Opportunities for Improving Water Quality Through Nonpoint Source Control in the Red Cedar River Basin

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Stakeholder surveys of watershed efforts at the local and national level identify the need for participation of all individuals and organizations in implementing solutions. This often manifests itself as a concern that certain individuals, businesses or organizations are not contributing their "fair share" to solving the problem. Wastewater discharge permit holders will be required to implement Best Management Practices (BMPs) or meet phosphorus limits. The extent to which non-regulatory actions also take place will significantly influence whether progress toward a shared goal is made. Studies in the Red Cedar Basin, and other agricultural watersheds in Wisconsin experiencing water quality problems, have shown that reducing phosphorus contributions at the source is critical and losses from cropland are the largest source. The focus on cropland has increased over the last 15 years as Wisconsin Department of Natural Resources (WDNR) regulations affecting wastewater discharges (point sources) have reduced phosphorus from these sources. As the focus moves to increase nonpoint source control efforts, the need for both a "fair share" commitment from everyone will be critical. Actions need to reduce existing phosphorus discharges as well as the potential for additional future sources. These actions will require a high degree of inter-agency cooperation, funding, and landowner interest.

1. Create a multi-agency partnership for water quality improvement

A variety of implementation activities should be coordinated to obtain the most cost-effective strategies for phosphorus control. Although the main thrust of this effort needs to focus on agricultural runoff, other phosphorus sources must also be addressed. A multi-agency partnership can provide information exchange and overall direction needed in an effort of this size. This partnership could utilize cooperative agreements to document commitments of the various organizations. Cooperative agreements can be useful in coordinating a multi-agency effort that will involve a wide range of people and functions. These agreements can be as specific as desired and they can answer important questions about who does what, when, where, for how much, and how long. The following organizations could become involved in cooperative agreements. More details on their roles and function appear in Appendix 1.

- Barron and Dunn County Land Conservation and Zoning Departments
- USDA / NRCS offices in both counties
- Wisconsin Department of Natural Resources
- Local units of government
- Nonprofit lake and river organizations
- Wisconsin Department of Agriculture, Trade and Consumer Protection
- University of Wisconsin Extension
- UW Stout

Other river basins facing similar challenges utilize an established coordinating coalition of interested parties. Examples include the Fox / Wolf Watershed Alliance http://www.fwwa.org/ and the Rock River Coalition http://www.rockrivercoalition.org/. The Red Cedar River Basin had a coalition group, The Red Cedar River Basin Partnership, which was established under a USEPA grant in 1995 and later obtained nonprofit status as The Red Cedar River Basin, Inc. The EPA

grant ran out in 2001 and the group has not functioned since 2003. The group could be rejuvenated if sufficient interest exists

2. Develop an information and education program

Communication of the partnership goals and activities will be required to create the public and private support needed to fund and sustain implementation activities. Many local agencies involved in water resource management have experience with providing educational services and these same agencies could provide support for specific phosphorus control activities in this basin. This effort must also include sustainable and profitable approaches to changing human behavior. Improvement of Red Cedar Basin water quality will require public involvement including representation from the farm community and point source permitted dischargers. Farmers will be asked to make changes to their operations and invest in actions designed to reduce phosphorus loading to the Red Cedar River Basin. The most effective way to overcome obstacles with producers/landowners and earning trust is through personal contact. This is, unfortunately, one of the most time-consuming ways to approach the problem.

New approaches and strategies for public involvement should be developed to compete successfully for continued public attention. Community based social marketing is being used to ensure continued public input and change societal behavior, including adoption of the principles described in McKenzie–Mohr, D. and W. Smith (1999). This relatively new approach in watershed management involves well established principles from economics and marketing. Identification of barriers to adopting new behavior and identification of incentives to encourage adoption are core elements of Community Based Social Marketing. The UWEX and partners need to develop an integrated strategy that builds on conventional approaches to information/education while incorporating some of the elements of social marketing to change human behavior.

