	9 (?) Bull Moose Ridge	Directly into lake	Beach access	Slight surface erosion; bare soil	Moderate	15 x 15'	Establish vegetation buffer	Low	Low	Low

Attachment 2. List of North Pond NPS Sites

Site	Location	Flow into lake via	Land Use	Problems	Slope	Size of Exposed/ Eroded Area	Recommendations	Impact	Cost	Technical level
5-14	5 Shady Ridge	Directly into lake	Residential	Slight surface erosion; lack of shoreline vegetation	Steep	6 x 3'	Add vegetation to buffer	Low	Low	Low
5-15	Shady Ridge	Directly into lake	Residential	Slight surface erosion; delta in stream/lake	Flat	35 x 3'	Armor ditch with stone	Low	Medium	Medium
5-16	Maple Ridge Rd - Shoulder	Stream	Town Road	Moderate surface erosion; bare soil	Moderate	40 x 1	Add new surface material (gravel); reshape (crown)	High	Medium	Medium
5-17	Pine Tree Camp (see JJ separate write-up)	Directly into lake	Commercial (multiple uses)	Slight-Moderate surface erosion, bare soil, roof runoff erosion, inadequate shoreline vegetation, shoreline erosion, unstable access; paved road and paths flow directly to lake; inadequate driveway treatment; inadequate dripline trenches on new buildings; failing silt fences; erosion at outlet of culvert at beach	Flat-Moderate	Large-across many acres	Install turnouts and runoff diverters (open-top culverts) for paved roads and paths, stabilize foot paths, define parking areas at staff cabins; redo infiltration trenches on driplines of new construction (extend wider and deeper to capture roof runoff); replace failing silt fences with ECM berm & native shrubs; reseed or mulch bare and thinning grass areas; add rain gardens or other undrained soil filter between new buildings; add larger plunge pool at culvert outlet at beach	Medium	High	High
6-01	Bog Stream N Shore Dr (after landing)	Stream	Town Road	Moderate surface erosion; moderate road shoulder erosion	Moderate	10 x 10	Armor ditch with stone; add rock - near culvert; vegetate shoulder; mulch / erosion control mix	Medium	Medium	Medium
6-02	Pond Rd 1st Culvert Pole 27/8680	Ditch	Town Road	Unstable culvert outlet; moderate road shoulder erosion	Flat	10' x 20'	Armor culvert inlet / outlet; install plunge pool	Medium	Low	Medium
6-03	484 Pond Rd	Directly into lake	Residential	Inadequate shoreline vegetation; shoreline erosion	Moderate	75'	Establish vegetation buffer; add riprap to undercut area 10-12' long	High	Low	Low

Attachment 2. List of North Pond NPS Sites

Site	Location	Flow into lake via	Land Use	Problems	Slope	Size of Exposed/ Eroded Area	Recommendations	Impact	Cost	Technical level
6-04	Pond Rd (4 Lufkin Ln?)	Directly into lake	Residential	Shoreline undercut; inadequate shoreline vegetation	Moderate	120'	Establish vegetation buffer; install stone on undercut area	High	Medium	Low
6-05	Lufkin Lane	Directly into lake	Residential	Inadequate shoreline vegetation; shoreline erosion; unstable shoreline access	Steep	25' x 12'	Stabilize foot path; mulch / erosion control mix; establish vegetation buffer; no raking	High	Medium	Medium
6-06	392 Pond Rd	Directly into lake	Residential	Slight surface erosion	Moderate	70' x 20'	Mulch / erosion control mix; establish vegetation buffer	Medium	Medium	Low
6-07	352 Pond Rd (house)	Directly into lake	Residential	Slight surface erosion; bare soil near beach	Moderate		Mulch / erosion control mix; no raking; cedar mulch	Low	Low	Low
6-08	352 Pond Rd (driveway to house)	Ditch	Driveway	Unstable culvert outlet		8' x 8'	Armor culvert inlet / outlet; install plunge pool	Medium	Medium	Medium
6-09	Pond Rd cross culvert @ Utility Pole #57	Ditch	Town Road	Unstable culvert inlet/outlet	Moderate	10' x 10'	Armor culvert inlet / outlet; install plunge pool	Medium	Medium	Medium
6-10	350 Pond Road	Directly into lake	Residential	Moderate surface erosion; shoreline undercut; lack of shoreline vegetation	Moderate	20' x 15'	Establish vegetation buffer	Medium	Low	Low
6-11	336 Pond Rd	Directly into lake	Residential	Moderate surface erosion; lack of shoreline vegetation; shoreline erosion	Moderate	100' x 20'	Mulch / erosion control mix; establish vegetation buffer; rock armor rip rap	High	Medium	Medium
6-12	330 Pond Rd	Directly into lake	Residential	Slight surface erosion; front yard, sheet erosion	Moderate	50' x 50'	Mulch / erosion control mix; add vegetation to buffer; crushed stone around fire pit	Low	Medium	Low

