IMPLEMENTATION PLAN

Objectives

The objective of this implementation plan is to recommend implementation activities to meet the resource water quality goal of improving long term Secchi transparency to an average of 7 meters (23 feet). The implementation plan is a combination of activities identified as a part of this study and activities from the 2002 Diagnostic Feasibility Study and Implementation Plan ("2002 Implementation Plan"). Based on the findings from the Diagnostic Study (Section 1), the following priority management areas have been identified for implementation and will be referred to throughout this implementation plan:

Primary: In-Lake Food Web Interactions

In-lake food web interactions were predicted to have the strongest effect on improving water quality and are the primary focus of this implementation plan.

Secondary: Groundwater

Phosphorus loads from groundwater account for 70% of the total phosphorus load to Square Lake and are a secondary focus of this implementation plan.

Secondary: Surface Water Runoff

Phosphorus loads from surface water runoff account for 18% of the total phosphorus load to Square Lake and are a secondary focus of this implementation plan. No changes were made to the 2002 estimated surface watershed load (30 lb P per year) to Square Lake as a result of this update to the watershed assessment. However, an additional 12.6 and 13.7 acres of land were developed within subwatersheds SW-2 and SW-4, respectively, since the 2002 diagnostic study. Implementation of best management practices in response to these watershed changes can reduce phosphorus loading to Square Lake.

Table 12 summarizes all implementation activities that were assessed in the 2002 Implementation Plan and as a part of this study. The numbering system used in the original 2002 Implementation Plan is used in this study. In order to distinguish between original and new projects, completed and priority projects, the implementation activities have been categorized with the following symbols:

- ***Completed*** (✓): Implementation activities from the 2002 Implementation Plan that have been completed, or partially completed, at the time this report was finished.
- ***New*** (NEW): New implementation activities recommended as a part of this study.
- ***Updated*** (ⓘ): Updates to implementation activities originally recommended in the 2002 Implementation Plan.
- ***Priority*** (★ or ★★)**:** Implementation activities that address primary or secondary management areas. Recommendations with one star (★) address a secondary management area and are a priority; recommendations with two stars (★★) address a primary management area and are a high priority.

Ultimately, the priority implementation activities follow two main to meet the transparency goal:

1. Increase *Daphnia pulicaria* densities through either decreasing predation pressure and/or improving habitat.
2. Maintain or decrease existing watershed phosphorus loads to buffer the lake against potential eutrophication.

Table 1. Summary table of implementation plan activities from the 2002 Implementation Plan and this study, as well as updates and prioritization recommendations

Implementation Plan Activities	Completed	New	Priority	Updated (See report page)
1. Water Quality—Groundwater				
a. Informational kiosk at the Washington County Square Lake Park	✓			
b. In-lake groundwater monitoring				ⓘ (32-35)
c. Groundwater monitoring network				
d. Distribution of septic management materials to homeowners in Square Lake Watershed	✓		★	
e. Septic pumping program	✓		★	
f. Septic system upgrades			★	ⓘ
2. Water Quality—Surface Water				
a. Informational kiosk at the Washington County Square Lake Park	✓			
b. Distribute home lawn care information	✓			
c. Stormwater runoff regulations to provide no net increase in phosphorus			★	
d. Soil testing program				
e. In-lake bio-monitoring				ⓘ (47-58)
f. In-lake water quality monitoring			★★	ⓘ (37-44)
g. Wilder road stabilization				
h. Gully erosion control project				ⓘ
i. Maywood stormwater pond retrofit/enhancement				ⓘ
~~j. Wilder wetland rehabilitation~~ ‡				
k. Landowner education programs		NEW	★	
3. Fisheries Management Plan				
a. Evaluate predation of Daphnia	✓			ⓘ (47-58)
b. Suspend trout stocking		NEW	★★	
4. Aquatic Vegetation				
a. Develop and distribute information to encourage riparian landowners to protect and/or restore aquatic vegetation	✓			
b. Distribute MN DNR rules to riparian landowners	✓			
c. Aquatic plant survey				ⓘ (44-46)

