Wilson Pond (Monmouth, Wayne & Winthrop)
Watershed Based Plan (2023-2032)

NPS Grant Project #20190016

Prepared for the
Maine Department of Environmental Protection
by Cobbossee Watershed District

December 2022

Acknowledgements

Funding for this project was provided in part by the U.S. Environmental Protection Agency (EPA) under Section 319 of the Clean Water Act. This Section 319 grant was administered by the Maine Department of Environmental Protection (MDEP) in partnership with EPA. Amanda Pratt of DEP was the initial Agreement Administrator for the grant and was succeeded by Gregory Beane (DEP).

Cobbossee Watershed District (CWD) was the grantee and provided the bulk of non-federal matching funds required for the project. This Watershed-based Plan was prepared by CWD's Project Manager Bill Monagle. Assisting on the project were CWD staff Ryan Burton, Matthew Farragher, and Wendy Dennis.

A Steering Committee was comprised of Bill Monagle (CWD), Ryan Burton (CWD), Wendy Dennis (CWD), Matthew Farragher (CWD), Tamara Whitmore (Friends of the Cobbossee Watershed District), Toni Pied (FOCW), Jay Lindsey (FOCW), Eileen O'Reilly (Berry Dexter Wilson Watershed Association), Doug Ludewig (BDWWA/Town of Monmouth Board of Selectmen), Greg Beane (DEP), Amanda Pratt (DEP), and Maddy Crutchley (DEP).

CWD's water quality monitoring program was partially supported by the watershed-based plan grant, and the data produced were essential for developing the Plan. Water quality monitoring staff in 2021 included CWD Water Resources Technician Ryan Burton and Limnologist Wendy Dennis.

Cover Photo: Wendy Dennis

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Wilson Pond (Monmouth, Wayne & Winthrop) Watershed Based Plan (2023 – 2032)

This updated 2022 Watershed-based Plan succeeds the initial 2009 Wilson Pond Watershed-Based Plan and compliments - with updated information – the Wilson Pond Phosphorus Control Action Plan and Total Maximum Daily Load (PCAP-TMDL) completed by the Maine Department of Environmental Protection (MDEP), Cobbossee Watershed District (CWD), and FB Environmental Consulting (FBE) in August of 2007.

Document Purpose

The purpose of the Watershed Based Plan, herein referred to as the "plan", is to lay out a strategy and schedule, beginning in 2023, for phosphorus mitigation in the watershed to stabilize and improve Wilson Pond. A current and approved Watershed-Based Plan is required to apply Clean Water Act §319 funds to help restore an impaired waterbody. A Watershed-Based Plan must be designed to achieve the pollutant load reductions called for in a TMDL and address EPA's 9 mandatory elements for watershed planning.

Scope of Plan

The plan is outlines and describes actions that will be implemented over the course of a ten-year period (2023-2032) in the Towns of Monmouth, Wayne and Winthrop in the watershed of Wilson Pond. The Wilson Pond TMDL (MDEP 2007) reported a need for an estimated reduction of 98 kg/yr in annual phosphorus loading from the then current level (736 kg/yr), plus an additional 37 kg/yr to address future development. The total, or 135 kg, approximated 18% of the annual phosphorus load to Wilson Pond from all sources (the direct and indirect watersheds and internal loading) based on the results of a phosphorus retention model (Dillon and Rigler, 1974 and others). In the 2009 Wilson Pond Watershed-based Plan, it was reported that an interim goal for phosphorus loading reduction over a ten-year (2010-2019) period was set at 56 kg/yr, estimated to achieve a 1 ppb decrease in average in-lake phosphorus concentrations during the summer period. Based on available data collected by the CWD over the period 2008-2021, the average in-lake total phosphorus concentration has in fact increased by 1 ppb to 16 ppb.

In developing this updated plan, the intention was to identify and prescribe measures in the watershed, and possibly the lake, to continue the pursuit of the previously established interim goal of 14 ppb. Applying the additional 1 ppb in in-lake concentration to the Dillon and Rigler (1974) model yields an updated load

reduction requirement of an estimated 22% (105 kg) in annual phosphorus loading from the direct watershed, including 7 kg to account for new development over the 10-year plan period. In addition, the plan includes a discussion of estimated internal loading of phosphorus to the pond and consideration of the merits of prescribing a nutrient inactivation (i.e., alum treatment) project. It's worth noting that based on recent (2020-2021) data, Wilson Pond exhibited annual average total phosphorus concentrations of 13.8 ppb, which fell short of the target established in the TMDL, but satisfied the previously established interim goal of 14 ppb for these two years. Under Element A below, we elaborate more on this "achievement" relative to updated land uses in the watershed.

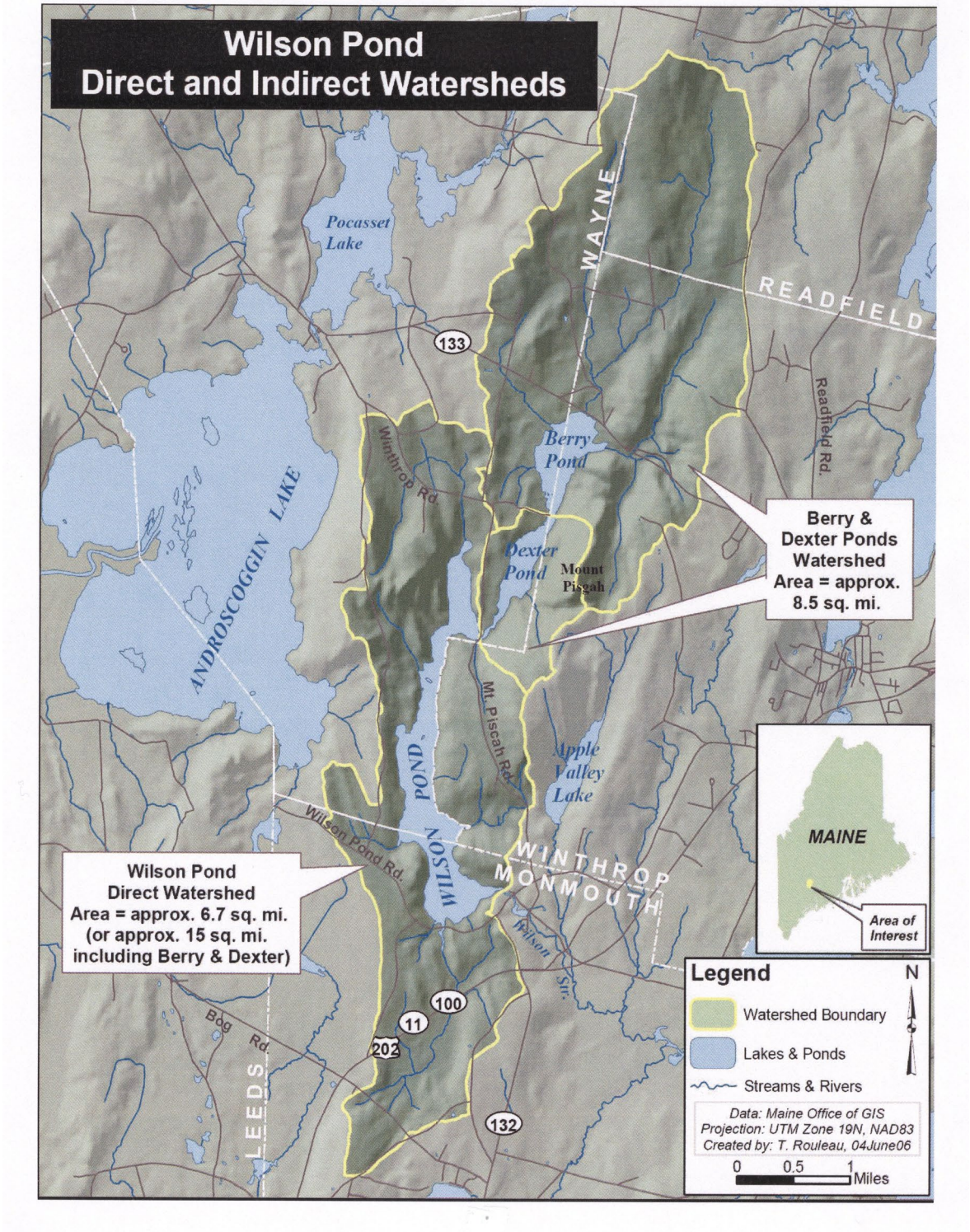
Pond Water Quality Objective

In general, the main objective of this plan is to achieve a decreasing trophic state, with the main goal to both halt the progressive decline in Wilson Pond water quality and restore the pond's water quality to that observed prior to 1990. The decline in the trophic state of the pond was largely detected and defined by a steady decline in pond water clarity, measured as Secchi disk transparency (SDT), which is intimately tied to the concentration of algae in the water column and is influenced by phosphorus, the limiting nutrient in north temperate lakes and ponds. Based on historical data and the water clarity in other local lakes, we are establishing an objective of maintaining mean annual water clarity (i.e., SDT) in Wilson Pond of no less than 5 meters and an average minimum SDT of no less than 3.0 meters (CWD's standard for all district lakes). We believe these goals can be satisfied by the continued pursuit of the original interim phosphorus concentration goal of 14 ppb that may now only be attained by prescribing an aggressive program aimed at achieving an estimated 22% further reduction in the current phosphorus loading from the direct watershed. In doing so, the pond could attain Class GP-A water quality criteria (38 MRSA 465-A(b)). By achieving these objectives, Wilson Pond could be removed from the §303(d) TMDL list, similar to Cobbossee Lake's delisting in 2006.

Description of Watershed & Pond Water Quality

Wilson Pond is a 551-acre (223 ha) lake located in the Towns of Monmouth, Wayne and Winthrop in Kennebec County, Maine. The pond has a direct watershed area of 4,304 acres (6.7 sq. mi.), which is located completely in the Towns of Monmouth, Wayne, and Winthrop (Figure 1). The pond has a maximum depth of 43 feet, a mean depth of 23 feet, and a flushing rate of approximately 1.8 times per year. There are four small unnamed tributaries that contribute to the hydrologic and nutrient

Figure 1. Map of Wilson Pond Direct & Indirect Watersheds



From: Wilson Pond (Monmouth, Wayne & Winthrop) PCAP-TMDL (MDEP 2007)

budgets of Wilson Pond. There are also two ponds (Berry and Dexter Ponds) immediately upstream of Wilson Pond that represent the major external water load to the pond, and which bring the total watershed of Wilson Pond, inclusive of the associated sub-watersheds, to 9,723 acres. Wilson Pond drains via a dam along the southeast portion of the pond. The dam is owned and operated by Tex-Tech Industries. The outlet, Wilson Stream, flows southerly to Annabessacook Lake.

> ***Watershed*** *– All of the land directly surrounding a lake and which serves as a source of water through tributaries, ditches, direct overland flow, or via groundwater.*

The shoreline of Wilson Pond is lightly to moderately developed in comparison to other regional lakes and ponds of the CWD. The eastern shoreline is more intensely developed than the west shore. Much of the land along the western shore of the pond is either prohibitively steep for development, under private ownership, or lacks access to land along the shoreline. There are about 120 structures located along the approximate 9-mile shoreline, of which, more than half are seasonal camps.

There are two public access locations on Wilson Pond: A state-operated public boat launch on the south shore of the pond along Wilson Pond Road in the Town of Monmouth; and a public beach on Wilson Pond Road, owned by the North Monmouth Community Club. The pond supports widespread human uses, including power boating, but most are of the passive variety, such as canoeing, kayaking, angling (including ice-fishing), swimming, birding, general leisure, etc.

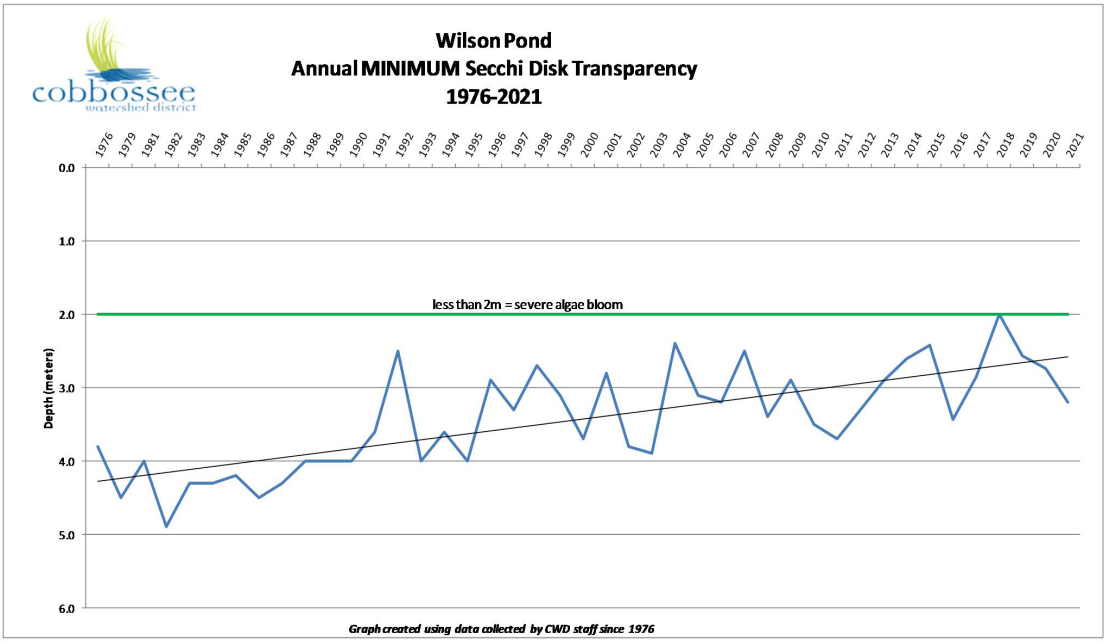
Wilson Pond is currently managed as a mixed cold/warmwater fishery (brown trout and black bass). Members of the fish assemblage include 8 native indigenous fishes (American eel, golden shiner, white sucker, brown bullhead, chain pickerel, redbreast sunfish, pumpkinseed, and yellow perch); 6 introduced fishes (white perch, rainbow smelt, smallmouth and largemouth bass, brown and brook trout); and 1 illegally stocked fish species – northern pike. Transient catches of stocked brook and brown trout may occur, as these two species are annually stocked by Maine Department of Inland Fisheries & Wildlife (MDIF&W) to support a "put-grow-and take" trout fishery in the absence of suitable salmonid spawning and nursery areas. Principal warmwater fisheries, in addition to black (large and smallmouth) bass, include white perch, yellow perch and chain pickerel.

Along the western shore of Wilson Pond is State Listed Habitat for Great Blue Heron, a Species of Special Concern, and there are listed areas of Inland Wading Bird and Waterfowl Habitat associated with both Wilson Pond and Berry Pond (MDIF&W: see

website: https://www.maine.gov/ifw/fish-wildlife/wildlife/beginning-with-habitat/index.html).

The Cobbossee Watershed District (CWD) has monitored Wilson Pond for over forty years, and based on the CWD's data, the Maine DEP has classified the pond as having moderate/sensitive water quality. The classification, and concern, is due in large part to increases in total phosphorus concentration, reduced water clarity, and depletion of dissolved oxygen in bottom waters. Of particular concern, is that this deteriorating trophic trend began in the early 1990's when Wilson Pond began exhibiting an abrupt and chronic reduction in water clarity of between 15 and 20 percent. During the 11 years prior to 1992, the pond had an average SDT of 5.6 meters and an average annual minimum SDT of 4.2 meters. Over the past 30 years, however, the pond has exhibited a steady decline in water quality with an annual mean SDT of about 4.55 meters, and the mean annual minimum value has been about 3.1 meters (Figure 2). In 2018, Wilson Pond suffered its worst algae bloom to date with a minimum SDT of 2.0 meters. Two upstream ponds, Dexter and Berry Ponds, have exhibited consistent water clarity that would be considered average compared to lakes statewide. Both ponds have relatively high flushing rates and a combined drainage area that is a sizeable 5,419 acres. Therefore, these two ponds and the respective drainage areas are likely to be very influential to Wilson Pond water quality.

Figure 2.



The MDEP has placed Wilson Pond on its Nonpoint Source Priority Watersheds list and the list of Lakes Most at Risk from New Development under the state's Stormwater Law. Additionally, the pond was listed on Maine's 303(d) (TMDL) list in 2006, designating it as a lake that does not meet State water quality standards. An EPA-approved Phosphorus Control Action Plan and TMDL (PCAP-TMDL) was prepared by the CWD and others in 2007. Following this effort, the CWD prepared the *Wilson Pond (Monmouth, Wayne & Winthrop) Watershed Based Plan* (#2008RT32) which was completed in June 2009. The Wilson Pond PCAP-TMDL and the watershed-based plan were funded in part by USEPA under section 319 of the Clean Water Act.

