

Peppermill Lake District – Lake Management Plan 2016 – Draft 2



About Peppermill Lake

Peppermill Lake is a spring-fed impoundment approximately 67 acres in size located in the southeast corner of Adams County in the Town of Jackson. It is a shallow lake with a trophic status ranging between mesotrophic to eutrophic. Supported in the past by 2 lake associations, popular support grew for the creation of a Lake District and in 2002, the Peppermill Lake Management District was formed.

Peppermill Lake has one public landing (owned by the Town) and one dam (owned by the County),

Peppermill lake is home to 51 aquatic plant varieties, turtles, blue gills, crappies, largemouth bass, northern pike, perch, and a robust Sandhill crane population.

About Peppermill Lake - Milestones

- 1960's – Lake and subdivision established
- 1981 – Slow no-wake ordinance adopted by Town of Jackson
- 1992 – Aeration systems installed (in response to fish kills)
- 1998 – EWM identified
- 2002 – A full [Lake Study](#) was conducted
- 2002 – Lake District Established
- 2003 - First Annual Lake District Meeting
- 2005 – Lake Management Plan established
- 2006 – [Critical Habitat Report](#) developed
- 2007 – [Bathymetric Map](#) created
- 2008 – [Lake Classification Report](#) developed
- 2008 – AIS Grant awarded
- 2008 – Overhaul of winter aeration systems (in response to limited fish kill)
- 2009 - Pier installed at Public Landing
- 2011 – [Fish population study](#)
- 2012- [Aquatic Plant Survey](#)
- 2015 – Aquatic Plant Survey
- 2016 – Aquatic Plant Survey
- 2016 – Woody Debris Map

Lake Management Plan Overview

- Main Elements
 - Review Process
 - Aquatic Species Management
 - Water Quality
 - Dam Management
 - Shoreland Protection
 - Recreational Uses
 - Education

Plan Review Process

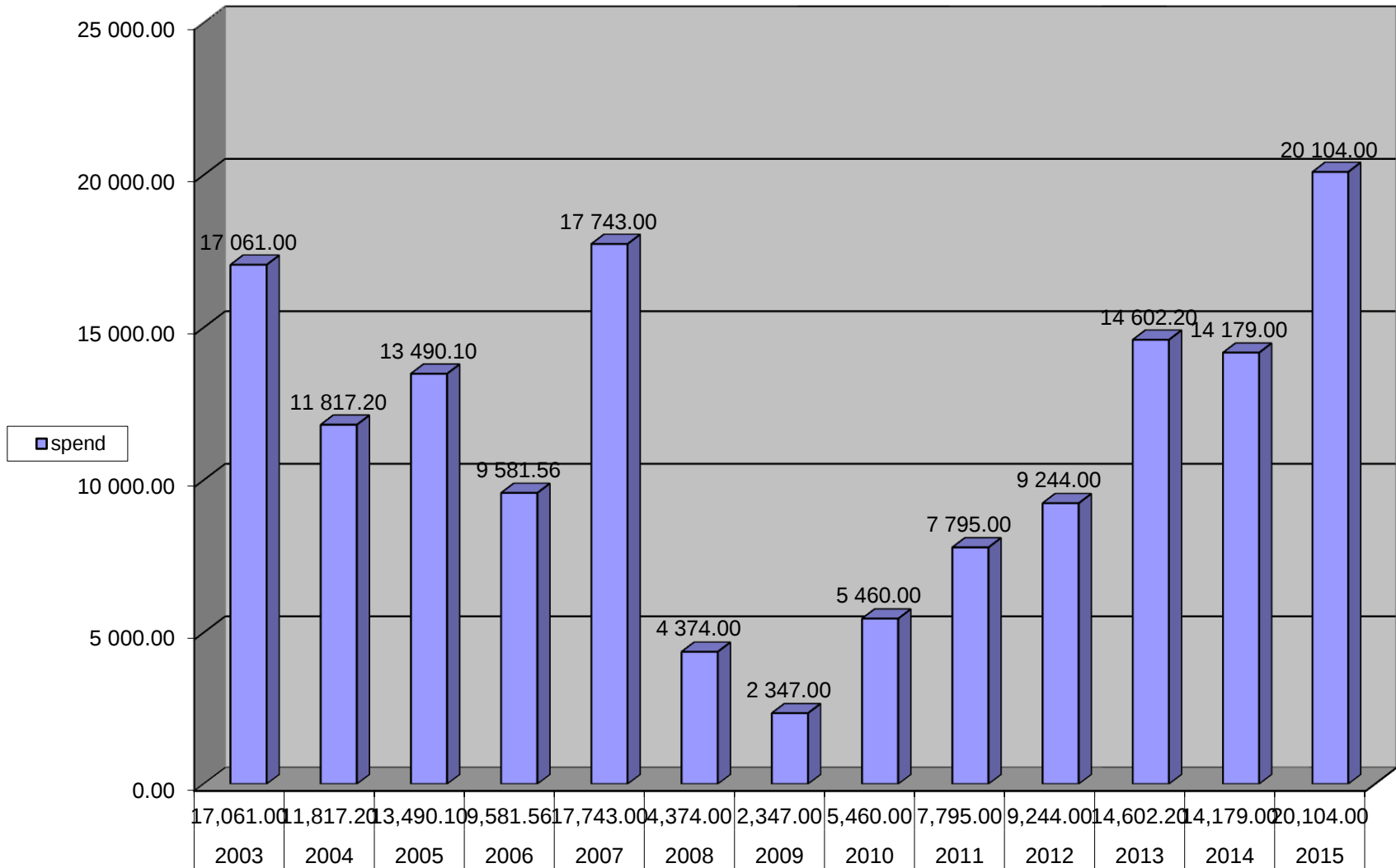
- Public meeting (advertised) soliciting citizen comment is held annually
- Lake District Board reviews all recommended changes
- Plan is reviewed at Lake District Annual Meeting for comment
- Plan is posted at [LWCD](#) website and www.peppermilllake.us

