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APR 20 2015

WT/3 - WY/3 - OGL/3

CEDAR LAKE PROTECTION AND REHABILITATION DISTRICT RUNOFF MANAGEMENT GRANT RESOLUTION

WHEREAS, The Cedar Lake Protection and Rehabilitation District is interested in acquiring a Grant from the Wisconsin Department of Natural Resources for the purpose of implementing measures to control agricultural or urban stormwater runoff pollution sources (as described in the application and pursuant to ss. 281.65 or 281.66, Wis. Stats., and chs. NR 151, 153 and 155); and

WHEREAS, a cost-sharing grant is required to carry out the project:

THEREFORE, BE IT RESOLVED, that the Cedar Lake Protection and Rehabilitation District HEREBY AUTHORIZES the Chair of the Cedar Lake Protection and Rehabilitation District, to act on behalf of the Cedar Lake Protection and Rehabilitation District to:

- Submit and sign an application to the State of Wisconsin Department of Natural Resources for any financial aid that may be available;
- Sign a grant agreement between the local government (applicant) and the Department of Natural Resources;
- Submit reimbursement claims with necessary supporting documentation;
- Submit signed documents; and
- Take necessary action to undertake, direct and complete the approved project.

BE IT FURTHER RESOLVED that the Cedar Lake Protection and Rehabilitation District shall comply with all state and federal laws, regulations and permit requirements pertaining to implementation of this project and to fulfillment of the grant document provisions.

Adopted this 24th day of February, 2015.

I hereby certify that the foregoing resolution was duly adopted by the Cedar Lake Protection and Rehabilitation District at a legal meeting on the 24th of February, 2015.

Authorized Signature: _____

Bradley Johnson

Title: _____

Chairman

Date: _____

Feb. 24, 2015

Notice: This application form template was created by the Wisconsin Department of Natural Resources. Application is hereby made to the Wisconsin Department of Natural Resources, Bureau of Watershed Management, for grant assistance consistent with s. 281.65, Wis. Stats., and Chapters NR 153 and NR 154, Wis. Adm. Code. Collection of this information is authorized under the authority of s. 281.65, Wis. Stats. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law [ss. 19.31 - 19.39, Wis. Stats.]. *Unless otherwise noted, all citations refer to Wisconsin Administrative Code.*

Please read the instructions prior to completion of this form. Complete all sections as applicable. Tab to each section or click in answer space.

Applicant Information

Calendar Year of Grant Start 2016

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Project Name

Cedar Lake TMDL Implementation

Governmental Unit Applying (name and type) (example: Dane County Land and Water Resources Department)

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Cedar Lake Protection and Rehabilitation District

Governmental Unit Web Site Address

cedarlake-wi.org

WT/3 - WY/3 - OGL/3

Name of Government Official - Authorized Signatory
 (First Last)

Don Demulling

Name of Government Official - Grant Contact Person
 (First Last) (if different)

Dan Davison

Title

Chair

Title

Secretary

Area Code + Phone Number

(715) 338-4460

Area Code + Phone Number

(715) 425-8916

E-Mail Address

Donald.Demulling@AndersenCorp.com

E-Mail Address

ddavison@rfstatebank.com

Mailing Address - Street or PO Box

PO Box 93

Mailing Address - Street or PO Box

725 River Ridge Road

City

Star Prairie

State

WI

ZIP Code

54026

City

River Falls

State

WI

ZIP Code

54022

Part I. Project Information

A. Project Category: Total Maximum Daily Load (TMDL) or Non-TMDL

You must be able to check either Question 1 or Question 2 and provide the documentation requested. If you answer "No" to both questions or omit the documentation requested, the application will not be scored.

- 1. **TMDL Project:** The project must meet all the following criteria:
 - The project is in a geographical area covered by an EPA-approved TMDL.
 - The project addresses the agricultural nonpoint pollutants identified in the TMDL document.
 - The project addresses the most critical nonpoint pollution sources in the the project area.
- 2. **Non-TMDL Project:** The project must meet all of the following criteria:
 - The project implements water resource goals included in a DNR-approved watershed plan or strategy.
 - The watershed project area is between 8 and 39 square miles (HUC 12 size).
 - The project addresses the most critical nonpoint pollution sources that are significant based on relative contribution to impairment and can be cost-effectively controlled.
 - The project addresses NR 151 agricultural performance standards and prohibitions.

Provide the title of the TMDL report or watershed plan that this project implements.

(TMDL link: <http://dnr.wi.gov/topic/tmdls/tmdlreports.html>).

Cedar Lake Phosphorus TMDL, Revised July 3, 2003

Cedar Lake Management Plan, April 2014 (cedarlake-wi.org)

Horse Creek Priority Watershed Plan (9-key element plan)

Provide a link to the report, if available.

<http://dnr.wi.gov/topic/tmdls/tmdlreports.html>

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TRM Grant Project Name:

Cedar Lake TMDL Implementation

List the critical nonpoint source pollutants the project will control.

Cedar Lake is listed as phosphorus impaired as a result of agriculture, internal loading and local land use (page 1 TMDL). The goal of the TMDL is to install BMP's and reduce internal loading to reduce water column P loads in Cedar Lake (page 4 TMDL). The internal loading from lake sediments comes from historic agricultural sources. The load reduction assigned to carp removal was accomplished through a natural die-off of carp in 2002.

Provide the document page number(s) that address the pollutants and sources.

Cedar Lake Phosphorus TMDL, Revised July 3, 2003 (pages 1 and 4)

Cedar Lake Management Plan, April 2014 (cedarlake-wi.org) (page 25 re: carp and page 18 re: internal load as phosphorus source)

Horse Creek Priority Watershed Plan, June 2001 p49-50

B. Location of Project

County	State Senate District number:				State Assembly District number:		
Polk	10				28		
Name of Township(s), Center Point(s)	Township (N)	Range	E or W	Section	Latitude (North, 4 to 7 decimal places)	Longitude (West, 4 to 7 decimal places)	
Star Prairie	31 N	18	W	2	45.2170000	-92.5719000	
Alden	32 N	18	W	34			
	N						
	N						

Method for Determining Latitude & Longitude (check one)

GPS DNR Surface Water Data Viewer - (<http://dnrmmaps.wi.gov/SL/?Viewer=SWDV>)

Other (specify): _____

C. Waterbody and Watershed Information (see Attachment A and SWDV <http://dnrmmaps.wi.gov/SL/?Viewer=SWDV> for items 1 through 6 and 10)

1. Name of Targeted Waterbody	2. Name of Watershed	3. Watershed Code
Cedar Lake	Lower Apple River	0703000508
4. 12-digit Hydrologic Unit Code (HUC) Code:	5. 12-digit HUC Subwatershed Name:	6. Watershed or Subwatershed Project Drainage Area (square miles):
070300050806	Cedar Lake - Horse Creek	28.6
7. Estimated Number of Cropland Acres in Project Area	8. Number of WPDES-Permitted Livestock Operations in Project Area	9. Estimated Number of Other Livestock Operations in Project Area
6,036	0	6

10. This is a surface water project and Wisconsin Buffer Initiative (WBI) Watershed Information is available (fill in A-I below)

This is a surface water project and **no** WBI Watershed Information is available for this area

This is a groundwater project (do not fill in A-I below)

- A. WBI Watershed ID: 127071
- B. Stream at Watershed Outlet: Horse Creek
- C. County at Watershed Outlet: Polk
- D. Watershed Area (square miles): 35
- E. WBI Highest Group Rank: 51
- F. Stream Water Quality Component Rank: 54
- G. Fish Habitat Component Rank: 742
- H. Lake Water Quality Component Rank: 54
- I. WBI Composite Rank: 1052

D. Maps and Photographs

Yes

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- An 8.5" x 11" map from the DNR Surface Water Data Viewer. (link to <http://dnrmaps.wi.gov/SL/?Viewer=SWDV>).
- Aerial photo maps and photographs showing the critical project area(s) of the subwatershed are attached.

E. Endangered and Threatened Resources, Historic Properties, and Wetlands

Check the appropriate box for each question based on what the **governmental unit knows** to occur where the project disturbs land. If you have no evidence of the items below, leave check box blank.

1. There are endangered or threatened resources, as identified in s. 29.604, Wis. Stats., and NR 27 in the project area. (Refer to http://dnr.wi.gov/topic/erreview/publicportal.html?tm_source=featureimage&utm_medium=homepage&utm_campaign=20140929_nhiportal for assistance.)
2. There are archaeological sites, historical structures, burial sites, or other historic places identified in s. 44.45, Wis. Stats., in the project area.
3. There are wetlands in the project area that are governed by water quality standard provisions of NR 103. (Answer with the SWDV map layer **Wetland Indicators** at: <http://dnrmaps.wi.gov/SL/Viewer.html?Viewer=SWDV&runWorkflow=Wetlandland>.)