Prior Work

Wilson Pond has been the subject of limited pond and watershed restoration efforts over the past three decades. A 1975 Federal water quality management (Clean Water Act §208) planning grant enabled the CWD to work with the Southern Kennebec Valley Regional Planning Commission to perform detailed diagnostic studies throughout the CWD and develop strategies for pond restoration. Wilson, Dexter, and Berry Ponds were included in this effort, resulting in the assessment of baseline water quality, land use, and phosphorus loading from the contributing watersheds. At the time, Wilson Pond was exhibiting good water quality. Although agriculture at the time accounted for approximately 9% of the direct watershed land use, it was estimated to contribute 45% of the total phosphorus load to the pond.

In 1980, the CWD received a Lakes Protection grant, funded in part under the federal Clean Water Act §314 (Clean Lakes Program), that provided cost-sharing opportunities for farmers throughout the District to implement agricultural best management practices (BMPs) to enable them to maintain compliance with existing regulations and at the same time protect lake water quality. At the WarPort Farm along the northern perimeter of Wilson Pond, the project supported the construction of a manure storage facility and milk room waste management improvements. The farm also worked with the Natural Resource Conservation Service to incorporate drainage improvements in the cultivated fields on the farm.

Although the pond was showing gradual signs of decline since about 1990, the very poor water clarity observed in 2004 (a minimum SDT of 2.4 m) prompted the CWD to pursue an NPS grant (i.e., CWA §319) in 2005 to survey the direct watersheds of Wilson, Dexter, and Berry Ponds to identify potential problems sites for future mitigation. The survey was conducted in 2005 and 2006 by CWD staff and trained volunteers and the project was completed in September 2008. During this endeavor,

81 NPS sites were identified. Of these, 14 were considered high priority sites and 26 were identified as medium priority. There were 54 road-related sites; suggested BMPs included re-grading and stabilization of roadside shoulders, adding material to eroded roads and reshaping them as required, replacing new culverts where needed or stabilizing culvert inlets and outlets, reshaping and stabilizing roadside ditches and installing turnouts to buffer areas where deemed beneficial. It was estimated that the average cost of each of the road sites was approximately $5,000.

In the midst of the watershed survey effort, the pond was listed in 2006 on Maine's §303d (TMDL) list, designating it as a pond that does not meet State water quality standards. The PCAP-TMDL prepared by the MDEP, FB Environmental Consultants, and the CWD in 2007 included a detailed determination of land uses in the direct watershed of Wilson Pond, an estimation of the relative contribution of the various land uses to the annual phosphorus budget, a detailed survey of the shoreline of the pond, and suggestions for future work to improve the pond and satisfy the established water quality goals.

Throughout the past few decades, the CWD has continued working with local citizens and town officials, including planning boards, code enforcement officers, road crews, the Maine DEP, and other state and federal agencies to improve water quality. More recently, to address NPS problems identified in the above noted assessments the CWD undertook an initial Wilson Pond Water Quality Improvement Project (#2009RT06) during which BMPs were installed at 24 NPS sites on 6 private camp roads and 200 feet of shoreline were stabilized. During the more recently completed Wilson Pond NPS Watershed Restoration Project, Phase II (#2014RT05), BMPs were installed on a total of 16 NPS sites on 3 private camp roads and 700 feet of shoreline on Wilson Pond were stabilized. Both watershed projects involved watershed education for local schools and the general public, were conducted in partnership with a local non-profit organization, *Friends of the Cobbossee Watershed*, and were both funded in part by USEPA under section 319 of the Clean Water Act. Most recently, as part of this project (#20190016), the collective watersheds of the three ponds were surveyed in May of 2022 to identify current sources of NPS in the watershed (see Appendix).

Nine Mandatory Elements (A – I) of the Watershed Based Plan Required by EPA

A. Identify Causes and Sources of Water Quality Impairment

As reported in the original 2009 Watershed-Based Plan, a gradual decrease in the water clarity and increased hypolimnetic anoxia in Wilson Pond over the previous two decades were attributed to an increase in algal biomass in the water column

during summer periods. The principal cause for the increased algal biomass was an approximately 2 ppb increase in the in-lake total phosphorus concentration resulting from increased nonpoint source (NPS) phosphorus pollution from the direct watershed of Wilson Pond and from two upstream ponds, Dexter Pond and Berry Pond. Additionally, internal recycling of phosphorus from the anoxic sediment-water interface in the pond contributes phosphorus to the water column, particularly during the late summer and fall period. Due to this increased trophic state, Wilson Pond was placed on the Maine DEP's list of impaired ponds (i.e., CWA §303(d)) in 2006. Phosphorus is considered the pollutant of primary concern. The 2007 Wilson Pond PCAP-TMDL report emphasized the need to correct erosion problems, encourage better land use practices in the shoreland zone, monitor manure management on farms, expand homeowner education and technical assistance, promote forest land conservation and management, and improve road drainage design and maintenance practices on both private and public roadways. All of these recommendations remain valid and have been implemented to a varying extent since that time (see Prior Work above).

In developing the PCAP-TMDL Report for Wilson Pond, the DEP-CWD-FBE team determined the land use in the watershed using several methods including (1) Geographical Information System map analysis, (2) analysis of aerial photographs, and (3) field analysis. As part of the PCAP-TMDL preparation, the CWD also conducted an in-depth survey of shorefront properties and shoreline conditions. The survey effort was expanded beyond the shoreline in the 2008 Watershed Survey of Wilson Pond's watershed and the direct watersheds of the two upstream ponds, Dexter Pond and Berry Pond. In preparing this updated (2022) plan, current land use was reviewed using land use information available through the website, www.modelmywatershed.org, as well as ground-truthing, reviewing local municipal land use development records, and a comparison of historical Google-Earth imagery. Based on the updated analyses, very little has changed with respect to most land uses in the watershed. Over the past thirteen-year period, for instance, no major commercial or institutional developments or residential sub-divisions have been built in the watershed. However, roughly 70 acres of unmanaged forest lands have been selectively harvested, and another 65 to 80 acres of hayland previously classified as being non-manured, had been fertilized annually with hen manure for about a decade until just recently. These hayfields are largely located on soils classified as High Risk soils (i.e., coarse, or with high water table) as reported in the *Septic System Soils Vulnerability Analysis* included with the 2022 Wilson Pond Watershed Assessment Report (see Appendix). In addition, land previously classified as pasture (4 ac.) has been

expanded as a small 8-acre farm combining relatively light livestock-keeping with miscellaneous non-row crop production. It should be noted that since the economic recession of 2008, there has been limited economic and/or land use development activity in the largely rural areas of the CWD.

Of the 118 shorefront dwellings documented in the PCAP-TMDL, approximately two-thirds, or 78 properties, were deemed to have moderate to high NPS pollution impact due to a combination of inadequate buffers, close proximity to the shoreline, and the presence of bare and/or eroding soils. A small percentage, or approximately 6% of these properties have been serviced by the Friends of the Cobbossee Watershed's Youth Conservation Corps during the two Wilson Pond Watershed Projects (i.e., CWA §319) over the past 15 years, largely via shoreline stabilization

In addition to nutrient loading via stormwater runoff from the watershed, nutrients also enter lakes through groundwater seepage. Although the complexity of subsurface drainage and difficulties in understanding subsurface flow pathways challenge our understanding of phosphorus transport to surface waters via groundwater, educated guesses can be made based on available information such as topography, climate, proximity to water resource, and soils (Sharpley et al., 2015). Based on these criteria, it would seem that transport of phosphorus to Wilson Pond via groundwater seepage represents an additional nutrient vector often overlooked when modelling watershed nutrient loading to surface waters. The new land use-based loading from manure hayland, supplemented with contributions via subsurface groundwater, was unforeseen when preparing the 2007 PCAP-TMDL. In combination, an increase in annual phosphorus loading of between 50 and 100 kg/yr via these sources (i.e., surface runoff and groundwater seepage) would not seem inconceivable. It's worth noting that based on data collected by the CWD, the total phosphorus concentration at spring overturn in both 2020 and 2021 was the lowest since 1996 and 1994. Similarly, in both of those years, the whole lake volume-weighted TP concentration essentially satisfied the original interim goal of 14 ppb during summer periods. This is potentially significant as there had been no manure applied to the fields in either 2021 or 2022, and possibly in 2020 as well. Based on this information and the water quality in 2020 and 2021 it would appear that application of manure applied to these fields, particularly as they are positioned on coarse, well drained, soils close to the pond's shore, could represent an acute as opposed to a chronic '*legacy*' source of phosphorus.

Internal loading of phosphorus to the pond was calculated based on water quality data collected and analyzed by CWD staff and compared to the estimate, 90 kg/yr, which was based on 2006 data and reported in the 2007 TMDL. Based on data collected in 2021 as part of this project to update the plan, internal loading of phosphorus to Wilson Pond that year was 141 kg. A review of historical data shows that for the period 1992 to 2005, the average internal loading to the pond was 108 kg/yr, and for the period 2007 to 2021, the mean annual internal load was 172 kg/yr. For the entire period, 1992 to 2021, the mean load was 138 kg/yr with a range of 44 to 279 kg/yr, with the higher estimates associated with post-TMDL estimates. If in fact there has been an increase in phosphorus loading to the pond from NPS related sources, particularly the aforementioned manured hay fields, then that may explain the recent increase in the internal loading component of the pond's phosphorus budget.

The August 2007 PCAP-TMDL reported that an annual phosphorus load reduction of 135 kg/yr (or 18%) would be required for Wilson Pond water clarity to return to pre-1990 conditions. To achieve this, it was determined that the average annual total phosphorus concentration would need to be reduced from 15 ppb to 13 ppb. Of the 736 kg/yr that were estimated to enter the pond, approximately 478 kg/yr (65%) were estimated to originate as NPS pollution from the direct watershed. The bulk of the remainder was associated with upstream ponds (18%) and internal recycling from Wilson Pond sediments (12%, or 90 kg/yr), and atmospheric deposition (5%). As that plan was intended to provide a schedule of actions over the ten-year timeframe 2007-2016, an interim annual load reduction of 56 kgP/yr was established as a goal and considered adequate to provide a decrease of 1.0 ppb in total phosphorus concentration in the pond. As noted previously in the Scope of Plan section, the average in-lake phosphorus goal of 14 ppb established in the original plan was not realized despite the accomplishments of the Phase I and Phase II Wilson Pond Watershed Projects (CWA §319), and these accomplishments may have been, in no small way, compromised by the combined phosphorus loading from haylands and internal loading as described above and explain, in part, the 2 ppb increase in in-lake phosphorus concentration.

The goal now of further reducing the annual phosphorus load to Wilson Pond by an additional 105 kg/yr will require that several sources, most of which were identified and prioritized in the TMDL Report, be addressed, including:

- Agricultural and Forestry – all of the hayland, and particularly that which was previously presumed to be non-manured, will be reviewed and recommendations made as needed for BMP implementation and/or less intense land management. Pastureland and active forest operations will also be reviewed, and recommendations made for appropriate BMPs where needed.
- Shoreline Development – Approximately 20 % of all residential properties and 50% of the camp and private roads will be addressed.
- Non-Shoreline Development – Approximately 60% of all state roads, town roads, and the public boat launch facility as well as private unimproved roads will be addressed.
- Internal Loading from Wilson Pond Sediments – No action planned at this time. Any plans to address the internal load via nutrient inactivation (i.e., alum treatment) will be developed if, following further watershed-related work and continued monitoring of Wilson Pond water quality it is determined that in-lake actions are necessary to achieve water quality goals.

B. Estimate Phosphorus Load Reduction to Result from Planned Management Measures

Nonpoint source reduction from watershed BMP implementation

The external loading reduction goal is 105 kg/yr of phosphorus, or 22% of the estimated direct watershed load, to provide a reasonable margin of safety to reduce the average total phosphorus concentration of 16 ppb to a stable interim target of 14 ppb. This has been discussed under "Element A" above. This goal certainly represents a challenge for all stakeholders, but in considered achievable with an aggressive approach to implementing watershed NPS controls.

Many of the non-agriculture related nonpoint source problems in the watershed are likely associated with roads. Based on previous work in the watershed, a reduction goal of 14 kg P/yr was set for roads (Table 1).

Another 3 kg P/yr targeted reduction from external loading will be accomplished through the erosion and nonpoint source prevention program for property owners, which will be directed primarily, although not exclusively, at developed areas along the shorefront. The estimated reduction was calculated in two ways. EPA's Region 5 "Michigan Method" (http://it.tetratech- ffx.com/step1/), adjusted for lower soil phosphorus content based on CWD monitoring results, was used to estimate phosphorus reduction from shoreline erosion control, and phosphorus reduction from planting vegetative buffers was based on DEP's manual

"Phosphorus Control in Lake Watersheds: A Technical Guide to Evaluating New Development" (MEDEP, 2016[a] & 2016[b]).

Internal phosphorus recycling reduction from nutrient inactivation

Nutrient inactivation of Wilson Pond sediments is not a "planned" management action at this time. However, a detailed review of historical and current water quality data indicate that the annual (i.e., 2006) internal load reported in the 2007 PCAP-TMDL (90 kg/yr) was at the low end of the range of calculated loads over the past three decades. A more recent (2007 – 2021) average annual internal load of 172 kg/yr is substantial. If a nutrient inactivation treatment is conducted to reduce this source of the annual load, then based on previous such projects conducted by the CWD, a reduction of about 80%, or 138 kg/yr is to be expected. At this time, the CWD views an alum treatment in Wilson Pond to be "Plan B", with the hope that addressing sources of external loading alone will both achieve the desired interim phosphorus goals, and at the same time, reduce the internal stores of phosphorus in Wilson Pond sediments.

Table 1: External and Internal Phosphorus Load Reduction Goals for Wilson Pond.

I. External P Sources	BMP goals	P source reduction goals, kg P/yr	P source reduction goals, % of total load
Roads public & private mostly gravel roads	BMPs on 15 Roads and public boat launch (30 sites total)	14 kg	13%
Shorefront Properties eroding shorelines and residential lot NPS	BMPs at 25 sites	2 kg	2%
Non-Shorefront Properties and Low density residential BMPs	BMPs on 25% of Properties	1 kg	1%
Agricultural[1]	Manure BMPs on 65 to 80 acres of hayland	50 to 100 kg[1]	47% to 95%
Total anticipated from External sources		66 to 117 kg	63% to 111%
II. Internal P Sources			
Anaerobic sediments[2]	Nutrient Inactivation	~ 138 kg [2]	

1 - Much will depend on either the cessation or future fertilizing (i.e., manuring) of targeted haylands, which at this time is uncertain or unknown.

2 - The expectation is for the internal loading to decline by about 138 kg/yr. This is based on an alum treatment effectiveness of 80% applied to an average annual internal load of 172 kg/yr.

C. Description of Management Measures

The 2007 Wilson Pond PCAP-TMDL Report emphasized the need to correct erosion problems, encourage better land use practices in the shoreland zone as well as in the non-shoreline areas of Monmouth, Wayne, and Winthrop, promote forest land conservation and responsible management, and improve road drainage design and maintenance practices on both private and public roadways. There has been much accomplished since then in these regards, primarily as products of the two CWA §319-funded projects, but there remains more work to be done. Most recently, as a component of this project to update the 2009 Watershed-Based Plan, a survey of the total watershed of Wilson Pond was conducted in May 2022 (see Appendix).

The anticipated implementation scheme is as follows:

Shoreline Development

Residential

Twenty percent of shorefront properties will be addressed. This is roughly consistent with the degree of activity over the past decade which saw many shorefront property owners on Wilson Pond and other local lakes of the CWD receiving technical assistance and construction service through the FOCW's Youth Conservation Corps. The majority of these were the result of public outreach by the CWD and the FOCW, and it is this approach that will be followed. Based on CWD's general familiarity and the recent watershed survey results, the most common BMPs will likely be vegetated buffers, shoreline stabilization, stormwater diversion measures, rain gardens, and general better grounds-keeping practices (e.g., no lawn fertilization, etc.).

Camp/Private Roads

Approximately 50% of the camp roads associated with shoreline development will need to be addressed. The CWD and the Berry Dexter Wilson Watershed Association (BDWWA) have long recognized the impact that private camp roads in the shoreline area have on Wilson Pond as well as Dexter and Berry Ponds immediately upstream. There are about 30 camp roads surrounding the three ponds, several which are well designed and maintained. Most, however, would benefit greatly by improved drainage systems or surface modifications, and

regular maintenance. Those roads which pose the greatest threat and/or the highest degree of successful implementation will be selected first. Publicly held demonstrations and promotion through the BDWWA newsletter and other local publications will further serve to encourage participation by all private road associations or groups.

