WATER QUALITY GOAL | MEMORANDUM

TO: Lisa Murphy, Strafford Regional Planning Commission
FROM: Erik Phenix & Christine Bunyon, FB Environmental Associates
SUBJECT: **Milton Three Ponds Water Quality Goal Documentation**
DATE: September 30, 2025
CC: Laura Diemer & Forrest Bell, FB Environmental Associates

This memo summarizes steps undertaken in determining a recommended water quality goal and objectives for Milton Three Ponds. The final water quality goal will be determined based on discussions among project partners and stakeholders at a Technical Advisory Committee meeting on 9/4/2025. The goal will be used to measure the success of future watershed management actions which will be recommended in the Milton Three Ponds Watershed-Based Management Plan (WMP).

PROBLEM BACKGROUND

NHDES Lake Trophic Survey Reports (1980, 1995) categorized all three ponds as mesotrophic largely due to low dissolved oxygen in bottom waters. Townhouse Pond was classified as borderline oligotrophic-mesotrophic since there was only a one-point difference between the 1980 and 1995 surveys due to slightly elevated chlorophyll-a measured during the 1995 survey. All three ponds were assessed by the New Hampshire Department of Environmental Services (NHDES) as impaired (5-M) for Aquatic Life Integrity due to low pH. The ponds were also assessed by NHDES as potentially not supporting (3-PNS) for Aquatic Life Integrity due to low alkalinity (all three ponds) and elevated total phosphorus (all except for Northeast Pond) and for Primary Contact Recreation due to the presence of cyanobacteria hepatotoxic microcystins.

Cyanobacteria blooms in the ponds have been reported in recent years, with three NHDES-issued warnings occurring within the last 10 years (one for Townhouse Pond and two for Northeast Pond). The most recent blooms occurred in 2023 and 2024 in Northeast Pond, the former of which occurred following record-high precipitation for New Hampshire according to the National Oceanic and Atmospheric Administration. Enhanced loading of phosphorus to surface waters, whether from internal or external sources, particularly when compounded by the impacts from climate change, can stimulate excessive plant, algae, and cyanobacteria growth and degrade water quality.

WATER QUALITY SUMMARY

Water quality for the ponds is summarized below. For figures and additional information please refer to the 2025 Water Quality Analysis Report for Milton Three Ponds.

Trophic State Indicators

Northeast Pond, Townhouse Pond, and Milton Pond have existing median concentrations of total phosphorus as 13.1, 9.4, and 10.9 ppb, respectively. Existing median chlorophyll-a concentrations are 3.5, 3.9, and 3.5 ppb, respectively (Table 1). For the deep spots of Northeast, Townhouse, and Milton Ponds, generally higher total phosphorus concentrations were measured in the hypolimnion compared to the epilimnion (both grab and composite) and metalimnion, indicating some amount of internal phosphorus loading is possibly occurring in these waterbodies. Milton Pond showed a statistically significant decreasing (improving) trend in chlorophyll-a (p-value = 0.03) for the period of 1995-2024. In contrast, Northeast Pond had a statistically significant decreasing (worsening) trend in Secchi disk transparency (p-value = 0.02) during the period of 1995-2024.

ASSIMILATIVE CAPACITY

The assimilative capacity of a waterbody describes the amount of pollutant that can be added to a waterbody without causing a violation of the water quality criteria and is based on lake trophic designation. NHDES has developed water quality criteria for lakes and ponds, which were utilized for this assessment[1]. Milton Three Ponds are designated as mesotrophic waterbodies, though they have displayed eutrophic characteristics for one or more key parameters. For enhanced protection of water quality, the mesotrophic and oligotrophic designations were used to run separate assimilative capacity analyses for Milton Three Ponds.