F. Filter Questions (Check the appropriate box for each question.)

*Note: The applicant **must** be able to answer "Yes" to filter questions 1 through 10 and "Yes" or "NA" to questions 11 and 12. In addition, provide additional documentation as required by questions 5, 6, 10, 11 and 12. If any of these questions cannot be answered "Yes" or documentation is omitted, the application will not be scored.*

Yes

1. The project will control agricultural runoff.
2. The applicant certifies that funding from this grant will **not** be used for best management practices to bring into compliance with state standards and prohibitions any cropland, livestock facility, or significant livestock facility alteration that is created after the effective date of the applicable NR 151 performance standard or prohibition. (See Table in instructions at Project Information Part I. E. for standards, prohibitions and effective dates.)
3. The applicant certifies that funding from this grant will **not** be used for best management practices to bring a livestock facility or cropland back into compliance with a performance standard or prohibition in NR 151 when such compliance had previously been achieved after the effective date of the standard or prohibition.
4. The applicant certifies that funding from this grant will **not** be used for best management practices for which the DNR or local unit of government included a previous offer of cost sharing as part of a NR 151 notice or county notice meeting requirements of NR 151.09 or NR 151.095.
5. The county, in which the project resides, has a strategy in an approved county Land & Water Resources Management Plan (LWRMP), an updated LWRMP work plan, or an Inter-Governmental Agreement with the DNR to implement agricultural performance standards and prohibitions contained in NR 151. To answer "Yes," the strategy must include **all** of the key activities listed in the instructions. Identify here the document name, date approved and provide a web link to that document.
St. Croix County Land and Water Resource Management Plan 2009 (5 year extension approved April 2013)
Polk County Land and Water Resource Management Plan <http://www.co.polk.wi.us/landwater/docs/LWRM%20Plan%2012-1-09.pdf>
6. This project is consistent with the resource goals, objectives, or activities identified in the LWRMP, plan amendment, or workplan prepared under s. ATCP 50.12, Wis. Adm. Code. Provide the LWRMP page numbers which relate to this project.
St. Croix County LWRM page 43
Polk County LWRM page 16
7. Project will be completed within 36 months of the start of the grant period.
8. Staff and contractors designated to work on this project have adequate training, knowledge, and experience to implement the proposed project.
9. Staff or contractual services, in addition to those funded by this grant, will be provided if needed.
10. The local DNR Nonpoint Source Coordinator (see <http://dnr.wi.gov/topic/nonpoint/NPScontacts.html>) has been contacted and the project was discussed:

Name of the local DNR Nonpoint Source Coordinator Contacted	Date Contacted	Topic of Discussion
Cindy Koperski	02/23/2015	TRM Grant application process

Yes N/A

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11. If this application is for one or more livestock facilities, an **Animal Units Calculation Worksheet** (Form 3400-25a) for existing and future livestock numbers is attached for each facility.
(Form available at: http://dnr.wi.gov/topic/AgBusiness/documents/3400025A_WT.pdf.)
12. If this is a joint application among local units of government, a **draft** of the **Inter-Governmental Agreement** is attached.
(See Attachment F.)

G. Best Management Practices (BMPs) for which DNR TRM Funding is Requested.

Check all BMPs for which DNR funding is requested and insert the Performance Standard and Prohibition codes the BMP addresses if applicable. See instructions for table of standards and prohibition codes and effective dates.
(Also see Attachment C for additional BMP information.)

Structural Practice (Wis. Adm. Code)	Enter Code #s: Performance Std.(s) or Prohibition(s) the BMP Addresses	Structural Practice (Wis. Adm. Code)	Enter Code #s: Performance Std.(s) or Prohibition(s) the BMP Addresses
<input checked="" type="checkbox"/> Manure Storage Systems (NR 154.04(3)) R16	Code(s) 9,4,6,10,11,12	<input checked="" type="checkbox"/> Riparian Buffers (NR 154.04(25)) R23	Code(s) 2,13
<input checked="" type="checkbox"/> Manure Storage System Closure (NR 154.04(4)) R15	Code(s) 5,10	<input type="checkbox"/> Roofs (NR 154.04(26)) R25	Code(s)
<input checked="" type="checkbox"/> Barnyard Runoff Control Systems (NR 154.04(5)) R3	Code(s) 12	<input type="checkbox"/> Roof Runoff Systems (NR 154.04(27)) R24	Code(s)
<input type="checkbox"/> Access Roads & Cattle Crossings (NR 154.04(6)) R1	Code(s)	<input type="checkbox"/> Sediment Basins (NR 154.04(28)) R26	Code(s)
<input type="checkbox"/> Animal Trails and Walkways (NR 154.04(7)) R2	Code(s)	<input type="checkbox"/> Sinkhole Treatment (NR 154.04(30)) R28	Code(s)
<input checked="" type="checkbox"/> Critical Area Stabilization (NR 154.04(10)) R6	Code(s)	<input type="checkbox"/> Subsurface Drains (NR 154.04(33)) R30	Code(s)
<input type="checkbox"/> Diversions (NR 154.04(11)) R7	Code(s)	<input type="checkbox"/> Terrace Systems (NR 154.04(34)) R31	Code(s)
<input type="checkbox"/> Field Windbreaks (NR 154.04(12)) R8	Code(s)	<input checked="" type="checkbox"/> Underground Outlets (NR 154.04(35)) R32	Code(s) code = 1
<input checked="" type="checkbox"/> Filter Strips (NR 154.04(13)) R9	Code(s) 13,1	<input checked="" type="checkbox"/> Waste Transfer Systems (NR 154.04(36)) R33	Code(s) 12,11,7,4,6
<input checked="" type="checkbox"/> Grade Stabilization (NR 154.04(14)) R10	Code(s) 1	<input checked="" type="checkbox"/> Wastewater Treatment Strips (NR 154.04(37)) R34	Code(s) 7,12
<input checked="" type="checkbox"/> Heavy Use Area Protection (NR 154.04(15)) R11	Code(s) 13	<input checked="" type="checkbox"/> Water and Sediment Control Basins (NR 154.04(38)) R35	Code(s) code = 1
<input type="checkbox"/> Lake Sediment Treatment (NR 154.04(16)) R12	Code(s)	<input checked="" type="checkbox"/> Waterway Systems (NR 154.04(39)) R36	Code(s) code = 1
<input checked="" type="checkbox"/> Livestock Fencing (NR 154.04(17)) R13	Code(s) 13	<input type="checkbox"/> Well Decommissioning (NR 154.04(40)) R37	Code(s)
<input type="checkbox"/> Livestock Watering Facilities (NR 154.04(18)) R14	Code(s)	<input type="checkbox"/> Wetland Development or Restoration (NR 154.04(41)) R38	Code(s)
<input checked="" type="checkbox"/> Prescribed Grazing (NR 154.04(22)) R20	Code(s) 9	Streambank and Shoreline Protection (NR 154.03(31)) (includes associated fencing)	
<input type="checkbox"/> Relocate or Abandon Animal Feeding Ops. (NR 154.04(23)) R21	Code(s)	<input type="checkbox"/> Stream Crossing R39C	Code(s)
Process Wastewater Handling (NR 154.04(19) & NRCS 629)		<input type="checkbox"/> Rip-rapping R39R	Code(s)
<input type="checkbox"/> Milking Center Waste Control Systems R17	Code(s)	<input type="checkbox"/> Shaping & Seeding R39S	Code(s)
<input type="checkbox"/> Feed Storage Leachate R52	Code(s)	<input type="checkbox"/> Fencing R39F	Code(s)
<input type="checkbox"/> Other Wastewater - specify in "Other" below	Code(s)	<input type="checkbox"/> Other Protection - e.g. bio- engineering - specify in "Other" below R39O	Code(s)
Cropping Practices		Cropping Practices	
<input checked="" type="checkbox"/> Contour Farming (NR 154.04(8)) R4	Code(s) 3,1	<input type="checkbox"/> Pesticide Management (NR 154.04(21)) R19	Code(s)

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Structural Practice (Wis. Adm. Code)	Enter Code #s: Performance Std.(s) or Prohibition(s) the BMP Addresses	Structural Practice (Wis. Adm. Code)	Enter Code #s: Performance Std.(s) or Prohibition(s) the BMP Addresses
<input checked="" type="checkbox"/> Cover & Green Manure Crop (NR 154.04(9)) R5	Code(s) 1,3,9	<input checked="" type="checkbox"/> Residue Management (NR 154.04(24)) R22	Code(s) 1,3
<input checked="" type="checkbox"/> Nutrient Management (NR 154.04(20)) R18	Code(s) 1,3,9,11,10	<input type="checkbox"/> Strip-Cropping (NR 154.04(32)) R29	Code(s)
<input checked="" type="checkbox"/> Other (specify)	Lake Sediment Treatment (NR 154.04(16))		

Part II. Competitive Elements**1. Budget and Grant Needs****A. Activities Timeline, Funding and Source of Staff**

Complete the table below to identify the timing of project activities and how the local assistance activities required under this project will be funded and staffed.

Activities	Timeline	Funding Source		Source(s) of Staff
		*This Grant Local Assistance	Other	
1. Contacting farmers	Ongoing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Farmer Led Council, Polk LWRD, NRCS,
2. Education/outreach	Ongoing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Farmer Led Council, Polk LWRD, NRCS,
3. Inventory	Ongoing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Farmer Led Council, Polk LWRD
4. Targeting sources	Ongoing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Farmer Led Council, Polk LWRD, NRCS
5. CSA development	Ongoing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Polk County LWRD, NRCS, Farmer Led Council
6. Design & installation	Ongoing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Polk County LWRD, NRCS, Farmer Lead Council
7. Project management	2016-2017	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Cedar Lake P&R District
8. Mid-term evaluation	2017	<input type="checkbox"/>	<input checked="" type="checkbox"/>	WNDR, UW-Stout
9. Final reporting	2018	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Cedar Lake P&R District, UW Stout, WDNR
10. Enforcement	Ongoing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Polk County LWRD
11. Other		<input type="checkbox"/>	<input type="checkbox"/>	
12. Other		<input type="checkbox"/>	<input type="checkbox"/>	

* Note: State statutes prohibit DNR from reimbursing governmental units for certain activities under a local assistance grant. This includes BMP design and certain educational costs. See instructions for more information.