Attachment 2. List of North Pond NPS Sites

Site	Location	Flow into lake via	Land Use	Problems	Slope	Size of Exposed/ Eroded Area	Recommendations	Impact	Cost	Technical level
6-13	314 Pond Rd	Directly into lake	Residential	Moderate surface erosion; roof runoff erosion; direct run-off from driveway to water on South side of house (both sides); 2 issues bigger issue is run-off, 2nd issue lack of ground cover	Moderate	30 x 40	Install runoff diverters - rubber razor and water bar; add vegetation to buffer; reseed bare soil and thinning grass; enhance ground cover	High	Medium	Medium
6-14	310 Pond Rd	Directly into lake	Driveway (Residential)	Moderate surface erosion; no understory, no ground cover	Moderate	5 x 100'	Add new surface material (crushed rock); install runoff diverters; establish vegetation buffer; let ground cover grow up	High	Medium	Medium
6-15	302 Pond Rd	Directly into lake	Residential	Moderate surface erosion; bare soil; roof runoff erosion; primary problem run-off both sides of house; run-off off roof and down-hill	Moderate	5 x 50' / 5 x 75'	Infiltration trench and drywell @ gutter downspout; install runoff diverter (water bar)	High	Medium	Medium
6-16	302 Pond Rd	Directly into lake	Driveway	Slight surface erosion	Moderate		Add new surface material; reshape (crown); install runoff diverters	Medium	Medium	Medium
6-17	8 Bonfire Lane	Directly into lake	Residential	Bare soil	Moderate	10 x 30'	Establish vegetation buffer; reseed bare soil and thinning grass	Medium	Low	Low
6-18	268 Pond Rd	Directly into lake	Residential	Bare soil	Flat	30 x 30'	Establish vegetation buffer; no raking; reseed bare soil and thinning grass	Medium	low	Low
6-19	7 and 10 Baker Lane (Rd)	Minimal vegetation	Residential	Slight surface erosion; bare soil	Moderate	10 x 15' and 10 x 20' and 15 x 30'	Add vegetation to buffer; no raking; reseed bare soil and thinning grass	Low	Low	Low
6-20	8 Brookside Lane	Directly into lake	Residential	Bare soil	Flat	10 x 30'	Establish vegetation buffer; reseed bare soil and thinning grass	Medium	Low	Low
6-22	Pond Rd (across #195 Garage)	Directly into lake	Construction Site (Residential)	Slight surface erosion; bare soil; shoreline undercut; lack of shoreline vegetation	Moderate	50' x 150'	Infiltration trench @ roof dripline; mulch / erosion control mix; rain garden; establish vegetation buffer; reseed bare soil and thinning grass; mulch construction site; stabilize shoreline (rip rap)	Low	Medium	Medium