For mesotrophic waterbodies, the water quality criteria are set at 12 ppb for total phosphorus and 5.0 ppb for chlorophyll-a, above which the waterbody is considered impaired (28 ppb and 11 ppb, respectively, for eutrophic waterbodies) (Table 1). For oligotrophic waterbodies, the water quality criteria are set for 8.0 ppb for total phosphorus and 3.3 ppb for chlorophyll-a, above which the waterbody is considered impaired (Table 2). NHDES requires a portion of the difference between the best possible water quality and the water quality standard be kept in reserve as described in the 2024 Section 305(b) and 303(d) Consolidated Assessment and Listing Methodology (CALM); therefore, according to Table 3-17 of the CALM, total phosphorus and chlorophyll-a must be at or below 11.6 ppb and 4.8 ppb, respectively, to achieve Tier 2 High Quality Water status under a mesotrophic designation. Total phosphorus and chlorophyll-a must be at or below 7.2 ppb and 3.0 ppb, respectively, to achieve Tier 2 High Quality Water status under an oligotrophic designation. Support determinations are based on the nutrient stressor (phosphorus) and response indicator (chlorophyll-a), with chlorophyll-a dictating the assessment if both chlorophyll-a and total phosphorus data are available and the assessments differ.

Results of the mesotrophic assimilative capacity analysis show that Northeast Pond, Townhouse Pond, and Milton Pond meet Tier 2 (High Water Quality) for the mesotrophic designation (Table 1). Both Milton Pond and Townhouse Pond meet the mesotrophic thresholds for chlorophyll-a and total phosphorus, while Northeast Pond does not meet the mesotrophic threshold for total phosphorus. As tea-colored ponds, high total phosphorus for the trophic class paired with comparatively low chlorophyll-a may suggest that other factors, such as restricted light availability, may be limiting eutrophication. Results of the oligotrophic assimilative capacity analysis show that Northeast Pond, Townhouse Pond, and Milton Pond all fail to reach Tier 2 High Quality Water status (Table 2) and are thus considered impaired for oligotrophic water quality criteria.

[1] Milton Three Ponds straddles the border between New Hampshire and Maine. While New Hampshire water quality criteria are primarily relied on for this assessment, it is important to recognize water quality standards set by the Maine Department of Environmental Protection (DEP) for the protection of Aquatic Life Support in Great Ponds such as Milton Three Ponds. Maine DEP requires Great Ponds to have a stable or decreasing trophic state, defined as the ability of a body of water to produce algae and other aquatic plants as a function of its nutrient content. The Trophic State Index (TSI) formulas for chlorophyll-a, total phosphorus, and Secchi disk transparency are specified in the *Regulations Relating to Water Quality Evaluations*, 06-096 C.M.R. ch. 581, effective date January 29, 1989 and the DRAFT Maine DEP 2024 305(b) Report and 303(d) List. In addition, a classification and condition analysis for Maine lakes was completed by the Maine DEP and the University of Maine in 2020 (Deeds et al., 2020). Thresholds for reference and altered condition classes were established and provides another means of assessing the water quality status of a waterbody in Maine.

TABLE 1. Mesotrophic assimilative capacity (AC) analysis results for Milton Three Ponds (Northeast Pond, Townhouse Pond, Milton Pond) using mesotrophic thresholds. Chlorophyll-a dictates the assessment results.

Parameter	**Mesotrophic AC Threshold (ppb)**	**Existing Median WQ (ppb)***	**Remaining AC (ppb)**	**Results**
Northeast Pond – DEEP SPOT [1 Milton]				
Total Phosphorus	11.6	13.1	-1.5	Tier 2
Chlorophyll-a	4.8	3.5	1.3	(High Water Quality)
Townhouse Pond – DEEP SPOT [TOWNHOUSE POND-DEEP SPOT]				
Total Phosphorus	11.6	9.4	2.2	Tier 2
Chlorophyll-a	4.8	3.9	0.9	(High Water Quality)
Milton Pond – DEEP SPOT [MILTON POND-DEEP SPOT]				
Total Phosphorus	11.6	10.9	0.7	Tier 2
Chlorophyll-a	4.8	3.5	1.3	(High Water Quality)

** Existing water quality data truncated to May 24-Sept 15 in the previous 10 years (2015-2024) for composite, epilimnion, or upper samples (in order of priority on a given day). Data were summarized by day, then month, then year using median statistic.*

TABLE 2. Oligotrophic assimilative capacity (AC) analysis results for Milton Three Ponds (Northeast Pond, Townhouse Pond, Milton Pond) using oligotrophic thresholds. Chlorophyll-a dictates the assessment results.