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B. Project Budget Complete the table below to develop budgets for the BMPs checked in Part I G. and the activities above.

Identify the estimated total project costs for all best management practice (BMP) construction and installation. Enter BMP costs into cells A1 (column A, row 1) and A2, as applicable.

If requesting local assistance, identify the total costs associated with local assistance (LA) activities. Enter LA costs into cell A4.

Enter the state share amounts being requested under the grant in Column C. Keep in mind that the total of the amounts in cells C1 + C2 + C4 must be less than or equal to \$1,000,000. The total of the requested grant amounts you enter must not exceed the grant cap of \$1,000,000.

Enter the state share amount(s) being requested for BMPs under the grant into cells C1 and C2, as applicable. The maximum state cost share rate is 70% for best management practices.(Contact DNR if economic hardship consideration is necessary.)

Enter the state share amount being requested for LA under the grant into cell C4. The amount that can be requested for LA may be up to 10% of the grant amount allocated for best management practices. The maximum state cost share rate for local assistance is 70%; however, the portion of the grant that can be used for local assistance activity may not exceed 10% of the grant amount allocated for best management practices (cell C3). See LA calculation examples in the instructions.

*ENSURE THAT THE GRANT REQUESTS IN COLUMN C DO NOT EXCEED \$1,000,000.

		A	B	C	D
	Project Budget	Enter Estimated Total Costs	Eligible Cost Share (70% of Total Costs)	Enter Requested State Share Amounts	Local Share (auto-calculates)
	Best Management Practice				
1	Structural Practices	2,200,000	1,540,000	979,000	1,221,000
2	Cropping Practices	30,000	21,000	21,000	9,000
3	Subtotal for BMPs	2,230,000	1,561,000	1,000,000	1,230,000
4	Local Assistance Needs	0			
	Totals	2,230,000	1,561,000	1,000,000	1,230,000

C. Cost-estimate Accuracy and Cost-containment Measures

Describe the quality of data used in preparing these budget estimates for cost-share need. Identify whether the needs are based on specific knowledge of the targeted farms in the project area or are based on more generalized estimation methods. Identify the cost-containment procedures that will be used for the installation of best management practices identified in Part 1. F. See instructions.

Cost estimates are based upon gallons of alum needed and recent costs for alum applications (James, 2013). The alum project will be competitively bid by the Cedar Lake P&R District following legal procedures.

Polk County Land and Water Resources Department will manage cost containment and bidding process for agricultural BMPs using bids or average practice costs.

2. Water Quality Need

Describe how the water resources within the project area are impaired or threatened by the nonpoint pollution sources that will be addressed by the project. See the instructions for the factors to address in describing "water quality need". Cedar Lake has been on the Wisconsin 303(d) list of impaired waters since 1998 because of high total phosphorus levels. Phosphorus leads to heavy growth of algae in the lake. Impairment of recreation uses was added to the list of water quality impairments for Cedar Lake because of excess algae growth in 2012. The phosphorus standard for impaired waters listing for nonstratified drainage lakes such as Cedar Lake is 40 ug/L. The lake consistently exceeds this standard, and the trend has been upward since 1986 (DNR Long Term Trend Monitoring). Annual mean total phosphorus during study years 2009-2010 was 62 ug/L. An alum treatment will bring the lake to meeting water quality standards with phosphorus concentrations well below 40 ug/L at 33 ug/L.

Phosphorus impairment comes primarily from lake sediments and is a result of past nonpoint source loading. Current nonpoint source phosphorus loading is low with an average P index value for crop fields of 1 lb/acre/year. The state of Wisconsin sets a limit of 6 lb/acre/year. Lake sediment internal loading contributes 85 percent of the summer phosphorus load to Cedar Lake. External loading from the watershed contributes 15% of the summer phosphorus load to Cedar Lake. (James, 2013 pg 105) Phosphorus index values will aid in selecting sites for BMP installation.

The potential for toxic algae blooms is a primary threat to Cedar Lake. High phosphorus levels lead to the growth of blue green algae in the lake. Algal blooms during a recent study period (2009-2011) were largely dominated by potential toxin-producing cyanobacteria (*Aphanocapsa incerta* and *Microcystis smithii*). Algae growth in Cedar Lake exceeded the World Health Organization risk guidelines for closure in Cedar Lake during the study period. Chlorophyll concentrations greater than 50 µg/L occurred on average ~ 17% of the time in the summer (June-October), exceeding the World Health Organization threshold of risk associated with potential exposure to cyanotoxins (WiscCALM 2013). Cyanotoxin exposure has been linked to liver damage, neurological impacts, illness, and even death in humans, domestic animals, and wildlife. (James, 2013) Figure 2 in the attached documents shows the heavy scum-forming algae growth in Cedar Lake that is of particular concern.

Heavy algae growth and resulting low water clarity leads to low growth of rooted aquatic macrophytes and degrades lake habitat.

Goals and objectives of the St. Croix County Land and Water Resource Management Plan identify the need to improve Cedar Lake water quality: GOAL II. Protect and enhance surface waters and wetlands to preserve and restore their water quality, ecological functions, and recreational and scenic values. Objective A. Maintain/improve the water quality and clarity of St. Croix County lakes and streams. 1) Reduce phosphorus loading by 20% in the portions of the St. Croix River Basin within St. Croix County. 2) Achieve established water quality objectives for additional water bodies such as Cedar Lake (TMDL). This project will help to achieve #1 and achieve #2.

Bonus Points: Federal NPS Program Watershed Project Funding Eligibility

Check this box if the project meets all of the following criteria:

- The project addresses a nonpoint source impaired waterbody listed on the most current EPA-approved Section 303(d) list of impaired waters or a nonpoint source threatened unimpaired/high quality water.
- The project is located upstream of and in the same 12-digit hydrologic unit (sub-watershed) as the 303(d) listed water or the unimpaired/high quality water.. (Refer to Attachment A and <http://dnrm.wi.gov/SL/?Viewer=SWDV> for assistance.)
- The project implements the goals and recommendations of an EPA-approved watershed-based "9 key element" plan.
- The project controls the same NPS pollutants which are impairing the 303(d) listed waterbody or threatening the unimpaired/high quality water..

The project may be eligible for Federal NPS Program (Clean Water Act Section 319) Watershed Project Funding. (Refer to Attachment B of the application instructions for a list of eligible plans. Link to map and plans at: <http://dnr.wi.gov/water/9kemp/>.)

Provide the name of the NPS-impaired 303(d) listed waterbody or NPS-threatened unimpaired/high quality water.
Cedar Lake

Provide the title of the EPA-approved nine key element plan this project implements.
Nonpoint Source Control Plan for the Horse Creek Priority Watershed

3. Public Water Supply Protection Bonus: Completion of this part of the application is optional.

Yes

Check this box if the project water quality goals identified above relate to the reduction of nonpoint source contaminants in community or non-community public drinking water supplies. This includes any of the following: Municipal water supplies governed by NR 809 and NR 811; Other-Than-Municipal (OTM) water supplies governed by NR 809 and NR 811; Non-Transient water supplies governed by NR 809 and NR 812; Transient water supplies governed by NR 809 and NR 812.

A. If "Yes" and this project is primarily to protect groundwater resources, then check "a" or "b" below. (You will need assistance from your DNR District NPS Coordinator <http://dnr.wi.gov/topic/nonpoint/NPScontacts.html> or Water Supply Specialist <http://dnr.wi.gov/topic/drinkingwater/documents/countycontacts.pdf> to answer).

- a. Check here if the project is located within the wellhead protection area of a municipal well, or within 1,200 feet of a municipal well for which a wellhead protection area is not delineated, or within 1,200 feet of an "Other-Than-Municipal (OTM)" water supply well, or within 1,200 feet of a non-transient water supply well.
- b. Check here if the project is located within 200 feet of a transient water supply well.

B. If "Yes" and this project is primarily to protect surface waters, then check the box next to the drainage area where the project is located (see Attachment E for map).

- | | |
|---|---|
| <input type="checkbox"/> Pike River and Creek | <input type="checkbox"/> Twin Rivers |
| <input type="checkbox"/> Root River | <input type="checkbox"/> Kewaunee and Ahnapee Rivers |
| <input type="checkbox"/> Oak Creek | <input type="checkbox"/> Menominee River |
| <input type="checkbox"/> Milwaukee River | <input type="checkbox"/> Fish Creek |
| <input type="checkbox"/> Sauk Creek | <input type="checkbox"/> St. Louis and Nemadji Rivers |
| <input type="checkbox"/> Sheboygan and Onion Rivers | <input type="checkbox"/> Lake Winnebago |
| <input type="checkbox"/> Manitowoc River | |

4. Inventory and Targeting

A. Project Area: Present the rationale for why you have delineated this particular project area. Describe previous work in the project area, if applicable. Describe why the project area is (still) considered a significant contributor of pollutants or habitat impairments to the targeted waterbodies.