Non-Shoreline Development

State and Town Roads

The CWD has a long history of working with the public works departments from the Towns of Monmouth, Wayne, and Winthrop as well as with the Maine Department of Transportation throughout the CWD on road related projects to protect water quality. Problems continue to exist on town roads, particularly in the more rural areas. Although some of the town road related problems may require reconstruction or modifications that will require significant financial expenditures, most of these likely pertain to routine maintenance practices. The most common BMPs will be improved drainage through combinations of culverts, turnouts, proper ditching design and stabilization, and general surface improvements.

Residential

Of the residential component of the non-shoreline development, the vast majority (88%) is considered low density residential. The rural and geographically widespread nature of this category presents a challenge to recruiting participation in BMP implementation. However, efforts will be made to encourage 25% of low-density residential landowners to adopt various BMPs. The 2007 TMDL estimated that these land uses collectively represented only about 6% of the phosphorus load from the direct watershed. In these more rural areas, there are likely to be more opportunities to install structural or vegetative BMPs than in shoreland areas where lot sizes tend to be small. Depending on individual site-specific features, BMPs might include vegetated buffers, fertilizer restrictions, drainage swales (including grassed swales, dry swales, and level spreaders), rain gardens, and in some cases, stormwater ponds. The education and outreach program noted above will also extend to these areas.

Agricultural

Hayland accounted for approximately 19% of the annual phosphorus load to Wilson Pond as reported in the 2007 PCAP-TMDL. The vast majority of this was ascribed to non-manured hayland. However, recent revelations indicate that

between 65 and 80 acres of hayland in close proximity to the shoreline of Wilson Pond as well as to a few tributaries have been fertilized with hen manure biannually for the majority of years since the original 2009 Watershed-based Plan. This updated land use information, considered along with the current water quality in Wilson Pond, establishes this category as a top priority in reducing land use-based phosphorus loading and reversing the downward trend in Wilson Pond water quality. If the manuring of these particular hayfields is to continue, then the farmers that manure these hayfields will be encouraged to solicit assistance from the Natural Resource Conservation Service (USDA) to adopt BMPs such as performing soil tests and making efforts to limit manure application according to phosphorus requirements of the soil and to spread only on those portions of fields that are away from drainage ways and are not subject to excessive runoff or erosion. Because of the magnitude of this general category watershed-wide, continued scrutiny of all hayfields should be continued to remain apprised of any newly adopted fertilization practices on hayfields.

In-Lake Sediments

It was reported in the 2007 Wilson Pond TMDL that the internal loading of phosphorus from Wilson Pond sediments in 2006 was estimated at 90 kg/yr. However, based on data collected and analyzed by CWD, the internal phosphorus loading to the pond in 2021 was estimated at 141 kg/yr. A more extensive review of data collected by CWD over the period 1992 to 2021 suggests that the internal load averaged 172 kg/yr from 2007 through 2021. As a result, if other land-based approaches fail to provide the desired results, then addressing this component of the annual load through in-lake phosphorus mitigation via nutrient inactivation (i.e., alum treatment) should warrant serious consideration.

D. Description of Technical and Financial Assistance

The cost of successfully implementing this updated 10-year watershed plan is approximately $760,000. This general, 'best guess' estimate is based on the following assumptions: 15 camp road repairs/upgrades ($200,000); residential shoreline and non-shoreland development-based projects such as buffers, riprap, etc. ($175,000); watershed education ($152,000); lake water quality and BMP monitoring and assessment ($175,000); and miscellaneous public and private projects such as town and state road projects ($50,000). The major sources of funding the program will be Clean Water Act Section 319 sub-grants, local cash and in-kind match. If a nutrient inactivation project is to be prescribed, then the total cost could increase by $650,000 or more.

Cobbossee Watershed District will continue serving as the Clean Water Act, Section 319 sub-grantee and will be responsible for the successful and complete implementation of all project activities. The CWD will continue monitoring Wilson Pond water quality, managing lake water levels to control erosion and flooding, and providing technical assistance to watershed citizens and the Towns of Monmouth, Wayne, and Winthrop. As the designated Stormwater Administrator for projects subject to DEP Stormwater Permitting, the CWD will seek to apply any pertinent phosphorus compensation fees to address eligible and certified NPS problems to offset impacts from new developments.

Maine Department of Environmental Protection will provide watershed partners with ongoing guidance, technical support and resources, and the opportunity for financial assistance through grant funding such as the Clean Water Act Section 319(h).

US Environmental Protection Agency will provide guidance on Clean Water Act Section 319(h), work plan guidance, and selected project funding, pending acceptability of grant proposals, final workplans and availability of federal funds.

Berry Dexter Wilson Watershed Association will have representatives serving on the steering committee and will continue to provide support to the CWD and other local lake groups to advance lake improvement and protective measure.

Friends of the Cobbossee Watershed will promote public education and information through a variety of programs aimed at all levels throughout the watershed and will provide technical assistance to shorefront property owners seeking to implement BMPs.

The Towns of Monmouth, Wayne, and Winthrop may provide in-kind support through providing labor and/or materials to address any road-related NPS problems. The towns will also continue their strong enforcement of local and state ordinances that address lake water quality issues.

E. Information & Education Outreach

An education and information program is central to reduce NPS in the Wilson Pond watershed. The program will address all levels of the community, including shoreline and non-shoreline related development as well as public school programs.

Public education in the watershed will be largely conducted by the Friends of the Cobbossee Watershed (FOCW), the CWD, and the Berry Dexter Wilson Watershed Association (BDWWA). The CWD has for more than four decades provided public education through local publications, contributions to lake association meetings and newsletters, as well as through project related demonstrations. The FOCW formed in the early 2000's to provide support to a common mission to protect area lakes and ponds. They have developed top-notch watershed education programs including a LakeSmart-Start! Program to provide community-wide education and technical assistance, their Tadpole Patrol program, and a year-round watershed education program tailored to students in watershed towns. Additionally, the FOCW provides on-pond education via their education vessel, the pontoon boat, the OTTER II. These three principal groups will coordinate their respective programs to provide a long-term education and outreach campaign that will reach all levels of the community to educate them about lake and watershed protection in general, and about project specific information, with the goal being watershed-wide appreciation of watershed issues and adoption of lake protective practices.

F. Implementation Schedule

2023: The CWD will re-survey the watershed for NPS sites in early to mid-spring when NPS sites are most visible, particularly those related to camp/gravel roads surrounding the three ponds. All information will be entered into the Wilson Pond NPS Site-tracker Spreadsheet.

2024-2025: Implement NPS Project - Wilson Pond NPS Watershed Restoration Project, Phase III (Monmouth, Wayne & Winthrop).

2026: The CWD will review lake water quality monitoring data to date, coupled with an assessment of the results of the Phase III project. Based on this assessment and consultation with MDEP, if a Phase IV project, which may involve nutrient inactivation of pond sediments, were to be warranted, a grant proposal would be prepared and submitted to MDEP, and if funded, would likely commence in 2027.

2027 – 2028: Implement NPS Project – Wilson Pond NPS Watershed Restoration Project, Phase IV (Monmouth, Wayne & Winthrop).

2023-2032: The CWD will continue their longstanding water quality monitoring program and with MDEP will assess water quality data and gauge the success of watershed implementation work and if the stated goals are being met.

2023 – 2032: Cobbossee Watershed District and the Friends of the Cobbossee Watershed will continue programs to provide education and outreach to watershed citizens, municipal officials, and local schools.

Table 2. Action Plan & Milestones	Schedule	Who	Potential Funding Sources	Estimated Cost
Address the External Phosphorus Load in Wilson Pond				
Address NPS Problems on Private Camp Roads				
Conduct rainy day road survey and update NPS Site Tracker with additional NPS sites	2023	CWD, BDWWA	CWD	$1,000
Address Priority Sites Identified in the Watershed Survey and NPS Site Tracker through Phase III and Phase IV Projects (Goal – 30 sites)	2024-2028	CWD, Towns, Road Associations	Towns, Road Associations, US EPA (319), Maine DEP	$250,000
Address NPS Problems on Shorefront Residential Properties				
Provide landowners with technical assistance and utilize the FOCW's Youth Conservation Corps to install residential BMPs (Goal – 20 sites)	2024-2028	FOCW, CWD	FOCW, US EPA (319), BDWWA, Landowners	$100,000
Address Non-Shoreline NPS Sites				
Implement BMPs at 25 residential sites	2024-2028	Towns, Landowners	CWD, Towns, US EPA (319)	$75,000
Address Agricultural Problems				
Implement Nutrient Management BMPs on manured hayland	2023-2032	CWD, NRCS, Farmers	USDA-NRCS (EQUIP)	unknown
Education, Outreach & Communications				
Prepare and distribute press releases about watershed restoration	Ongoing	CWD, FOCW	CWD, FOCW	$2,000
Promote vegetated buffers, responsible lawn care and erosion control practices, septic maintenance and pet waste management.	2023-2032	CWD, FOCW, BDWWA	CWD, FOCW, BDWWA, US EPA (319)	$50,000
Educate citizens about water quality and watershed stewardship through Tadpole Patrol program and pontoon boat Otter II program	Ongoing	FOCW	FOCW	$100,000
Prevent New Sources of NPS Pollution				
Attend regular planning board meetings and provide input on development proposed for the watershed	Ongoing	CWD	n/a	n/a
Work with town planning boards to strengthen town ordinances and ensure timely enforcement of current rules that protect water quality	Ongoing	CWD	n/a	n/a
Conduct Long-Term Monitoring & Assessment				
Continue collecting intensive baseline water quality data	Ongoing	CWD	CWD	$175,000
Update NPS Site Tracker on annual basis	Ongoing	CWD	CWD, US EPA (319)	$600/yr
Address the Internal Phosphorus Load if Applicable				
Conduct Nutrient Inactivation (i.e., Alum) Treatment	2027-2028	CWD	CWD, Towns, US EPA (319)	$ 650,000

G. Milestones to Measure Progress Implementing Management Actions

1. An annual review of progress relative to the schedule (Element F) should be conducted in January in each of the ten years (2023-2032), and adjustments made as necessary. This would be done by CWD, FOCW, and BDWWA.

2. An annual review of available funding sources relative to anticipated funding (Element D) should be conducted in January of each of the ten years (2023-2032), and additional efforts to procure funding developed if needed. This would be done by CWD.

3. An annual review of progress with the information and education program should be conducted in each of the ten years (2023-2032), with the action items stated in Element E serving as a checklist. This would be done by CWD, FOCW, and the BDWWA.

4. BMP implementation is expected to be complete at 15 road sites by the end of 2025. CWD will maintain its Site Tracker spreadsheet to document the status of road sites.

5. It is anticipated that by the end of 2025, owners of at least 13 (of the ultimate goal of 25) shorefront properties will have received technical assistance visits regarding site specific BMP plans, and that BMPS will have been installed at those sites needing cost-sharing and/or FOCW YCC projects. This will be tracked and evaluated by FOCW and CWD. By the end of 2025, dependent on successful funding, BMPS will be implemented at the remaining 12 or fewer shorefront properties. The BDWWA and CWD will also attempt to track those non-shorefront sites where homeowners will likely implement practices on their own, and completeness of this tracking will be evaluated at the end of 2025 and again at the end of 2028.

6. An alum treatment has been recognized as a possible future BMP. If following the anticipated Wilson Pond NPS Watershed Restoration Phase III project and a thorough review of Wilson Pond water quality, including the extent of internal loading of phosphorus to the pond, stakeholders will decide if an alum treatment is both needed and deemed cost-effective. If it is agreed that the internal load needs to be reduced in order to satisfy water quality goals, then a Phase IV project involving an alum treatment in Wilson Pond will be applied for. If this course of action is not selected, however, then the Phase IV project would be similar to the Phase III project.

H. Criteria to Determine Progress in Attaining WQ Standards & Load Reductions

Attaining Water Quality Standards

Maine water quality criteria require lakes have a stable or improving trophic state and be free of culturally induced algal blooms. Maine's functional definition of a nuisance, or severe, algae bloom is an annual minimum Secchi disk transparency (SDT) of less than 2.0 meters (i.e., an algae bloom is declared if the SDT falls below 2.0 meters once during the year). The CWD, on the other hand, has slightly more stringent standards, with the minimum acceptable SDT being 3.0 meters. As with all lakes in the Cobbossee Stream watershed, this is certainly one of the CWD's goals for Wilson Pond. Unfortunately, in seven of the previous ten years (2012-2021), the annual minimum SDT values were between 2 and 3 meters, with the worst of these years being 2018, when the minimum SDT was 2.0 meters. Over the course of the ten-year plan period, an interim goal is that the occasional observation of a single SDT approaching the "severe algae bloom" level (i.e., SDT between 2 and 3 meters) will cease sequentially as scheduled in Table 3. It is anticipated that if water clarity were to improve accordingly and the trend continued, the pond could ultimately be deemed to attain water quality standards, in which case DEP could elect to remove the lake from the 303(d) list.

Table 3. Water Quality Benchmarks	Interim Targets		
	2023-2024	2025-2028	2029-2032
Stabilize or Decrease In-lake Annual Average Total Phosphorus concentration	<=16 ppb	<=15 ppb	<= 14 ppb (Stable)
Decrease in the Maximum Observed Total Phosphorus concentration on any single event	<= 20 ppb	<= 18 ppb	<= 17 ppb
Decreased number years observing annual minimum SDT less than 3 meters?	<= 2	<= 1	0

Note: the symbol, <=, denotes "less than or equal to".

Load Reductions

The BMPs that are to be proposed over the course of this plan are projected to provide a reduction in annual phosphorus loading to the pond of about 105 kg/yr or greater from the watershed. The success of meeting the water quality benchmarks (Table 3) will largely depend on achieving the source-specific reduction goals stated in Table 1 and implementing the proposed schedule of activities presented in Element G, above. For the majority of major BMPs that are

expected to be implemented, pollutant load reduction estimates will be made using methods approved and recommended by the EPA. It is anticipated that the collective reduction of greater than 105 kgP/yr from all sources will serve to stabilize and or reduce the annual average phosphorus concentration over the 10-year plan period to a stable 14 ppb reflective of the interim target cited in the 2007 Wilson Pond TMDL.

And as previously noted, there is a scenario in which a nutrient inactivation project is conducted which could conceivably reduce annual phosphorus loading by as much as 138 kgP/yr from the pond's sediments. Such an action would immediately reduce the total annual phosphorus loading to the pond, providing great water quality benefits, especially during late summer and fall periods. (see scheduled interim targets in Table 3).

I. Monitoring Progress Compared to Criteria

CWD and DEP will periodically monitor progress as follows:

Attaining Water Quality Standards

The CWD will continue monitoring Wilson Pond water quality monthly from May through October each year. Water quality parameters include SDT, temperature, dissolved oxygen, chlorophyll *a*, and total phosphorus. With this continued monitoring effort, short-term and long-term trends in water quality parameters, particularly SDT and total phosphorus, will be easily documented. These data will be particularly valuable in alerting the CWD of any needs to make adjustments in the watershed plan.

Load Reduction Estimates

Estimates of NPS pollutant load reductions and resources protected will be prepared as project work proceeds. Pollutant load reduction estimates will be developed and reported as follows:

- During design or installation of BMPs at NPS sites, appropriate field measurements should be recorded to prepare written estimates of pollutant load reductions. Estimates should be prepared for NPS sites, unless there is no applicable estimation method for a given site. Methods to be used are the EPA's Pollutant Load Estimation Tool (PLET) (see website: https://www.epa.gov/nps/plet) and/or the federal WEPP Road Model (http://forest.moscowfsl.wsu.edu/fswepp/).

- For BMPs that provide other means of treatment, such as infiltration or bio-retention, the CWD will review other publications (e.g., MDEP, 2016[a] & 2016[b]) for estimates of pollutant removal.

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APPENDIX

Wilson Pond Watershed Assessment (October 2022)

Project #20190016
Wilson Pond Watershed-Based Plan Update Project
Task 3, Deliverable 4

Wilson Pond Watershed Assessment

October 2022

Prepared by: **Cobbossee Watershed District**, with
Maine Department of Environmental Protection

Acknowledgments

The Wilson Pond Watershed Assessment Project was made possible by the cooperative efforts of several individuals and organizations. The following organizations participated in the development of this survey:

- **Cobbossee Watershed District (CWD)**
- **Friends of the Cobbossee Watershed (FOCW)**
- **Berry Dexter Wilson Watershed Association (BDWWA)**
- **Maine Department of Environmental Protection (Maine DEP)**
- **United States Environmental Protection Agency (USEPA)**

Specifically,

The **watershed survey field work** was performed by the following organizations and individuals:

CWD - Bill Monagle and Wendy Dennis.
FOCW – Jay Lindsey.
BDWWA – Tim Biron, Mary & Glenn Griswold, Paula Nersesian, Eileen O'Reilly, and Bob Mascarelli.
Maine DEP –Greg Beane, Amanda Pratt, Maddy Crutchley, and Hanae Garrison.