Implementation Plan Activities	Completed	New	Priority	Updated (See report page)
d. Develop an aquatic plant management plan				
5. Wildlife				
a. Work with landowners to place remaining undeveloped shoreline into conservation easement(s)			★	ⓘ
6. Exotic Species				
a. Conduct boat inspections for Eurasian milfoil and zebra mussels	✓			
b. Conduct aquatic plant survey				
7. Land Use/Zoning				
a. Distribute current shore land zoning regulations	✓		★	
b. Develop regulations regarding the alteration of ice/beach ridges			★	
c. Stormwater runoff regulations to provide no net increase in phosphorus			★	
d. Work with landowners to place remaining undeveloped shoreline into conservation easement(s)			★	ⓘ
8. Surface Water Use				
a. Distribute Square Lake boating regulations at boat launches	✓			
b. Conduct a study to determine appropriate peak and off-peak surface water use				
9. Public Water Access				
a. Distribute Square Lake boating regulations at boat launches	✓			
b. Develop an access policy consistent with surface water use study				
c. Work with private campground/marina (Golden Acres) to distribute educational materials and provide exotics inspections concurrent with efforts at public (Square Lake Washington County Park) boat launch				

‡ Removed based on findings from this study, see Section 4.3

Implementation Activity Alternatives and Analysis

The following discussion is organized by priority management area and describes new, updated, and priority implementation activities (refer to Table 12). Activities from Table 12 that are already described in *Section 3: Diagnostic Study* or are unchanged from the original 2002 Plan are not discussed here. Table 12 includes reference page numbers for items previously discussed in Section 3 of this report. Information on priority recommendations carried over from the 2002 Implementation Plan was based on text taken directly from the 2002 Implementation Plan and appears in quotation marks; minor revisions to this text are underlined.

In-Lake Food Web Interactions

★★ NEW Suspend trout stocking

The CMSCWD is in discussions with the Minnesota Department of Natural Resources (MDNR) regarding a three-year suspension of trout stocking in Square Lake, beginning in the fall of 2012, to evaluate whether stocking suspension results in significant changes to *Daphnia pulicaria* densities and water clarity of the lake. During this period, the effects of the stocking suspension will be evaluated with respect to whether or not it leads to an increase in the abundance of *D. pulicaria* in Square Lake and to an increase in the lake's water clarity.

The overall goal of this project is to evaluate the impact of the three-year temporary suspension of trout stocking on zooplankton abundance and water quality in Square Lake. The outcomes are the following:

1. Zooplankton species abundance data;
2. Water quality (nutrients, chlorophyll, transparency, dissolved oxygen, and temperature) data during the same time period;
3. Evaluation of the impact of the three-year suspension of rainbow trout stocking on the water quality of Square Lake; and
4. A recommendation of whether or not to permanently extend the trout stocking suspension for the benefit of the water quality in Square Lake.

Monitoring data collected during the stocking suspension period will be evaluated with respect to monitoring data taken during the years when trout were stocked in the lake. See Section 4.5: Implementation Monitoring and Evaluation and Appendix C for monitoring plan details.

★★ In-lake water quality monitoring

"In-lake monitoring conducted by the Metropolitan Council and Minnesota Pollution Control volunteers to look at Secchi disk transparency, temperature and dissolved oxygen depth profile, surface chlorophyll *a*, surface total phosphorus, and lake elevation, as well as qualitative characteristics such as recreational suitability, should continue 14 times per

year (April through October) at the deepest location in Square Lake (Station 201). This data will give the data necessary to ensure that Square Lake is maintaining its goal Secchi disk transparency of 22.9 ft (7 m) and give early warning signs of trends in decreased water quality. This program will continue to be funded through the Watershed District and would cost approximately $2,100 per year."

