

2005 Lake Management Program

Pipe & North Pipe Lakes Protection & Rehabilitation District

**Recommended by
The Citizens Advisory Committee for Water Quality**

**Approved by
The District Board of Commissioners with Modifications***

Budget Adopted at District Annual Meeting held August 28, 2004

*Removed \$49 from contingency fund and added \$400 to the shoreland restoration project.

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Preamble

We are two lakes - one community. Our two lakes came into existence over 10000 years ago when the last glaciers in this area receded. With the formation of the lakes, a community of plants and animals started to develop. Over many years, this community evolved into a healthy ecosystem, without the help of humans. Today this community includes people as well. As humans we collectively desire much of the natural character that existed in and around the lakes prior to our presence. At the same time, we also desire the opportunity to enjoy the many forms of recreation that a lake offers. Accomplishing these two desires at the same time is a major challenge. This challenge results because, as humans, we have the capacity to degrade many of the natural things we came to the lake for. A tool is needed to help us maintain the best possible balance between enjoying a natural setting and at the same time enjoying the variety of recreational opportunities available to us. The tool we recommend is a lake management program approved by the district electors. This tool is to be dynamic, continually updated to reflect new information and community needs.

Our Vision

Our greatest desire is to have a healthy lake ecosystem. This means we want a place that attracts both humans and a diverse population of other living species. Two specific desires that stand out as priorities are water clarity compatible with the nature of the ecosystem and prevention of invasive species entrenchment.

1. Introduction

This document is the result of (1) lake monitoring since 1998, (2) an initial lake planning grant in 2000-2001 guided by Polk County, (3) a 2nd lake planning grant in 2003 guided by Blue Water Science, and (4) recent activity of the Citizens Advisory Committee for Water Quality. The committee hopes that this document will be updated on a yearly basis and continue to include plans spanning 5-10 years into the future. This document could be expanded to cover additional topics in the future. Because this committee did not want to risk diluting its efforts or take on a role not intended by the board of commissioners for this initial planning document, topics such as water uses, youth involvement, and water level were not included.

The process of building the 2005 Lake Management Program was a process of thinking about the Pipe Lakes as a system, an ecosystem. At this lake district level, the lakes and their watersheds defined the scope to consider for management. This system was broken into 10 project (management) categories. A goal was written for each of these categories. Then specific projects were detailed within each of these categories.

This document consists of 4 components: a statement of our lake management strategy, a consolidation of the document content, a detailed explanation of the projects recommended for 2005, and an appendix containing the working project idea list that the committee evolved in assembling this document. The first

2 components "Our Current Strategy" below and the "Synopsis of Project Information" that follows form a summary of the information in this document.

