Summary of Accomplishments of the Red Cedar River Water Quality Partnership for the End of Year Seven (2022) of the Ten-Year Plan

Authored by the Partnership in 2023

Introduction

In 2015, *A River Runs Through Us: A Water Quality Strategy for the Land and Waters of the Red Cedar River Basin* was approved by the US Environmental Protection Agency and the Wisconsin Department of Natural Resources. The Red Cedar River Water Quality Partnership has been implementing this plan for the past seven years. This report is a brief summary of some of the activities of the Partnership in 2022.

In 2022, emergence from the COVID pandemic began to accelerate, which allowed for more activities, more in-person events, and a slight sense of getting back to normal. Although the annual Red Cedar River Conference had to be cancelled in March due to a spike in COVID cases in the early months of the year, activities in the Red Cedar watershed began to pick up as the year progressed. While this report touches on some of the projects, accomplishments and events that took place in 2022, it is by no means comprehensive. Many people throughout the watershed continue to change land management practices, install best management practices like catchment basins, grass waterways, detention ponds, and rain gardens, analyze their soil, and generally find ways to decrease surface runoff and increase infiltration of precipitation where it lands…and much of this work happens beyond the reach of this Partnership. Such practices combined with others and augmented by many events where learning about such practices is the topic of discussion, are the reasons for continued optimism regarding water quality in the Red Cedar River watershed. This report tries to summarize the known activities conducted, attended, or assisted by members of the Partnership.

Lake Associations and Districts

Many of the lake organizations in the Partnership continued their work in 2022, with various projects designed to focus on the individual issues in their lakes.

Red Cedar Lakes Association (Red Cedar, Balsam, Hemlock Lakes, Bass, Mud Lakes & Murphy Flowage)

A study funded by a three-year DNR Water Quality grant which included volunteers testing and measuring phosphorous (P), dissolved oxygen, flow volume and precipitation in our lakes and incoming tributaries revealed significant increases in P as compared to the 2003 USGS Study. While most of the lake increases in P were up slightly, the four tributaries/streams coming into our lakes showed anywhere from double to triple the loading. The largest P loading stream comes from the headwaters of the watershed – Big Chetac and Birch Lakes- which are contributing 2400 pounds per year. The other streams are collectively contributing 5,300 pounds per year. While the source of P in Big Chetac and

Birch lakes has been identified as unmanaged Curly Leaf Pondweed (CLP), RCLA will work with the DNR, water and land conservationists and other constituents to determine the sources of P in the other streams and develop a plan to address these areas.

RCLA continued its management of Curly Leaf Pondweed (CLP) as part of a DNR Aquatic Invasive Species (AIS) Control grant. Our CLP pre-treatment survey indicated another year of reduced, densely populated CLP resulting in the need to only treat 3.5 acres in 2022. In addition, beetles were raised and released to help control purple loosestrife in a collaborative effort with Lake Education and Planning Services, LLC and the Birchwood Charter School.

A DNR Clean Boats Clean Waters grant allowed for over 400 hours of monitoring on the highest volume boat landings. In addition to monitoring, volunteers conducted surveys and handed out literature to boat owners. Decontamination sites were also installed over the past two years on our lakes' highest volume landings.

Three Healthy Lakes grants aimed at reducing shoreline erosion were completed in conjunction with RCLA volunteers and land owners. In addition, a major island restoration project, including rip rap, native plant seeding and cover, and signage was completed via a collaborative effort involving RCLA, DNR and Barron County.

RCLA assisted lake shore property owners with four tree drops aimed at improving woody habitat and fish cover on Balsam Lake.

Chetek Lakes Protection Association

During the 2022 year, the Chetek Lakes Protection Association (CLPA) continued a focus on public/visitor education, shoreline protection, algae mat management, and updating the aquatic plant management plan.

Public/Visitor Education

We have completed our third year of public landing sign updates with new constructed CLPA Landing signs throughout our chain of lakes. In total, volunteers have constructed 13 new signs with weather-proof materials and a clean platform for consistent messaging. In addition, communication focus on digital platforms was increased with updates to Facebook and the CLPA website, and informational lake

brochure distributed to the visitor center and local resorts and campgrounds to improve lake education for the 30,000-40,000 visitors to the Chetek Chain of Lakes each year.

In 2022, our website had over 13,000 visits from 8,000 unique visitors, becoming a reliable source of information for local residents and visitors.

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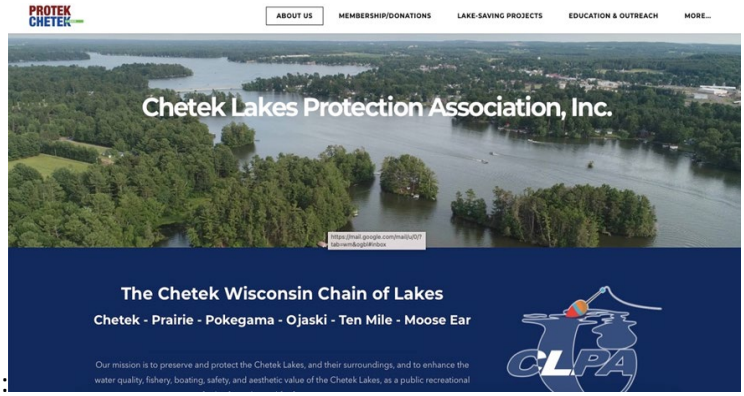
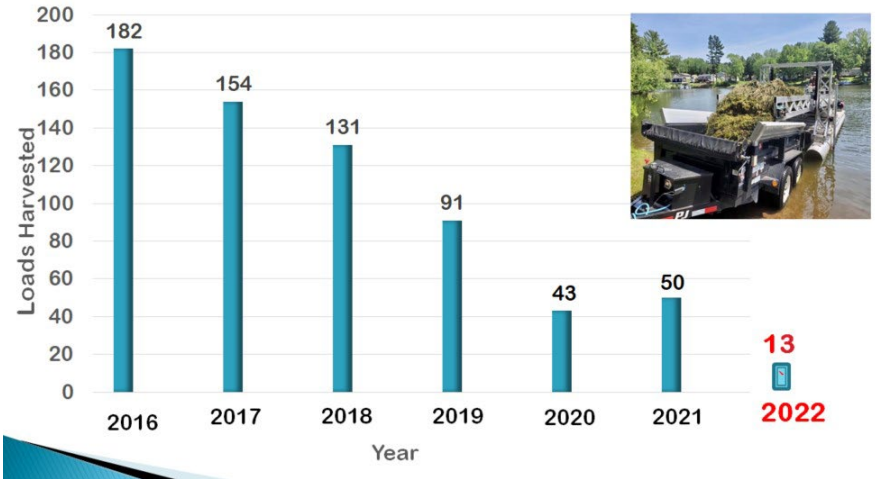