Aquatic Species – EWM/Chara

- First detected in the late 1990's
- Chemical treatment began around 2000
- In 2005, mechanical harvesting was introduced
- In 2007, peak costs incurred
- Severe 2008 winter coupled with aerator failure resulted in significant decline in EWM population (replaced by Chara)
- Severe 2008-2009 winter continued trend
- Costs plummeted to a low in 2009
- Costs increased in 2010 as plants reestablished themselves
- 2011 costs still well below 2007 costs
- 2013 plant mgmt costs exceeded \$14K for the first time since 2007.
- Since 2008 Chara has become the predominant plant management issue.
- Since 2008 no chemical treatment has been used.



2003-2015 Aquatic Plant Mgmt Costs

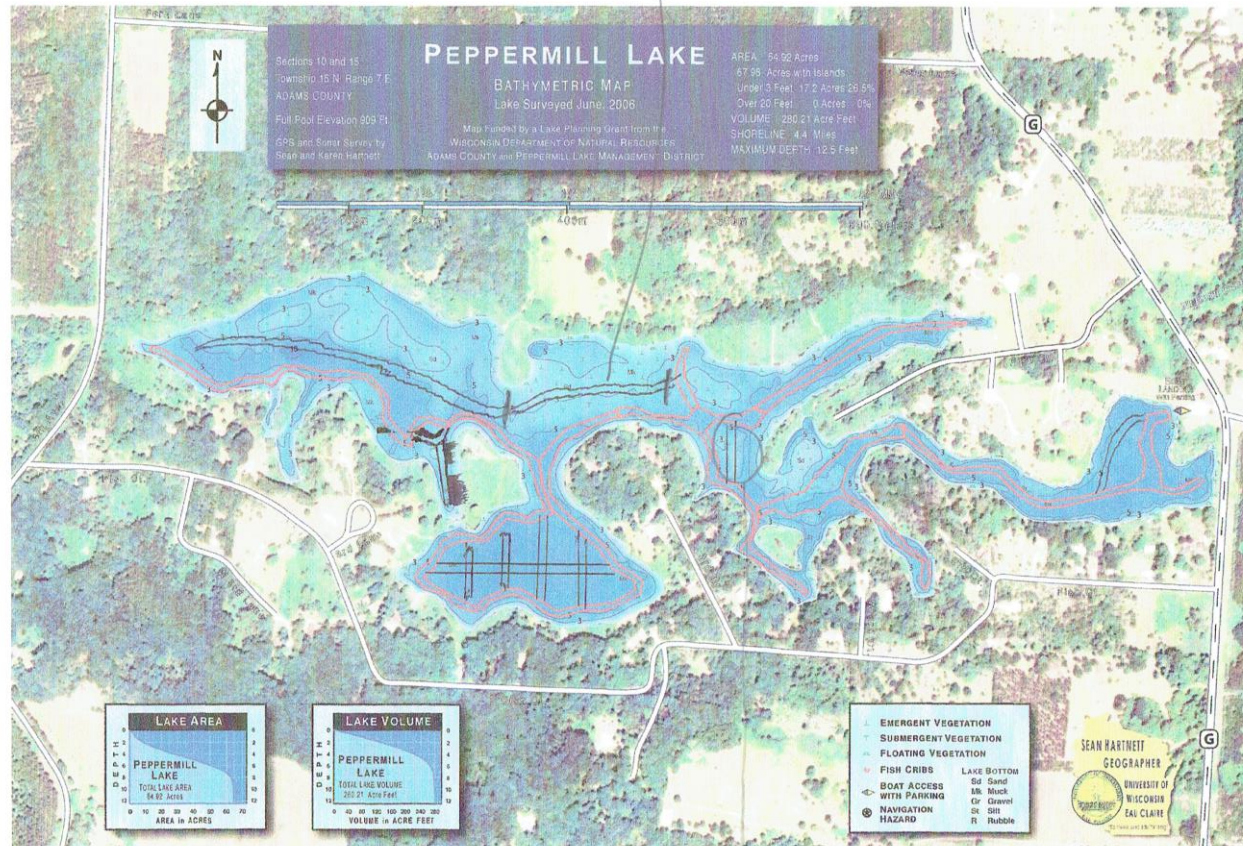


Aquatic Species - Harvesting

Task	Problem to solve	criteria	Owner	When	Deilverable	Desired outcome	Funding	Comments
Mechancial Harvesting	Nutrient Load mgmt/ navigational access/	Based on approved Map	PMLD	May through Sept	plant removal, navigational improvement, phosphorus removal	See Line 8	PMLD	
Hand Pulling of EWM	Removal of EWM in shallow areas	Based on approved Map	PMLD	May through Sept	EWM removal	Reduce EWM expansion in shallow water near piers	PMLD	Volunteer effort
Manual Removal of selected Chara mounds	May not be able wait for Harvester	Mounds that have risen to the surface	PMLD	May through Sept	Chara mounds pulled to the shore	Increased navigation during times when Harevster is not available	PMLD	Volunteer Effort
Nutrient Load modelling	How to understand the impact of phosphorus removal	Based on plant sampling	PMLD/DN R/LWCD	Annually	prevent lake from becoming Eutrophic	Measurable way to model nitrogen and phosphous levels in lake	?	

Harvesting Map (proposed)

SHOULD BE REMOVED
LOWER DUE TO
SHALLOWNESS AT SHORE



SHOULD BE ANGLED AS
TO MAP TO NAVIGATION

Aquatic Species - Monitoring

Task	Problem to solve	criteria	Owner	When	Deilverable	Desired outcome	Funding	Comments