2. Our Current Strategy



- **Improve our understanding of lake and watershed ecology so that as individuals and as a group we can participate in preservation or improvement of the quality of our lake environment.**
- **Continue to monitor both lakes for characteristics that are indicators of lake quality.** Monitoring will help make today's management decisions and help future lake managers with information on long-term trends.
- **Discourage invasive species and encourage natural aquatic plants.** Because we know that prevention is much better than responding to crises, we will emphasize inspections of our waters and watercraft for invasive species. Because we know that natural aquatic plants help maintain water clarity, wildlife habitat, and nature's beauty and because our lakes do not have large quantities of aquatic plants, we will discourage removal of native aquatic plants except for navigation purposes and in near-shore areas within the viewing corridor.
- **Protect or improve water clarity of North Pipe Lake by focusing on the incoming streams and internal cycling of nutrients.** We will obtain a more accurate understanding of the quantity and sources of nutrients that are added to the lake from the major streams entering the lake. With this improved understanding we hope to implement projects that will reduce the quantity of nutrients entering the lake from streams. In addition, we will continue to build understanding of the contribution of nutrients from the lake sediments to the lake surface waters. Taking into account safety, economics, and our ecological responsibilities, we will search for and then decide on the suitability of projects that would limit introduction of nutrients from the sediments to the lake surface water.
- **Protect or improve water clarity of Pipe Lake by exploiting the role of zooplankton in lake clarity, minimizing nutrient contributions from North Pipe Lake, and improving the % coverage of shoreland buffer strips. In addition to protecting water quality, the buffer strips will also enhance scenic beauty.** We will collect information on the amounts and type of zooplankton. We will blend this information with similar information on algae and decide if lake clarity protection or enhancement projects should be implemented based on this increased understanding. Secondly, we expect that any nutrient reductions in the waters of North Pipe Lake will aid in the preservation of Pipe Lake. Thirdly, because we know that lakes tend to degrade when they begin to be dominated by urban-like shorelands, we will devise projects to increase the length of shoreland with buffer strips.
- **Seek ways to ensure the preservation of our mostly forested watershed for future generations.** We will communicate to landowners and users the benefits that forests and wetlands provide for our lake ecosystem. Use of government programs and conservation easements to preserve these valuable lands will be encouraged.
- **Adapt our strategy as new information evolves.** Our knowledge will improve, and the physical environment (climate, atmosphere, etc.) for our lakes will change over time. The desires and needs of the people in our lake community will change. We will update our strategy to reflect these changes and our continuing desire to sustain a healthy lake ecosystem.

3. Synopsis of Project Information

3.1. Timeline Chart

The chart below shows approximate times for planned projects, for possible projects which need further investigation, and for pending projects whose implementation depend on the outcome of other projects or investigations.

Project Category	Specific Project	Recommended Action	Timeline							
			2003	2004	2005	2006	2007	2008	2009	2010
1. Watershed - agricultural										
	1a. Agriculture practice summary	Implement 2005								
	1b. Improved agriculture practices	Pending								
	1c. Agriculture cost share program	Pending								
2. Watershed - forests and wetlands										
	2a. Watershed photo log	Implement 2005								
	2b. Identify critical watershed areas	Implement 2005								
	2c. Wetland phosphorus sampling	Implement 2005								
	2d. Preserve critical watershed areas	Implement 2007								
3. Watershed - streams										
	3a. Stream monitoring	Continue 2005								
	3b. Stream restoration pilot project	Implement 2005								
	3c. Correct high phosphorus streams	Pending								
	3d. Restore highly eroded stream banks	Pending								
4. On-site septic systems										
	4a. On-site maintenance awareness	Implement 2005								
	4b. On-site workshops	Implement 2006								
	4c. On-site inspections	Investigate further								
5. Shorelands										
	5a. Shoreland restoration demo	Implement 2005								
	5b. Shoreland ordinance understanding	Implement 2005								
	5c. Volunteer shoreland landscaping	Implement 2006								
	5d. Water infiltration improvements	Implement 2006								
6. Aquatic plant										
	6a. Curlyleaf pondweed inspections	Continue 2005								
	6b. Boat inspection	Implement 2005								
	6c. Minimize aquatic plant destruction	Implement 2005								
	6d. Aquatic plant survey	Implement 2007								
	6e. Lake soil fertility tests	Pending								
7. Fisheries										
	7a. Fisheries habitat protection	Implement 2005								
	7b. Biomanipulation familiarization	Implement 2005								
	7c. Add shoreline woody debris	Investigate further								
	7d. Biomanipulation program	Pending								
8. In-lake clarity										
	8a. Zooplankton & algae monitoring	Continue 2005								
	8b. In-lake treatment familiarization	Implement 2005								
	8c. North Pipe Lake alum treatment	Pending								
9. Ongoing education										
	9a. Education through the newsletter	Continue 2005								
	9b. Expert speaker	Implement 2005								
	9c. Lake leader education support	Implement 2005								
	9d. Educational demonstrations	Implement 2006								
	9e. Educational web pages	Investigate further								
10. Lake monitoring										
	10a. Summer lake monitoring	Continue 2005								
	10b. Winter lake monitoring	Continue 2005								

	indicates planned projects
	indicates investigation period or estimated time for decisions on pending items