Groundwater

★ Distribution of septic management materials to homeowners

"The Square Lake Association and/or Washington County could distribute septic management materials to residents in the Square Lake watershed on even years starting in 2016. Septic systems, when properly designed, installed, operated, and maintained, will treat sewage cost-effectively to protect the family, community, and water supply from contamination and diseases for many years. A number of publications are available from the Minnesota Pollution Control Agency and the University of Minnesota Extension Service, including a prepared information packet from the Extension Service entitled, "A Septic System Owner's Guide". This document includes a worksheet for determining cleaning frequency based on specific septic system designs and on the amount of usage of the system, as well as information on how to minimize water use in the household. These publications may cost $100 per distribution and could be funded by the Square Lake Association and/or Washington County."

★ Septic pumping program

"Washington County Individual Sewage Treatment System Regulations (Ordinance 128) states: "The owner of an individual sewage treatment system or the owner's agent shall regularly, but in no case less frequently than every three years, have the tank or tanks pumped. As an alternative, the owner may inspect and measure the accumulations of scum, which includes grease and other floating materials at the top of each septic tank and compartment along with the sludge, which includes the solids denser than water." A septic system that fails to treat sewage can also allow excess nutrients to reach nearby lakes and streams promoting algae and weed growth."

"Washington County is currently working in conjunction with the Metropolitan Council on the Washington County Septic Tank Maintenance and Tracking Program. Notification is sent out every three years to remind homeowners to have their septic tanks pumped. The septic pumper sends in verification to the county once the septic has been pumped. If the county does not receive notification from the pumper, a follow-up letter is sent to the homeowner. The Square Lake Association could publish articles in the newsletter to remind homeowners to pump their septic systems. This program could begin in 2016 and would be on-going. It would be funded by individual homeowners."

★ **Septic system upgrades**

"A septic system that fails to treat sewage can allow excess nutrients to reach nearby lakes and streams promoting algae and weed growth. Even systems that appear to be working well or that are in compliance with local design and installation codes may allow nutrients or bacteria to reach the ground or surface water."

"The design and installation of a septic system is controlled by local and state rules through the permit process. There are still households on Square Lake that do not have permitted septic systems. The permit takes into consideration all specific site characteristics including the type of soil, size of house, and wastewater-contributing fixtures and appliances. The system must be installed by licensed contractors and inspected by qualified officials to ensure proper installation. Inspections should be conducted by Washington County in 2016-2018 to reveal poorly functioning septic systems or systems that do not meet current standards. These inspections should include septic lines and drain fields as well. At that time, Washington County may recommend septic system upgrades. The cost of the upgrade will depend on the individual septic system. The septic system upgrades would be paid by the individual landowner, but the landowner may seek funding assistance from the Washington SWCD, Washington County, and/or the MPCA."

ⓘ A 2004 study by the MPCA estimated that approximately 11.4% of septic systems are failing (nonconforming) in the St. Croix Basin of Minnesota where Square Lake is located (MPCA 2004). Upgrading all failing septic systems (~7) to conforming systems in the Square Lake watershed would reduce the groundwater phosphorus load by 7 lb per year, or 4% of the total phosphorus load to Square Lake.

★ **Work with landowners to place remaining undeveloped shoreline into conservation easement(s)**

"The Minnesota Land Trust will provide resources to individuals and communities to help them permanently protect their properties and guide growth in a manner that respects these landscapes. May Township could work with lakeshore landowners, the Square Lake Association, Washington County, MN DNR, and Minnesota Land Trust to place remaining undeveloped shoreline into conservation easements, a legally recorded agreement by which landowners may voluntarily restrict the use of their land. The landowner retains title to the property, the right to sell it, the right to restrict public access, and the right to deed it to whomever they choose. However, most or all of the rights to develop are restricted or eliminated. The terms of a conservation easement are individually tailored to reflect each landowner's particular needs, situation and property. Although the duration of a conservation easement can vary depending on the desires of the landowner, tax benefits generally are available only for perpetual easements. The Minnesota Land Trust will only accept perpetual easements, since they provide permanent protection by subjecting all future landowners to the same restrictions. The cost of the program depends on the value of the property being placed into a conservation easement. May Township, MN Land Trust, Washington County, MN DNR, the Square

Lake Association could work annually, beginning in 2013, with individual landowners to place undeveloped shoreline into conservation easements."