All **mapping** of survey results was produced by Maddy Crutchley of the Maine DEP.

The **Wilson Pond Septic System Soils Vulnerability Analysis** was prepared by Amanda Pratt of the Maine DEP.

Steering Committee members included Bill Monagle (CWD), Ryan Burton (CWD), Wendy Dennis (CWD), Tamara Whitmore (FOCW), Toni Pied (FOCW), Jay Lindsey (FOCW), Eileen O'Reilly (BDWWA), Doug Ludewig (BDWWA/Town of Monmouth), Greg Beane (DEP), Amanda Pratt (DEP), and Maddy Crutchley (DEP).

Funding for this project, in part, was provided by the U.S. Environmental Protection Agency under Section 319 of the Clean Water Act. Section 319 grants are administered by the Maine Department of Environmental Protection in partnership with EPA. The DEP Grant Agreement Administrators were Greg Beane and Amanda Pratt.

This **Watershed Assessment Report** was prepared by CWD Project Manager, Bill Monagle.

For copies of this report, contact: *Cobbossee Watershed District, cwd@fairpoint.net.*

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INTRODUCTION

General Watershed and Lake Water Quality Information:

Wilson Pond is a 551 acre (223 ha) lake located in the Towns of Monmouth, Wayne and Winthrop in Kennebec County, Maine. The pond has a direct watershed area of 4,304 acres (6.7 sq. mi.), which is located completely in the Towns of Monmouth, Wayne, and Winthrop. The pond has a maximum depth of 43 feet, a mean depth of 23 feet, and a flushing rate of approximately 1.8 times per year. There are four small unnamed tributaries that contribute to the hydrologic and nutrient budgets of Wilson Pond. There are also two ponds immediately upstream of Wilson Pond (Berry and Dexter Ponds) that represent the major external water load to the pond, and which bring the total watershed of Wilson Pond, inclusive of the associated sub-watersheds, to 9,723 acres. The predominant land uses or cover types in the watershed, in general order, are forest, agriculture (hayland, orchards, miscellaneous non-row crops, and pasture), residential, gravel pits, and light commercial. Wilson Pond drains via a dam along the southeast portion of the pond. The dam is owned and operated by Tex-Tech Industries. The outlet, Wilson Stream, flows southerly to Annabessacook Lake.

> ***Watershed*** *– All of the land directly surrounding a lake and which serves as a source of water through tributaries, ditches, direct overland flow, or via groundwater.*

The shoreline of Wilson Pond is lightly to moderately developed in comparison to other regional lakes and ponds of the CWD. The eastern shoreline is more intensely developed than the west shore. Much of the land along the western shore of the pond is either prohibitively steep for further development or lacks access to land along the shoreline. There are about 120 structures located along the approximate 9 mile shoreline, of which, more than half are seasonal camps. There are two public boat launch facilities on the three ponds. One is located in Wayne on Berry Pond, and the other is in North Monmouth at the south end of Wilson Pond.

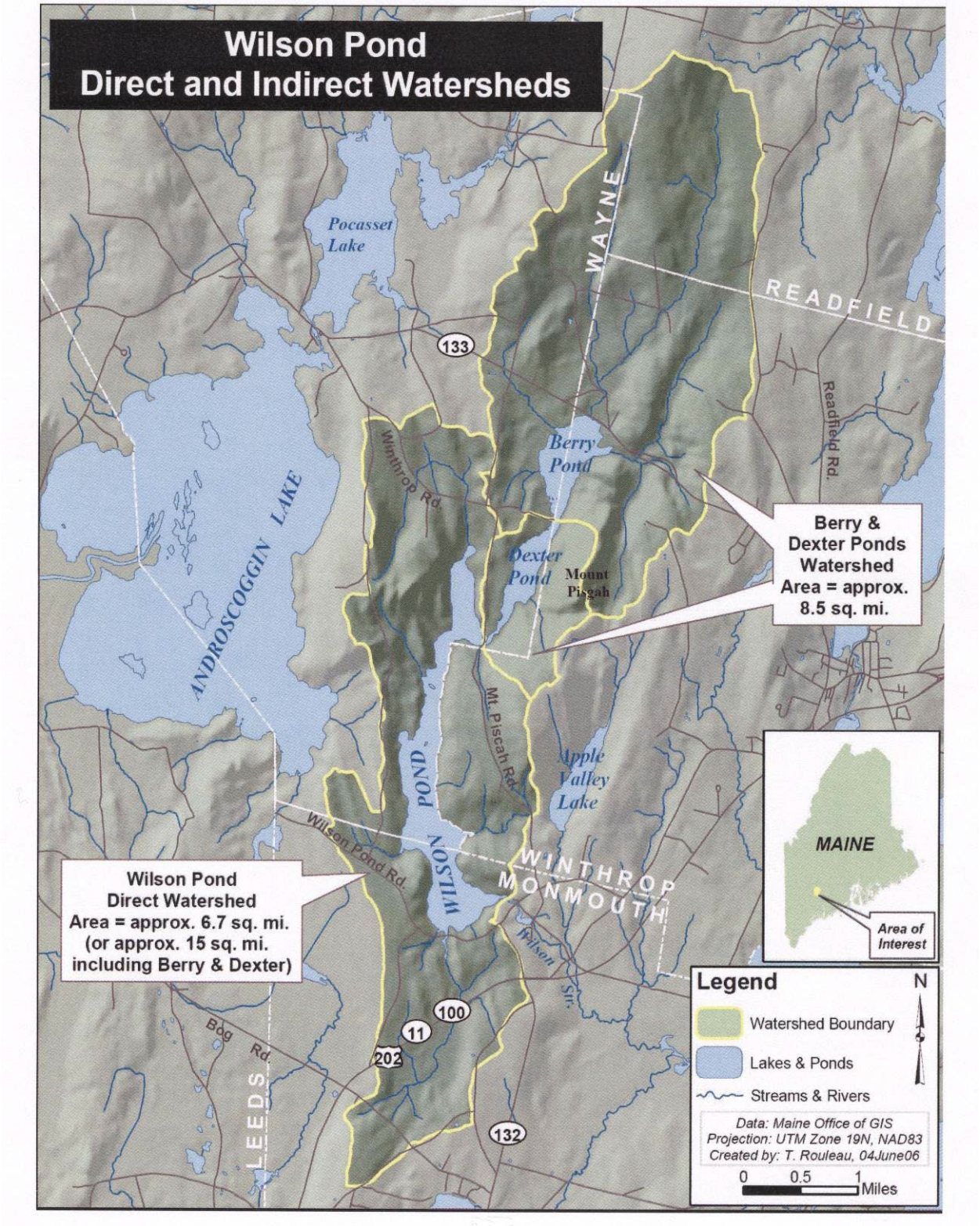
The Cobbossee Watershed District (CWD) has monitored Wilson Pond for over forty years, and based on the CWD's data, the Maine DEP has classified the pond as having moderate/sensitive water quality. The classification, and concern, is due in large part to increases in total phosphorus concentration, reduced water clarity, and depletion of dissolved oxygen in bottom waters. Of particular concern, is that this deteriorating trophic trend began in the early 1990's when Wilson Pond began exhibiting an abrupt and chronic reduction in water clarity of between 15 and 20 percent. During the 11 years prior to 1992, the pond had an average Secchi disk transparency (SDT) of 5.6 meters and an average annual minimum SDT of 4.2 meters. Over the past 30 years, however, the pond has exhibited a steady decline in water quality with an annual mean SDT of 4.5 meters, and the mean annual minimum value has been about 3.1 meters. The two upstream ponds, Dexter and Berry Ponds, have

> ***Phosphorus*** *– An essential plant nutrient that is considered most responsible for the proliferation of algae and aquatic plant growth in lakes.*

exhibited consistent water clarity that would be considered average, or slightly above average, compared to lakes statewide. Both of these ponds have relatively high flushing rates and a combined drainage area that is sizeable. Therefore, these two ponds and the respective drainage areas are likely to be very influential to Wilson Pond water quality.

The MDEP has placed Wilson Pond on its Nonpoint Source Priority Watersheds list and the list of Lakes Most at Risk from New Development under the state's Stormwater Law. Additionally, the pond was listed on Maine's 303(d) (TMDL) list in 2006, designating it as a lake that does not meet State water quality standards. An EPA-approved Phosphorus Control Action Plan and TMDL (PCAP-TMDL) was prepared by the CWD and others in 2007. Following this effort, the CWD prepared the *Wilson Pond (Monmouth, Wayne & Winthrop) Watershed Based Plan* (#2008RT32) which was completed in June 2009.

Figure 1. Map of Wilson Pond Direct & Indirect Watersheds



PREVIOUS SURVEY EFFORTS

As part of 2006 NPS watershed survey project (§319 project #2005R-02), a survey and land use determination of the collective watersheds of Berry, Dexter, and Wilson Ponds was performed in cooperation with the KCSWCD, volunteers of BDWWA, and students from Monmouth Academy. Forty-nine of the 82 NPS sites identified in the three watersheds were classified as either Medium or High Priority sites. However, there has not been a formal watershed survey of all NPS sources in the watershed conducted since that effort, but an assessment of potential sources of NPS throughout Wilson Pond's watershed was conducted by CWD during the preparation of the Wilson Pond Total Maximum Daily Load (TMDL) Report in 2007. And in preparing the TMDL, the CWD also surveyed the shoreline of Wilson Pond and identified 31 properties lacking shorefront vegetation, and another 35 properties with inadequate buffers.

> ***Total Maximum Daily Load (TMDL)*** *– In general, the loading capacity, or greatest loading of a pollutant a waterbody can receive without violating water quality standards.*

More recently, many NPS sites were identified during the preparation of candidate site lists to be included in the grant applications to Maine DEP to conduct watershed projects under Clean Water Act Section 319 funding. As a result, numerous NPS sites in the direct watersheds of Wilson, Dexter, and Berry Ponds were corrected as part of the Wilson Pond Water Quality Improvement Project (§319 project #2009RT06) and the Wilson Pond NPS Watershed Restoration Project, Phase II (§319 project #2014RT05) administered by CWD in partnership with Friends of the Cobbossee Watershed. In all, 40 NPS sites were addressed with varying degrees of sediment and phosphorus reduction as well as the stabilization of about 900 feet of eroding shoreline (see Survey Site-Tracker Spreadsheet in Appendix D).

PURPOSE OF THE WATERSHED ASSESSMENT

This Wilson Pond Watershed Assessment was undertaken to identify and document specific NPS problem sites where future BMPs should be implemented to further reduce sediment and/or phosphorus loading to the lake. The assessment was conducted as part of the Wilson Pond Watershed-Based Plan Update Project (§319 project #20190016). The assessment included a watershed survey of the collective watersheds of the three ponds for the purpose of identifying and prioritizing NPS problem sites for future BMP implementation based on their severity and their suitability for corrective measures. The survey process and results also serve to prepare citizens, road associations, and municipalities for understanding and accepting their own active roles in reducing soil erosion, regularly maintaining their own roads and protecting the lake, and provides support for updating the watershed-based plan. It also provides a list of candidate sites to target for mitigation in future watershed restoration efforts. The watershed assessment also included an analysis of the soils located in close proximity of the ponds and their tributaries to gage their suitability, or lack thereof, to support on-site wastewater treatment systems.

NPS SURVEY METHODS:

The survey was conducted by CWD, staff members of both the Friends of the Cobbossee Watershed (FOCW) and the Maine DEP, and volunteers from the BDWWA, and generally followed the "Maine DEP Lake and Stream Watershed Survey QAPP" (2009) and the guidance in the "Citizen's Guide to Volunteer Lake Watershed Surveys" (2011). Access to private property was to be limited to that permitted by the respective property owners. Prior to conducting the survey, notices of the survey were mailed to all shoreline property owners (approx. 260) and posted in the town offices in the Towns of Wayne, Winthrop, and Monmouth.

The effort began with a classroom training session held at the Winthrop Fire Department on Route 202 in Winthrop on May 21, 2022 immediately followed by 13 participants of the aforementioned groups surveying assigned sectors of the watershed. Training was conducted by CWD Project Manager Bill Monagle, DEP Agreement Administrator Amanda Pratt, and Maddy Crutchley (DEP). The survey began immediately following the training session and was largely completed that day. The watershed was divided into 7 sectors (See Figure 2), and surveyors were assigned a specific sector, or sectors. Surveyors were supplied with Microsoft Surface pads to enter data via ArcGIS Survey 123 (or hard copies of survey forms), sector maps, and a letter for property owners who might inquire about the survey, as well as other materials necessary to complete the survey. See Appendix A for an example of an NPS survey field sheet used in this survey and the informational letter to property owners. Each NPS site was assigned an NPS site number, located on the respective sector map, and the GPS location recorded in UTM and later converted to lat/long (decimal degrees).

SEPTIC SYSTEM SOILS VULNERABILITY ANALYSIS METHODS:

Soils in the Wilson, Berry, and Dexter Pond watershed were assessed based on their relative risk of short circuiting. Soil series that are at risk due to coarse texture (rated as very high or high risk) or being shallow to bedrock were identified by Maine State Soil Scientist Dave Rocque (retired). This analysis utilized Natural Resources Conservation Service (NRCS) National Cooperative Soil Survey data from the Soil Survey Geographic Database (SSURGO). Soils were mapped along with town tax parcels (data from Maine Office of GIS and watershed town tax maps).

In conducting this analysis, a buffer zone of 150 feet was drawn around all lakes and streams in the watershed. Any tax parcels that intersected with any soil series of interest within this buffer zone were flagged and exported to an excel spreadsheet. A digital imagery-based assessment of each parcel was completed to ascertain whether any developed portion of the parcel likely to be associated with a septic system (e.g., near a house) was on a soil series of interest. Parcels were classified as to their location (Berry Pond, Dexter Pond, tributary stream, etc.). A total of 89 unique parcels were identified as being on an at-risk or shallow to bedrock soil within 150 feet of a lake or stream in the watershed. Of these 89 parcels, 73 are located in Wayne and 16 are in Winthrop. The results were shared with local Licensed Plumbing Inspectors (LPIs).