Plant removal monitoring	Understand total P and N removed after each harvest	Send samples to Soil analysis lab in Marshfield	PMLD	After each harvest	spreadsheet to send to LWCD and DNR	Way to understand impact of harvesting	PMLD	Need baseline model to know how we are matching what goes into lake
Aquatic Plant survey	Understand plant growth dynamics	Based on 209 GPS coordinates provided by LWCD	PMLD/LWCD	Annually?	Information that can inform future harvesting maps and fish population enhancements	YOY understanding of changing plant population	PMLD/LWCD	
DO Testing	Measure effectiveness of aeration and overall oxygen transfer year-round	Measure DO at 3 depths in 4 locations on lake	PMLD	Monthly	Data spreadsheet to be compiled annually	Year over year (YOY) understanding of oxygen deployment in lake	PMLD	Volunteer effort (some months may not be doable due to lake conditions)
SWIMS database	Make sure all acquired data is stored in SWIMS for DNR access		PMLD	As compiled	Data that SWIMS can consume	Compilations of analytical data that can be used by future residents and DNR scientists	PMLD	
Testing for Common Carp	Perform DNA testing from water sample	Validate visual siting of Carp	PMLD/LWCD	On time only	Report that gives us an action plan for 2018	Plan for 2018 if needed	PMLD\LWCD	Three carp sitings were reported in 2016
Zebra Mussell Monitoring	Monitor for incursion	East and West locations	PMLD	Annually	Send notification to LWCD if infestation occurs	prevent Mussels from spreading any further if possible	PMLD	

Water Quality

- Lake Surface Watershed —
972 Acres
 - 53.4% woodlands
 - 36.2% residential
 - 6.9% water
 - 3.5% agricultural
- Groundwater watershed —
4715 acres
- As of 2002 Phosphorus and Nitrogen levels were at manageable levels
- 75 riparian owners
 - Septic systems on east properties are oldest (30 plus years)
 - 2002 Chloride levels indicated minimal septic tank impact
 - County Septic Tank Survey —
Awaiting Count report