The long-term success of a lake sediment treatment depends upon prior control of nonpoint sources in the watershed. This project has a high likelihood of success because significant nonpoint sources in the watershed are already controlled as required in NR 154.06(16). The current phosphorus loading rate for the overall Horse Creek Watershed (based on stream monitoring) is .30 lb/acre/year. (James, 2013) (The P index value described above is for crop fields only.) This loading rate falls below the most likely range for watersheds with at least 50% agricultural land cover. Land with about 50% agricultural cover in Wisconsin is generally about 0.60 lb/acre/yr (Panuska and Lillie 1995). The median for agricultural watersheds in Wisconsin is about 1.0 lb/acre/year (Corsi et. al. 1997). Further BMP installation will be guided by phosphorus index values. The Farmer Led Council will provide outreach and targeting for cost shared BMPs for this project. They are currently encouraging cover crops, soil testing, and manure spreader calibration as appropriate low-cost practices of interest to local farmers. The practices are also appropriately targeted to reduce watershed runoff of phosphorus and sediment.

Upstream lake water is included in the watershed loading rates because they are from actual stream water quality samples. A cooperative WDNR/St. Croix Tribe carp control project is planned for 2014 to control upstream sources of phosphorus from Lotus Lake. If successful, this project may be expanded to Horse Lake (Havranek and Cole 2014). Within Cedar Lake a natural die-off of carp due to disease occurred in 2002. According to DNR Fisheries Biologist, Marty Engel, carp populations remain low through 2013 (page 25 Cedar Lake Management Plan). Another upstream lake, Big Lake, has its own water quality project underway emphasize waterfront practices. The outflow from Big Lake does not run to Horse Creek in dry years.

The Horse Creek Priority Watershed project ran from 2001 to 2009. Best management practices installed as part of the project included nutrient management (over 5,000 acres), high residue management (over 1,300 acres), pesticide

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management (over 3,700 acres), gully stabilization in a farm field, and animal waste storage system abandonment (2 systems). In addition, 15 barnyards which previously delivered 698 pounds to surface waters in the direct drainage portion of the watershed have been eliminated through retirement and attrition. Significant numbers of residential practices such as lakeshore habitat restoration and rain garden projects were installed along the shores of project lakes. (Horse Creek Priority Watershed Final Report) Septic systems were estimated to contribute only 0.5 percent of the Cedar Lake phosphorus load in the water quality appraisal for the watershed project.

B. Inventory of the Critical Pollution Sources to Date:

- Describe how the project area has been assessed to identify the most critical pollution sources responsible for causing impairments or threats to water quality within and/or downstream of the project area.
- Describe the results of the inventory of critical pollution sources to date. (Also mark the critical areas needing BMPs on an aerial photo/map and include it with this application.)
- Provide an estimate of the percent of assessment and inventory that has been completed to date in the project area.

The water quality appraisal and inventory helped to target agricultural BMPs which were completed for the Horse Creek Priority Watershed Project. No critical site barnyards identified in the Horse Creek Priority Watershed Plan remain operational. Inventory and targeting will continue with Polk County implementation of NR151 standards.

It is important to note that this project will control agricultural sources of phosphorus from the watershed. A comprehensive analysis of a lake sediment core identified that the internal sediment load clearly comes from historic agricultural sources. Sedimentation rates greatly increased in the late 1800s when the watershed was plowed for agriculture and again beginning in the 1960s. Phosphorus loading rates increased especially beginning in the 1970s which coincides with evidence of increased use of commercial fertilizers. (Garrison, 2002)

The Polk County Land and Water Resources Department conducted an assessment of soil fertility and phosphorus delivery from cropland to Horse Creek and Cedar Lake (Wojchik 2013). The objectives of this work were to gather field soil test data, model phosphorus delivery from fields, identify areas of concern, and identify strategies to reduce nutrient runoff. Fields adjacent to Horse Creek had the highest average soil test phosphorus levels at 52.4 ppm. However, because of field management practices and field characteristics, the phosphorus index in the Horse Creek main drainage was estimated to be very low at 1 lb. per acre per year. The state of Wisconsin sets an upper threshold of 6 lbs/ac/yr. Many of these fields have conservation or no till cropping practices which minimize the potential of phosphorus and sediment delivery to water resources. Phosphorus index values are available to target BMP installation. Lakeshore lawns generally had high average levels of phosphorus (51.4 ppm). Methods for reducing runoff of phosphorus have been provided along with soil test results. (Wojchik 2013) Reducing runoff of phosphorus from waterfront properties will be emphasized in lake district education efforts. (Harmony Environmental 2014)

C. Additional Assessment and Inventory of Critical Pollution Sources:

- Describe additional project area assessment that is needed to complete the inventory of the most critical pollution sources responsible for causing impairments or threats to water quality.
- Describe the methods that will be used to conduct the assessment, including quantitative and qualitative tools that will be used.

Additional inventory will be completed to better target agricultural best management practices in the watershed. These recommendations come from the recently completed Soil Fertility and Phosphorus Index Assessment. Implementation will be carried out by the Horse Creek Farmer Led Council with support from the Polk County Land and Water Resources Department.

1. Continue soil phosphorus and management data collection. More data is needed over a longer period of time.
2. Compare modeled data with edge-of-field monitoring data to verify model estimates.
3. Support and encourage the implementation of the Horse Creek Farmer-Led Watershed Council recommendations.
4. Promote the planting of cover crops to store nutrients that have not been used during the growing season.
5. Encourage end of year corn stalk testing to fine tune nitrogen fertilization during the growing season.
6. Support reduced tillage and no till farming to promote soil health and reduce erosion.
7. Provide an incentive to farmers to do a soil health test that will give an indication on how well they are managing their soil.

The Farmer-led Council is interested in providing cost share support to farmers in the watershed to get them to try

various practices. They have been and will continue to work closely with the Polk County Land and Water Conservation Office to administer any and all projects that are promoted in our watershed.

Funding for the farmer led council and on-going data collection comes from a McKnight Foundation grant and Department of Natural Resources Lake Protection grants. These grants provide funding for staff support, monitoring, and farm incentives.

5. Project Implementation and Management Strategy

Describe your methods, strategy and timeline for: 1) contacting and educating farmers about the project; 2) conducting farm needs assessments and status reviews for performance standards and prohibitions; 3) timing and coordinating technical and financial assistance within the project period; 4) making interim progress assessments; 5) tracking and reporting progress; 6) identifying problems and making any needed adjustments.

The Polk County LWRD is responsible for the NR151 reviews in the Horse Creek Watershed. They will be providing technical assistance and cost share administration for best management practice installation for this project allowing NR 151 coordination.

The Horse Creek Watershed is home to one of only four farmer-led watershed management pilot projects across the state. Farmers in the watershed are using information from an inventory conducted by the Polk County Land and Water Resources Department to develop incentives for on-farm measures for water quality improvements. The inventory results show that phosphorus levels leaving farm fields and draining directly to Horse Creek average only about 1/6 of the allowed state standard.

The Farmer Led Council will prioritize BMP selection and cost share fund distribution and make initial contacts with farmers. It is expected that cost share funds will be used in each year of project implementation. Technical assistance and follow-up work with farmers will be provided by the Polk County Land and Water Resources Department. The County provides farm assessments and status reviews as part of its ongoing work. Cost share agreements will be held and tracked by the Cedar Lake P&R District.

The primary goal of the Farmer Led Council pilot project is to allow members of the agricultural community an opportunity to become actively involved in the process of developing a strategy to improve water quality, adopting that strategy, and ensuring its success. The council has been meeting regularly with support from Polk County Land and Water Resources staff and a University of Wisconsin Extension statewide council coordinator. The project received state level attention in late 2013 with local leaders showcasing the project to the WDNR's Deputy Secretary and Water Division Deputy Director along with the head of DATCP's Division of Agricultural Resource Management. Local leaders have been selected, and incentives for farmer participation are developed for 2015. Initial meetings have attracted many local producers. Council incentives will target soil testing and data collection, cover crops, and manure spreader calibration this year. The council will also be supporting installation of an edge of field monitor on a grassland field. This will allow comparison of runoff from local farm fields to more natural areas. Funding for the farmer led council and on-going data collection comes from a McKnight Foundation grant and Department of Natural Resources Lake Protection grants. These grants provide funding for staff support, monitoring, and farm incentives.

The Cedar Lake Protection and Rehabilitation District is leading this grant project with assistance from the Wisconsin Department of Natural Resources (Buzz Sorge), UW-Stout (Bill James), and the Polk County Land and Water Resources Department (Eric Wojchik). The Lake District will manage the bidding, supervise contracts, and borrow up-front funds needed for the alum treatment. They will be assisted by Buzz Sorge and Bill James. A 2-phase alum application is planned, and James will monitor effectiveness following the first alum treatment and make recommendations for any adjustments needed for the second treatment. Sorge and James will oversee the in-lake and tributary monitoring. The Cedar Lake P&R District will submit the final project report. Funds for monitoring are not being requested through this grant application.

6. Enforcement

Describe how local ordinances will be used when necessary to facilitate compliance. (Note: Your answer must be consistent with your claim for local enforcement multiplier points in Part III. of this application.) Polk County's Land and Water Resource Management Plan guides local enforcement in the Horse Creek Watershed. The Plan includes an approved NR151 Priority Farm Strategy. Polk County has accepted responsibility for implementing runoff management standards. The Animal Waste Advisory Committee Prohibitions were incorporated into the Polk County Manure and Water Quality Management Ordinance in 2000. While the most of the watershed is in Polk County, a portion of Cedar Lake and the outflow is in St. Croix County.