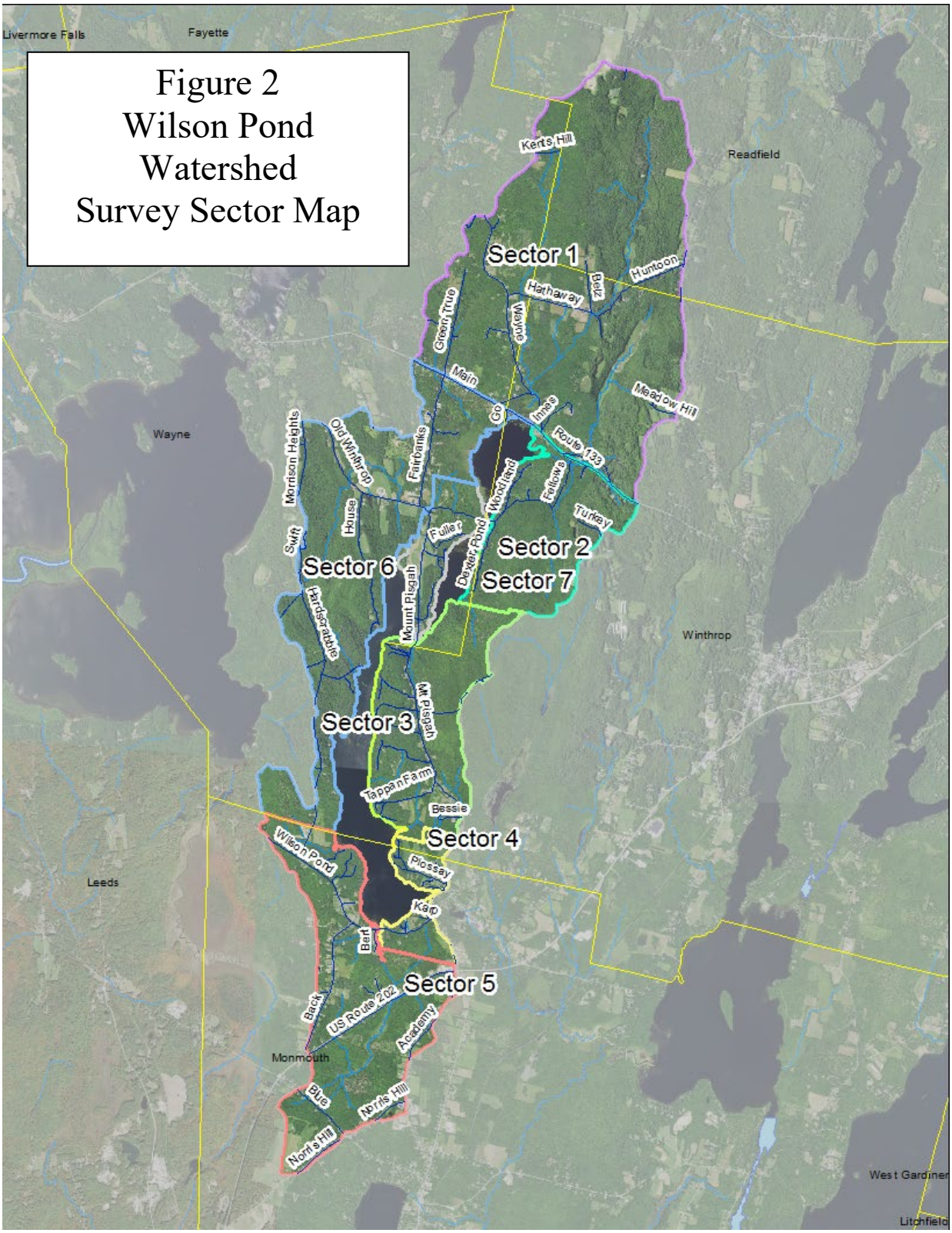


Figure 2
Wilson Pond
Watershed
Survey Sector Map
Livermore Falls
Fayette
Readfield
Wayne
Winthrop
Leeds
Monmouth
West Gardiner
Litchfield
Sector 1
Sector 2
Sector 3
Sector 4
Sector 5
Sector 6
Sector 7
Kents Hill
Huntoon
Hathaway
Belz
Green True
Weeks
Main
GP
Innes
Meadow Hill
Route 133
Old Winthrop
Morrison Heights
Fairbanks
Woodland
Fellows
Turkey
House
Swift
Fuller
Dexter Pond
Hardscrabble
Mount Pisgah
Tappan Farm
Bessie
Wilson Pond
Plossay
Kamp
Bert
Back
US Route 202
Academy
Blue
Norris Hill
Norris Hill

SUMMARY OF SURVEY RESULTS

In general, there were 25 NPS "sites" identified that involved 11 subcategories of NPS-related problems described by surveyors. In most cases, a particular site satisfied more than one NPS problem category. Of the 25 NPS sites, 16 percent were considered to be High Priority, 48 percent as Medium Priority, and 36 percent as Low Priority (Figure 1). Priority ranking was based on a combination of factors including the type of erosion, relative size of eroded area and treatment by buffers (Table 1) with the intent being to rank the sites based on the degree of threat to lake water quality. A breakdown of NPS-related problem types is shown in Table 2 below.

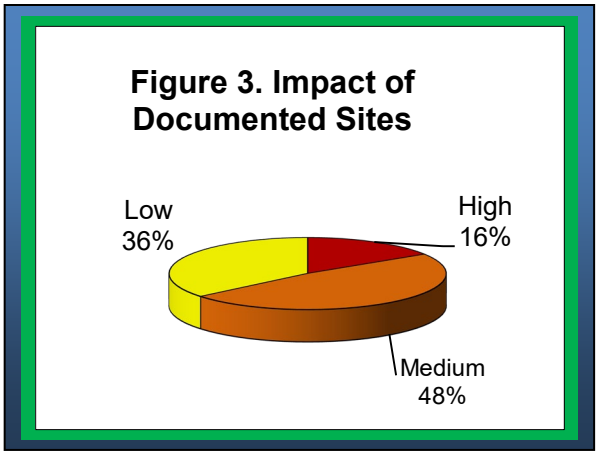


Table 1. Impact Rating for NPS Sites

Type of Erosion	Area	Buffers and Other Filters	IMPACT
Gully - **3**	Large - **3**	No filter, all channelized direct flow into lake or stream - **3**	High: **8-9** pts
Rill - **2**	Medium - **2**	Some buffer or filtering, but visible signs of concentrated flow and/or sediment movement through buffer and into lake - **2**	Med: **6-7** pts
Sheet - **1**	Small - **1**	Significant buffer or filtering - **1**	Low: **3-5** pts

Table 2. Occurrence of Identified NPS problems by Category

LAND USE TYPE	Number of NPS problems
Private Road Surface Erosion	**6**
Public Road	**5**
Private Driveway Surface Erosion	**4**
Public Boat Launch Erosion	**1**
Ditch Erosion	**6**
Culvert (undersized, clogged, or broken)	**5**
Roadside Shoulder Erosion	**2**
Lack of Vegetation/Bare Soil	**3**
General Site Erosion	**8**
Shoreline Erosion	**2**
Shoulder (grader) Berms	**2**

As the data in Table 2 suggest, the majority of NPS problems that were identified were related primarily to individual private roads and/or driveways, and public roads. These problems included surface and shoulder erosion, ditch erosion, culvert related problems. The remainder of NPS problems pertained to residential, primarily shorefront, properties.

The Appendices include Maps depicting the geo-located NPS sites (Appendix B) and a Site-Tracker Spreadsheet presenting the complete NPS survey results (yellow highlighted) as well as sites previously identified, some of which have been corrected (Appendix C). It is recommended that prior to pursuing any future funding under CWA Section 319 that efforts be made to conduct additional surveying, particularly during the early springtime when gravel road conditions tend to be challenged weather-wise and to afford better visual assessment of both land and road related problems. All newly generated information should be included into a well maintained Site-Tracker Spreadsheet.

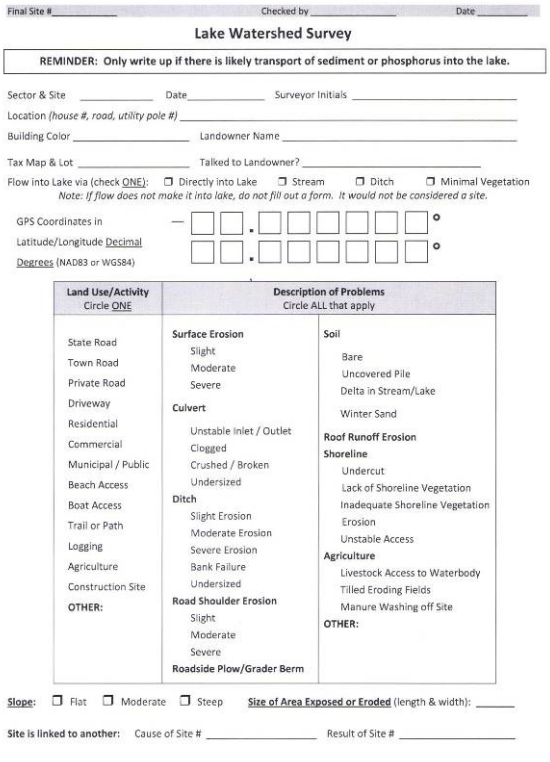
The updated Watershed-based Plan will combine information gathered during this survey effort with information contained in the Wilson Pond Total Maximum Daily Load- Phosphorus Control Action Plan (TMDL-PCAP) and gathered during the Wilson Pond Water Quality Improvement Project and the Wilson Pond NPS Watershed Restoration Project, Phase II, along with CWD's keen knowledge and understanding of the lake's watershed.

APPENDIX A

Watershed Survey Field Sheets and Information Letter to Landowners

Watershed Survey Field Sheet

Front



Final Site #_____ Checked by _____ Date _____

Lake Watershed Survey

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.

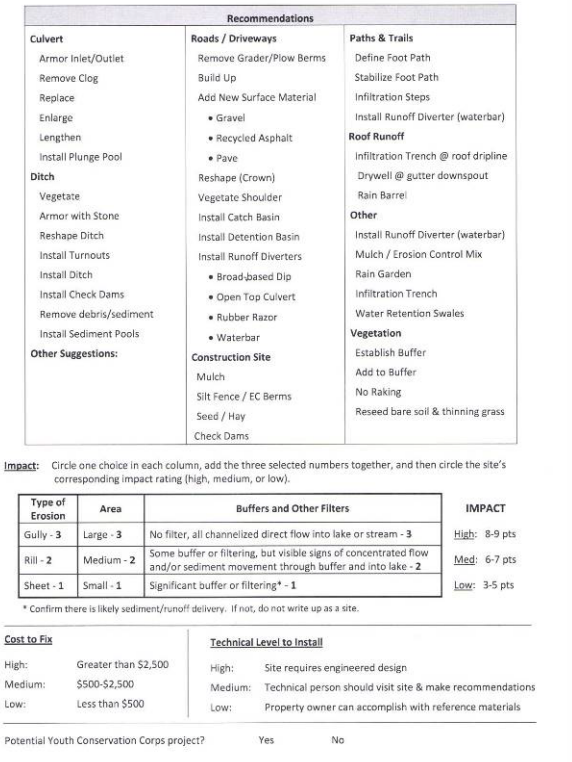
GPS Coordinates in Latitude/Longitude Decimal Degrees (NAD83 or WGS84) — ☐☐.☐☐☐☐☐☐° ☐☐.☐☐☐☐☐☐°

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
	Undersized	Tilled Eroding Fields
	Road Shoulder Erosion	Manure Washing off Site
	Slight	**OTHER:**
	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 # _____

Back



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 Plunge Pool	• Pave	Infiltration Trench @ roof dripline
Ditch	Reshape (Crown)	Drywell @ gutter downspout
Vegetate	Vegetate Shoulder	Rain Barrel
Armor with Stone	Install Catch Basin	**Other**
Reshape Ditch	Install Detention Basin	Install Runoff Diverter (waterbar)
Install Turnouts	Install Runoff Diverters	Mulch / Erosion Control Mix
Install Ditch	• Broad-based Dip	Rain Garden
Install Check Dams	• Open Top Culvert	Infiltration Trench
Remove debris/sediment	• Rubber Razor	Water Retention Swales
Install Sediment Pools	• Waterbar	**Vegetation**
Other Suggestions:	**Construction Site**	Establish Buffer
	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	IMPACT
Gully - **3**	Large - **3**	No filter, all channelized direct flow into lake or stream - **3**	High: 8-9 pts
Rill - **2**	Medium - **2**	Some buffer or filtering, but visible signs of concentrated flow and/or sediment movement through buffer and into lake - **2**	Med: 6-7 pts
Sheet - **1**	Small - **1**	Significant buffer or filtering* - **1**	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

Potential Youth Conservation Corps project? Yes No

April 29, 2022

Dear Wilson, Dexter, and Berry Ponds Watershed Landowners:

I am writing you to inform you that the Cobbossee Watershed District (CWD) is planning a survey of the Wilson Pond watershed, which will also include the respective direct watersheds of Dexter and Berry Ponds, on Saturday, May 21, 2022. The purpose of the survey is to locate erosion sites and possible sources of sediment contamination that may be having an impact on the pond's water quality.

A watershed survey entails teams of volunteers walking and driving throughout the specified watershed area looking for possible sources of pollution to the pond. Stormwater runoff carries nutrients (such as phosphorus) and pollutants (such as sediment) to the lake and can result in poor water quality. Soil erosion is the single largest pollutant (by volume) to Maine's surface waters.

The Wilson Pond watershed is the area where all rain and snowmelt running off the land drains to the pond. Activities in the watershed that take place a long distance from the pond can have as much impact on water quality as those that occur in the shoreline area. Wilson Pond's total watershed area covers about 16 square miles.

The survey will be conducted by the CWD, Friends of Cobbossee Watershed, and volunteers with assistance provided by technical experts from the Maine Department of Environmental Protection. Although most of the survey fieldwork will be conducted on May 21st, some follow-up fieldwork also may occur later in June and in July.

Locally-led watershed surveys such as this one have been used successfully throughout Maine to document threats to water quality. The information we gather will be used to give us a better handle on possible sources of pollution to Wilson Pond, to provide opportunities for addressing problem sites, and to provide the information needed for CWD to apply for grant funds that can be used to fix priority problems.

Your participation, as a landowner of property within Wilson Pond's total watershed is purely voluntary. We would like to include your land in this survey, but we will respect your property lines if you do not wish for us to include your property in this survey. Please contact me at 207-377-2234, or email to cwd@fairpoint.net, if you do not want us to survey your land, or if you simply would like to learn more about the Cobbossee Watershed District, or for any other reason.

The CWD is pleased to lead this project to help protect and enhance the quality of Wilson Pond.

Sincerely,

Executive Director

P.S. If you would like to volunteer to assist us on the May 21st survey please contact me at 207-377-2234, or email me at cwd@fairpoint.net. We will have a brief training session in the morning, and then we'll break into teams to survey the watershed. It's an enjoyable activity and provides valuable information to protect our lakes.

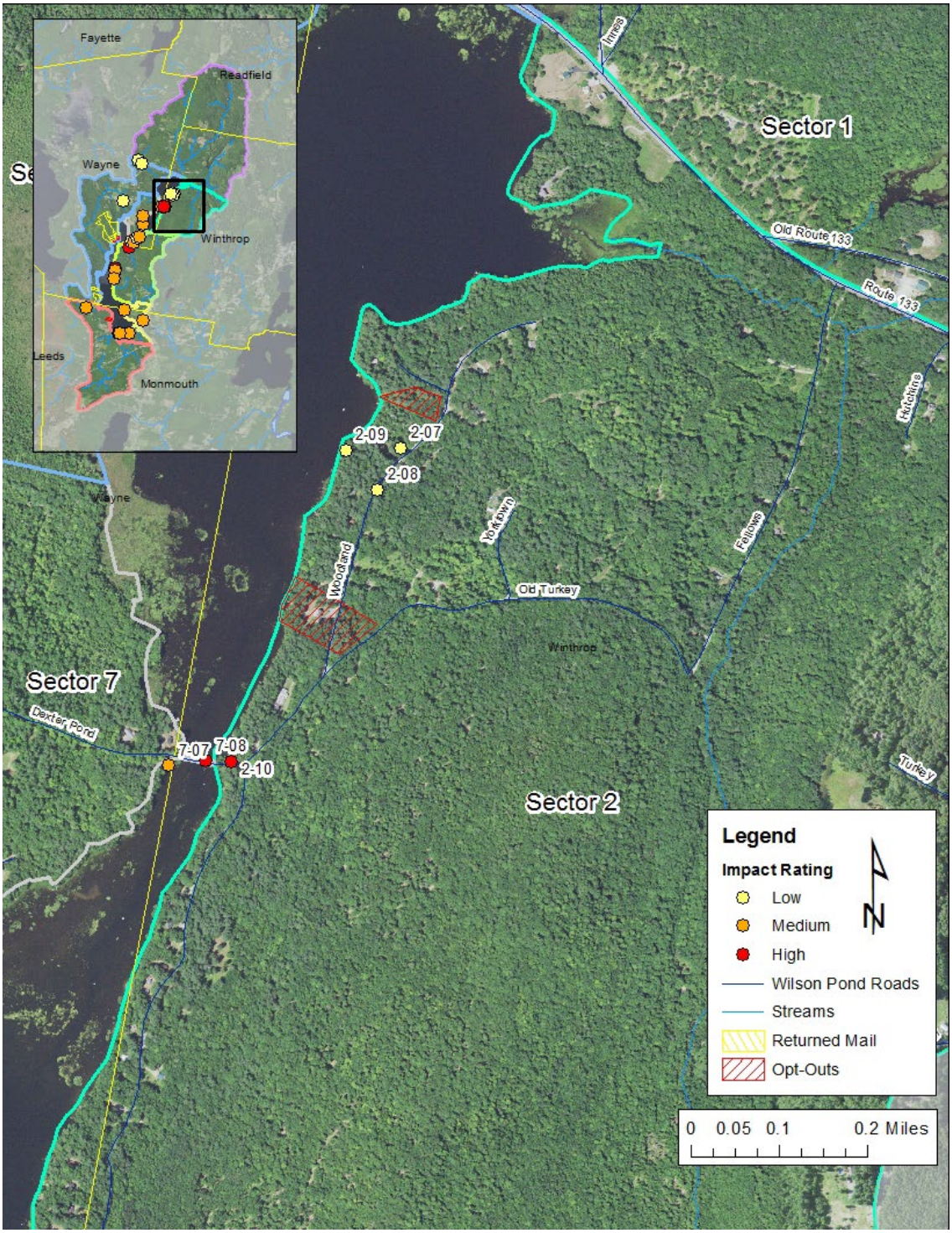
APPENDIX B

Mapped Watershed Survey Results – 7 Sectors/ 6 Maps
(There were no NPS sites identified in Sector 1)