<u>Shoreline Protection</u>

The CLPA has finished their two Healthy Lakes Grants totaling over $67,000 to assist lake property owners improve their properties and reduce runoff into the Chetek Chain of Lakes. We completed multiple projects for 29 property owners which included native plantings, rain gardens, water diversions and rock infiltrations. In addition, we have placed 29 fish stick bundles on the shores of the chain to improve fish habitat.

<u>Algae Mat Management</u>

2022 also saw further decrease in algae mats throughout the chain of lakes. As measured and reported in the graph below:



Aquatic Plant Management

The CLPA contracted an engineering company in 2021 to start the process for updating the aquatic plant management plan in 2022/2023. In 2022, 3000 sites across our 5 lakes were sampled and reported. An updated Aquatic Plant management plan will be completed and released in 2023.

Tainter Lake Rehabilitation District

In July of 2022 a petition was submitted to the Dunn County Board to create the Tainter Lake Rehabilitation District. Throughout the year, more progress was made toward this District becoming a reality, and in January of 2023, the District was formally established. While there is no activitiy by the District to report for 2022, an invitation to join the Partnership and attend meetings was extended, and it is the hope of the Partnership to work with the District in addressing the water quality problems in the Red Cedar River watershed in the coming years.

County Governments

Parts of nine counties are included in the Red Cedar River watershed. Many of these have small portions of their counties within the watershed, with Dunn and Barron Counties having the largest share. With the close contact county land conservation staff have with farmers and land managers in their counties, they are an integral part of the efforts to reduce runoff, promote infiltration, and decrease the pollutant loads flowing to both surface and groundwater in the watershed, and are key members of the Partnership.

Dunn County Land & Water Conservation Division

The Dunn County Land & Water Conservation Division (LWCD) completed the following work within the Red Cedar Watershed, specifically the Lake Menomin and Tainter Lake TMDL Watershed. The LWCD had 8 employees that worked in the field and in the office to implement conservation practices and manage grants and financial responsibilities for conservation practices and programs within the

watershed. It is important to note that LWCD staff work and administer conservation practices and programs throughout Dunn County. While many more technical and financial resources were expensed throughout the county, this report is specific to the TMDL watershed.

In 2021 Dunn County revised its Manure Storage Ordinance to now include the State of Wisconsin's Agriculture Performance Standards as described in Administrative Code NR151. The County Ordinance is now known as the "Agriculture Performance Standards and Manure Storage and Management Ordinance" – Chapter 10 of the Dunn County Code of Ordinances. This ordinance is applicable to all agricultural lands in Dunn County and is not limited to those lands or farms with manure. All farms must meet tolerable soil loss (T) and follow a nutrient management plan on all cropland and pastureland that receives nutrients, including commercial fertilizers. In some instances an offer of cost-share is required prior to enforcement of the standards.

Conservation Practice	Quantity	Cost-share $
Nutrient Management Plans	112 acres	$4,480
Manure Storage Closure	1	$9,100
Grade Stabilization Structure	2	$30,180
Critical Area Planting	1 acre	$1,440
Ordinance compliance reviews	6 farms	NA
Farmland Preservation compliance reviews	12 participant farms	NA
No Till Drill rental	241 acres (10 individuals)	NA

Surface Water Monitoring

The LWCD continued to partner with the Department of Natural Resources in establishing a systematic surface water monitoring program. This includes five (5) volunteers through the Water Action Volunteer (WAV) Program, the Red Cedar Conservation Farmers producer led watershed group and staff and students from UW-Stout. Forty-eight (48) stream sites were monitored in 2022. Those streams were: Annis Creek, Little Beaver Creek, Big Beaver Creek, Birch Creek, Bronken Creek, Clack Creek, Eighteen Mile Creek, Galloway Creek, Gilbert Creek, Hay Creek, South Fork Hay River, Jarrett Creek, Lambs Creek, Little Otter Creek, Popple Creek, Quarter Creek, Red Cedar River, Rush Creek, Tiffany Creek, Trout Creek, Vance Creek, Little Vance Creek, and Wilson Creek.

Red Cedar Demonstration Farm

The Red Cedar Demonstration Farm hosted two public events and one event for UW-Stout students. These events highlighted the conservation practices implemented on the farm to improve soil health and the impacts to the return on investment of the farm. The Red Cedar Demo Farm is operated by the agronomy classes at Chippewa Valley Technical College (CVTC) with advisory roles from Dunn County LWCD, USDA-Natural Resources Conservation Service (NRCS) and UW-Extension.

Dunn County Transect Survey

The LWCD conducted its annual Soil/Crop Transect Survey in 2022. The Soil/Crop Transect Survey is an inventory of cropping data identified and pre-determined locations throughout the County. The following data is specifically for the TMDL watershed, and is a small representation of the data available

from the survey. Based on the 2022 Transect Survey the TMDL watershed within Dunn County consists of:

36% of cropland was in Corn;

38% of cropland was in Soybeans;

22% of cropland was in a form of forage such as alfalfa, grass, hay;

27% of the crops were planted using a no-till system;

The average tolerable soil loss value for the soils within the watershed is 3.9 Tons/acre/year; and the rotational average soil loss for the cropping years of 2019-2022 was 2.7 tons/acre/year. In general, based on the Transect Survey, farmers are implementing conservation practices that are meeting "T" or tolerable soil loss. Even though the rotational average soil loss is less than what is considered "tolerable" there are several instances of individual fields that exceed the tolerable level. Continued work by the LWCD and partners is needed to assist those responsible for those fields in meeting T.