Water Quality

Task	Problem to solve	criteria	Owner	When	Deilverable	Desired outcome	Funding	Comments
Total P, Chlor A, Secchi	Water Clarity analysis	4 Locations	PMLD	May thru August	Water samples sent for analysis	YOY understanding of water quality. Bellweather for possible problems.	PMLD	Volunteer effort
Barley Bag placement	Algae control	all piers	PMLD	Annually	?	Less filamentous algae along piers	PMLD	No data this this really works
DO Testing	See previous slides							
Household water testing	Establish baseline for groundwater quality	All PMLD residents	PMLD	2017 test results		baseline map of groundwater quality	PMLD	Do bi-annually?

Dam Management

Task	Criteria	Owner	When	Funding
Dam Management				
	Annual Inspections per DNR standards	LWCD	Annually	County
	Operation and maintenance of Dam	LWCD	Weekly	County
Seasonal recording of rain		LWCD	3X week	County
Electronic Monitoring of water level		LWCD	Daily	County
Repair Outflow Grate		County	2017	County

Shoreland Protection

In 2007, in conjunction with the County, several shoreline restoration projects were initiated and funded partially through grants which expire at the end of 2010.

Since then two significant pieces of legislation have passed, the Adams County Shoreland Protection Act, and the Wisconsin Act 9, banning the use of phosphorus fertilizers. Both laws will have a significant impact on completing initiatives stated in the Lake Management Plan.

In 2005, Tree Drop program began with 2008 being the only year with fewer than 8 trees being felled. Some trees were felled as part of shoreline restoration projects and as of 2012, only naturally occurring tree drops have been managed. With new shore land mapping protocol completed, we will re-evaluate for 2017 and beyond.

2016 – new shoreland mapping protocol has been adopted. Peppermill lake will establish baseline in 2016. Completed.

Shoreland Protection

Task	Criteria	Owner	When	Funding
Inventory/map septic systems in PMLD		Cnty. Planning/Zoning	By 2017	State Law
Shoreland habitat mapping	All of Lake shore. Capture photos of all structures and plant strata.	LWCD/PMLD	2016 Completed.	LWCD/PMLD
Educate on NR115		PMLD/LWCD	Ongoing	PMLD/LWCD
Post Critical Habitat Map at Landing		PMLD	2017	PMLD
Explore North Shore Conservancy		PMLD	Ongoing	

Recreational Uses

- In 1981 the Town of Jackson adopted a slow no-wake ordinance for Peppermill Lake.
- In the 1970's-1980's there were 4 fish kills, 1 in the late 1990's and one in 2008. Winter aeration began in 1992 and all systems were overhauled in 2008, adding a new system in the south bay.
- Mechanical harvesting for navigational purposes began in 2005.
- In 2002-2003 one fish stocking occurred (bass fingerlings).
- Tree drops began in 2005 as a means to augment fish habitat. Between shoreline restoration projects and natural tree drops, no formal tree drop program is in place.
- Boat launch fee was established in 2008 by Town of Jackson.
- Boat launch pier installed in 2009 through boat launch fee funds.
- Catch and Release Brochure/Initiative 2014
- AIS Signage Completed for EWM

Recreational Uses

Task	Criteria	Owner	When	Funding
Improve fishery based on DNR recommendation	Based on Catch-and-release education	PMLD	Year round	PMLD
Place trees within littoral zone for fish habitat		PMLD	Yearly	PMLD
Conduct Fish Survey		LWCD & DNR	2022	DNR
Aerator Operation		PMLD	Annually	PMLD
Conduct survey of lake users (compare to 2004)		PMLD	2017	PMLD

Education

- LWCD New Home Owner informational kits are given to each new owner.
- Lake District Board continues to issue a quarterly newsletter and maintain a website, www.peppermilllake.us
- Peppermill Lake is an active supporter of the Adams County Lake Alliance.
- Member of WAL.
- Expand alliances to groups like CSWAC (Central Sands Water Action Coalition)

Education and Outreach

Task	Criteria	Owner	When	Funding
Create alliances with new organization	Sand Counties	PMLD	Ongoing	PMLD
Quarterly Newsletter	Mailed and Posted to Website	PMLD	Annually	PMLD
Website	Monthly updates	PMLD	Annually	PMLD

Open Issues

Objective	Result
Establish Volunteer Reporting system for fish caught	Report data to PMLD Board
Algae Bloom Notification	Remediation and support from LWCD
Management of swimming floats	Assure they are not in navigational paths