3. Invest in new grant opportunities

The Runoff Management Program of the WDNR administers several grant programs designed to control nonpoint source pollution. Local units of government are eligible to apply for these grants. Use of these grants will be critical to provide financial incentives for farmers to install important phosphorus controlling BMPs. Occasionally, grants from other sources become available. Certain sections of the Federal Clean Water Act legislation offer grant opportunities for nonpoint source planning and implementation activities. A list of grant opportunities appears in Appendix 2.

Of particular importance in the Red Cedar River Basin are Wisconsin Department of Agriculture, Trade and Consumer Protection (WDATCP) funds for nutrient management and alternative tillage. While this program received a significant increase in funds in recent years, resolution to state budget problems proposes a significant funding reduction. Funds may be re-established during better financial times.

The WDNR's Targeted Runoff Management Grant Program provides opportunities to local units of government to target site specific areas and obtain funds to cost share up to 70% of total costs (maximum $150,000/grant). These funds are currently restricted to construction activities, and cannot cover technical assistance, staff or practices such as nutrient management. Eligibility is enhanced if local units of government identify phosphorus control in the Red Cedar River Basin as a high priority.

The WDNR's Urban Nonpoint Source and Stormwater Management Grant Program provides additional funding opportunities to urban areas. Up to $150,000 of cost-sharing is available for construction projects that control stormwater runoff, and up to $85,000 is available for stormwater planning.

Under certain situations where agricultural operations are identified as serious pollution sources and in violation of animal feeding operation rules, WDNR or WDATCP funding may be requested by counties to cost share corrective measures.

4. Implement existing Runoff Management Performance Standards

Wisconsin counties have the opportunity to work with the WDNR to implement a set of performance standards for both rural and municipal areas designed to control nonpoint sources. Both Dunn and Barron County can develop specific language in their respective Land and Water Resource Management Plans detailing how they will implement these standards. Local ordinances may also be developed to implement these standards. The amount of phosphorus control achievable through these standards is uncertain; however, it must be noted that these standards were originally described as minimum expectations.

5. Utilize innovative practices for phosphorus control

The University of Wisconsin Extension and the University of Wisconsin are currently investigating the concept of whole-farm phosphorus balances. Identifying whole-farm P balances will help farmers better manage phosphorus losses. This is accomplished by an assortment of management techniques ranging from changes in the phosphorus content in the mixed ration fed to dairy cows to more effectively retaining phosphorus applied to fields. Opportunities exist in growth areas to incorporate BMPs into new development sites. Land use and planning concepts can be developed that limit the amount of runoff from developing areas. There are numerous methods available to accomplish this objective, using implementation tools such as planning, local permits and ordinances. Steps that riparian property owners can take have been well defined and multiple examples of successful implementation programs exist.

See Appendix 3 for examples of efforts sponsored by various units of local government.

Appendix 1 - Roles and Responsibilities of Partners

Wisconsin Department of Natural Resources

WDNR is the lead agency for, identifying, monitoring and enforcing water quality standards and overall management of the states' waters. In addition to statewide coordination of water quality management, the WDNR also provides funding through grants and aids, staffing and technical assistance for water quality activities.

Wisconsin Department of Agriculture, Trade & Consumer Protection

WDATCP is responsible for providing financial support to county government for staffing assistance to the county LCDs. This important function provides needed resources for LCDs to implement their programs locally. WDATCP also sets the technical standards for agricultural BMPs and provides some engineering review for more complex practices. WDATCP also requires county LCDs to develop and implement local county Land and Water Resource Management Plans. These plans are produced every 5 years and must be approved by WDATCP as a condition of State funding assistance. Both Dunn and Barron are scheduled to rewrite their plans in 2011 and will be starting that process soon.