Multi-Discharger Variance Program (MDV)

The LWCD participated in the Multi-Discharger Variance Program through the Department of Natural Resources in 2022. The goal of this program was to use funds generated from point source facilities to implement a local buffer program. We received $14,377 in 2022 for this program. Some of those funds were used in 2022 to install 16 acres of buffers, totaling $3,300. Remaining funds were carried forward for implementation in 2023. As a result of those buffers, the following are the estimated nutrient reductions:

MDV practice (acres)	P reduction (lbs)	N reduction (lbs)	Sediment reduction (tons)
16	17.6	9.6	8

The Conservation Reserve Enhancement Program (CREP) continued to be an important conservation practice and program for the watershed. Four landowners enrolled 37 new acres in the program. The following are the estimated nutrient reductions:

CREP (acres)	P reduction (lbs)	N reduction (lbs)	Sediment reduction (tons)
37	54	25	16.5

Red Cedar Conservation Farmers

The Red Cedar Conservation Farmers (RCCF) is one of two farmer-led watershed councils within Dunn County. The watershed covered by this group falls in both Chippewa and Dunn Counties, but staff from Dunn County Land & Water Conservation Division worked as the county collaborator for RCCF. In 2022, a Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP) grant was awarded to RCCF to fund conservation practice incentive payments to farmers. The practices installed with these funds and donated match are shown below.

Practice	Amount	Pounds of Phosphorus Reduction	Pounds of Nitrogen Reduction	Tons of Sediment Reduction
Cover Crops	1559 acres	260 pounds	63 pounds	156 tons
No-till crops	3633 acres	2595 pounds	1091 pounds	1817 tons
Planting green	1322 acres	73 pounds	40 pounds	66 tons
Total	-	2928 pounds	1194 pounds	2039 tons

The RCCF held several field days, workshops and public meetings to share information about their group and to provide an opportunity for outreach and education. Eight (8) different events were attended by 170 individuals.

Several farmers within RCCF also installed different demonstration plots within the watershed. The plots consisted of multi-species cover crops after snap beans, nitrogen utilization and nitrogen stabilizer trials.

The group continued to collect sixteen (16) surface water samples from tributaries to the Red Cedar River and its main stem, those sites were mentioned earlier in this report. New in 2022 was the sample collection of two tile outlets to compare ammonia and nitrate-nitrite concentrations between a corn crop and soybean crop.

Hay River Farmer-Led Watershed Council

In 2022, County staff continued to work as the county collaborator for the Hay River Farmer-Led Watershed Council (HRFLWC). A grant through the Department of Agriculture, Trade and Consumer Protection (DATCP) and the McKnight Foundation helped fund the group's conservation practice incentive payments to farmers. The following chart describes the practices implemented using both grant funds and what was donated by the participating farmers.

Practice	Amount	Pounds of Phosphorus Reduction	Pounds of Nitrogen Reduction	Tons of Sediment Reduction
Cover Crops	1362 acres	229 pounds	55 pounds	136 tons

While installation of BMPs is a large part of what the HRFLWC does, there is also a large need for outreach and education to recruit and inform area farmers. The Council held several field days, workshops and public meetings to share information about their group and to provide an opportunity for outreach and education. Ten (10) different events were attended by 150 individuals.

The LWCD is looking forward to 2023 to continue the implementation of conservation practices and programs. Several more projects are already being planned for the TMDL watershed including additional grant funds for conservation projects.

Barron County Soil and Water Conservation Department

In 2022, Barron County Soil and Water Conservation Department staff assisted with the implementation/installation of the following practices in the Red Cedar River watershed:

Practice	Acres	Number
Nutrient Management Plans (new for 2022)	1600 (affected acres)	
Grass Waterways	3	
Cover Crops	800	
Manure Storage Closures		6
Well Decommissioning		1
Critical Area Stabilization		2

Additionally, the County completed year one of our groundwater study with samples from 350 well owners across the county. We feel this baseline data will guide many of our programs such as our goal of working to close idle earthen manure storage facilities. We have closed 142 of them in the last 20 years. Those facilities cover 52 acres that had the potential for leaching to the groundwater.

Rusk County Land and Water Conservation Department

While the Rusk County Land and Water Conservation Department continues to be an active partner in the Red Cedar Water Quality Partnership, only a small portion of the county along its western edge is in the watershed. In 2022, there were no substantial projects in this region of the watershed.

Chippewa County Land Conservation and Forest Management Department

Small portions of western and northwestern Chippewa County are part of the Red Cedar River watershed. In 2022, two projects of note occurred in the watershed with the assistance of Chippewa County Land Conservation and Forest Management Department staff.

1) Worked with a landowner to incorporate 100 acres of cover crops into their rotation through the MDV cost sharing program.
2) Constructed a manure storage facility project in response to an ongoing manure runoff issue (see details below in WDNR segment of this report).

Other Partners

In addition to the categories listed above, other entities and agencies are key members of the Red Cedar River Water Quality Partnership and play vital roles in the work they do with the Partnership and with their constituencies.

Wisconsin Department of Natural Resources

The WDNR's presence in the Partnership is crucial to implementation of the ten-year plan on many levels. They provide advice and counseling on various grant programs available to the partners for work toward improving water quality. They provide valuable science data regarding water quality monitoring and modeling. They have institutional knowledge of the history of waterways and waterbodies in the state. And WDNR staff are a valuable networking partner, having connections to their own divisions, and to other agencies, non-profits, and resources. In 2022 they provided valuable assistance in all the above areas, and the Partnership continues to rely on them as a vital connection to the state and its resources.

Nonpoint Source Pollution Program

Nonpoint source (NPS) pollution, or runoff, caused by rainfall or snowmelt picks up pollutants as it moves over land on its way to waterbodies and is a leading cause of water quality problems. The Nonpoint Source Coordinator representing the program in this partnership addresses NPS issues through administering the Runoff Grant Program and enforcing Wisconsin Administrative Code Chapter NR 151 Runoff Management.