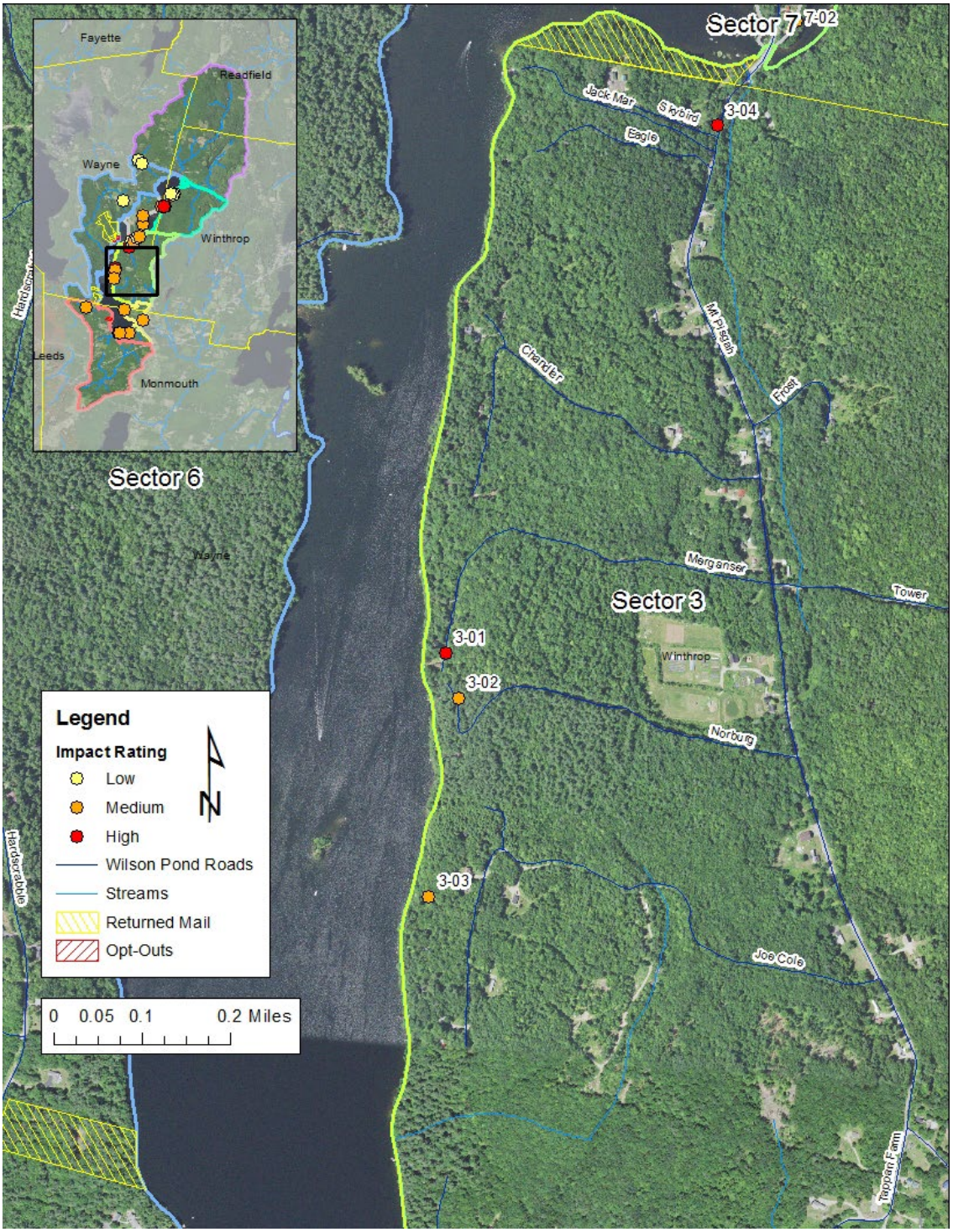
Individually mapped NPS sites are color-coded.

- **Red – High Priority**
- **Orange – Medium Priority**
- **Yellow – Low Priority**

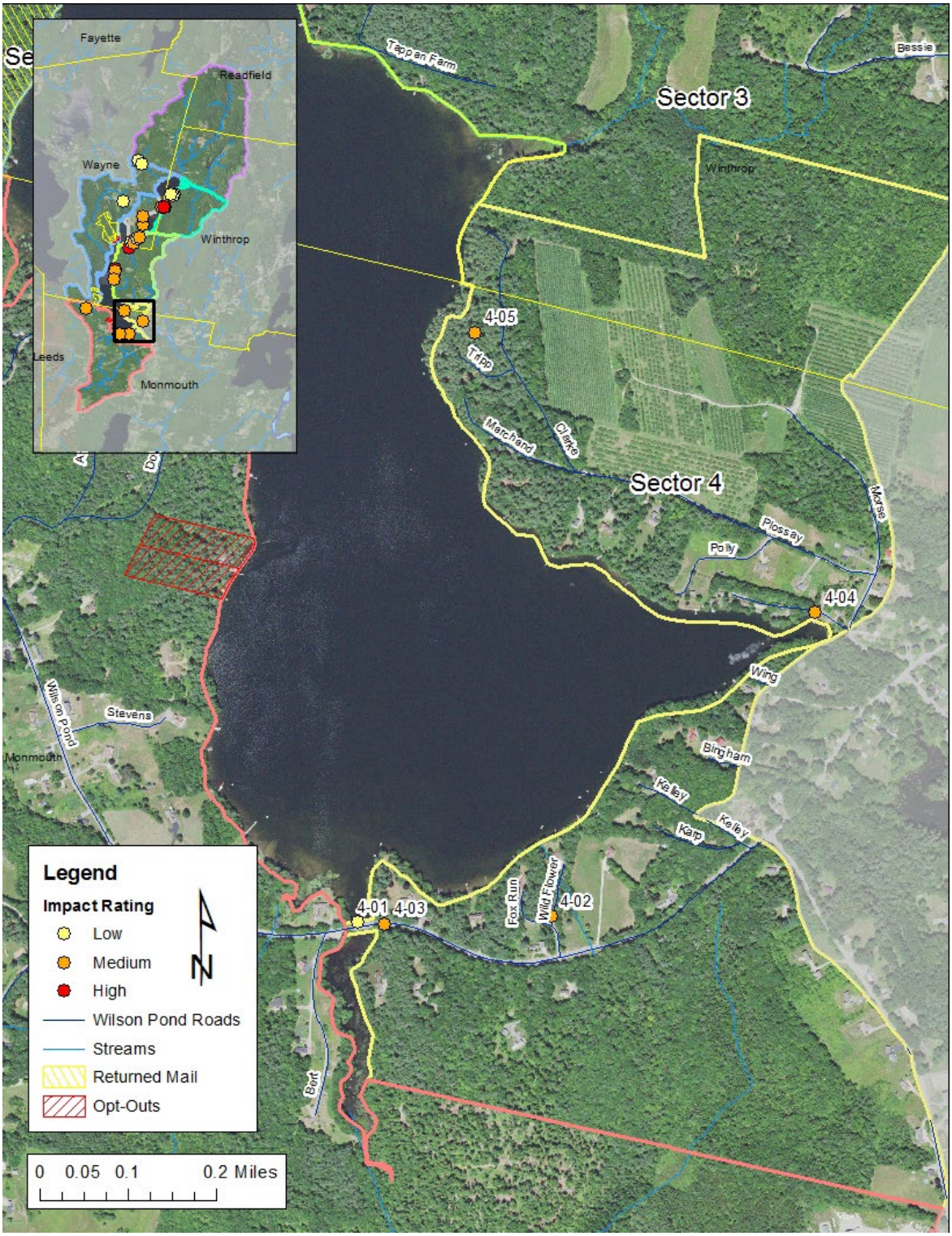
Wilson, Dexter, and Berry Ponds Watershed Survey
Sector 2 Identified Sites 2022



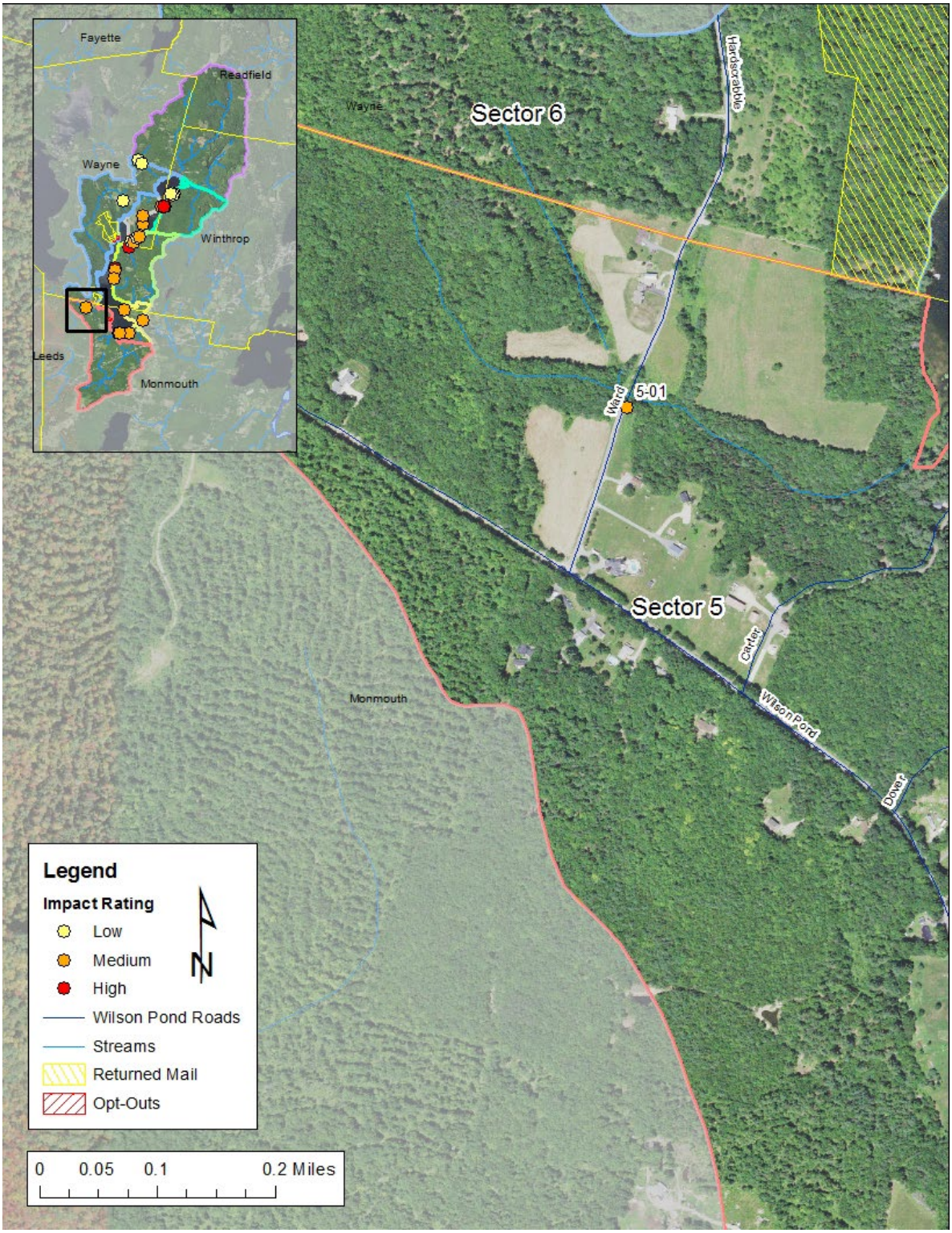
Wilson, Dexter, and Berry Ponds Watershed Survey
Sector 3 Identified Sites 2022



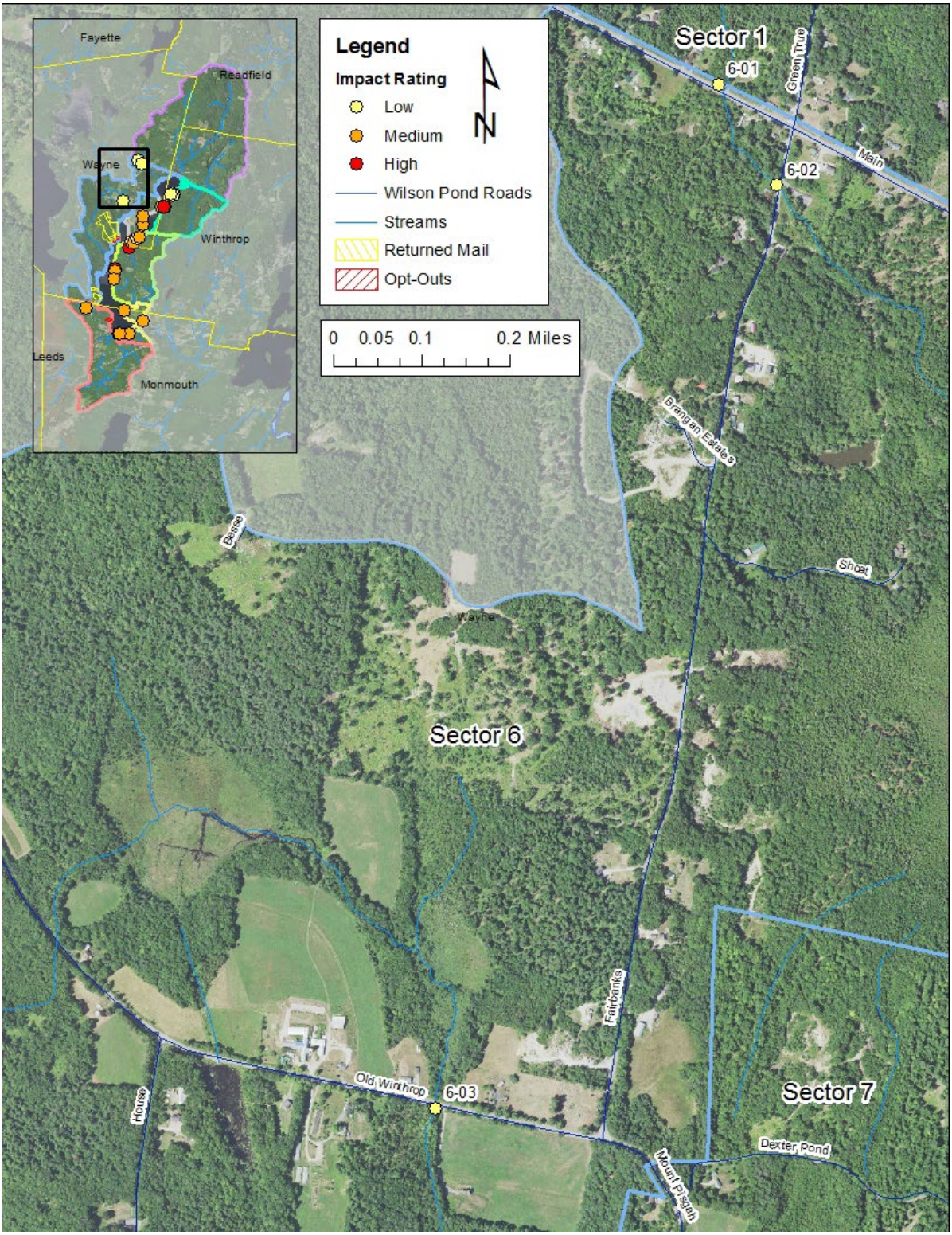
Wilson, Dexter, and Berry Ponds Watershed Survey
Sector 4 Identified Sites 2022