3.2. Consolidated Project Information

This table shows project titles with the projects recommended for 2005 grouped together near the top. The number and letter preceding the title indicate the project category and specific project within the category respectively as shown in the Timeline Chart above. The 2005 volunteers are those who have offered so far to work on the various projects in 2005. A high priority identifies projects that the committee considers the most important to implement. A 10% contingency has been added to cover unknown expenses for the 2005 projects.

Recommended Action*	Specific Project	2005 Volunteers	Priority	2005 Cost Estimate	
Projects recommended for 2005	Continue in 2005	3a. Stream monitoring	D. Hollar, J. Weinkauff	High	735
		6a. Curlyleaf pondweed inspections	E. Durkee, K. Jenson, D. Wenger	High	
		8a. Zooplankton & algae monitoring	L. Bresina, D. Hollar, M. Zenner	High	1800
		9a. Education through the newsletter	D. Hollar	High	250
		10a. Summer lake monitoring	L. Bresina, D. Hollar	High	255
		10b. Winter lake monitoring	L. Bresina, M. Zenner	High	225
	Implement 2005	3b. Stream restoration pilot project	D. Hollar, J. Weinkauff	High	300
		4a. On-site maintenance awareness	L. Fornetti	High	
		5a. Shoreland restoration demos	R. Vantine	High	900
		5b. Shoreland ordinance understanding	R. Vantine	High	
		6b. Boat inspection		High	
		6c. Minimize aquatic plant destruction	K. Jenson	High	100
		7a. Fisheries habitat protection	M. Zenner	High	50
		7b. Biomanipulation familiarization	M. Zenner	High	100
		8b. In-lake treatment familiarization	L. Bresina	High	200
		9b. Expert speaker	D. Hollar	High	
		9c. Lake leader education support	D. Hollar	High	225
		1a. Agriculture practice summary		Medium	15
		2a. Watershed photo log	L. Bresina	Medium	25
		2b. Identify critical watershed areas	L. Bresina	Medium	25
	2c. Wetland phosphorus sampling	D. Hollar	Medium	200	
	Implement 2006	4b. On-site workshops		High	
		5c. Volunteer shoreland landscaping		High	
		5d. Water infiltration improvements		High	
		9d. Educational demonstrations		Medium	
	Implement 2007	6d. Aquatic plant survey		High	
2d. Preserve critical watershed areas			Medium		
Investigate further	4c. On-site inspections				
	7c. Add shoreline woody debris	M. Zenner			
	9e. Educational web pages				
Pending	1b. Improved agriculture practices				
	1c. Agriculture cost share program				
	3c. Correct high phosphorus streams				
	3d. Restore highly eroded stream banks				
	6e. Lake soil fertility tests				
	7d. Biomanipulation program				
*May continue in subsequent years. See timeline chart.	8c. North Pipe Lake alum treatment				
	Estimated total project cost			\$5,405	
	Contingency fund (8.4%)			\$452	
Total for 2005 management program			\$5,857		

4. Explanation of 2005 Projects

All projects to be implemented in 2005 are explained in this section.

4.1. Watershed - Agricultural

Category Goal: Provide assurance that the agricultural lands in the Pipe Lakes watershed contribute no more nutrients to the lakes than should be expected using best management practices.

4.1.1. Agriculture practice summary (project 1a)

Specific Objective: Prepare a written summary of current farming practices on agricultural lands.

Description: Identify all farmland parcels in the watershed. Make a visual inspection of each parcel several times during the year. Prepare a questionnaire to send to farmland owners to find out what practices they currently employ to minimize nutrient and particulate runoff. Ask the appropriate county department for help in preparing the questionnaire.