Federal 319: Wisconsin submits a 5-year Nonpoint Source Program Management Plan (currently 2021-2025) that meets U.S. Environmental Protection Agency (EPA) Clean Water Act requirements and ensures Wisconsin's eligibility for Section 319 funding. Time spent developing/renewing/implementing 9 Key Element Plans/TMDL Implementation plans with groups such as the Red Cedar Water Quality Partnership is used as match for this federal NPS Program grant.

Grants: There are several categories within the Runoff Grants program. Targeted Runoff Management (TRM) and Notice of Discharge (NOD) grants are typically applied for by County Land and Water Conservation Divisions (i.e., Dunn and Barron Counties). Municipalities like the City of Menomonie (or Rain to Rivers through Regional Planning Commission) apply for the Urban Nonpoint Source & Storm Water (UNPS) Planning or Construction grants. There are other NPS funding sources like the Multi-discharger Variance (MDV) which is more of a collaboration between point source and nonpoint source efforts.

Targeted Runoff Management (TRM)

Rusk County submitted a $59,675 small scale TRM grant application in 2022 for a project in the Red Cedar that was successfully awarded funding for 2023 through 2024. The project includes nutrient management, barnyard runoff control systems, and clean water diversions for an approximately 50 animal unit beef operation. The project is estimated to cost about $85,000 and will be cost shared at 70%. The site is approximately 9 miles upstream from Lake Chetek that drains into the Red Cedar River at the north end of the watershed. The BARNY model estimates the project will prevent 32.5 pounds of phosphorus delivery per year.

Photo 1: Project site awarded TRM funding for application submitted in 2022

Photo 2: Project site awarded TRM funding for application submitted in 2022

Notice of Discharge (NOD)

Approximately 5 miles upstream a direct tributary to the Red Cedar River, north of Tainter Lake, a notice of discharge was issued in 2017 to an approximately 730 animal unit organic dairy operation for a field stacking runoff event. The operation did not have any manure storage at the time of the discharge, therefore this project directly addressed one of the top TMDL objectives by adding one more manure storage facility within the watershed and eliminating winter spreading on 975 acres. Reduction of winter spreading is listed in the TMDL Implementation plan as the second highest practice for reducing phosphorus, and this project is located in a HUC 12 identified in the plan as one of the highest contributors of phosphorus. From approximately 2010-2015, Chippewa County and DNR responded to a series of public complaints alleging large volumes of liquid manure were being field stacked on sandy soils located near Trout Creek. At that time, a TRM grant was awarded for $150,000, but was turned down by the landowner, citing it to be an insufficient amount to address the noncompliance. Both Chippewa and Dunn Counties contributed cost share funding towards developing a nutrient management plan for the farm. A notice of violation was issued in 2018 due to a lack of progress towards meeting compliance deadlines. Finally, an NOD grant was awarded for $457,397 at a 90% cost

share rate. Originally a compost project with an estimated total cost of over $1.7 million, the NOD grant was amended three times before it was finally completed as a traditional manure storage facility with a final total cost of $807,877.39 in the fall of 2022. The NOD was officially closed out, documenting compliance with state code.

The final report submitted calculated a 4-pound phosphorus reduction, as SnapPlus showed no noticeable difference when comparing the stacked manure in the field prior to the manure storage being built, as manure still would be spread with or without the manure storage facility. However, the concentration of nutrients that ran off from the one-time event (250 lbs. of N, 375 lbs. of P and 750 lbs. of K) was eliminated due to the landowner now having adequate storage to properly handle and apply the manure.

Photo 3: Manure runoff event that prompted action and was finally resolved by an eventual NOD grant that concluded in 2022

Photo 4: Liquid manure being stored in a field posing a substantial runoff pollution risk that was finally resolved through an NOD grant that concluded in 2022

Photo 5: Liquid manure being stored in a field posing a substantial runoff pollution risk that was finally resolved through an NOD grant that concluded in 2022

Photo 6: Construction in 2022 of manure storage facility funded through NOD grant

Photo 7: Construction in 2022 of manure storage facility funded through NOD grant

Photo 8: Construction in 2022 of manure storage facility funded through NOD grant

Photo 9: Construction in 2022 of manure storage facility funded through NOD grant

A farm operating at two locations in St. Croix County was contributing runoff pollution to Sandy Creek, approximately 20 miles upstream of Tainter Lake. Complaints and a spills report were received by DNR in 2020. Water samples taken in Sandy Creek documented manure runoff from the facility was reaching surface water. The farm was issued a notice of noncompliance and later a notice of violation for not addressing one unused manure storage facility, one leaking and overtopping manure storage facility, direct runoff from feedlots, applying manure without a nutrient management plan which led to field runoff, and unlimited livestock access to a stream causing bank erosion. A notice of discharge was issued in 2021 and a $43,288 NOD grant was successfully completed at the end of 2022. The final project cost was $65,401.26 and led to a reduction of 8,308 pounds of phosphorus and 13,848 pounds of nitrogen. Originally a 614 animal unit operation, cattle were completely removed from one location resolving the unlimited livestock access eroding the stream bank issue, and herd size was dramatically reduced at the other. The livestock also transitioned from dairy cows to beef bulls. Both manure storage facilities were properly closed, and a nutrient management plan was developed to guide the manure application from the storage emptying.

Photo 10: Unlimited livestock access leading to streambank erosion. Compliance was achieved by removing cattle from site

Photo 11: Unlimited livestock access leading to streambank erosion and feedlot runoff. Compliance was achieved by removing cattle from site

Photo 12: Manure overflowing and leaking

Photo 13: Flow path of manure from overflowing and leaking storage structure on its way to Sandy Creek

Photo 14: Manure overflowing and leaking

Photo 15: Flow path of manure from overflowing and leaking storage structure before it reaches Sandy Creek

Photo 16: Water samples taken where manure entered Sandy Creek. E. coli result in this sample was 259,000/100ml, total nitrogen was 184 mg/L, and total phosphorus was 46 mg/L

Photo 17: From left to right, comparison of water samples taken above the confluence, in the manure flow path, and where the flow path met the stream

Photo 18: What the overflowing/leaking manure storage structure looked like in July 2022. NOD grant funding was used to properly close this facility.

Photo 19: What the overflowing/leaking manure storage structure looked like in September 2022 with most of the liquid pumped out. NOD grant funding was used to properly close this facility.