ⓘ The northern shoreline of Square Lake remains largely undeveloped. If this land were subdivided into ten lots with permanent shoreline residences, approximately 11 lb P per year (or 6.5%) could be added to the total phosphorus load to Square Lake. Working with landowners to place the remaining undeveloped shoreline into conservation easement(s) would prevent future increases in septic system phosphorus loading to Square Lake.

Surface Water Runoff

★ NEW **Landowner education programs**

Landowner education programs are vital for increasing awareness of how human activities in the Square Lake watershed contribute to watershed phosphorus loading and affect lake water quality. Typical lake homeowner education programs include the benefits and installation of shoreline buffers and rain gardens, and proper management of lawns:

1. Shoreline buffers provide native vegetation with deep roots along lakeshores to reduce phosphorus loads through reduced runoff velocities, increased settling of particles, enhanced infiltration of water into the soil, and vegetative adsorption of phosphorus in runoff. Buffers should be at least 15 feet wide and on average 25 feet wide. In addition to phosphorus load reductions, shoreline buffers provide many additional benefits, including: filtering out other pollutants (besides nutrients) and sediments from runoff, protecting shoreline from erosion, providing food and habitat for wildlife, protecting property values, and providing aesthetic value.
2. Rain gardens are small, vegetated depressions that store and infiltrate runoff to reduce phosphorus loads through reduced runoff velocities, increased settling of particles, enhanced infiltration of water into the soil, and vegetative adsorption of phosphorus in runoff.
3. Proper management of lawns involves maintaining a healthy dense stand of turfgrass to reduce transport of phosphorus to lakes through erosion of bare soils and physical transport of grass and leaves. Proper lawn management recommendations include: leaving grass clippings on the lawn as fertilizer, mowing at a slightly higher height (2 ½ to 3 ½ inches) to shade out weeds, mowing often and not cutting off more than one-third of the grass blade so clippings will filter into grass and quickly decompose, and keeping stockpiles of yard waste (leaves and clippings) out of contact with watershed runoff.

These education programs could be funded through the Watershed District and would cost approximately $1,500 per workshop with 20 attending landowners. Two workshops could be held every even year beginning in 2016.

★ **Distribute current shore land zoning regulations**

"The Square Lake Association and/or May Township could distribute current shoreland zoning regulations to residents in the Square Lake watershed annually beginning in 2013. Educating landowners of shoreland zoning regulations could decrease the amount of sediment, fertilizers, or pesticides from surface runoff. It may also positively affect the shoreline habitat for wildlife. These regulation packets, which would include information from the MN DNR, Washington County, and May Township, may cost $100 per distribution and could be funded by the Square Lake Association and/or May Township."

★ **Develop regulations regarding the alteration of ice/beach ridges**

"May Township, with cooperation from Washington County, MN DNR, and the Square Lake Association, could develop regulations regarding the alteration of ice/beach ridges. These ice/beach ridges provide areas of natural surface runoff infiltration and lower the potential phosphorus loading into the lake. This regulation could be developed concurrent with other zoning changes and may cost $400."

★ **Stormwater runoff regulations to provide no net increase in phosphorus**

"May Township, with cooperation from Washington County, MPCA, and Washington SWCD, could develop stormwater runoff regulations that provide no net increase in phosphorus loading into Square Lake. This regulation could be developed concurrent with other zoning changes and may cost $1,000."

Gully erosion control project

"Two existing gullies in the Square Lake watershed have recently received treatment by Washington SWCD. In 1999, a gully erosion control project was completed on the north side of the lake in SW-12. While there are several other gullies on this property, they appeared stable at the time of this study and no further action is required other than periodic monitoring for future problems. Another active gully was treated on the south side of the lake in SW-2. This gully received drainage from CR 7 and was causing sediment to accumulate into the wetland complex within SW-2. No other active gullies exist within the watershed at this time, however, land use changes and alterations can change conditions which may cause stable drainage ways to begin to actively erode. Washington SWCD could work with individual landowners to abate gully erosion as necessary. This program could begin whenever necessary and could cost up to $20,000 with funding from Washington SWCD and individual landowners."