Estimated 2005 cost: \$15 for mailing materials

Schedule: Complete in 2005

4.2. Watershed - Forests and Wetlands

Category Goal: Preserve the mostly forested watershed for the benefit of future generations.

4.2.1. Watershed photo log (project 2a)

Specific Objective: Maintain a photo log of main forest and wetland areas for future reference.

Description: Search government and private sources for aerial photos that were taken in 2004. Try to find higher resolution photos than those collected for grant 1.

Estimated 2005 cost: \$25 if charged for copies of photos.

Schedule: Complete anytime in 2005

4.2.2. Identify critical watershed areas (project 2b)

Specific Objective: Identify forests and wetlands important to preserve undisturbed for the benefit of water quality.

Description: Identify forest and wetlands that are critical to preserving water quality of the Pipe Lakes. Identify options available for legally preserving these lands. Find out if any of these forests or wetlands are currently protected by legal means. Talk to land owners who do not currently protect their lands legally and find out if they would support legal preservation measures.

Estimated 2005 cost: \$25 for mailing costs and charges for search copies.

Schedule: Complete over the 2005-2006 period.

4.2.3. Wetland phosphorus sampling (project 2c)

Specific Objective: Measure the phosphorus levels in open water wetlands associated with streams that may receive restoration work.

Description: For any open water wetland in the subwatershed of a stream that may receive restoration work, determine the total phosphorus in the open water area. Use this information to help identify the sources of phosphorus in the stream. Analyze approximately 10 wetland water samples for total phosphorus.

Estimated 2005 cost: \$200

Schedule: Complete in 2005.

4.3. Watershed - Streams

Category Goal: Reduce the total phosphorus entering the lakes from inlet streams by 20%.

4.3.1. Stream monitoring (project 3a)

Specific Objective: Monitor the flow-weighted mean of total phosphorus and total suspended solids for the 6 major streams entering the lakes.

Description: Using the techniques developed in 2003, measure the total phosphorus, total suspended solids, and flow rates for the streams designated NPI-W1, NPI-E2, NPI-E3, NPI-NE, NPO, and PI-GUL. Within 24 hours of major runoff events, complete these measurements for at least 3 runoff events. Set aside enough funds to add a 4th event if needed. The targeted time for the 3 runoff event measurements is twice in April-June and once in July-September. Combine the flow-weighted mean data for 2003-2005 and determine if the average stream concentration exceeds 150 ppb total phosphorus or 100 ppm total suspended solids. Review results with a qualified consultant and determine best methods to reduce the phosphorus or/and total suspended solids equal to or below the above levels. Decide if a 20% reduction in total phosphorus entering the lakes is practical.

Estimated 2005 Cost:

Total phosphorus analysis	360
Total suspended solids analysis	240
Shipping	60
Consultant services	<u>75</u>
Total	\$735

Schedule: See description above.

4.3.2. Stream restoration pilot project (project 3b)

Specific objective: Demonstrate erosion correction methods in selected segments of a North Pipe inlet stream.

Description: Using 2003-2004 data identify a high erosion section of a North Pipe stream bank. Review photos with Polk County Land and Water Resources department. Install 1 or 2 pilot stream bank corrections as recommended by the county.

Estimated 2005 Cost: \$300

Schedule: Contact the county Land and Water Resources department for recommended timing.

4.4. On-site Septic Systems

Category Goal: Encourage proper maintenance of septic systems and monitor for failing systems.

4.4.1. On-site maintenance awareness (project 4a)

Specific Objective: Obtain a professional speaker for a district meeting to explain how the various on-site septic systems should be maintained.

Description: Briefly describe how the various on-site systems work and how they should be maintained. Ask the speaker to include information on how proper maintenance enhances the longevity of the system and protects the lake from nutrient contamination.

Estimated 2005 cost: none

Schedule: Summer of 2005

4.5. Shorelands

Category Goal: Increase the portion of the shoreline of the Pipe Lakes that exists in a natural state.