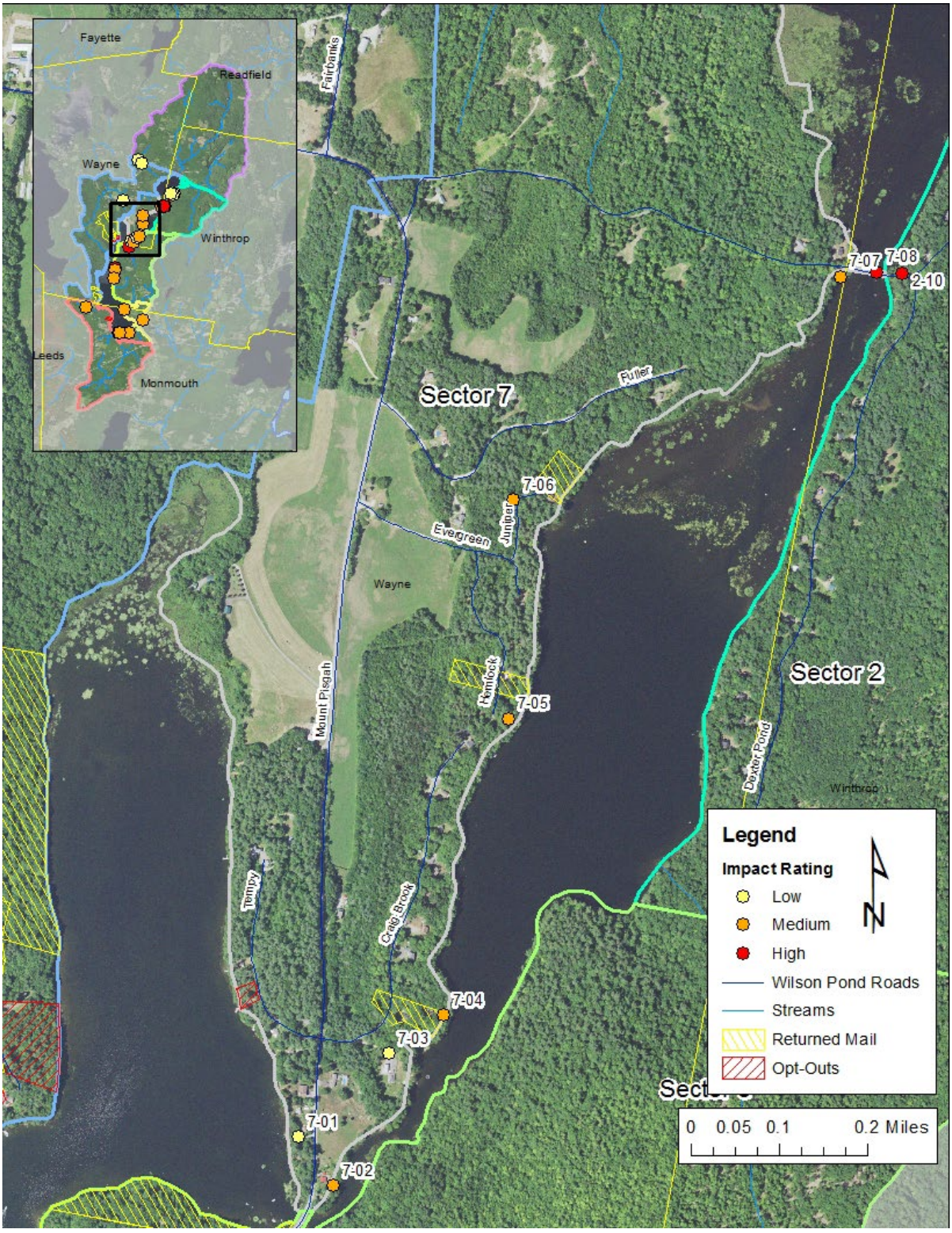
Wilson, Dexter, and Berry Ponds Watershed Survey
Sector 5 Identified Sites 2022



Wilson, Dexter, and Berry Ponds Watershed Survey
Sector 6 Identified Sites 2022



Wilson, Dexter, and Berry Ponds Watershed Survey
Sector 7 Identified Sites 2022



APPENDIX C

Wilson Pond Septic System Soils Vulnerability Analysis

Wilson Pond Septic System Soils Vulnerability Analysis
By Amanda Pratt, Maine DEP

Introduction

Soils in the Wilson, Berry, and Dexter Pond watershed were assessed based on their relative risk of short circuiting. Soil series that are at risk due to coarse texture (rated as very high or high risk) or being shallow to bedrock were identified by Maine State Soil Scientist Dave Rocque (retired). This analysis utilized Natural Resources Conservation Service (NRCS) National Cooperative Soil Survey data from the Soil Survey Geographic Database (SSURGO). Soils were mapped along with town tax parcels (data from Maine Office of GIS and watershed town tax maps).

A buffer zone of 150 feet was drawn around all lakes and streams in the watershed. Tax parcels that intersected with any soil series of interest within this buffer zone were flagged and exported to an excel spreadsheet. A digital imagery-based assessment of each parcel was completed to ascertain whether any developed portion of the parcel likely to be associated with a septic system (e.g., near a house) was on a soil series of interest. Additionally, parcels were classified by their location (Berry Pond, Dexter Pond, tributary stream, etc.). A total of 89 unique parcels were identified as being on an at risk or shallow to bedrock soil within 150 feet of a lake or stream in the watershed. Of these 89 parcels, 73 are located in Wayne and 16 are in Winthrop.

Results

Table 1. Breakdown of parcels by waterbody and soil risk type/rating.

Type	Shallow to Bedrock	Very High Risk Coarse	High Risk Coarse	Total
Berry Pond	2	9	0	11
Dexter Pond	0	26	0	26
Wilson Pond	1	10	1	12
Tributary	14	14	3	31
Other/Multiple Ponds	3	5	1	9
Total	20	64	5	89

In table 1, for parcels with multiple coarse soils, the parcel was counted in the column of the highest-risk soil it contained.

Table 2. Breakdown of likelihood of septic system, by town

Town	Septic Likey	Septic Unlikely	Total
Wayne	50	23	73
Winthrop	5	11	16
Total	55	34	89

The determination of likelihood in Table 2 is based on a rapid visual assessment of aerial imagery. Likelihood of a septic system was assessed for only the portion of the parcel that intersected with the at risk or shallow to bedrock soil series. If coarse or shallow to bedrock soils were mapped in a developed area of the parcel that was likely to have a septic system (e.g., a house or large building), the parcel was counted.

Table 3. At-Risk soil types and their prevalence within the Wilson, Berry and Dexter Pond Watershed

Soil Type	Risk	Acres	% of Watershed
Deerfield	High	32	0.7%
Hinckley	Very High	575	11.8%
Lyman-Tunbridge Complex	Shallow to Bedrock	896	18.5%
Lyman-Abram-Rock Outcrop Complex	Shallow to Bedrock	54	1.1%
Scarboro	Very High	68	1.4%
Windsor	High	68	1.4%

Table 3 presents data for the entire watershed and is not limited to just the soils within 150 feet of a lake or stream resource.

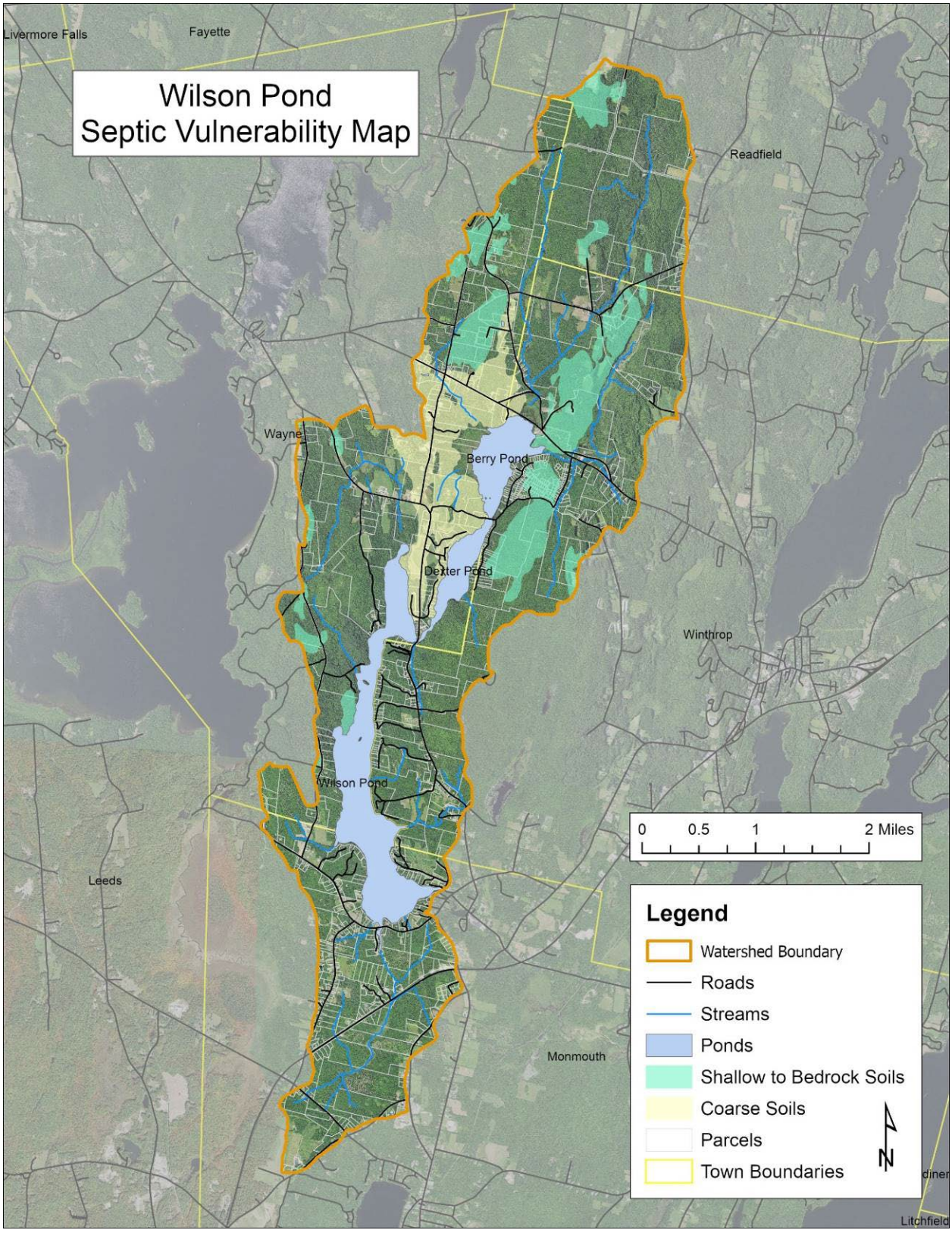
Summary

A total of 89 parcels on coarse or shallow to bedrock soils are within 150 of a stream or lake resource in the watershed of Wilson, Berry and Dexter Ponds. In the entire watershed, there are 950 acres of shallow to bedrock soils (19.6% of the entire watershed area) and 743 acres of coarse soils (15.3% of the watershed area).

Sixty-two percent of the 89 identified parcels are likely to have septic systems intersecting with coarse or shallow to bedrock soils. The majority of these parcels are located in the town of Wayne. Of the soils of concern identified, 51.6% by area are shallow to bedrock, 5.9% are high risk, and 38.0% are at very high risk for short circuiting.

Future assessment should be focused on the parcels that were identified as likely to have septic systems on coarse and shallow to bedrock soils. Town records should be used to identify the location and age of septic systems in these areas and parcels should be further prioritized for on-the-ground inspection.

Appendix A. Soils Map



Appendix B. Wilson Pond Septic Analysis Spreadsheet

Town	Tax Map and Lot	#	Street	Buffer Distance (ft)	Buffer Type	Soil Series	Designation	Location	Likely Septic?
Wayne	003-054-B	0	Dexter Pond Rd	150	Pond	HkB	Very High Risk (coarse)	Berry Pond	No
Wayne	003-055	0	On Berry Pond	150	Pond	HkC	Very High Risk (coarse)	Berry Pond	No
Wayne	003-054	0	Dexter Pond Rd	150	Pond/ Stream	HkB, HkC	Very High Risk (coarse)	Berry Pond	No
Wayne	005-045	0	Fairbanks Road	150	Pond/ Stream	Sd, HkC	Very High Risk (coarse)	Berry Pond	No
Wayne	003-057-A	0		150	Pond	HkB, HkC	Very High Risk (coarse)	Dexter/Berry	No
Wayne	003-057	0	Dexter Pond	150	Pond	HkB, HkC	Very High Risk (coarse)	Dexter Pond	No
Wayne	003-063-001	0	Dexter Pond	150	Pond	HkB, HkC	Very High Risk (coarse)	Dexter Pond	No
Wayne	003-063-003	0		150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	No
Wayne	016-049	0	Juniper Lane	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	No
Wayne	016-052	0	Juniper Lane	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	No
Wayne	016-053	0	Fuller Road	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	No
Wayne	005-024	0		150	Stream	HrC	Shallow to Bedrock	Trib to Berry Pond	No
Wayne	005-047	0	Fairbanks Road	150	Stream	HrC	Shallow to Bedrock	Trib to Berry Pond	No
Wayne	005-049	0	Maxim Road	150	Stream	HrC	Shallow to Bedrock	Trib to Berry Pond	No
Wayne	005-077-A	0	Green True Rd	150	Stream	HrC	Shallow to Bedrock	Trib to Berry Pond	No
Wayne	003-046	0	Fairbanks Road	150	Stream	DeB, HkB, HkC	High & Very High Risk (coarse)	Trib to Berry Pond	No
Wayne	003-053	0	Dexter Pond Rd	150	Stream	DeB, HkB, HkC, Sd	High & Very High Risk (coarse)	Trib to Berry Pond	No
Wayne	003-057B-1	0	Dexter Pond Rd	150	Stream	HkC	Very High Risk (coarse)	Trib to Berry Pond	No
Wayne	005-038	0	Fairbanks Road	150	Stream	DeB	High Risk (coarse)	Trib to Berry Pond	No
Wayne	005-068	0	Route 133	150	Stream	DeB, HkB, Sd	High & Very High Risk (coarse)	Trib to Berry Pond	No
Wayne	003-040	0	Old Winthrop Rd	150	Stream	Sd	Very High Risk (coarse)	Trib to Wilson	No
Wayne	003-049	0	Fairbanks Road	150	Stream	HkC, Sd	Very High Risk (coarse)	Trib to Wilson	No
Wayne	001-007	0	Hardscrabble Rd	150	Pond	HrC	Shallow to Bedrock	Wilson Pond	No
Wayne	005-068-A	0	Main Street	150	Pond	HkC, Sd	Very High Risk (coarse)	Berry Pond	Yes

Town	Tax Map and Lot	#	Street	Buffer Distance (ft)	Buffer Type	Soil Series	Designation	Location	Likely Septic?
Wayne	005-075	0	Route 133	150	Pond	HkC	Very High Risk (coarse)	Berry Pond	Yes
Wayne	003-054-A	0	Dexter Pond Rd	150	Pond	HkB	Very High Risk (coarse)	Dexter/Berry	Yes
Wayne	003-056	0	Dexter Pond Rd	150	Pond	HkB	Very High Risk (coarse)	Dexter/Berry	Yes
Wayne	003-063-002	0	Fuller Road	150	Pond	HkB, HkC	Very High Risk (coarse)	Dexter Pond	Yes
Wayne	003-063-004-B	0	Fuller Road	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	Yes
Wayne	016-034	0	Dexter Pond	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	Yes
Wayne	016-035-001	0	Craig Brook Trail	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	Yes
Wayne	016-035-002	0	Craig Brook Trail	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	Yes
Wayne	016-035-003	0	Craig Brook Trail	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	Yes
Wayne	016-035-004	0	Craig Brook Trail	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	Yes
Wayne	016-035-005	0	Craig Brook Trail	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	Yes
Wayne	016-035-006	0	Craig Brook Trail	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	Yes
Wayne	016-035-007	0	Craig Brook Trail	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	Yes
Wayne	016-035-008	0	Craig Brook Trail	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	Yes
Wayne	016-035-009	0	Craig Brook Trail	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	Yes
Wayne	016-035-010	0	Mt. Pisgah Road	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	Yes
Wayne	016-038	0	Evergreen Lane	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	Yes
Wayne	016-038-001	0	Hemlock Lane	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	Yes
Wayne	016-039	0	On Dexter Pond	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	Yes
Wayne	016-040	0	Hemlock Lane	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	Yes
Wayne	016-041	0	Hemlock Lane	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	Yes
Wayne	016-050	0	Juniper Lane	150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	Yes
Wayne	016-050-001	0		150	Pond	HkC	Very High Risk (coarse)	Dexter Pond	Yes
Wayne	005-077-003	0	North Wayne Rd	150	Pond	WmC	High Risk (coarse)	Small Pond	Yes
Wayne	005-077-009	0	North Wayne Rd	150	Pond	HkC, WmC, HrC	Very High & High Risk (coarse), Shallow to Bedrock	Small Pond	Yes
Wayne	005-077-A-004	0	Deer Hill Road	150	Pond	HrC	Shallow to Bedrock	Small Pond	Yes
Wayne	005-029	0	Main Street	150	Pond	HkC	Very High Risk (coarse)	Trib to Berry Pond	Yes
Wayne	005-077-005	0	Old Schoolhouse	150	Stream	HrC	Shallow to Bedrock	Trib to Berry Pond	Yes