ⓘ The 2002 Implementation Plan discussed a gully erosion control project on the south end of the lake that receives drainage from County Road 7 and discharges to the large wetland complex adjacent to Square Lake in subwatershed SW-2. The project is located at the upstream end of the gully and provides energy dissipation to drainage from County Road 7. The project site is stable and operating properly. Energy dissipation is important for reducing soil erosion and transport of soil bound phosphorus. However, the gully

remains channelized and devoid of vegetation in the main channel so there is likely insufficient control of watershed runoff volume. The focus of this implementation plan is to reduce watershed phosphorus loads and not watershed runoff volume. Therefore, enhancements to this project to achieve volume control are not priority at this time.

Maywood stormwater pond retrofit/enhancement

"Although the Maywood South stormwater pond contributes only 5.4% of the total surface inflow phosphorus load and only 1% of the total phosphorus load to Square Lake, it is still an opportunity to remove approximately 1.6 lbs of phosphorus per year from Square Lake. May Township could work with the MPCA, Marine WMO, and Washington SWCD to retrofit or enhance the Maywood South Stormwater Pond and surrounding subwatershed so that there is no net increase in phosphorus to Square Lake from this subwatershed. A feasibility study needs to be conducted that would determine the best way to accomplish this objective. The determined practices would all work towards reducing storm flows and therefore total phosphorous loading to Square Lake. This project, which could begin in 2001, could cost approximately $10,000 with funding supplied from MPCA grants and matched with contributions from May Township, Marine WMO, and Washington SWCD."

The 2002 Implementation Plan recommended that the Maywood South stormwater pond and surrounding subwatershed may be retrofit or enhanced so that there is no net increase in phosphorus to Square Lake from this subwatershed. Updated information from this study indicates that the Maywood stormwater pond has significant storage capacity for its drainage area, but there is currently no skimmer on this stormwater pond to remove floatables. This pond, located in SW-4, discharges along a wide, gently sloped swale prior to discharging to Square Lake. A future enhancement to this stormwater pond could be the addition of a skimmer at the pond outlet to remove floatables and debris. However, enhancements to this project are not priority at this time.

Implementation Activity Selection and Justification

Priority implementation activities were selected based on their relevance to the priority management areas. The highest priority implementation activities are to suspend trout stocking because in-lake food web interactions were predicted to have the strongest effect on improving water quality in Square Lake, and to continue in-lake water quality monitoring. Other priority implementation activities were chosen to reduce phosphorus loading from groundwater and surface runoff through education and regulation.

No watershed structural best management practices (BMPs) were identified for this implementation plan due to the small contribution of watershed runoff to the total phosphorus load.

One activity was removed from the 2002 Implementation Plan based on results from this study. The 2002 Implementation Plan recommended an evaluation of the effects or benefits to restoring or rehabilitating the Wilder Forest wetland. Updated information from this study indicates that the phosphorus load from the Wilder wetland may not be as big a component of the overall phosphorus budget to Square Lake as previously thought, and phosphorus loads have likely not increased in recent years. The estimated load from the Wilder wetland to Square Lake in the 2002 diagnostic study (6.2 kg, based on 1999 data) was 1.7 to 7.9 times higher than the 2010 estimated phosphorus load (0.7-2.3 kg) in 2010. Combining the Wilder wetland runoff and load estimates from the 2010 data with the loads estimated in the 2002 diagnostic study, the load from the Wilder wetland represents approximately 24% of the surface water runoff load to Square Lake (compared to 46% estimated in the 2002 diagnostic study), and approximately 4% of the total load to Square Lake (compared to 8% estimated in the 2002 diagnostic study), which includes the high contribution from groundwater.