4.5.1. Shoreland restoration demo (project 5a)

Specific Objective: Establish a fund to be used to encourage shoreland buffer strips through demonstrating shoreland restoration sites on the lakes.

Description: This fund will be awarded in conjunction with any grant money obtained from other sources to award shoreland property owners who agree to establish and maintain a shoreland restoration site. A procedure will be devised whereby one or more lake residents are selected to receive, or share in, this award.

Estimated 2005 cost: \$900 initial contribution by the lake district.

Schedule: Award to be targeted to start a restoration project in 2005.

4.5.2. Shoreland ordinance understanding (project 5b)

Specific Objective: Help educate lakeshore owners with respect to the applicable shoreland regulations.

Description: Study shoreland regulations and develop explanatory summaries for lakeshore owners. Answer questions at lake meetings or the picnic.

Estimated 2005 cost: no cost

Schedule: summer 2005

4.6. Aquatic Plants

Category Goal: Prevent invasive species through watercraft inspection and early detection. Encourage retention of existing aquatic plants.

4.6.1. Curlyleaf pondweed inspections (project 6a)

Specific Objective: Perform early summer inspections for curlyleaf pondweed.

Description: Make visual inspections of the entire lake littoral zone (depths where aquatic plants grow) between May 15th and June 15th. Pay special attention to areas where aquatic plants presently grow.

Estimated 2005 cost: none

Schedule: See Description above.

4.6.2. Boat inspection (project 6b)

Specific Objective: Start an exotic species boat inspection program at the public landing.

Description: Seek volunteers to periodically monitor watercraft and their trailers at the public landing for presence of plant material when launching. Explain the current regulations regarding transfer of invasive species from watercraft to lakes.

Estimated 2005 cost: none

Schedule: Start program in 2005.

4.6.3. Minimize aquatic plant destruction(project 6c)

Specific Objective: Install a sign near the path through the aquatic plants north of the bridge reminding boaters to preserve aquatic plants.

Description: Start an effort to encourage retention of aquatic plants by installing a sign visible in an area midway in the path explained above. The sign should remind boaters to avoid destruction of aquatic plants in the path and explain that aquatic plants are important for wild life habitat, stabilizing the lake bottom, water clarity, and natural beauty.

Estimated 2005 cost: \$100

Schedule: Spring of 2005.

4.7. Fisheries

Category Goal: Maintain habitat which supports a healthy fishery. Use fish management as much as possible to maintain water clarity, especially in Pipe Lake.

4.7.1. Fisheries habitat protection (project 7a)

Specific Objective: Work with the DNR to promote long term habitat protection. Start a project to improve habitat.

Description: Contact DNR fisheries representatives and discuss potential habitat improvement projects. Consider what has been successful in other lakes and evaluate cost & benefit of each possibility. Based on recommendations from the DNR, start a project that improves fish habitat.

Estimated 2005 cost: \$50 for habitat structure materials

Schedule: Investigation in summer and fall of 2004, implementation beginning in 2005

4.7.2. Biomanipulation familiarization (project 7b)

Specific Objective: Become familiar with biomanipulation as it might apply to clarity of Pipe and North Pipe Lakes.

Description: Contact DNR fisheries representatives and an additional private consultant for an opinion on using biomanipulation as a tool for water quality improvements in the Pipe Lakes. Use analysis of zooplankton and algae samples taken from the Pipe Lakes to evaluate potential of this technique.

Estimated 2005 cost: \$100 for private consulting services

Schedule: Investigation in 2004 and 2005.

4.8. In-lake Clarity

Category Goal: Improve the average summer clarity of each lake by 20% through the combination of in-lake and inlet stream management (See Watershed - Streams and Fisheries above), without detrimental effects.

4.8.1. Zooplankton & algae monitoring (project 8a)

Specific Objective: Determine if zooplankton consumption of algae explain why water clarity is better than total phosphorus and chlorophyll concentrations predict it should be in Pipe Lake.