Photo 20: What the overflowing/leaking manure storage structure looked like in September 2022 with most of the liquid pumped out. NOD grant funding was used to properly close this facility.

Photo 21: Manure solids being removed during the 2022 NOD grant funded manure storage closure project

Photo 22: Clean fill being added as manure solids are removed during the 2022 NOD grant funded manure storage closure project

Photo 23: Clean fill being added as manure solids are removed during the 2022 NOD grant funded manure storage closure project

Photo 24: Material removed from the storage facility was field stacked and spread according to a nutrient management plan

An NOD grant was awarded to Dunn County for $796,150 in late 2022 to replace a failing manure storage structure. Approximately 8 miles upstream of the Red Cedar River on Lower Pine Creek, DNR issued a notice of discharge in the spring of 2022 to an approximately 820 animal unit dairy operation for manure storage overflow, feedlot runoff and feed pad leachate reaching surface water. This project implements manure storage BMPs as outlined in the TMDL for Tainter Lake and Lake Menomin as one of the second highest recommended BMPs for potential significance in reducing phosphorus loading in the watershed. The NOD grant will reimburse 90% of the eligible project costs up to the grant award maximum. The full project cost to correct all the noncompliance issues at the site is estimated at over $1.3 million dollars. Other funding sources, such as NRCS EQIP, MDV, and DATCP SWRM, will be combined with the NOD grant in order to complete the total project.

Photo 25: Overflowing manure storage to be corrected with NOD grant awarded to Dunn County in 2022

Photo 26: Surface water area where manure storage overflow collects. Impact to be corrected by NOD grant awarded to Dunn County in 2022

Photo 27: Overflowing manure storage to be corrected with NOD grant awarded to Dunn County in 2022

Photo 28: Intermittent stream and flow path of manure storage overflow to Lower Pine Creek. Impact to be corrected by NOD grant awarded to Dunn County in 2022

Multi-Discharger Variance (MDV)

Wisconsin's phosphorus MDV was approved by EPA on Feb. 6, 2017. The multi-discharger variance (MDV) for phosphorus extends the deadline for point sources of phosphorus to comply with new, lower phosphorus limits in their permits. This variance to the phosphorus limit can cover multiple point source permits, whereas an individual variance would only apply to a single facility. This provides for

administrative streamlining while benefiting the watershed as a whole. While point sources are investing in gradual reductions of phosphorus at their facilities, they are also paying into a fund that is dispersed to counties to spend on nonpoint pollution reduction projects. MDV funds, totaling $37,456.71, were allocated among Barron, Dunn, and St. Croix Counites in 2022 to be spent in the Red Cedar Watershed. These funds were generated from 5 point sources: Village of Luck, Village of Almena, Downsville Sanitary District Wastewater Treatment Facility, Crystal Lake Sanitary District, and Lakeland Sanitary District. Each county gets an amount proportional to the precent of area within it that is covered by the watershed.

Enforcement: Enforcement activities include responding to manure spills and complaints pertaining to small and medium (non-permitted) farms and conducting site inspections. For facilities in violation of NR 151 performance standards and prohibitions, Notice of Noncompliance (NON) and Notice of Discharge (NOD) letters are issued. If this is not enough to resolve the noncompliance, and it becomes necessary to escalate enforcement, Notice of Violation (NOV), Enforcement Conferences, and Department of Justice referrals, among other consequences, are then recommended by the NPS program to DNR's Environmental Enforcement staff. The following are some specific examples of enforcement activities in the Red Cedar Watershed during 2022.

Approximately 6 miles upstream from the Red Cedar River is a facility whose feed storage pad leachate is running off and leaving the site via the road right of way drainage ditch. A notice of noncompliance was issued in the fall of 2022 with corrective deadlines for 2023. Efforts to correct the noncompliance with the farm are ongoing.

Photo 29: Feed leachate runoff leaving storage pad and entering road ditch evidenced by burned vegetation

Photo 30: Feed leachate runoff leaving storage pad and entering road ditch evidenced by burned vegetation

Photo 31: Other side of road after feed leachate runoff travels thorough road ditch culvert

A facility roughly 2 miles upstream on a tributary to Tainter Lake, was issued a notice of noncompliance in 2021 for not having a nutrient management plan. The facility developed and submitted a plan, leading to the resolution of the noncompliance being finalized in 2022. However, information contained in the plan indicated the facility may be operating over 1,000 animal units without obtaining the proper permit. DNR Nonpoint and CAFO staff are currently collaborating on working with the facility.

Photo 32: Runoff concerns detected during a 2017 inspection prompting investigation into animal units and nutrient management plan through an NON in 2022

Photo 33: Runoff concerns detected during a 2017 inspection prompting investigation into animal units and nutrient management plan through an NON in 2022

Photo 34: Runoff concerns detected during a 2017 inspection prompting investigation into animal units and nutrient management plan through an NON in 2022

Photo 35: Runoff concerns detected during a 2017 inspection prompting investigation into animal units and nutrient management plan through an NON in 2022

Photo 36: Runoff concerns detected during a 2017 inspection prompting investigation into animal units and nutrient management plan through an NON in 2022

Photo 37: Runoff concerns detected during a 2017 inspection prompting investigation into animal units and nutrient management plan through an NON in 2022

Roughly a quarter mile from Tainter Lake an operation was issued a notice of noncompliance and later a notice of violation for not meeting the state cropland erosion and nutrient management performance standards. Final compliance deadlines are in 2023 and this is an ongoing case.

Photo 38: Field not meeting state erosion standards with pending enforcement action

Photo 39: Sediment leaving field through road culvert

Photo 40: Field not meeting state erosion standards with pending enforcement action

Photo 41: Sediment deposited in wetland on other side of road

Another long-term compliance site was resolved in 2022. Efforts to bring the facility into compliance began in 2017 and had escalated through notices of noncompliance, discharge, and violation. After all options had been exhausted, and the DNR was considering referring the case to the Dept. of Justice at the beginning of 2022, it was discovered the property was sold to a new owner. The new owner was contacted and immediately began addressing compliance at the site. Manure runoff from the barnyard was being conveyed through an underground pipe to a wetland along Hay Creek a little less than 6 miles upstream from the Red Cedar River. The new management has successfully permanently sealed the pipe.