Parameter	**Oligotrophic AC Threshold (ppb)**	**Existing Median WQ (ppb)***	**Remaining AC (ppb)**	**Results**
Northeast Pond – DEEP SPOT [1 Milton]				
Total Phosphorus	7.2	13.1	-5.9	Impaired
Chlorophyll-a	3.0	3.5	-0.5	
Townhouse Pond – DEEP SPOT [TOWNHOUSE POND-DEEP SPOT]				
Total Phosphorus	7.2	9.4	-2.2	Impaired
Chlorophyll-a	3.0	3.9	-0.9	
Milton Pond – DEEP SPOT [MILTON POND-DEEP SPOT]				
Total Phosphorus	7.2	10.9	-3.7	Impaired
Chlorophyll-a	3.0	3.5	-0.5	

** Existing water quality data truncated to May 24-Sept 15 in the previous 10 years (2015-2024) for composite, epilimnion, or upper samples (in order of priority on a given day). Data were summarized by day, then month, then year using median statistic.*

LAKE LOADING RESPONSE MODEL RESULTS

A second analysis linked watershed loading conditions with in-lake total phosphorus and chlorophyll-a concentrations to predict past, current, and future water quality in Milton Three Ponds. An Excel-based model, known as the Lake Loading Response Model (LLRM), was used to develop a water and phosphorus loading budget for the ponds and their tributaries. Water and phosphorus loads (in the form of mass and concentration) are traced from sources in the watershed, through tributary basins, and into the ponds The model incorporates data about land cover, watershed boundaries, point sources, septic systems, waterfowl, rainfall, and an estimate of internal lake loading, combined with many coefficients and equations from scientific literature on lakes and nutrient cycles. Refer to the 2025 Milton Three Ponds Lake Loading Response Model Report.

Overall, model predictions for Northeast Pond, Townhouse Pond, and Milton Pond were in good agreement with observed data for total phosphorus (1%, 2%, and 4%, respectively), chlorophyll-a (11%, 30%, and 2%, respectively), and Secchi disk transparency (19%, 6%, and 7%, respectively) (Table 2). It is important to note that the LLRM does not explicitly account for all the biogeochemical processes occurring within a waterbody that contribute to overall water quality and is less accurate at predicting chlorophyll-a and Secchi disk transparency. For example, chlorophyll-a is estimated strictly from nutrient loading, but other factors strongly affect algae growth, including transport of phosphorus from the sediment-water interface to the water column by cyanobacteria, low light from suspended sediment, grazing by zooplankton, presence of heterotrophic algae, and flushing effects from high flows. There were insufficient data available to evaluate the influence of these other factors on observed chlorophyll-a concentrations and Secchi disk transparency readings. The model predicts 15 cyanobacteria bloom days for Northeast Pond, 6 for Townhouse Pond, and 11 for Milton Pond (Table 3TABLE 3), which aligns with the number of bloom warnings and alerts issued by NHDES in recent years. Bloom warnings/alerts spanned 9 days (*Dolichospermum*) in 2023 and 7 days (*Dolichospermum*) in 2024 in Northeast Pond.

Watershed runoff combined with baseflow (96%) was the largest phosphorus loading contribution across all sources to Milton Pond, which is the final receiving waterbody in the Milton Three Ponds watershed (Table 4). The watershed load (96%) to Milton Pond includes the loads from Northeast Pond (84%), Townhouse Pond (6%), and the direct land area to Milton Pond (7%) (Table 4). Atmospheric deposition (1%), internal loading (<1%), waterfowl (<1%), and septic systems (2%) were relatively minor sources to Milton Pond but may be seasonally important during low flow summer conditions. For Townhouse Pond, 93% of the total phosphorus load is a result of backflow from Milton Pond, which has a dilutive effect on phosphorus in Townhouse Pond. Without this backflow flushing, the predicted in-lake total phosphorus concentration in Townhouse Pond would be double and water quality conditions likely much worse.