Project Description: Volunteers will take zooplankton and algae samples from Pipe and North Pipe Lakes in June, July, and August. These samples will be analyzed for type and populations. A professional lake consultant will prepare a report explaining the results and update recommendations to pursue. This project was started in the summer of 2004. The 2005 sampling process may be modified based on the 2004 results and will continue at least through 2006. This

project may lead to some form of biomanipulation that would increase the zooplankton population and thereby improve lake clarity. (See also 4.7 Fisheries) Decide by 2006 if biomanipulation management is a practical.

Estimated 2005 Cost:

Zooplankton analysis	350
Algae analysis	800
Consultant report and recommendations	<u>650</u>
Total	\$1800

Schedule: See description above.

4.8.2. In-lake treatment familiarization (project 8b)

Specific Objective: Get opinions of additional lake experts on what the most appropriate in-lake treatment would be for North Pipe Lake. Determine how similar lake communities decided on what method to implement.

Description: Contact the DNR and an additional private consultant to review the existing lake data and possible methods to reduce phosphorus internal cycling in North Pipe Lake. Ask them what additional information would be necessary to make a sound decision on the method to use and to build confidence the treatment would be successful. Interview at least 3 lake communities with similarities to the Pipe Lakes that have considered methods to reduce internal cycling. Find out how they decided on the method and the degree of success obtained.

Estimated 2005 Cost: \$200 for private consultant services

Schedule: Complete by December 2005.

4.9. On-going Education

Category Goal: Improve our understanding of lake and watershed ecology so that as individuals and as a group we can participate in preservation or improvement of the quality of our lake environment.

4.9.1. Education through the newsletter (project 9a)

Specific Objective: Provide instructive educational information in newsletters and by special publications dedicated to lake education.

Description: Continue the current practice of sending newsletters in the spring, fall, and for special needs. Include educational topics that increase the awareness of all factors that affect water quality and specific actions individuals can take to preserve the quality of our lakes. Mail a "key message" educational brochure to all district members.

Estimated 2005 Cost: The traditional newsletter cost is covered by a separate budget item. The additional cost to send a paper mailing once a year is approximately \$250.

Schedule: See description above.

4.9.2. Expert speaker (project 9b)

Specific objective: Obtain an expert lake educational speaker at least once per year.

Description: Enlist known experts who can make lake educational topics both fun and informative for people at any level of interest.

Estimated 2005 Cost: none

Schedule: Plan for springtime.

4.9.3. Lake leader education support (project 9c)

Specific objective: Provide financial support to district lake leaders to participate in lake education programs.

Description: Provide a \$75 subsidy to each of 2 lake leaders, who expect to work for the benefit of the lake district over the next few years, to attend at least 2 days of the Wisconsin Lake Convention. Provide up to \$25 to each of 3 lake leaders to pay registration fees for local or regional lake educational events.

Estimated 2005 Cost: \$225

Schedule: The 2005 Wisconsin Lake Convention will be April 28-30th in Green Bay.

4.10. Lake Monitoring (project 10a, Summer lake monitoring & 10b, Winter lake monitoring)

Category Goal: Monitor basic lake characteristics to build understanding and detect trends as early as possible.

Specific Objectives: Monitor Secchi depth, total phosphorus, chlorophyll, dissolved oxygen, and temperature of Pipe and North Pipe Lakes during the growing season. Monitor total phosphorus, dissolved oxygen, and temperature during the ice-on period.

Description: Measure Secchi depth every 2 weeks from May through October. Measure top and bottom total phosphorus once per month May through October and January through March. Obtain dissolved oxygen and temperature profiles from the top to the bottom of both lakes May through October and January through March. Sample chlorophyll in June, July, August, and October. The Wisconsin Self-Help Monitoring program pays for much of the cost. The costs below are lake district costs only.