Photo 42: Underground pipe inlet draining barnyard runoff

Photo 43: Sample bottles at pipe outlet documenting manure

Photo 44: Underground pipe outlet discharging to wetland

Photo 45: Pipe inlet sealed closed with concrete in 2022

Historical NOD and TRM grant projects are starting to get uploaded into the BMP Implementation Tracking System (BITS) database. Hopefully this effort will make the determination of "existing" vs. "new" noncompliance easier in terms of meeting our obligation for cost share. This is becoming ever more critical as the NR151 rule gets older and funding dollars are getting stretched thinner.

Farmers of Barron County Watersheds

The producer-led group known as the Farmers of Barron County Watersheds spent much of 2022 re-inventing itself with some new leadership. Logan Dwyer has taken on the role of Chair and Joe Ailts has been retained as a director of research efforts. There was no cost share offered to residents for conservation activities in 2022. Several developments and demonstration efforts took place under the guidance of Barron County Soil and Water Conservation Department staff, along with Andy Bensend of the Farmers of Barron County Watersheds. We have done some cover crops, and some grass headlands as well as some comparisons with manual deep ripping to alleviate compaction. The clovers looked good following the winter wheat grown during summer. There are several planned nitrogen utilization trials coming in 2023 utilizing a grant opportunity from DATCP. There were many acres of covers planted, even without incentives, but perhaps the biggest impact was the $5 per acre incentive from DATCP coming through as a discount on crop insurance. Several thousand acres were seeded and submitted under this incentive. The Practical Farmers of Iowa also has a $20/acre incentive for Wisconsin farmers to seed a small grain into a corn Soybean rotation and can be followed with another $20 per acre for reducing nitrogen fertilization by 40 lbs/acre in the following corn crop after a legume cover. Efforts will be made to find some interested farmers for these incentives.

City of Menomonie

In 2022, the City of Menomonie accomplished several projects and practices aimed at improving water quality. Water quality projects practices in 2022 included:

- Wastewater Treatment Plant Upgrades: The City began a construction project at the wastewater treatment plant focused on reducing the amount of phosphorus in the discharged effluent to meet upcoming DNR standards of 0.1 parts per million (ppm).
- Increased Street Sweeping: The City implemented the second year of increased street sweeping frequency in the fall in select residential neighborhoods with moderate tree canopy based on DNR technical guidance.
- Phosphorus Modeling: The City has identified a need for additional stormwater planning to quantify and account for all current practices providing water quality treatment and estimate municipal progress toward the TMDL/MS4 goals. The City applied for UNPS planning grants in 2019 and 2021 to assist with funding for the project but was unable to secure financial assistance. The City approved a locally funded planning project to update the TMDL delineations and complete WinSLAMM modeling in September 2022. The modeling project will provide updated numerical progress of the amount of total phosphorus reduced within the City's TMDL planning area. Work will be completed in 2023.

- The City is an active member in the regional water quality consortium, Rain to Rivers of Western Wisconsin. The City participates and helps promote stormwater education and outreach activities across the region and watershed.
- The City continues its annual efforts to improve water quality and maintain compliance with the requirements in the City's MS4 permit. Highlights of these efforts include:
    - 17 educational events with a focus on water quality
    - Inspected 142 stormwater outfalls
    - Conducted 19 erosion control inspections at construction sites
    - Inspected 30 municipally owned stormwater ponds
    - Inspected 28 privately owned stormwater ponds
    - Collected 710 tons of material during spring and fall street sweeping operations
    - Cleaned 30 catch basins
    - Collected bagged yard waste and leaves curbside on eight days (4 spring/4 fall)

Landmark Conservancy

Landmark Conservancy is a nationally accredited, non-profit land trust serving 20 counties in western and northwestern Wisconsin. They work primarily with private landowners who wish to conserve their land in perpetuity. They also work with local municipalities, state, and federal entities to create public preserves and trails for all to enjoy. Their primary tools for land protection are conservation easements and land acquisition.

Although Landmark Conservancy did not have any new projects in the Red Cedar River watershed in 2022, they continue to be a valuable member of the Partnership and will continue to work in western and northwestern Wisconsin to serve those looking to preserve natural lands in perpetuity.

3M

The 3M plant in Menomonie manages several hundred farmable acres around the plant, renting it out for farming. However, a decision has been made that 2022 would be the last year that renting that land would take place. Five Star Dairy again rented the land in 2022, but in 2023, 3M will explore other options for the land around the plant. Some may be utilized for other purposes, while some could be restored to a more natural landscape. The Partnership has contributed ideas to 3M for land management of this land that serves the goals of the watershed plan.

UW-Stout

Having UW-Stout located in Menomonie and in the Red Cedar River watershed is beneficial to the Partnership on many levels. The water quality issues in the watershed provide excellent opportunities for multi-disciplinary learning and teaching for faculty and students. Many programs sponsored by UW-Stout contribute valuable data for the Partnership regarding natural and social science elements that influence how water quality problems in the watershed are addressed. Additionally, UW-Stout hosts the annual Red Cedar River Conference (although in 2022 the Conference was cancelled due to a spike in COVID cases early in the year). What follows is a list of activities UW-Stout sponsors in which the Partnership participates or considers highly valuable in working toward its goals.

Linking Applied Knowledge in Environmental Sustainability Research Education for Undergrads (LAKES REU)

The LAKES REU hosted their first cohort of students under their current 3-year funding from the NSF in the summer of 2022. 11 students from around the country participated (some funded by another grant from the Freshwater Collaborative of Wisconsin). All research posters and summaries can be found at the program's website. Projects covered a variety of topics including (only a partial list):

- Views of conservation farmers surrounding barriers and opportunities in adopting conversation practices
- How the Colfax Red Cedar Preserve and Recreation area might help to better educate the public on watershed health
- Mapping agricultural land most at risk for soil erosion and nutrient run-off
- How we might create a network of low-cost lake monitoring stations
- A preliminary study of how best to promote beef raised in a sustainable way

The 2023 summer cohort has been recruited and will arrive on campus in early June. They will be working on projects related to sustainable agriculture in the watershed (Professor Arthur Kneeland), water quality monitoring and better understanding nutrient dynamics (Dr. Nicole Hayes), how the media and level of scientific literacy relate to citizen engagement (Dr. Kim Zagorski), and how we might better promote pro-social behaviors that can help improve water quality (Dr. Sarah Wood).