Implementation Monitoring and Evaluation

In-lake monitoring will be undertaken to track the progress of implementation. During the time that Square Lake is not stocked with rainbow trout, the effects of the stocking suspension on zooplankton abundance and community composition, surface water algal biomass (chlorophyll-*a*), and water clarity will be evaluated with respect to whether or not the suspension leads to an increase in the abundance of *Daphnia pulicaria* in Square Lake and an increase in the lake's water clarity. Trout suspension monitoring and evaluation, schedule, and budget can be found in a copy of the Memorandum of Understanding and Square Lake Monitoring Plan submitted by the CMSCWD to the MDNR in Appendix C. In addition, on-going monitoring of lake water quality will be conducted as an implementation activity to ensure that Square Lake is maintaining its goal Secchi disk transparency of 22.9 ft (7m) and give early warning signs of trends in decreased water quality.

Roles and Responsibilities of Project Participants

A list of project participants and their individual roles and responsibilities for each priority implementation activity, organized by priority management area, is included in Table 13 below.

Table 2. Project participants, and roles and responsibilities for priority implementation activities

Priority Implementation Activity		Project Participants	Roles and Responsibilities
In-lake Food Web	Suspend trout stocking	CMSCWD	Oversee monitoring and submit annual summary memos and final report to MDNR
		MDNR	Suspend all stocking of rainbow trout in Square Lake for the remainder of 2012 through the end of 2015.
		Consultants	Collect and evaluate monitoring data during stocking suspension.
	In-lake water quality monitoring	CMSCWD	Oversee and fund annual in-lake monitoring
		Washington CD	Collect monitoring data 14 times per year
		Volunteers	
Groundwater	Distribution of septic management materials to homeowners	Washington County	Distribute septic management materials to residents in the Square Lake watershed
		Square Lake Assoc.	
	Septic pumping program	Washington County	Notify homeowners to pump their septic systems and keep track of completions
		Metropolitan Council	
		Square Lake Assoc.	Publish reminder articles in newsletter
		Homeowners	Schedule and fund septic system pumping
	Septic system upgrades	Washington County	Inspect septic systems
		CMSCWD	Support homeowners seeking funding assistance
		Homeowners	Schedule and partially fund septic system upgrades
	Work with landowners to place remaining undeveloped shoreline into conservation easement(s)	May Township	Coordinate with lakeshore landowners, the Square Lake Association, Washington County, MDNR, and Minnesota Land Trust to place undeveloped shoreline into conservation easements
Surface Water Runoff	Landowner education programs	CMSCWD	Coordinate, advertise, and fund education programs for landowners
		Square Lake Assoc.	
		EMWREP	The East Metro Water Resource Education Program (EMWREP) is a collaborative group of multiple watershed organizations, municipalities, WCD, and Washington County, which conducts education to support implementation efforts
	Distribute current shore land zoning regulations	Square Lake Assoc.	Compile and distribute packets to residents in the Square Lake watershed
		May Township	
	Develop regulations regarding the alteration of ice/beach ridges	May Township	Develop regulations concurrent with other zoning changes
		Washington County	
		MDNR	
		Square Lake Assoc.	
	Stormwater runoff regulations to provide no net increase in phosphorus	May Township	Develop regulations concurrent with other zoning changes
		Washington County	
		MDNR	
		Square Lake Assoc.	

Information and Education Program

The District participates in the East Metro Water Resource Education Program (EMWREP). EMWREP is a collaborative group of multiple watershed organizations, municipalities, WCD, and Washington County, which conducts education to support implementation efforts, for example, to promote participation in cost-share programs. EMWREP activities include Blue Thumb workshops, articles in the media, and Stormwater U trainings.

Outreach has already been initiated as a part of this project in coordination with EMWREP through stakeholder meetings. Future outreach will include homeowner education programs on the benefits and installation of shoreline buffers and rain gardens, and proper management of lawns.

Permits Required

Permitting does not appear to be a feasibility constraint for any of the priority implementation activities identified in this implementation plan.