Estimated 2005 Cost:

	Summer	Winter
Total phosphorus analysis	165	180
Shipping	<u>90</u>	<u>45</u>
Total	\$255	\$225

Schedule:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pipe Lake												
Secchi depth	every 2 weeks May-Oct.											
Top total phosphorus	X	X	X		SH	SH	SH	SH	X	SH		
Bottom total phosphorus	X	X	X		X	X	X	X	X	X		
Chlorophyll (top)						SH	SH	SH		SH		
Dissolved oxygen depth profile	X	X	X		X	X	X	X	X	X		
Temperature depth profile	X	X	X		X	X	X	X	X	X		
North Pipe Lake												
Secchi depth	every 2 weeks May-Oct.											
Top total phosphorus	X	X	X		SH	SH	SH	SH	X	SH		
Bottom total phosphorus	X	X	X		X	SH	SH	SH	X	X		
Chlorophyll (top)						SH	SH	SH		SH		
Dissolved oxygen depth profile	X	X	X		X	X	X	X	X	X		
Temperature depth profile	X	X	X		X	X	X	X	X	X		
Notes: SH indicates Self-Help Monitoring Program X indicates monitoring costs paid by lake district												

Appendix - Working Project Idea List

This list contains project ideas generated by the 2004 Citizen's Advisory Committee for Water Quality. Most of the projects are based on the report on the 2003 planning grant. The 2005 volunteers column shows volunteers so far for project work in 2005.

Recommended Action*	2005 Volunteers	Priority	Project categories followed by specific project title and activity	
			1. Watershed - agricultural	
Implement 2005		Medium	1a. Agriculture practice summary	Prepare a written summary of agricultural acres and their current farming practices.
Pending			1b. Improve agriculture practices	Promote conservation tillage, grass waterways, and nutrient management techniques.
Pending			1c. Agriculture cost share program	Work with the county to implement a cost share program for installing best management practices on the critical agriculture lands.
			2. Watershed - forests and wetlands	
Implement 2005	L. Bresina	Medium	2a. Watershed photo log	Maintain photo log of main forest and wetland areas for future reference.
Implement 2005	L. Bresina	Medium	2b. Identify critical watershed areas	Identify forests and wetlands important to preserve undisturbed for the benefit of water quality.
Implement 2005	D. Hollar	Medium	2c. Wetland phosphorus sampling	Measure the phosphorus levels in open water wetlands associated with streams that may receive restoration work.
Implement 2007		Medium	2d. Preserve critical watershed areas	Pursue options to promote preservation of critical watershed lands.

Recommended Action*	2005 Volunteers	Priority	Project categories followed by specific project title and activity	
			3. Watershed - streams	
Continue 2005	D. Hollar, J. Weinkauff	High	3a. Stream monitoring	Monitor the flow-weighted mean of total phosphorus and total suspended solids for the 6 major streams entering the lakes.
Implement 2005	D. Hollar, J. Weinkauff	High	3b. Stream restoration pilot project	Demonstrate pilot erosion correction methods in sections of a North Pipe inlet stream.
Pending			3c. Correct high phosphorus streams	Correct causes if total phosphorus flow-weighted mean exceeds 150 ppb for any major stream.
Pending			3d. Restore highly eroded stream banks	Restore stream channels if total suspended solids exceeds 100 ppm in any major stream.
			4. On-site septic systems	
Implement 2005	L. Fornetti	High	4a. On-site maintenance awareness	Obtain a professional speaker for a district meeting to explain how the various on-site septic systems should be maintained.
Implement 2006		High	4b. On-site workshops	Produce on-site workshops and septic tank (tank between house and absorption field) pumping campaigns.
Investigate further			4c. On-site inspections	Contract to randomly inspect 10% of the on-site systems around the lakes.
			5. Shorelands	
Implement 2005	R. Vantine	High	5a. Shoreland restoration demo	Award \$500 from the lake district to be used for a high visibility shoreline naturalization or restoration project.
Implement 2005	R. Vantine	High	5b. Shoreland ordinance understanding	Help educate lakeshore owners with respect to the applicable shoreland regulations.
Implement 2006		High	5c. Volunteer shoreland landscaping	Implement a volunteer shoreland landscaping program to reestablish native conditions.
Implement 2006		High	5d. Water infiltration improvements	Encourage minimizing and mitigating the effects of impervious surfaces when modifying the land near the lake.