Freshwater Collaborative of Wisconsin

Several grants were received from the Freshwater Collaborative of Wisconsin in their initial funding cycle. The grants were used to support water-related research and students projects in the watershed as well as the creation of curriculum to train students to work in this area after graduation:

- Developing an easy-to-apply, integrated approach to modeling freshwater contamination from farm runoff using only commercial drones, cameras, and software, $116,832
- Establishment and support of the Red Cedar Basin Monitoring Group, $71,730 (a second round of funding was awarded later in the year)

- Predicting Crop per Drop in Sandy Soils, $36,121 (collaboration with Chippewa Valley Bean)
- Establishment of the Center for Rural Opportunities, Prosperity and Sustainability, $33,759
- Expanding LAKES REU to Wisconsin students, $29,382 (funding to add two Wisconsin students)
- Undergraduate student-faculty research engagement on developing rapid, easy-to-use and cost-effective test kits for the detection of E. coli/coliforms in water, $6,680
- Building water projects into an environmental math course, $6,362
- Development of People, Water, and the Environment course, $5,242

Summer Student Experiences

Summer collaborative student experiences through the Freshwater Collaborative engage local high school and college students in courses co-taught by UW-Stout, Eau Claire, River Falls, and Oshkosh instructors.

- Freshwater science outreach brings school students from western Wisconsin to local campuses and the UW-Oshkosh field station in Door County to participate in collegiate field courses.
- A freshwater field course for undergraduates in UW system schools introduces students to water quality issues and monitoring in Western WI.

Other Activities

- Dr. Keith Gilland and Dr. Julia Chapman continued collaborations with the City of Menomonie and the Red Cedar Colfax Preserve and Recreation Area on a variety of restoration projects.
- The 2022 Red Cedar Watershed Conference was cancelled due to ongoing concerns regarding the COVID 19 pandemic, but planning continued for the 2023 conference.
- A new concentration in the B.S. in Environmental Science program was approved: Human Dimensions of Conservation. This concentration will help to train students for work in conservation that needs social science and “people skills” to help to address the needs to engage communities and change behaviors to address complex environmental problems (including water quality).
- A proposal for the Center for Rural Opportunities, Prosperity, and Sustainability was created and taken through the first steps of the approval processes in May of 2022 (Dr. Zach Raff, Dr. Keith Gilland, and Dr. Abhishek Verma). The goals of the center (once it is fully established) are to:
  - Help develop vibrant rural communities in Western Wisconsin, through environmental and economic sustainability, providing a pathway to economic prosperity and better job opportunities through training on new in-demand technologies like drones, and the connection of the university, local governments, and the public.

- Increase student involvement and provide hands-on learning opportunities; increase student recruitment and retention through providing opportunities for hands-on learning experiences (research, internships, etc.) working on projects benefiting local communities.
- Support for curriculum initiatives: CROPS will provide a forum for instructors interested in developing and implementing coursework, embedded research, and service-learning opportunities to network across programs, departments, and colleges to collaborate on projects furthering their teaching in line with the center's mission.
- Coordinating outreach for maximal impact: Issues facing rural communities are multidisciplinary in nature and CROPS will provide an avenue for faculty across diverse disciplines to coordinate outreach, service, and other mutually beneficial work with internal and external stakeholders and partners.

Although not entirely focused on water quality issues, the center can contribute to those efforts both through faculty and student projects directly related to water and through addressing issues that are related (sustainable agriculture, community capacity to tackle environmental issues, etc.). So far, efforts have been funded through the Freshwater Collaborative of Wisconsin and through a USDA SARE grant (received in early 2023).

UW-Madison Division of Extension

Staff from UW-Madison Division of Extension continue to provide assistance and resources to the Partnership. Dan Zerr, regional natural resources educator, continues to act as facilitator/coordinator for the Partnership.

Estimated Load Reductions from Best Management Practices

The ten-year watershed plan calls for reducing annual phosphorus loads to the watershed by a little less than 200,000 lbs. by year ten. As listed above, many of the various partners have been involved with the installation of best management practices that help reduce phosphorus loads to the watershed. Such reductions will help lead to fewer and less intense algae blooms in the lakes and rivers of the Red Cedar River watershed.

In addition to the practices listed previously, there are landowners participating in other cost-share programs through the federal Natural Resource Conservation Service (NRCS). It is hoped that as education and outreach efforts, field days, mentoring, and other activities occur in the watershed, more farmers would begin to adopt many of the best management practices listed in the ten-year plan as being effective methods to reduce nutrient loads to water bodies. It's virtually impossible to know what every landowner is doing toward the use of best management practices, as some farmers are installing best management practices but not participating in cost-share programs, or not reporting what they're doing to any official agency; while others may have tried some practices in recent years and decided for whatever reason to discontinue such practices. However, in addition to what was captured above, we also have limited access to some of the NRCS cost-share activities in the watershed. Below is a summary of BMP data obtained for this report. Using modeling and calculations specific to individual projects, or using the calculation formulas contained in the ten-year plan to estimate load reduction projections

from certain BMPs, an estimate of load reductions from the 2022 data collected is included, and shows that 10,510.4 lbs. of phosphorus was kept from the waters of the Red Cedar watershed through these various programs.

(Note: It is not easy to calculate load reduction projections for all BMPs, so any BMPs listed above or otherwise happening in the watershed where calculations of load reduction are not possible are not listed below. This would include practices such as grassed waterways, managed grazing, grade stabilization structures, and others. It IS possible to do load reduction calculations for some of these practices, but not without detailed information about each specific project.)