Development in the watershed is most concentrated along the shorelines of the three ponds, as well as within multiple downtown areas in the upper watershed, including downtown Wakefield (Upper Branch River), Milton Mills (Lower Salmon Falls River), downtown Milton and Route 125 (Milton & Townhouse Pond direct sub-watersheds), and downtown Union (Upper and Lower Branch River). Development is also dense around the shoreline where septic systems or holding tanks are located within a short distance to the water, leaving little horizontal (and sometimes vertical) space for proper filtration of wastewater effluent. Improper maintenance or siting of these systems can cause failures, which leach untreated, nutrient-rich wastewater effluent to the lake. The entirety of the shoreline of the three ponds, except for a small portion of the Milton Pond shoreline in downtown Milton, is serviced by septic systems. Sewer can also represent a potential vulnerability if the sewer systems are old or damaged and leaking wastewater into groundwater near the ponds. Note that the septic system load estimate is only for those systems directly along the shoreline and potentially short-circuiting minimally treated effluent to the ponds. The load from septic systems throughout the rest of the watershed is accounted for in the coefficients used to generate the watershed load.

Once the model is calibrated for current in-lake total phosphorus concentration, we can then manipulate modeled land use and other factor loadings to estimate historical and future phosphorus loading (e.g., what in-lake total phosphorus concentration was prior to human development and what in-lake total phosphorus concentration will be following full buildout of the watershed under current zoning restrictions). A comparison of historical, current, and future water quality for Milton Three Ponds is shown in Table 4.

Pre-development loading estimation showed that total phosphorus loading to Milton Pond (representative of the total loads to all three ponds) increased by 234%, from 554 kg/yr prior to European settlement to 1,853 kg/yr under current conditions (Table 4). These additional phosphorus sources come from development in the watershed (especially from the direct shoreline of the three ponds and the multiple downtown areas), septic systems, atmospheric dust, and internal loading (Table 4). Water quality prior to settlement was predicted to be excellent with extremely low phosphorus and chlorophyll-a concentrations and high water clarity (Table 3).

Future loading estimation showed that total phosphorus loading to Milton Pond (representative of total phosphorus loading to all three ponds) may increase by 76%, from 1,853 kg/yr under current conditions to 3,267 kg/yr at full build-out (predicted in 2216) under current zoning (Table 4). Additional phosphorus will be generated from more development in the watershed (especially in undeveloped headwater areas), greater atmospheric dust, more septic systems, and enhanced internal loading (Table 4). The Milton Pond model predicted higher (worse) phosphorus (19.3 µg/L), higher (worse) chlorophyll-a (7.2 µg/L) with 118 bloom days, and lower (worse) water clarity (2.4 m) compared to current conditions for Milton Pond (Table 3). Predicted future water quality was similarly poor for Northeast Pond and Townhouse Pond.

TABLE 3. In-lake water quality predictions for the Milton Three Ponds. TP = total phosphorus. Chl-a = chlorophyll-a. SDT = Secchi disk transparency. Bloom Days represent average annual probability of chlorophyll-a exceeding 8 µg/L.

Model Scenario	Measured Median TP (µg/L)	Predicted Median TP (µg/L)	Mean Chl-a (µg/L)	Predicted Mean Chl-a (µg/L)	Mean SDT (m)	Predicted Mean SDT (m)	Bloom Days
Northeast Pond							
Pre-Development	--	3.7	--	0.7	--	8.4	0
Current (2025)	11.5	11.6	3.4	3.8	2.9	3.5	15
Future (2216)	--	21.1	--	8.0	--	2.2	148
Townhouse Pond							
Pre-Development	--	3.3	--	0.6	--	9.3	0
Current (2025)	9.8	9.9	4.2	3.1	3.7	4.0	6
Future (2216)	--	17.4	--	6.3	--	2.6	86
Milton Pond							
Pre-Development	--	3.3	--	0.6	--	9.3	0
Current (2025)	10.5	10.9	3.6	3.5	3.5	3.7	11
Future (2216)	--	19.3	--	7.2	--	2.4	118

TABLE 4. Total phosphorus (TP) and water loading summary by model and source for Northeast, Townhouse, and Milton Ponds. Italicized sources sum to the watershed load.