Attachment 2. List of North Pond NPS Sites

Site	Location	Flow into lake via	Land Use	Problems	Slope	Size of Exposed/ Eroded Area	Recommendations	Impact	Cost	Technical level
6-23	182 Pond Rd	Directly into lake	Residential	Shoreline undercut; inadequate shoreline vegetation; ashes spread on ground - can spread into lake	Moderate	20 linear feet	Establish vegetation buffer; close off fire pit - do not spread ash	Low	Low	Low
6-24	11 Island View Lane	Directly into lake	Residential	Slight surface erosion; bare soil (near pump house and near maple tree wood raft); inadequate shoreline vegetation	Flat	5 x 5 (x2)	Mulch / erosion control mix; add vegetation to buffer	Low	Low	Low
6-25	13 Island View Lane	Directly into lake	Residential	Bare soil; roof runoff erosion (gutters connected to culvert drain to lake); lack of shoreline vegetation; shoreline erosion; fertilizer use in SLZ?; appears they are trying to replant, cover bare soil - Japanese knotweed	Steep	10 x 10	Disconnect gutters, establish drywell or infiltration trench; remove culvert - armor (line with geotextile plant heavily); P free fertilizer & soil test; machine mover; infiltration trench @ roof dripline; drywell @ gutter downspout; mulch / erosion control mix; establish vegetation buffer; add vegetation to buffer	Low	Low	Low
6-26	15 Island View Lane (garage across road)	Ditch	Residential	Roof runoff - from garage/shed; feeds culvert with water next door	Flat	20'	Infiltration trench @ roof dripline	Low	Low	Low
6-27	19 Island View Lane	Directly into lake	Residential	Moderate surface erosion; bare soil; roof runoff - sheet; shoreline undercut; lack of shoreline vegetation; shoreline erosion	Moderate	80' x 20	Infiltration trench @ roof dripline; mulch / erosion control mix - worn lawn; establish vegetation buffer and add vegetation to buffer - need 12 ft of buffer; reseed bare soil and thinning grass	Low	Medium	Medium
6-28	21 Island View Lane	Directly into lake	Residential	Slight surface erosion; bare soil; erosion on foot paths	Moderate	10 x 10	Define foot path; stabilize foot path; drywell and infiltration trench @ roof dripline; mulch / erosion control mix and reseed bare soil and thinning grass (better)	Low	Low	Low
6-29	25 Island View Lane	Directly into lake	Residential	Slight surface erosion; bare soil	Moderate	10 x 10	Infiltration trench @ roof dripline; mulch / erosion control mix	Low	Low	Low

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Site	Location	Flow into lake via	Land Use	Problems	Slope	Size of Exposed/ Eroded Area	Recommendations	Impact	Cost	Technical level
6-30	27 Island View Lane	Directly into lake	Residential (+ boat access)	Slight surface erosion; bare soil; uncovered soil pile; unstable shoreline access	Moderate	20 x 10	Stabilize foot path; infiltration steps ?; mulch / erosion control mix; reseed bare soil and thinning grass; cover soil pile with tarp	Low	Medium	Medium
6-31	29 Island View Lane	Directly into lake	Residential	Moderate surface erosion; bare soil; roof runoff erosion; lack of shoreline vegetation; shoreline erosion	Moderate	30 x 30	Define and stabilize foot path; infiltration steps; mulch / erosion control mix; establish vegetation buffer; reseed bare soil and thinning grass	Medium	Medium	Medium
6-32	35 Island View Lane	Directly into lake	Residential	Slight surface erosion; bare soil; roof runoff erosion; shoreline undercut; inadequate shoreline vegetation; shoreline erosion; unstable shoreline access	Flat	15 x 5	Define foot path; stabilize foot path; infiltration trench @ roof dripline; mulch / erosion control mix; add vegetation to buffer; no raking; stabilize shoreline @ north end of boat house	High	Low	Medium
6-33	150 Bacon Rd (N. of Deer Run Lane), Mercer	Stream	Town Road (gravel)	Slight surface erosion; culvert outlet - ok; slight road shoulder erosion (above culvert); roadside plow / grader berm	Flat	10' x 3'	Remove grader / plow berms	Low	Medium - grader ?	Medium
6-34	252 Bacon Rd (S of Deer Run Lane) Mercer	Stream	Town Road	Severe surface erosion; culvert inlet - ok; moderate road shoulder erosion; delta in stream; winter sand	Flat	100' x 6'	Add new surface material (gravel); reshape (crown); vegetate shoulder	High	Medium	Medium - grader ?