7. Expected Pollutant Reduction and Water Resource Response

A. Expected Pollutant Reduction: Provide what is known about the current pollutant loads and state the expected reduction in pollutant(s) loading. Describe how this project achieves or significantly contributes toward that goal. Describe the critical source areas that will be addressed and how they will be addressed.

The lake management plan establishes an internal sediment load reduction of 90%. Although significant sources of nonpoint sources have already been controlled, the plan establishes an additional external watershed load reduction of 30%. Sediment internal load reductions of phosphorus are targeted with this grant project. Sediment internal loading contributes 85 percent of the summer phosphorus load to Cedar Lake. The study, Phosphorus Budget and Management Strategies for Cedar Lake, Wisconsin (James, 2013), provides specific recommendations to achieve a 90% reduction in internal loading with an alum treatment. Phosphorus loading will be reduced from the watershed with installation of best management practices.

A stratified application approach will achieve a 90% reduction in internal load. An Al dosage of 130 g/m² will be applied to lake sediments located at the 25-ft contour and deeper. An Al dosage of 100 g/m² will be applied to lake sediments located between the 20- and 25-ft depth contours. These are the lake depths that experience seasonal anoxia. The application rates are based on actual laboratory dosage assays of Cedar Lake sediments. Multiple alum applications are recommended to prevent the risk of lowered pH with a single application and to maximize the phosphorus binding efficiency. Lakes that receive at least 100 g Al/m² have a higher likelihood of success with long term reductions in phosphorus levels and resulting improvements in water clarity. (Table 23. James 2013)

The highest WBI ranking the Horse Creek Watershed is 51 for sustaining water quality.

This project will contribute significantly toward achieving phosphorus reduction goals in Lake St. Croix, another waterbody impaired by high phosphorus levels. Cedar Creek, the outflow of Cedar Lake will deliver 1,096 lbs/year LESS phosphorus to the Apple River which flows to Lake St. Croix. This will assist with phosphorus reduction for the Lake St. Croix TMDL project.

B. Expected Water Quality and Resource Response: Address the water quality response(s) that is(are) expected with the land management changes the project will bring about (e.g. physical, chemical, biological, bacteriological, designated uses, etc.). Discuss the sensitivity of the water resources and refer to the WBI for assistance in answering this question.

Annual steady-state empirical modeling (Walker and Nurenberg) indicated that immediate control of internal P loading by an alum treatment would result in attainment of the water quality standard for Cedar Lake! The predicted total phosphorus level with an alum treatment is .033 mg/L. This value is also at or below estimated pre-settlement conditions (Garrison 2013). Watershed reductions alone would not result in in-lake total phosphorus levels even close to reaching water quality standards, but they will reduce phosphorus and sediment loading to the lake. An alum treatment is predicted to remove Cedar Lake from the impaired waters list; substantial additional watershed practices alone are not. An alum treatment alone will also significantly minimize the risk of cyanotoxin production.

Measured Cedar Lake Conditions (2009-2010)

Annual TP 0.062 mg/L

Summer Chl a – 33.1 ug/L

Nuisance Algae Bloom Frequency: 69% of the summer

Cyanotoxin Production Risk: 17% of the summer

Secchi Depth (mean summer): 2 meters (6 feet)

Following 30% Reduction in Watershed P loading only

Annual TP – 0.054 mg/L DOES NOT ACHIEVE REMOVAL OF LAKE FROM IMPAIRED WATERS LIST!

Summer Chl a – 28 ug/L

Nuisance Algae Bloom Frequency: 61% of the summer

Cyanotoxin Production Risk: 12% of the summer

Summer Secchi Depth (summer) 2.2 meters (7 feet)

Following an Alum Treatment only

Annual TP – 0.033 mg/L BELOW IMPAIRED WATERS STANDARD!!

Summer Chl a – 13.4 ug/L

Nuisance Algae Bloom Frequency: 20% of the summer

Cyanotoxin Production Risk: 1% of the summer

Summer Secchi Depth (summer): 3.9 meters (13 feet)

Following an Alum Treatment and 30% Reduction in Watershed P loading

Annual TP - <0.025 mg/L

Chl a - <10 ug/L

Nuisance Algae Bloom Frequency: 8% of the summer

Cyanotoxin Production Risk: 0% of the summer

Summer Secchi Depth (summer): 5.1 meters (17 feet)

(Above results from Tables 18 and 19. James 2013)

Funding for watershed practices is available through the USDA National Water Quality Initiative Project where Horse Creek has been selected as a priority area and this grant project.

8. BMP Cost-Benefit Analysis

Describe why the proposed management practices are cost-effective and reasonable means to attain water quality improvement or protection benefits. Provide quantitative and qualitative analyses and assessments of the cost-effectiveness of the proposed project activities toward meeting the water quality goals of the TMDL or watershed plans being implemented with this project. Include in this answer such factors as BMP effectiveness, site feasibility, available technical standards, practicality and other available funding sources or management efforts that may occur in conjunction with this project, as applicable.

Significant watershed best management practices were installed through the Horse Creek Priority Watershed Project, and the resulting phosphorus load to Horse Creek and Cedar Lake is low for an agricultural watershed. Agricultural best management practices will continue to be addressed in the watershed. However watershed best management practices alone will not remove Cedar Lake from the 303(d) list. Lake sediment practices alone are predicted to attain this goal.

Lake modeling demonstrates that control of release of phosphorus from lake sediments is the only reasonable means available to improve Cedar Lake to a level where it can be removed from the impaired waters list. While an aeration system installed in the lake in 1991 also attempted to reduce release of phosphorus from lake sediments, it was found to actually be exacerbating the problem. The system periodically destabilized lake stratification while phosphorus was released because of low iron to phosphorus ratios in lake sediments. The alum application proposed is based upon sound science, and alum application rates are consistent with successful projects. Long term success is also assured by a low in-lake sedimentation rate. Moderate sedimentation rates of the late 1990s found in the Garrison sediment core

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study (Garrison 2002) have been reduced through the implementation of the Horse Creek Priority watershed project. Further reductions in sedimentation will occur with the implementation of the Farmer Led Council and decreased algal blooms resulting from the alum treatment. (James 2013)

Lake residents voted to support the borrowing necessary to provide substantial funding for the project at their 2013 annual meeting. The lake district is seeking DNR support to protect this important state resource. The project will be backed up by strong watershed protection and restoration measures through the Horse Creek Farmer-Led Watershed Council and the USDA National Water Quality Initiative Project. These projects will further reduce watershed loading and ensure long-term success of the alum treatment. The Horse Creek watershed is one of only three areas selected for the National Water Quality Initiative in the state of Wisconsin in 2013. This is a 3-year project subject to Federal funding allocations. The Cedar Lake P&R District is providing lake resident education to reduce phosphorus loading from waterfront lots. The alum application is projected to cost \$2.16 million.

9. Project Evaluation

A. Modeling and Measures of Change: Describe the strategy that will be implemented to evaluate the pre- and post-project pollution potential, pollutant loading and receiving water quality in the project area. The applicant is required to provide in the final project report the results of a comparison of the pre- and post-project changes in modeled pollutant loading to water resources using STEPL (EPA's Spreadsheet Tool for Estimating Pollutant Load at: <http://it.tetrattech-ffx.com/steplweb/>) or other applicable model and report the quantity of units managed.

The lake plan includes a detailed strategy for monitoring the Horse Creek inflow, the Cedar Lake outflow and the lake itself prior to and following the alum treatment (Appendix H in the lake plan). A one-page summary of this strategy is included with the application. Post-treatment monitoring will include field and laboratory research to document changes in 1) hydrology, the phosphorus budget, and water quality of the lake and 2) sediment mobile phosphorus fractions that have contributed to internal phosphorus loading. Overall, lake water quality is expected to respond to watershed and internal phosphorus loading reduction with significantly lower total phosphorus and chlorophyll concentrations throughout the summer, lower bloom frequency of nuisance chlorophyll levels, and higher water transparency. The lake sediment treatment alone is expected to remove the lake from the impaired waters list. Funds for monitoring are not being requested through this grant application.

B. Field Evaluation Monitoring Bonus

Yes **Monitoring** (not eligible for cost sharing under the DNR TRM Grant Program at this time)

Check this box if the project evaluation strategy will provide pre- and post-project information from water resource monitoring and the information will be provided to DNR. If "Yes," check all that apply below.

- 1. A one-page summary of the monitoring strategy and timeline for implementation and reporting is attached. This summary must be reviewed and signed by a DNR Water Quality Biologist.
- 2. The project will evaluate the in-stream physical habitat, fisheries, biological, or chemical conditions.
- 3. The project will evaluate BMP pollution reduction effectiveness (e.g., inlet/outlet monitoring).

10. Local Support for Project

Describe support for this project from other local, state and federal sources such as governmental units, interest groups, landowners and operators. Describe the extent to which available federal funding and other staffing and financial resources will be used. Address how the project would be improved due to support and partnerships. Include copies of letters of support, landowner commitments and letters documenting commitments to provide resources (materials, equipment, staff or financial resources) to the project.