SOURCE	PRE-DEVELOPMENT			CURRENT (2024)			FUTURE (2216)		
	TP (KG/YR)	%	WATER (CU.M/YR)	TP (KG/YR)	%	WATER (CU.M/YR)	TP (KG/YR)	%	WATER (CU.M/YR)
NORTHEAST POND									
Atmospheric	18.8	3%	2,695,429	29.6	1%	2,695,429	67.2	2%	2,695,429
Internal	0.0	0%	0	10.3	1%	0	18.7	1%	0
Waterfowl	16.1	2%	0	16.1	1%	0	16.1	<1%	0
Septic System	0.0	0%	0	24.2	1%	23,382	28.3	1%	28,492
Watershed Load	605.8	95%	132,849,312	1,925.3	96%	132,428,792	3,509.1	96%	131,872,342
TOTAL LOAD TO POND	**640.7**	**100%**	**135,544,741**	**2,005.5**	**100%**	**135,147,603**	**3,639.4**	**100%**	**134,596,263**
TOWNHOUSE POND									
Atmospheric	3.7	1%	528,589	5.8	<1%	528,589	13.2	<1%	528,589
Internal	0.0	0%	0	9.1	1%	0	13.0	<1%	0
Waterfowl	3.2	1%	0	3.2	<1%	0	3.2	<1%	0
Septic System	0.0	0%	0	23.4	1%	22,407	23.4	1%	22,407
Watershed Load	535.8	99%	143,947,890	1,614.2	98%	143,929,319	2,841.1	99%	143,917,241
Direct Land Use Load	*11.2*	*2%*	*2,153,437*	*68.7*	*4%*	*2,134,865*	*104.5*	*4%*	*2,122,787*
Backflow from Milton P.	*524.6*	*97%*	*141,794,454*	*1,545.6*	*93%*	*141,794,454*	*2,736.6*	*95%*	*141,794,454*
TOTAL LOAD TO POND	**542.7**	**100%**	**144,476,480**	**1,655.8**	**100%**	**144,480,315**	**2,893.9**	**100%**	**144,468,237**
MILTON POND									
Atmospheric	8.0	2%	1,150,405	12.6	1%	1,150,405	28.7	1%	1,150,405
Internal	0.0	0%	0	10.9	1%	0	19.2	1%	0
Waterfowl	6.9	1%	0	6.9	<1%	0	6.9	<1%	0
Septic System	0.0	0%	0	36.1	2%	34,502	37.9	1%	36,760
Watershed Load	539.2	97%	141,048,119	1,786.3	96%	140,609,547	3174.2	97%	140,007,886
Direct Land Use Load	*24.8*	*4%*	*4,476,014*	*124.4*	*7%*	*4,430,745*	*206.2*	*6%*	*4,392,502*
Townhouse Pond	*18.0*	*3%*	*2,410,738*	*110.2*	*6%*	*2,414,573*	*157.3*	*5%*	*2,402,496*
Northeast Pond	*496.4*	*90%*	*134,161,366*	*1,551.7*	*84%*	*133,764,228*	*2810.8*	*86%*	*133,212,888*
TOTAL LOAD TO POND	**554.1**	**100%**	**142,198,524**	**1,852.8**	**100%**	**141,794,454**	**3,266.9**	**100%**	**141,195,051**

WATER QUALITY GOAL & OBJECTIVES

The model results estimated changes in total phosphorus loading and in-lake total phosphorus concentrations over time from pre-development through future conditions, showing that the water quality of Milton Three Ponds is threatened by current development activities in the watershed and will degrade further with continued development in the future. We can use these results to make informed management decisions and set an appropriate water quality goal for Milton Three Ponds. In-lake chlorophyll-a and total phosphorus concentrations indicate that there may not be reserve capacity for the lake to assimilate additional nutrients under a "business as usual" scenario. Thus, it is highly recommended that ambitious objectives be established and strongly pursued to protect the water quality of Milton Three Ponds over the long term.

It would be unrealistic to set the water quality goal to meet the oligotrophic standard for all three ponds because, as shown in the reality check below (Table 5), the phosphorus reductions required to do so are infeasibly large. Instead, individual pond-specific goals are more attainable. These will include reducing phosphorus loads as much as possible or reducing phosphorus loads to attain oligotrophic standards, depending on the pond.