Practice (NRCS data)	**Acres**	**Pounds of Phosphorus Reduced**
Conservation Cover	9.7	8.4
Cover Crops	6,330.9	1,063.6
Critical Area Planting/Field Borders	37.9	32.7
No Till	8,417.8	6,033.9
Total NRCS		**7,138.6**
Totals from Counties and Farmer Led Council Activity		**3371.8**
Estimated Overall Annual Load Reduction for 2022		**10,510.4**

It's important to emphasize that these load reduction calculations are based on ONLY those practices for which some sort of cost-share or monitored program report can be referenced. Thus, we reiterate that this is not a comprehensive picture of practices in the watershed. It is very difficult to assess all acres, but we can offer an example of alternative estimation. If we were to refer to the item under Dunn County Land and Water Conservation's section previously listed in this report that discusses the County's transect survey, we could estimate that 27% of all cropland in Dunn County is planted in a no-till system. According to the USDA 2022 Census of Agriculture, there were 240,765 acres of cropland in Dunn County. If we estimate that 27% of that was in a no-till system (65,007 acres), and use the same formula for calculating load reductions for no-till as we used in the above table, this would give us a value of 46,597 lbs. of phosphorus reduced within Dunn County alone. However, we don't know for sure that the 27% in the transect area can truly translate county-wide, we don't know how many of these acres have been in no-till for years prior to 2022 (thus not "new" load reduction), and there are other variables for which we can't be confident. But all these numbers and estimates are valuable, and good for tracking load reductions year to year.

Point Sources

Phosphorus loads into the watershed from point sources, such as wastewater treatment plants, are monitored and managed through the WPDES permits those sources are mandated to have. However, it is beneficial for us to track those loads over the years to monitor changes.

The TMDL for the Red Cedar River watershed calls for a phosphorus load goal from point sources, of 20,100 lbs. per year. In 2022, total point source loads from all permitted sources were recorded to be 7,428 lbs. (source: WDNR), considerably below the stated goal. However, it's important to note that

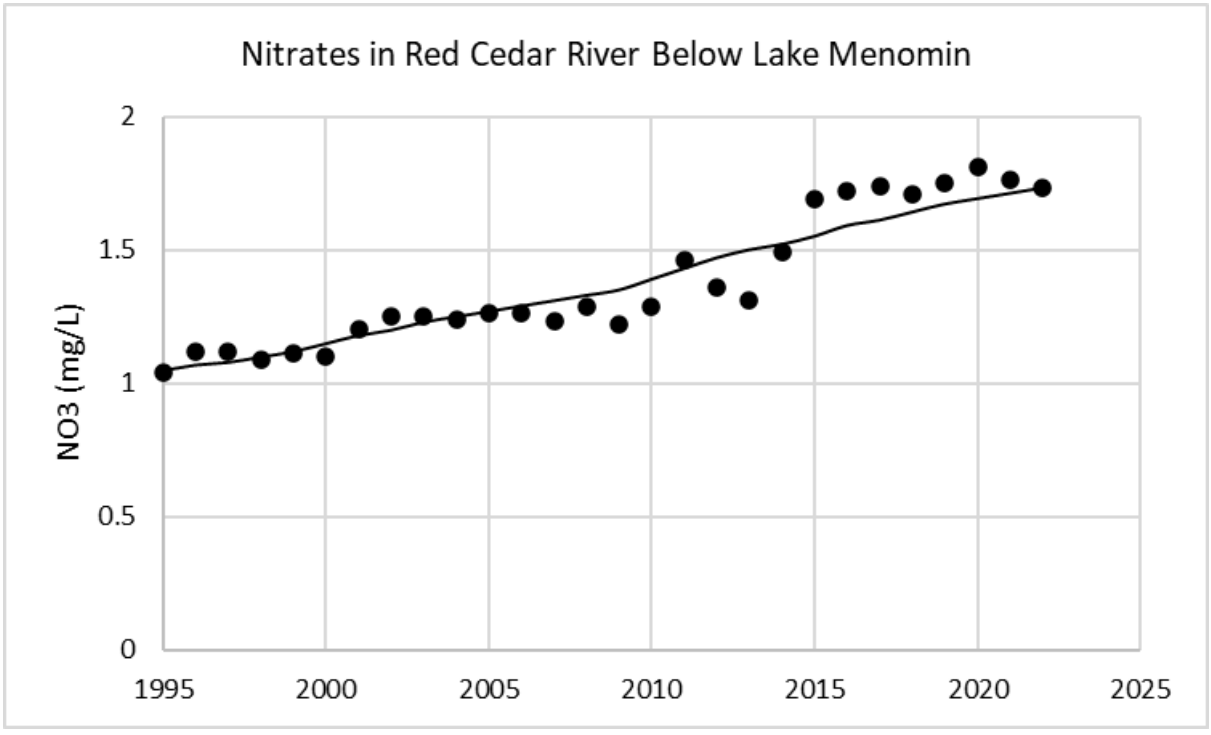
from year to year, this load varies. In the past eleven years annual point source loads in the watershed have varied from a low of 6,354 lbs. in 2011 to a high of 17,258 lbs. in 2014 which was still below the TMDL goal of 20,100 lbs. This tells us that point sources of phosphorus are generally doing their part and meeting their goals for reduction.

Water Quality Monitoring in the Red Cedar Watershed

In addition to special monitoring projects DNR does regular monitoring of phosphorus and nitrate below the Lake Menomin dam on the Red Cedar River near the bottom of the watershed. This monitoring has been going on for several decades and is a good historical picture of nutrients in the Red Cedar River. In 2022 phosphorus levels continued to decline, with the annual mean level for 2022 the lowest it has been since the beginning of these measurements (see graph below). The Partnership sees this as progress toward goals and would like to be able to say it's because of our work. However, that's a difficult connection to make directly, with so many variables involved. Still, the trend of declining phosphorus levels is a positive trend, and hopefully will continue. However, nitrate levels in the river continue to rise. Higher nitrate levels in surface water likely also means higher nitrate levels in ground water, and this presents a different set of problems than the phosphorus issues. This data will inform future discussions and actions within the Partnership.

In the graphs below provided by WDNR, the dots represent the annual mean total phosphorous or nitrates for each year, and the solid line is the annual concentration normalized for the annual flow.

Nitrate levels below the dam in Menomonie (source: WDNR)



Total phosphorus levels below the dam in Menomonie (source: WDNR)