After learning about the lake management plan and the rationale for the proposed alum treatment, lake district membership demonstrated a high level of support for the project. At the August 2013 annual meeting the membership voted to adopt the management plan and approved borrowing up to \$2.2 million for the project to be repaid over a 10 year period. The vote was 77 in favor and 19 opposed. Members were assured that the lake district would seek all

available grant funds to support increased clarity and safety of this regionally important water resource. The lake district board supports the use of TRM grant funds for watershed BMPs as stated in the attached board resolution.

Letters of support are included from the Horse Creek Watershed Farmer-Led Council and the Polk County Land and Water Resources Department. Support from Polk County comes in the form of technical assistance for best management practice design and administration, staff involvement in the Horse Creek Watershed Farmer-Led Council, and in County implementation of the NR151 agricultural performance standards. Funding for the Farmer Led Council comes from a McKnight Foundation grant and Department of Natural Resources Lake Protection grants. These grants provide funding for staff support, monitoring, and farm incentives. Best management practice funding included in this grant request will further support the Council's efforts.

The USDA's National Water Quality Initiative is committed to improving impaired waterways throughout the nation. Three watersheds have been selected in Wisconsin including Horse Lake -Horse Creek in Polk County. USDA's Natural Resources Conservation Service (NRCS) will manage the initiative by making funds available to farmers and forest landowners in the selected watersheds to begin needed conservation practices to reduce sediment and nutrients entering the waterway. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/wi/home/?cid=STELPRDB1117406>

Copies of letters are attached.

11. Local Plan Consistency

Check this box if the proposed project implements a water quality recommendation from a locally-approved resource management plan, **other than** a plan or report identified under Project Category (Part I. A.) or a County Land & Water Resource Management Plan. (Acceptable examples include Smart Growth plans, local storm water management plans, regional water quality plans, Water Star plans, Legacy Community plans or other watershed-based nonpoint source control plans not used to answer questions in Part I. of this application).

To receive credit for this question -

- 1) Provide a summary of the water quality recommendation from the local plan;
- 2) Briefly describe how this proposed project implements the recommendation;
- 3) Cite the name of the document, date(s) of publication and provide page numbers; and
- 4) Provide a link to the document, if available.

Implementation Plan for the Lake St. Croix Nutrient Total Maximum Daily Load. February 2013. Appendix B. County Implementation Plans. (available on line at <http://www.pca.state.mn.us/index.php/view-document.html?gid=18736>). For St. Croix County, the TMDL load reduction target for the Apple River Watershed is 4,711 lbs. per year pounds per year. Lowering the concentration of phosphorus from the outflow of Cedar Lake to the Apple River will reduce the load to the Apple River 1,096 lbs/year - a significant contribution toward reducing phosphorus loading to Lake St. Croix.

Part III. Eligibility for Local Enforcement Multiplier

Completion of Part III is optional. However, an applicant can increase the final project score by qualifying for a project multiplier. Check the one enforcement authority situation which best describes the local enforcement authority available and that would be used to require a livestock facility or cropland BMP being funded by this TRM grant to comply with the performance standard or prohibition. Provide an attachment or the URL for the local authority.

- The applicant certifies that it has local authority to enforce **all** state agricultural performance standards and prohibitions at **all** sites within the local jurisdiction where such state agricultural performance standards and prohibitions apply; **and** this project addresses one or more of the enforceable standards or prohibitions. *Multiply the initial project score by a factor of 1.15.*
- The applicant certifies that it has local authority to enforce **some**, but not all, of the state agricultural performance standards and prohibitions **at all sites** within the local jurisdiction where such state agricultural performance standards apply; **and** this project addresses one or more of the enforceable performance standards or prohibitions. *Multiply the initial project score by a factor of 1.10.*
- The applicant certifies that it has local authority to enforce **some**, but not all, of the state agricultural performance standards and prohibitions **at some**, but not all, of the sites within the local jurisdiction; **and**, this project addresses one or more enforceable performance standards or prohibitions on a site under local jurisdiction. *Multiply the initial project score by a factor of 1.05.*
- Applicant has no local authority to enforce state agricultural performance standards and prohibitions within the local jurisdiction **for this proposed project**. *No multiplier is earned.*
- Check this box if a copy of the appropriate local authority is attached or the website is provided here. **(Required if a multiplication factor of 1.05, or 1.1, or 1.15 is checked above.)**

Optional Additional Information

Is there additional information that will add to the understanding of this project? If so, describe here.

Resources cited in the application are included in a supplement CD of pdf documents. This CD is enclosed with the grant application packet and the list of references is included.

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TRM Grant Project Name:

Cedar Lake TMDL Implementation

Applicant Certification

A Responsible Government Official (authorized signatory) must sign and date the application form prior to submittal to the DNR. The governmental official with signatory authority must be the person authorized by the Governmental Responsibility Resolution. I certify that, to the best of my knowledge, the information contained in this application and attachments is correct and true.

Signature of Authorized Government Official <i>Donald J Demulling</i>		Date Signed <i>4-13-15</i>
Name (Please Print) Don Demulling	Title Chair	

The required completed Governmental Responsibility Resolution (signed in blue ink) (see Attachment G) is attached.

Submittal Directions

To be considered for funding, provide the following for each application submitted:

- One copy of the completed application form [DNR Form 8700-333 (R 1/15)] with original signature in blue ink, plus all attachments.
- Three additional copies of the completed, signed application form plus all attachments.
- One electronic copy of the completed application form in **PDF format only** plus all attachments and maps on CD.

All application materials must be postmarked by midnight **April 15 of the same calendar year**.

Send to: Department of Natural Resources
Runoff Management Section-WT/3
101 South Webster Street
Madison, WI 53703

or

PO Box 7921
Madison WI 53707-7921

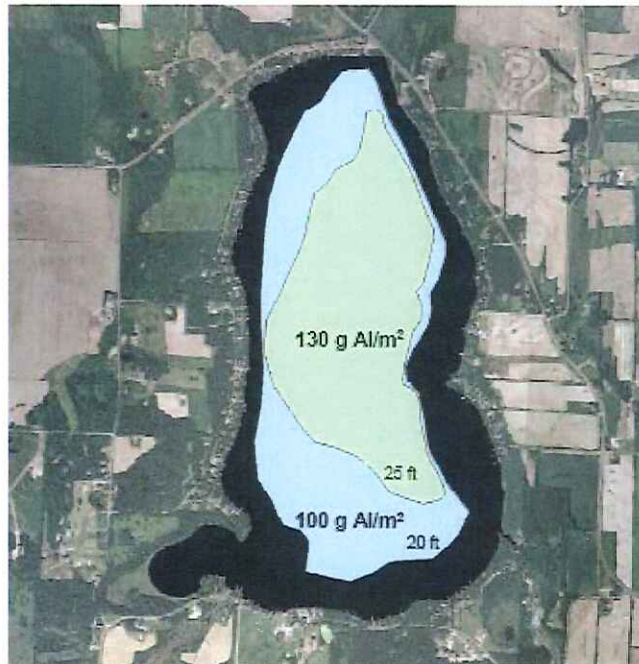


Figure 1. Aluminum Sulfate Treatment. The light green area (25 feet and deeper) will receive an Alum dosage of 130 g/m². The light blue area will receive an Al dose of 100 g/m². The 20 foot depth contour is the summer average extent of hypolimnetic anoxia in the water column.



Figure 2. Cedar Lake Algae. Severe summer algae blooms like this one in 2011 are caused primarily by internal loading when lake sediments become devoid of oxygen. Lake mixing brings water with high phosphorus concentration to the surface where algae can grow. Algae in Cedar Lake include species which produce toxins that are harmful to human health.