Ideally, we would recommend that the annual average total phosphorus concentration for **Northeast Pond** be reduced from a predicted 11.5 ppb to 10.0 ppb full year (8.3 summertime concentration), a well-documented threshold above which there is an increased risk of cyanobacteria blooms. However, that would equate to a 14% (276 kg/yr) reduction in the total phosphorus load to Northeast Pond, slightly exceeding the identified watershed load reduction opportunities (Table 5). Additional reduction opportunities from sites identified in existing reports for some of the headwater communities have been factored in (see footnotes to Table 5 for sources). The ideal goal of 10 ppb might be attainable as load reduction sites (not factored in here) were identified in the 2022 Lovell Lake Watershed Survey Report, but there are no associated load reduction calculations. Given this context, as part of the Milton Three Ponds WMP, we recommend the goal of reducing the annual average total phosphorus concentration for Northeast Pond from 11.5 ppb to 10.1 ppb full year (8.4 summertime concentration) by addressing all identified and calculated watershed sources of phosphorus inputs at a minimum, which equates to a 13% load reduction (253 kg/yr) from current conditions.

We recommend that the annual average total phosphorus concentration for **Townhouse Pond** be reduced from 9.8 ppb to 8.6 ppb full year (7.2 summertime concentration, the oligotrophic threshold). This equates to a 13% (216 kg/yr) reduction in the total phosphorus load to Townhouse Pond; however, 178% (385 kg/yr) of the Townhouse Pond goal would be achieved if all goals are met for Northeast, Townhouse, and Milton Ponds. A reduction of 385 kg/yr results in a modeled in-lake summertime concentration of 6.4 ppb for Townhouse Pond.

We recommend that the annual average total phosphorus concentration for **Milton Pond** be reduced from 10.5 ppb to 8.6 ppb full year (7.2 summertime concentration, the oligotrophic threshold). This equates to a 21% (385 kg/yr) reduction in the total phosphorus load to Milton Pond. If all goals are met for Northeast, Townhouse, and Milton Ponds, the model predicts 100% (385 kg/y) of the Milton Pond total phosphorus reduction goal would be met for Milton Pond.

The goal of the Milton Three Ponds WMP is to improve the water quality of Northeast Pond, Townhouse Pond, and Milton Pond such that they meet state water quality standards for the protection of Aquatic Life Integrity (ALI) and substantially reduce the likelihood of harmful cyanobacteria blooms. This goal will be achieved by accomplishing the following objectives. More detailed action items to achieve these objectives will be provided in the Action Plan of the WMP.

Objective 1: Reduce phosphorus loading from existing development by 253 kg/yr to Northeast Pond, 216 kg/yr to Townhouse Pond, and 385 kg/yr to Milton Pond to improve the average in-lake summer total phosphorus concentration to 8.4 ppb, 7.2 ppb, and 7.2 ppb, respectively.

Objective 2: Mitigate (prevent or offset) phosphorus loading from future development by 72 kg/yr to the Milton Three Ponds system to maintain average summer in-lake total phosphorus concentration for Milton Pond in the next 10 years (2035).

TABLE 5. Reality check of the water quality goal based on the identified external watershed loads.

	Northeast Pond Watershed	Townhouse Pond Watershed	Milton Pond Watershed
Remediating Watershed Assessment Sites Number of sites and total phosphorus load reduction.	49 sites, 31.8 kg/yr [2] 491 sites, 36.8 kg/yr [3] 221 sites, 120.4 kg/yr [4] 136 sites, unknown load [5]	5 sites, 2.9 kg/yr [2]	18 sites, 6.0 kg/yr [2]
Addressing Shoreline Properties Number of sites and total phosphorus load reduction High impact[6] = disturbance score (DS) 11+, Medium impact[7] = DS between 9-10, Low impact[8] = DS between 7-8.	3 high impact sites, 0.4 kg/yr 26 medium impact sites, 7.5 kg/yr 86 low impact sites, 49.7 kg/yr	5 high impact sites, 0.7 kg/yr 32 medium impact sites, 9.3 kg/yr 50 low impact sites, 28.9 kg/yr	8 high impact sites, 1.2 kg/yr 48 medium impact sites, 13.9 kg/yr 97 low impact sites, 56.1 kg/yr
Upgrading Shoreland Zone Septic Systems Number of septic systems > 25 years old and total phosphorus load reduction.	~63 systems 6.3 kg/yr	~47 systems 4.7 kg/yr	~80 systems 8.0 kg/yr
Total Phosphorus Load Reduction Per Individual Watershed Sum of remediating watershed assessment sites, addressing shoreline properties, and upgrading septic systems.	253 kg/yr	47 kg/yr	85 kg/yr
Modeled Total Phosphorus Summer Concentration Goal, and Load Reduction Needed to Meet the Water Quality Goal	8.4 ppb 253 kg/yr	7.2 ppb 216 kg/yr	7.2 ppb 385 kg/yr
Combined Total Reduction When Accounting for Hydrologic Connectivity (FIGURE 1) Total phosphorus load reduction and percent of the water quality goal.	253 kg/yr 100%	385 kg/yr 178%	385 kg/yr 100%