Implementation Program Elements, Milestone Schedule, and Budget

A 10-year (2013-2022) implementation schedule and budget for priority implementation activities in Square Lake and its watershed, organized by priority management area, are summarized in Table 14 and Table 15 below. Implementation activities are recommended to begin with trout stocking suspension and monitoring, resulting in a final recommendation in 2016 on whether to permanently extend the trout stocking suspension by the MDNR in Square Lake. To keep watershed conditions during the three-year stocking suspension similar to current conditions, other priority implementation activities that could result in the reduction of TP loading are recommended for implementation only after the initial three-year stocking suspension is complete at the end of 2015. These include distributing septic management materials to homeowners, the septic pumping program, and septic system upgrades. Priority implementation activities that work to maintain existing TP loading can be implemented beginning in 2013, including: working with landowners to place remaining undeveloped shoreline into conservation easement(s), distributing current shore land zoning regulations, developing regulations regarding the alteration of ice/beach ridges, and stormwater runoff regulations to provide no net increase in phosphorus.

Table 3. 10-year schedule (2013-2022) for priority implementation activities in Square Lake.

Priority Implementation Activity		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
In-lake Food Web	Suspend trout stocking											
	In-lake water quality monitoring											
Groundwater	Distribution of septic management materials to homeowners											
	Septic pumping program											
	Septic system upgrades											
	Work with landowners to place remaining undeveloped shoreline into conservation easement(s)											
Surface Water Runoff	Landowner education programs											
	Distribute current shore land zoning regulations											
	Develop regulations regarding the alteration of ice/beach ridges											
	Stormwater runoff regulations to provide no net increase in phosphorus											

Table 4. Estimated costs for priority implementation activities in Square Lake.

Priority Implementation Activity		Annual project costs ($)									
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
In-lake Food Web	Suspend trout stocking	14,005	14,005	14,005							
	In-lake water quality monitoring				2,092	2,092	2,092	2,092	2,092	2,092	2,092
Groundwater	Distribution of septic management materials to homeowners				100		100		100		100
	Septic pumping program				a	a	a	a	a	a	a
	Septic system upgrades				v	v	v				
	Work with landowners to place remaining undeveloped shoreline into conservation easement(s)	v	v	v	v	v	v	v	v	v	v
Surface Water Runoff	Landowner education programs				3,000		3,000		3,000		3,000
	Distribute current shore land zoning regulations	100	100	100	100	100	100	100	100	100	100
	Develop regulations regarding the alteration of ice/beach ridges		400								
	Stormwater runoff regulations to provide no net increase in phosphorus		1,000								
Total		**14,105**	**15,505**	**14,105**	**5,292**	**2,192**	**5,292**	**2,192**	**5,292**	**2,192**	**5,292**

a – Already funded; v – Variable; funded by landowner

Conclusions

To meet the resource water quality goal of improving long term Secchi transparency in Square Lake to an average of 7 meters (23 feet), the following strategies will be used:

1. Increase *Daphnia pulicaria* densities through either decreasing predation pressure and/or improving habitat.
2. Maintain or decrease existing phosphorus loads to buffer the lake against potential eutrophication.

The highest priority implementation activities identified in this implementation plan are a three-year stocking suspension of rainbow trout in Square Lake to evaluate whether stocking suspension results in an increase in *Daphnia pulicaria* density and water clarity of the lake, and continued in-lake water quality monitoring. Additional priority implementation activities that maintain or decrease the total phosphorus load to Square Lake include septic system pumping and upgrades to reduce phosphorus loading from groundwater; and shoreline buffers, rain gardens, and lawn management activities to reduce phosphorus loading from surface water runoff. Implementation of priority activities should begin immediately with a three-year trout stocking suspension. During this time, only activities which maintain existing phosphorus loads to the lake through regulation and education should be implemented. Following the trout stocking suspension, all remaining activities should be implemented according to the schedule from Table 14 in Section 4.6 of this report.