Cedar Lake TMDL Implementation Topo Map and Project Location



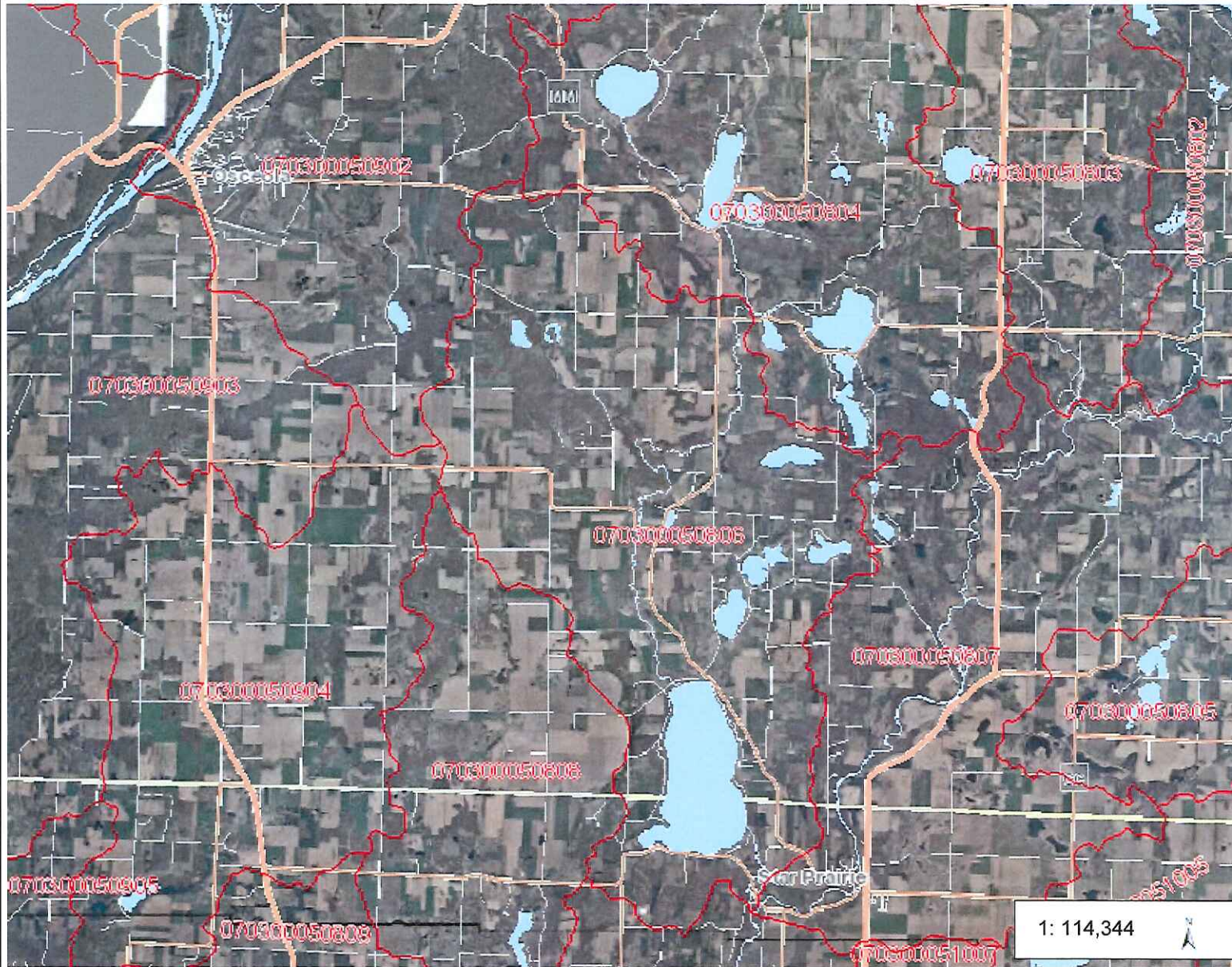
- Legend**
- 12-digit HUCs (Subwatersheds)
 - Rivers and Streams
 - Open Water

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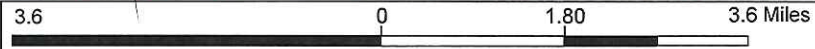


Cedar Lake TMDL Implementation Aerial Photo



- Legend**
- 12-digit HUCs (Subwatersheds)
 - Rivers and Streams
 - Open Water
 - 2010 Air Photos (WROC)

1: 114,344



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Cedar Lake Alum Treatment Post-treatment Monitoring and Evaluation

Cedar Lake water quality response to watershed and internal phosphorus loading reduction will be monitored over at least 5 post-treatment years in order to evaluate management progress and the need, if any, for adaptive management. Post-treatment monitoring will include field and laboratory research to document changes in 1) hydrology, the phosphorus budget, and water quality of the lake and 2) sediment mobile phosphorus fractions that have contributed to internal phosphorus loading.

1. Hydrology and tributary phosphorus loading

A gauging station will be established on Horse Creek above Cedar Lake at 10th Ave. for concentration, loading, and flow determination. Pool elevation changes in Cedar Lake will also be monitored weekly by CLPRD volunteers. During the ice-free months, stage height will be monitored continuously and daily flows will be computed from a rating curve established between stage elevation and flow. During winter and ice-covered months, instantaneous flows will be determined at monthly intervals when ice conditions are safe. Daily precipitation will be monitored by local volunteers. Data collected from this effort will be used to construct a hydrological budget for Cedar Lake.

At weekly to biweekly intervals throughout the summer months, and less frequently during the winter, grab samples will be collected at the 10th Ave. gauging station and the Cedar Lake outflow for chemical analysis. Water samples will be analyzed for total and soluble reactive phosphorus. Annual and seasonal tributary phosphorus loading will be calculated using the computer program FLUX.

2. In-lake monitoring

The deep basin water quality station 2 will be deployed in the lake for biweekly water sampling between the beginning of May and the end of October (~ 12 sampling trips). An integrated sample over the upper 2-m and discrete samples at 1-m intervals between 3 and 9 m will be collected for analysis of total phosphorus, soluble reactive phosphorus, and chlorophyll a. Secchi transparency and in situ measurements (temperature, dissolved oxygen, pH, and conductivity) will also be collected on each date. Additionally, samples collected in the hypolimnion (i.e., ≥ 4 m) at station 2 will be analyzed for total and dissolved iron. An additional integrated (0-3 m) water sample will be collected in August, September, and October at station 2 for determination of algal assemblage and biovolume (total samples = 3).

3. Sediment phosphorus concentrations

Sediment cores will be collected within the alum-treated region of the lake for determination of vertical profiles of various phosphorus fractions and aluminum. The goal of this task is to monitor the extent of binding of iron-bound phosphorus by the alum floc and the depth of sinking of the alum floc over several years. The effectiveness of the alum treatment in binding and inactivating iron-bound P will be evaluated and used in an adaptive management approach to adjust the next year's alum application concentration.

4. Laboratory-derived rates of phosphorus release from sediments under anaerobic conditions

Anaerobic phosphorus release rates will be measured from intact sediment cores collected in the alum-treated area for several years. Replicate intact sediment cores will be collected at each station for analysis. The sediment incubation systems will be placed in a darkened environmental chamber and incubated at a constant temperature for 1-2 weeks. The incubation temperature will be set to a standard temperature for all stations for comparative purposes.

The oxidation-reduction environment in each system will be controlled by gently bubbling nitrogen through an air stone placed just above the sediment surface to maintain anaerobic conditions. Post-treatment rates will be compared with pre-treatment rates over at least 5 years in order to evaluate the effectiveness of the Al floc in inactivating iron-bound phosphorus and controlling rates of phosphorus release under anaerobic conditions.

Approved Buzz Sore 9-14-14
Lake Mgmt Planner - WQNR - IEC

**Cedar Lake TMDL Implementation TRM Grant Application
April 15, 2015**

Cahow, Jim and Craig Roessler. *Horse Creek Priority Watershed Water Resources Appraisal Report*. Wisconsin Department of Natural Resources, 1999.

Corsi, Steven, David J. Graczyk, David W. Owens, and Roger T. Bannerman. *Unit-Area Loads of Suspended Sediment, Suspended Solids, and Total Phosphorus from Small Watersheds in Wisconsin*. United States Geological Survey, 1997.

Garrison, Paul. *Cedar Lake, Polk County Sediment Core Results*. Wisconsin Department of Natural Resources, 2002.

Harmony Environmental. *Cedar Lake Management Plan*, Cedar Lake Protection and Rehabilitation District. September 2014.

Horse Creek Priority Watershed Nonpoint Source Pollution Management Plan. Wisconsin Department of Natural Resources, 2001.

James, William F. *Phosphorus Budget and Management Strategies for Cedar Lake, WI*. University of Wisconsin Stout, 2013.

Konkel, Deb. *Changes in the Aquatic Plant Community of Cedar Lake 1988-2000 and Sensitive Area Designation*. St. Croix County, WI. Wisconsin Department of Natural Resources, 2003.

LimnoTech. *Implementation Plan for the Lake St. Croix Nutrient Total Maximum Daily Load*. Prepared for the Minnesota Pollution Control Agency in cooperation with the Wisconsin Department of Natural Resources and the St. Croix Basin Water Resources Planning Team, February 2013.

Olmsted, Julia. The St. Croix/Red Cedar River Basin Farm-Led Council Project, June 2013.

Panuska and Lillie. *Phosphorus Loadings from Wisconsin Watersheds: Recommended Phosphorus Export Coefficients for Agricultural and Forested Watersheds*. Research Management Findings, 1995.

Polk County Land and Water Resources Department. *Horse Creek Priority Watershed Final Report*, 2009

USDA. *NRCS National Water Quality Initiative*, April 2013.

WDNR. *Wisconsin 2014 Consolidated Assessment and Listing Methodology (WisCALM) (for Clean Water Section 305(b), 314, and 303(d) Integrated Reporting*. EGAD #3200-2013-01, 2013.

WDNR. *Cedar Lake Phosphorus TMDL*, 2003.

Wojchik, Erik. *Horse Creek Watershed Soil Fertility and Phosphorus Index Assessment*. Polk County Land and Water Resources Department, 2013.

Sources included on CD.

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
PO Box 4001
Eau Claire WI 54702-4001

Scott Walker, Governor
Cathy Stepp, Secretary
Telephone 608-266-2621
Toll Free 1-888-936-7463
TTY Access via relay - 711



January 30, 2015

Mr. Brad Johnson
Cedar Lake Protection and Rehabilitation District
P.O. Box 93
Star Prairie WI 54026

Subject: Cedar Lake Management Plan

Dear ^{Brad} ~~Mr.~~ Johnson:

I am pleased to approve the Cedar Lake Management Plan 2014 on behalf of the Wisconsin Department of Natural Resources. The lake management goals and objectives are approved and will be considered grant eligible within the Department's various grant programs. Eligible management activities identified in the plan would be considered eligible for funding under Chapter NR 191, NR 190, NR 198 and other Department applicable grant programs subject to the application requirements of those programs.