[2] Identified in the 2025 Milton Three Ponds WMP.
[3] Identified in the 2010 Salmon Falls Headwater Lakes WMP. A 40% attenuation factor was applied to the original load reduction value of 92 kg/yr to account for retention within the lakes.
[4] Identified in the 2022 Great East Lake Watershed-Based Protection Plan. This load reduction is likely an overestimate, and there is likely some site overlap with the 2010 Salmon Falls Headwater Lakes WMP. A 40% attenuation factor was applied to the original load reduction value of 301 kg/yr to account for retention within the lake.
[5] Identified in the 2022 Lovell Lake Watershed Survey Report.
[6] From PLET model bank stabilization estimate for fine sandy loams, using 200 ft (length) by 3 ft (height) and moderate lateral recession rate of 0.1 ft/yr.
[7] From PLET model bank stabilization estimate for fine sandy loams, using 10 ft (length) by 3 ft (height) and moderate lateral recession rate of 0.1 ft/yr.
[8] From PLET model bank stabilization estimate for fine sandy loams, using 50 ft (length) by 3 ft (height) and moderate lateral recession rate of 0.1 ft/yr.

In sum, treating existing pollutant sources identified as coming from the external watershed load could reduce the phosphorus load to Northeast Pond by 253 kg/yr, to Townhouse Pond by 47 kg/yr (216 kg/yr when combined with goal attainment in the other ponds), and to Milton Pond by 85 kg/yr (385 kg/yr when combined). Because these ponds are hydrologically connected (Figure 1), reducing external watershed loads in the Northeast Pond subwatershed will also reduce the load entering Milton Pond and indirectly to Townhouse Pond through backflow from Milton Pond. Reducing watershed loads to Townhouse Pond or Milton Pond will also be mutually beneficial.