Town	Tax Map and Lot	#	Street	Buffer Distance (ft)	Buffer Type	Soil Series	Designation	Location	Likely Septic?
			Ln						
Wayne	005-077-006	0	0ld Schoolhouse Ln	150	Stream	HrC	Shallow to Bedrock	Trib to Berry Pond	Yes
Wayne	005-033	0	Main Street	150	Stream	HkB, HkC	Very High Risk (coarse)	Trib to Berry Pond	Yes
Wayne	005-034	0	Main Street	150	Stream	HkB	Very High Risk (coarse)	Trib to Berry Pond	Yes
Wayne	005-035	0	Fairbanks Road	150	Stream	DeB, HkB	High & Very High Risk (coarse)	Trib to Berry Pond	Yes
Wayne	005-036	0	Main Street	150	Stream	DeB, HkB	High & Very High Risk (coarse)	Trib to Berry Pond	Yes
Wayne	005-037	0	Fairbanks Road	150	Stream	DeB, HkB	High & Very High Risk (coarse)	Trib to Berry Pond	Yes
Wayne	005-038-D	0	Fairbanks Road	150	Stream	DeB	High Risk (coarse)	Trib to Berry Pond	Yes
Wayne	005-040	0	Fairbanks Road	150	Stream	DeB	High Risk (coarse)	Trib to Berry Pond	Yes
Wayne	005-064	0	Main Street	150	Stream	DeB, HkB	High & Very High Risk (coarse)	Trib to Berry Pond	Yes
Wayne	005-028	0	Main Street	150	Stream /Pond	HkC	Very High Risk (coarse)	Trib to Berry Pond	Yes
Wayne	003-062	0	Mt. Pisgah Rd	150	Pond	WmB, WmC	High Risk (coarse)	Wilson Pond	Yes
Wayne	016-018	0	Mt. Pisgah Rd	150	Pond	HkB	Very High Risk (coarse)	Wilson Pond	Yes
Wayne	016-019	0	Tempy Lane	150	Pond	HkB	Very High Risk (coarse)	Wilson Pond	Yes
Wayne	016-021	0	Tempy Lane	150	Pond	HkB	Very High Risk (coarse)	Wilson Pond	Yes
Wayne	016-022	0	Tempy Lane	150	Pond	HkB, HkC	Very High Risk (coarse)	Wilson Pond	Yes
Wayne	016-023	0	Tempy Lane	150	Pond	HkC	Very High Risk (coarse)	Wilson Pond	Yes
Wayne	016-024-001	0	Tempy Lane	150	Pond	HkB, HkC	Very High Risk (coarse)	Wilson Pond	Yes
Wayne	016-025	0	Tempy Lane	150	Pond	HkB, HkC	Very High Risk (coarse)	Wilson Pond	Yes
Wayne	016-027	0	Tempy Lane	150	Pond	HkB, HkC	Very High Risk (coarse)	Wilson Pond	Yes
Wayne	016-030	0	Tempy Lane	150	Pond	HkB, HkC	Very High Risk (coarse)	Wilson Pond	Yes
Wayne	016-031	0	Tempy Lane	150	Pond	HkC, WmB	Very High & High Risk (coarse)	Wilson Pond	Yes
Winthrop	007-013-000-000	0	Route 133	150	Pond	HkB	Very High Risk (coarse)	Berry Pond	No
Winthrop	034-021-000-000	0	Old Turkey Lane	150	Pond	HkB	Very High Risk (coarse)	Dexter/Berry	No
Winthrop	007-020-000-000	72	Innes Road	150	Stream	HrD	Shallow to Bedrock	Fish & Game Pond	No
Winthrop	007-021-000-000	0	Route 133	150	Stream	HrD	Shallow to Bedrock	Fish & Game Pond	No
Winthrop	007-086-B00-000	0	Meadow Hill Rd	150	Stream	HrC, HrD	Shallow to Bedrock	Gardner Brook	No

Town	Tax Map and Lot	#	Street	Buffer Distance (ft)	Buffer Type	Soil Series	Designation	Location	Likely Septic?
Winthrop	007-003-A01-000	0	Old Turkey Lane	150	Stream	HrD	Shallow to Bedrock	Trib to Berry Pond	No
Winthrop	007-004-A00-000	0	Fellows Lane	150	Stream	HrD	Shallow to Bedrock	Trib to Berry Pond	No
Winthrop	007-031-A00-000	0	Turkey Lane	150	Stream	HrD	Shallow to Bedrock	Trib to Berry Pond	No
Winthrop	007-112-000-000	0	Turkey Lane	150	Stream	HrD	Shallow to Bedrock	Trib to Berry Pond	No
Winthrop	35A-001-003-000	0	Fellows Lane	150	Stream	HrD	Shallow to Bedrock	Trib to Berry Pond	No
Winthrop	35A-005-000-000	0	Woodland Road	150	Stream	HrD	Shallow to Bedrock	Trib to Berry Pond	No
Winthrop	007-010-000-000	792	Route 133	150	Pond	HrC	Shallow to Bedrock	Berry Pond	Yes
Winthrop	007-011-000-000	0	Route 133	150	Pond	HkB, HkC	Very High Risk (coarse)	Berry Pond	Yes
Winthrop	007-012-A00-000	8	Go Way	150	Pond	HkB, HkC	Very High Risk (coarse)	Berry Pond	Yes
Winthrop	007-010-B00-000	788	Route 133	150	Pond/ Stream	HrC, HrD	Shallow to Bedrock	Berry Pond	Yes
Winthrop	010-008-000-000	0	Belz Road	150	Stream	HrC	Shallow to Bedrock	Gardner Brook	Yes

APPENDIX D

Wilson Pond Watershed Site-Tracker Spreadsheet

(Sites identified in the 2022 survey are Highlighted in yellow)

Site #	Land Use	Location*	Latitude	Longitude	Description of Problem	Landowner name & contact info.	NPS Priority	Date Identified	Year Fixed	Lake Smart?	YCC?	Description of Work Completed	Funding Source
1.1	Private Road	Georges Road - Upper Section	44.305616	-70.053069	Road surface (600') erosion, no turnouts, and underisized culvert preventing drainage relief.	Wilson Pond Ladd Framily Trust. Licoln Ladd; 685-4716		Summer 2009	Fall 2009			Added gravel and super-elevated surface. Installed 4 waterbars (bumps) to direct runoff to buffer via turnouts. Replaced culvert	CWA §319 and local match
1.2	Private Road	Georges Road - Mid/Lower Section	44.305653	-70.050493	Road surface (1,100') erosion, no turnouts, and a constriction prohibiting any ditching causing excessive runoff volume and velocity.	Wilson Pond Ladd Framily Trust. Lincoln Ladd; 685-4716		Summer 2009	Fall 2010			Added gravel and super-elevated surface. Widen road at constriction to allow for ditch construction. Installed 9 waterbars (bumps) to direct runoff to ditch and buffer via turnouts	CWA §319 and local match
2	Private Road	Chandler Lane	44.304116	-70.041027	Road surface (1,150') erosion, clogged and undersized ditches, culverts, or turnouts.	Chandler Lane Road Assoc.		Summer 2009	Fall 2009			Added gravel and crowned surfaces. Installed 5 culverts (15" HDPE), rock-lined ditches, level spreaders, and plunge-pools	CWA §319 and local match
2-07	Residential	56 Woodland Road	44.330943	-70.020444	Moderate soil erosion with significant buffer/filter. Some shoreline erosion	Webster	Low	5/21/2022		No			
2-08	Residential	44 Woodland Road	44.330254	-70.020965	Moderately sloped with signs of sheet erosion to significant buffer.	DeBlois	Low	5/21/2022		No	No		
2-09	Residential	Woodland Road Pole #10	44.330898	-70.021699	Slight sheet erosion of flat terrain but with signs of sediment to lake. Shoreline undercut with erosion	Littlefield	Low	5/21/2022		No			
2-10	Private Road	Dexter Pond Road 13-1	44.325751	-70.024231	Steep road with a clogged culvert and surface, shoulder, and ditch erosion. No filter. Direct to lake forming delta	Dexter Pond Road Assn.	High	5/21/2022		No	No		
3	Private Driveway	91 Merganser Lane	44.300941	-70.044873	Undersized (18" CMP) culvert failure and complete driveway washout to pond	Field's Residence		Summer 2009	Fall 2009			Install 30" HDPE Culvert and stabilize in/out with rip-rap.	CWA §319 and local match

3-01	Wooded Steep Slope	101 Merganser Lane.	44.300194	-70.044833	Extreme erosion on steep slope creating a massive gulley. Discharges to ditch (Site 10.3). Sediment to pond creating large delta	Stevens	High	5/21/2022 Initially identified in 2014. See Site # 11 below.		No	No		
3-02	Private Road	Norburg Lane	44.299455	-70.044533	Moderately sloped with moderate to severe surface and ditch erosion. Some buffering, but evidence of sediment to lake	Blanchard	Medium	5/21/2022		No	No		
3-03	Driveway	94 Joe Cole Lane	44.296189	-70.045145	Steep 300' driveway with surface and ditch erosion with sediment to lake	Weymouth	Medium	5/21/2022		No	No		
3-04	Town Road	Mt. Pisgah Road Pole #10	44.308908	-70.038781	Steep road segment with eroded ditches that are undersized. Visible signs of sediment to lake	Town of Winthrop	High	5/21/2022		No	No		
4	Private Road	Joe Cole Lane	44.296766	-70.043111	Road surface (520')erosion, undersized culverts causing road washouts and erosion of ditches and ditch banks. Sediment dishcarge directly to pond.	Joe Cole Lane Road Assoc. Steve Ames; 441-4496		Summer 2011	Fall 2011			Added gravel and crowned surfaces. Reshape ditches and armor w/rip-rap. Installed 5 HDPE culverts to faciltate proper drainage. Armored ins/outs with	CWA §319 and local match
4-01	Boat Access	Town of Monmouth	44.273604	-70.043464	Surface and shoulder erosion of small area. Direct runoff to lake.	Town of Monmouth	Low	5/21/2022		No	No		
4-02	Private Driveway	24 Wildflower Lane	44.273736	-70.039043	Large moderate area with surface erosion to significant buffer.	Farrington	Medium	5/21/2022			Yes		
4-03	Private Driveway		44.273581	-70.042848	Paved steep drive with ditch erosion and bare soil. Some buffer, but visible signs of sediment to lake	Pollard	Medium	5/21/2022			No		
4-04	Private Road	Spring Meadow Lane Pole #15	44.278765	-70.033099	Road with surface erosion and grader berms. Some buffer, but visible signs of sediment to lake	NA	Medium	5/21/2022		No	No		

4-05	Private Driveway	Plossey Shores Road	44.283284	-70.040949	Steep driveway with surface erosion and shoulder berms. Some buffer, but visible signs of sediment to lake.	Manwell	Medium	5/21/2022		No	No		
5	Private Road	Craig Brook Trail	44.313079	-70.036857	Lack of culvert casued road flooding and erosion to brook/pond.	Charlie King; 685-4019		Summer 2011	Summer 2011			Installed 12" HDPE culvert, rock-lined ditch and settling basin discharging to 50' buffer	CWA §319 and local match
5-01	Town Road	Ward Road	44.284317	-70.05679	Town gravel road (700') with both surface and shoulder erosion. Some buffer, but visible signs of sediment to stream/lake	Town of Monmouth	Medium	6/14/2022		No	No		
6	Private Road	Woodland Road - Initial Section (south)	44.329124	-70.021553	Runoff from 400' of eroded road surface unimpeded to small stream/trib.	Woodland Road Association. Maynard Deblois		Summer 2010	Summer 2011			Add gravel and super-elevate to new 320' rock-line ditch. Installed 15' HDPE culvert and discharged to new rock-lined level-rimmed plunge pool to 75' buffer	CWA §319 and local match
6-01	State Road	Rte. 133 Pole #82/41	44.344873	-70.035097	Unstable culvert inlet and outlet. Some buffer, but visible signs of sediment to stream/lake	State of ME	Low	5/21/2022		No	No		
6-02	Town Road	Fairbanks Road Pole #03/3	44.343236	-70.033725	Unstable culvert inlet and outlet. Some buffer, but visible signs of sediment to stream/lake	Town of Wayne	Low	5/21/2022		No	No		
6-03	Town Road	Old Winthrop Road Pole #284-1	44.328051	-70.041261	Unstable culvert inlet and outlet. Some buffer, but visible signs of sediment to stream/lake	Town of Wayne	Low	5/21/2022		No	No		
7	Private Road	S. Georges Road	44.303664	-70.04841	Severe surface erosion on 350' steep approach to the pond. Sediment delivery to pond.	Wilson Pond Ladd Framily Trust. Licoln Ladd; 685-4716		Spring 2014	Summer 2014			Add crushed base (blue stone) material to surafce and super-elevate. Installed 4 waterbars (bumps) to deflect runoff to buffer.	CWA §319 and local match

7-01	Residential	247 Mt. Pisgah Road	44.311442	-70.037808	Patio area with bare soil and surface erosion. Lack of vegetation with no filter. Channelized to stream/lake	Farber	Low	5/21/2022		No	Yes		
7-02	Residential	256 Mt. Pisgah Road	44.310645	-70.036998	Bare soil and surface erosion. No filter. Channelized to stream/lake	Briggs	Medium	5/21/2022		No	Yes		
7-03	Residential	9 Craig Brook Trail	44.312832	-70.035748	Steep ditch with steep banks suffering erosion. Some buffer, but visible signs of sediment to lake	Schacter	Low	5/21/2022		No	Yes		
7-04	Residential	21 Craig Brook Trail	44.313478	-70.034519	Steep sloped area with bare soil and erosion. No buffer and channelized flow to lake	Olsen	Medium	5/21/2022		No	Yes		
7-05	Residential	End of Hemlock Lane	44.318356	-70.033124	Moderately sloped unstable eroded path to shore with no buffer. Channelized flow to lake	Brown	Medium	5/21/2022		No	Yes		
7-06	Private Road		44.321948	-70.033063	Road surface with erosion, undersized and clogged culvert causing stream overflow. Some buffer, but visible signs of sediment to lake	NA	Medium	5/21/2022		No	No		
7-07	Town Road	Dexter Pond Road	44.32568	-70.025658	Surface erosion at plow turnaround. No filter.	NA	Medium	5/21/2022		No	No		
7-08	Private Road	Dexter Pond Road	44.325767	-70.024817	Steep road segment with surface and shoulder erosion. No buffer and channelized flow to stream/lake	NA	High	5/21/2022		No			

8	Private Road	Woodland Road - Upper Section (north)	44.332105	-70.019273	Extreme road surface (~500') erosion, driveway (steep!) erosion, inadequate ditching and too few culverts. Sediment delivery to stream.	Woodland Road Association. Maynard Deblois		Summer 2010	Fall 2014			Add crsuhed base (blue stone) material to driveway and super-elevate. Install rip-rapped ditch to receive runoff. Add gravel to road and crown. Install rip-rapped ditch, 60' x 18" HDPE culvert to rock-lined plung pool and buffer. Installed 4 waterbars (bumps) to deflect runoff to buffer.	CWA §319 and local match
9	Private Road / bridge and causeway	Dexter Pond Road	44.325805	-70.024996	Moderate road surface erosion with severe erosion on causeway banks. Sediment delivery to Bery and Dexter Ponds	Dexter Pond Road Association, Rick Parker		Summer 2014	——			——	——
10.1	Private Road	Merganser Lane - Initial (Upper) Section	44.301803	-70.040182	Severe road surface erosion (900') with grader brsm and inadequate ditching and turnouts.	Merganser Laner Road Association, Larry Stevens		Summer 2016	Fall 2016			Added gravel and crowned surfaces. Rmoved berms and reshaped ditches. Installed 2 HDPE culverts and onne turnout to faciltate proper drainage to buffers. Armored	CWA §319 and local match
10.2	Private Road	Merganser Lane - Lower Section, parallel to sshore	44.300833	-70.044589	Excessive runoff from upland areas, via eroded ditch and 2 culverts, caused Extreme erosion of outfall areas, ditches, etc. With direct discharge to pond,	Merganser Laner Road Association, Larry Stevens		Summer 2014	Fall 2016			Add rip-rap to 75' of ditch, install 2 culverts (24" and 18") and apply geo-textile and rip-rap to ditch and very large rip-rap to outfall area.	CWA §319 and local match
10.3	Private Property	101 Merganser Lane. Drainage ditch to pond.	44.30012	-70.04487	Eroded ditch with slight meander that caused deflection of flows and erosion of adjacent banking. Discharge directly to pond.	Larry Stevens		Summer 2014	Fall 2016			Removed several small trees and soil contributing to the meander and applied heavy rip-rap to initial 75' of ditch.	CWA §319 and local match

11	Upland Gulley	Just west of 101 Merganser Lane	44.300035	-70.043852	Extreme erosion on steep slope creating a massive gulley. Discharges to ditch (Site 10.3). Sediment to pond creating large delta	Larry Stevens		Summer 2014	___			___	___
12	Public Road/Boat Launch (unofficial)	Mt. Pisgah Road	44.310269	-70.037641	Severe road shoulder, bank, and shoreline erosion (450 sf) as a result of boat trailer access.	Town of Wayne		Summer 2014				Graded bank and stabilized with geo-textile and rip-rap. Installed 75' guardrail extension to prevent further access	**CWA Section 319**

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