Recommended Action*	2005 Volunteers	Priority	Project categories followed by specific project title and activity	
			6. Aquatic plants	
Continue 2005	E. Durkee, K. Jenson, D. Wenger	High	6a. Curlyleaf pondweed inspections	Perform early summer inspections for curlyleaf pondweed.
Implement 2005		High	6b. Boat inspection	Start an exotic species boat inspection program at the public landing.
Implement 2005	K. Jenson	High	6c. Minimize aquatic plant destruction	Install a sign near the path through the aquatic plants north of the bridge to remind boaters to preserve aquatic plants.
Implement 2007		High	6d. Aquatic plant survey	Conduct an aquatic plant survey every 3-4 years.
Pending			6e. Lake soil fertility tests	Sample sediments up to 30 sites around lakes for indicators of potential for curlyleaf pondweed and eurasian milfoil.
			7. Fisheries	
Implement 2005	M. Zenner	High	7a. Fisheries habitat protection	Work with the DNR to promote long term habitat protection.
Implement 2005	M. Zenner	High	7b. Biomanipulation familiarization	Become familiar with biomanipulation as it might apply to clarity of Pipe and North Pipe Lakes.
Investigate further	M. Zenner		7c. Add shoreline woody debris	Encourage retention of natural shorelines with woody debris such as downed trees left in water.
Pending			7d. Biomanipulation program	Based on zooplankton/algae analyses and DNR 2004 fishery study, devise an appropriate biomanipulation program for both lakes.

Recommended Action*	2005 Volunteers	Priority	Project categories followed by specific project title and activity	
			8. In-lake clarity	
Continue 2005	L. Bresina, D. Hollar, M. Zenner	High	8a. Zooplankton & algae monitoring	Determine if zooplankton consumption of algae explain why water clarity is better than total phosphorus and chlorophyll concentrations predict it should be in Pipe Lake.
Implement 2005	L. Bresina	High	8b. In-lake treatment familiarization	Get opinions of additional lake experts on what the most appropriate in-lake treatment would be for North Pipe Lake. Determine how similar lake communities decided on an what project to implement.
Pending			8c. North Pipe Lake alum treatment	Consider an alum treatment for North Pipe Lake if the average Secchi depth is less than or equal to 3 feet during 21 days in each of 3 consecutive years.
			9. Ongoing education	
Continue 2005	D. Hollar	High	9a. Education through the newsletter	Provide instructive educational information in newsletters and by special publications dedicated to lake education.
Implement 2005	D. Hollar	High	9b. Expert speaker	Obtain an expert lake educational speaker at least once per year.
Implement 2005	D. Hollar	High	9c. Lake leader education support	Provide financial support to district lake leaders to participate in lake education programs.
Implement 2006		Medium	9d. Educational demonstrations	Arrange demonstration projects.
Investigate further			9e. Educational web pages	Improve web site for educational purposes.
			10. Lake monitoring	
Continue 2005	L. Bresina, D. Hollar	High	10a. Summer lake monitoring	Monitor Secchi depth, total phosphorus, chlorophyll, dissolved oxygen, and temperature of Pipe and North Pipe Lakes during the growing season.
Continue 2005	L. Bresina, M. Zenner	High	10b. Winter lake monitoring	Monitor total phosphorus, dissolved oxygen, and temperature during the ice-on period
*May continue in subsequent years. See timeline chart.				