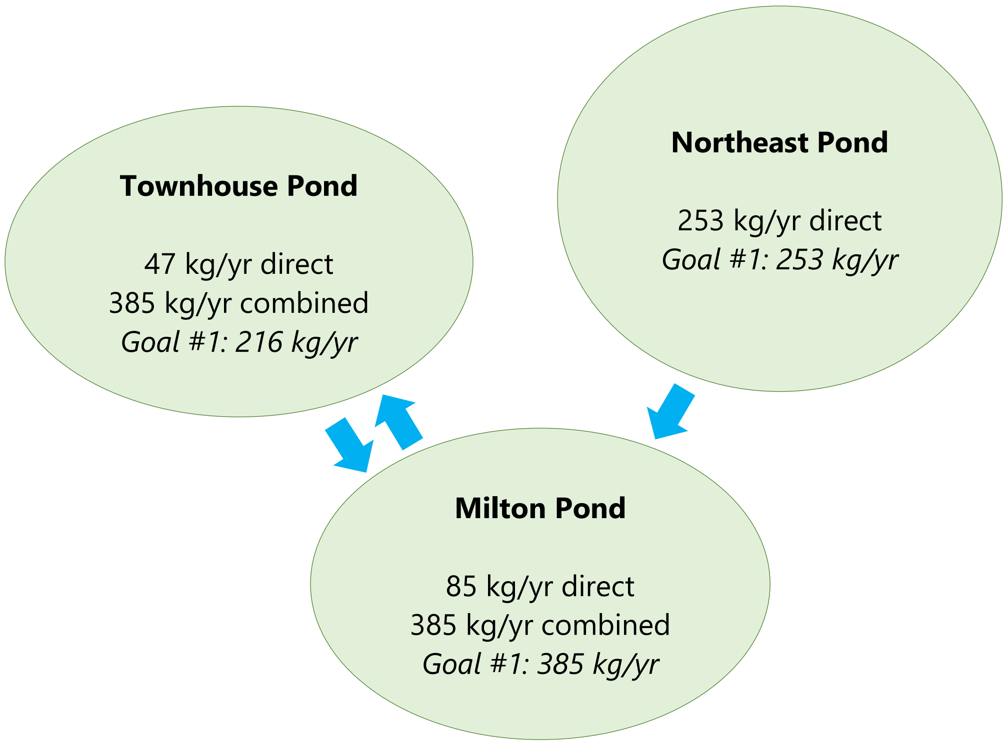

FIGURE 1. Conceptual diagram of external watershed load reductions for each pond's watershed. Green ovals represent the waterbody's watershed, blue arrows represent the typical flow patterns between the waterbodies. The first values ("direct") represent the external watershed load reduction from identified sources within the watershed of each pond, and the following value ("combined", Townhouse and Milton ponds only) represents the sum of watershed load reductions when accounting for hydrologic connectivity. The final value represents the load reduction needed to attain the goal for Objective 1.

Non-structural best management practices (BMPs) throughout the watershed, such as educating homeowners about septic system maintenance, fertilizer use, and residential stormwater management, may be effective at reducing phosphorus loading to three ponds beyond what had been identified in Table 5 to meet and exceed the water quality goals. Preventing septic system failures, reducing residential lawn fertilizer use, and improved stormwater management at the property-scale were not relied on in the goal attainment calculations above.

Objective 2 can be met through ordinance revisions that implement low impact development strategies and encourage cluster development with open space protection and/or through conservation of key parcels of forested and/or open land.

The interim goals for each objective allow flexibility in reassessing water quality objectives following more data collection and expected increases in phosphorus loading from new development in the watershed over the next 10 or more years (Table 6). Understanding predicted water quality following watershed improvements compared to likely water quality following no action will help guide adaptive changes to interim goals (e.g., goals are on track or goals are falling short). If the goals are not being met due to lack of funding or other resources for implementation projects versus due to increases in phosphorus loading from new development outpacing reductions in phosphorus loading from improvements to existing development, then this creates much different conditions from which to adjust interim goals. For each interim goal year, stakeholders should update the water quality data and model and assess why goals are or are not being met. Stakeholders will then decide on how to adjust the next interim goals to better reflect water quality conditions and practical limitations to implementation.

TABLE 6. Summary of water quality objectives for Milton Three Ponds. Objective 2 is represented as only Milton Pond due to the connectivity and mutual benefit. Interim goals/benchmarks are cumulative. TP refers to total phosphorus.

Water Quality Objective	Interim Goals/Benchmarks		
	2027	**2030**	**2035**
1. Reduce phosphorus loading from existing development to Milton Three Ponds by 253 kg/yr for Northeast Pond, 216 kg/yr for Townhouse Pond, and 385 kg/yr for Milton Pond to improve average in-lake summer or annual total phosphorus concentration to 8.4 ppb for Northeast Pond, 7.2 ppb for Townhouse Pond, and 7.2 ppb for Milton Pond.			
	Achieve 63 kg/yr reduction in TP loading to Northeast Pond, 54 kg/yr to Townhouse Pond, and 96 kg/yr to Milton Pond	Achieve 127 kg/yr reduction in TP loading to Northeast Pond, 108 kg/yr to Townhouse Pond, and 192 kg/yr to Milton Pond; re-evaluate water quality and track progress	Achieve 253 kg/yr reduction in TP loading to Northeast Pond, 216 kg/yr to Townhouse Pond, and 385 kg/yr to Milton Pond; re-evaluate water quality and track progress
2. Mitigate (prevent or offset) phosphorus loading from future development by 72 kg/yr to the Milton Three Ponds system to maintain average summer in-lake total phosphorus concentration for Milton Pond in the next 10 years (2035).			
	Prevent or offset 18 kg/yr in TP loading from new development to Milton Three Ponds.	Prevent or offset 36 kg/yr in TP loading from new development to Milton Three Ponds; re-evaluate water quality and track progress.	Prevent or offset 72 kg/yr in TP loading from new development to Milton Three Ponds; re-evaluate water quality and track progress.