I am looking forward to continue working with the Cedar Lake community to successfully implement this lake management plan.

Sincerely,

Buzz Sorge
Lake Management Planner

- c. Shelly Thomsen – WDNR
Marty Engel - WDNR

From: Thomsen, Shelly B – DNR

Sent: Friday, April 03, 2015 8:06 AM

To: Gluckman.Matthew@epamail.epa.gov; Davenport.Thomas@epamail.epa.gov

Cc: Schaal, Carroll - DNR; Billings, Corinne L - DNR; Sylvester, Susan - DNR; Lowndes, MaryAnne - DNR; Sorge, Patrick W - DNR

Subject: Wisconsin 319 Grant Funding- Cedar Lake alum treatment

Good morning Matt and Tom,

Wisconsin Department of Natural Resource's surface water grant program has identified a Lake Protection Grant application from the Cedar Lake Protection and Rehabilitation District to remove Cedar Lake from the impaired waters list as eligible for s.319 project funding. We are requesting your review and approval of the application to use a portion of the s. 319 funds allocated to Wisconsin for lake protection and restoration on this project per our Section 319 Work Plan.

Cedar Lake is located in southern Polk and northern St. Croix County. In addition to a local lake management plan, the project area is covered under the St. Croix TMDL Implementation Plan, approved by your office as a 9 Key Element Plan in December 2014. Below is a brief project description. Attached you will find:

- * Grant application (8700-284 LPT Cedar Lakes PRD St Croix)
- * Map showing the two-stage alum application proposed (alum treatment scenario and algae photo)
- * Description of the watershed status (Horse Creek Watershed Status)
- * Technical report describing the watershed loading and lake nutrient budget (James Study)

We look forward to your response at your earliest convenience and let me know if you have questions or need additional information.

Project Description:

Cedar Lake is on the 303(d) list of impaired waters for total phosphorous, as it exceeds the phosphorous standard (40ug/L) for non-stratified drainage lakes at 62ug/L (2010). The high level of phosphorous leads to heavy algae growth, dominated by cyanobacteria. In 2007 Cedar Lake PRD began working with US Army Corps of Engineers and the University of Wisconsin, Stout to study phosphorous loading by analyzing sediment samples, water quality samples, algae, lake modeling, phosphorous loading, aeration and alum treatment as means of controlling internal loading, and comprehensive watershed agricultural land use assessment. The study concluded that internal sediment loading contributes 85% of the phosphorous during the summer and an alum treatment would reduce the internal load by 90%. Cedar Lake Protection and Rehabilitation District have applied for a grant to implement an alum treatment and remove Cedar Lake from the impaired waters list. The application is to off-set a portion of the costs of alum treatment. Based on the watershed status and the study on Phosphorous Budget and Management Strategies completed by William James at UW Stout we feel the sources of watershed loading to the lake is under control enough to warrant the use of alum.

Shelly Thomsen

Lakes & Rivers Team Leader - Bureau of Water Quality/Water Division Wisconsin Department of Natural Resources
101 S. Webster St | PO Box 7921 | Madison, WI 53707

Phone: (608) 266-0502

Fax: (608) 267-2800

LETTERS OF SUPPORT



April 10, 2015

Dear Buzz Sorge:

On behalf of the Horse Creek Farmer-Led Watershed Committee, I am writing to express our enthusiastic support of the Cedar Lake P & R District's TRM Grant application. We consider the group an important partner in the efforts to protect and improve water quality in our area.

The Horse Creek Farmer-Led Watershed Committee is a group of farmers working together in the watershed to promote soil health and other conservation measures that protect water quality and enhance farm productivity. In the next three years our plans are to:

- Continue promoting soil testing and using Best Management Practices to responsibly use fertilizer inputs through nutrient management plans.
- Promote the planting of cover crops to store nutrients that have not been used during the growing season.
- Encourage end of year corn stalk testing to fine tune nitrogen fertilization during the growing season.
- Support reduced tillage and no till farming to promote soil health and reduce erosion.
- Provide an incentive to farmers to do a soil health test that will give an indication on how well they are managing their soil.
- Will do field days and other outreach and education opportunities within the agriculture community and encourage our lake district partners to attend.
- We will continue collecting data from three edge-of-field monitors installed on fields within the watershed. The monitors will help us better understand how water and nutrients move through different types of agricultural and natural systems.

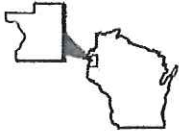
The Farmer-led Council is interested in providing cost share support to farmers in the watershed to get them to try various practices. We have been and will continue to work closely with the Polk County Land and Water Conservation Office to administer any and all projects that are promoted in our watershed.

We realize that generally the Horse Creek Watershed is in pretty good shape compared to many watersheds throughout the state of Wisconsin. It is our goal to do an even better job through our efforts. In this way, we feel that our work is very closely aligned and complimentary to that of the Cedar Lake P & R District - we all want to see a thriving community with clean, healthy water resources.

Sincerely,

A handwritten signature in cursive script that reads "Andrew Johnson".

Andrew Johnson
Chairman



POLK COUNTY LAND & WATER RESOURCES DEPARTMENT
100 POLK COUNTY PLAZA—SUITE 120 BALSAM LAKE, WI 54810
PHONE: 715-485-8699 FAX: 715-485-8601
TIM RITTEN, DIRECTOR: 715-485-8631

April 4, 2015

Dan Davison, Secretary
Cedar Lake Protection and Rehabilitation District
PO Box 93
Star Prairie, WI 54026

Dear Dan,

The Polk County Land and Water Resources Department (LWRD) fully supports the Cedar Lake Protection and Rehabilitation District's Targeted Runoff Management Grant to complete an alum treatment on Cedar Lake and implement watershed best management practices. The nutrient budget for Cedar Lake indicates that an astounding 85% of the summer phosphorus load comes from sediment internal loading, with only 15% of the total phosphorus load originating from watershed sources. By reducing internal load by 90%, an alum treatment could remove Cedar Lake from the Impaired Waters List. Additionally, the implementation of best management practices will further reduce watershed phosphorus sources.

The success of an alum treatment hinges on the achievements of prior control of nonpoint phosphorus sources in the watershed. From 2001 to 2009 a wide range of best management practices were implemented through the Horse Creek Priority Watershed Project including: nutrient management, high residue management, pesticide management, farm field gully stabilization, animal waste storage system abandonment, barnyard retirement and attrition, lakeshore habitat restoration, and rain garden projects. An assessment conducted by LWRD determined that the phosphorus index in the Horse Creek main drainage was 1 lb/acre/year, a value well below the Wisconsin upper threshold of 6 lbs/acre/year. Additionally, the current phosphorus loading rate for the Horse Creek Watershed is 0.30 lb/acre/year, which is half of the Wisconsin average for land with 50% agricultural cover. The Horse Creek Farmer Led Watershed Council will continue soil phosphorus data collection and management activities. Modeled data will be compared with edge-of-field monitoring data to verify model estimates.

An alum treatment and implementation of best management practices to address watershed phosphorus sources should remove Cedar Lake from the Impaired Waters List. Polk County LWRD supports this goal and commits to providing cost sharing agreements, designs, and bidding for best management practices for this project. This project advances Goal 1, Objective 1B of the Polk County Land and Water Resource Management Plan, adopted by the County Board and approved by the State which reads "limit the amount of non-point phosphorus reaching our waterbodies to prevent degradation from agricultural land uses."

Sincerely,

A handwritten signature in black ink that reads "Timothy Ritten".

Tim Ritten, Director, LWRD

United States Department of Agriculture

 Natural Resources
Conservation Service

Keith Zygowicz, District Conservationist
941 Mallard Lane Room 103, Balsam Lake, WI 54810
715-485-3138 ext: 6 fax: 855-814-3110
Keith.zygowicz@wi.usda.gov

Date: April 10, 2015

Subject: Cedar Lake P&R District alum treatment

To: Dan Davison, Secretary
Cedar Lake Protection and Rehabilitation District
PO Box 93
Star Prairie, WI 54026

The Natural Resources Conservation Service out of Balsam Lake has been involved in watershed based management in the region for many years. Using general conservation concepts and planning and in some cases financial support aiding landowners and operators to make sound conservation decisions for land management. Examples include:

- National Water Quality Initiative priority area – Horse Creek watershed is a priority area and cost sharing is available
- Assisted the Farmer-Led Council effort to get Soil Health / Cover crop information out to producers

The Natural Resources Conservation Service appreciates any activity that partners participate in that parallels our agencies goals and objectives for protection and restoration of natural resources in the Horse Lake-Horse Creek, St Croix River and Upper Mississippi River Basin.

Sincerely,



Keith Zygowicz
District Conservationist

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Cedar Lake Protection and Rehabilitation District

March 31, 2015

Resolution 2015 - 1


Resolution 2015 -1

Resolved:

The Cedar Lake Protection and Rehabilitation District is dedicated to agricultural Best Management Practices within and near the Cedar Lake Watershed and will designate and contribute up to 10% of the TRM grant funds received to help fund these types of local projects in the watershed.

Motion to adopt the above Resolution made by Warren Wood, seconded by Dan Davison.
Motion carried.

I hereby certify that the above Resolution #2015-1 was adopted at a regular Board of Commissioners meeting held on March 31, 2015 at which all Commissioners were present.



Daniel J. Davison
Board Secretary