County Land Conservation Departments

Water quality efforts in Wisconsin have a long history of involving partnerships between the state agencies and local units of government, especially county Land Conservation Departments (LCDs). Beginning with the Nonpoint Source Pollution and Abatement Program established in the 1970s to the more recent Targeted Runoff Management Grant Program, Wisconsin has invested significantly in providing local units of government with financial resources to plan, staff and implement many watershed based efforts around the state. Beginning in the late 1990s, Wisconsin counties became increasingly more focused on nonpoint source pollution control through a series of laws and administrative rules. County LCDs are typically the lead agencies for management of nonpoint sources in rural agricultural areas.

The individual county LCDs take the lead in county nonpoint source control planning and implementation activities. They play the important role of working with area landowners to reduce phosphorus losses from their farms and lands. They are also a key organization for implementing agricultural performance standards.

USDA Natural Resource Conservation Service

The NRCS provides technical standards and engineering assistance to cooperating landowners. They also implement a variety of conservation programs. They play a cooperative role with other local and State units of government. Their financial resources are significant and they can provide funding needed to reduce phosphorus loading to the Red Cedar

University of Wisconsin – Extension

The UWEX program's mission is to bring the power of the State University system to the people of Wisconsin to improve their lives and the environment. Their primary role is to assist local governmental and private organizations, in developing educational programs that incorporate the latest knowledge of the University into local affairs.

Lake Districts and Associations

Lake Districts are special purpose units of government in Wisconsin that allow property owners around lakes to organize themselves as a unit of government. They have taxing authority and a range of lake management functions. Lake Associations are entirely voluntary. Both lake groups are in a key position to influence membership adoption of practices to reduce nonpoint runoff.

Private Individuals

Private individuals have many opportunities to contribute to a "fair share" approach to watershed management through land management practices in both the urban and rural setting. Examples include maintenance of on-site septic systems, establishment of rain gardens, use of non-phosphorus lawn fertilizers and implementation of agricultural practices that exceed statewide minimum performance standards.

Because the majority of watershed land use is agricultural and the predominant phosphorus source is cropland runoff, agricultural landowners will be the single most important stakeholder group in Red Cedar water quality improvement. They will determine if and when and under what circumstances BMPs will be installed to control nonpoint source pollution. Local governments and private organizations can represent the collective interests of landowners, but ultimately the landowner will decide what actions are taken to reduce phosphorus losses from farmlands. It is critically important to enlist the cooperation of significant numbers of farmers to ensure successful Red Cedar Basin water quality improvement.

Government programs are key to achieving water quality improvements. Individuals and organizations can contribute to the important and influential process of public involvement in the development of government programs related to water quality. Examples include

- Public meetings conducted by EPA, DNR or DATCP to change rules governing disposal of phosphorus containing waste
- County Land Conservation Department meetings for developing Land and Water Resource Management Plans
- County ordinance development designed to address a wide range of important land uses affecting water quality.

Municipalities and Businesses

The municipalities that have WPDES point source discharge permits for stormwater or other pollutants will be responsible for complying with their individual permit conditions designed to limit phosphorus discharge. Their role may also involve the development of a basin wide inter-municipal organization to develop plans and actions between permit holders that allows for local decision making regarding permit compliance. Municipalities too small to be regulated under WPDES permits for storm water can take a "fair share" approach and strive to implement good storm water management practices. The Chippewa Valley Storm Water Forum (CVSWF) is a network of storm water professionals representing municipalities from the area, and provides a good venue for stormwater related information and education.

Business and industry stakeholders will be involved in several ways. Some will be subject to WPDES permits and others will be subject to statewide performance standards, like nutrient management on lawns of 5 acres or more. Some businesses can play an important role in providing specialized services in areas like cropland fertilization, soil testing, nutrient management planning, and livestock feed management, which are critical to the control of phosphorus in the rural landscape. They can also implement many of the "fair share" practices listed for individuals.

Appendix 2 - Costs and Funding Sources

Point sources in the Red Cedar Basin currently spend an estimated half a million dollars per year treating their discharges to remove phosphorus. These costs are expected to grow proportionately to the population served by these facilities. While loans with favorable interest rates can be obtained for this work, there are no grant programs. State grants, with local match, are available for municipal stormwater planning and construction.

Cost-effective practices needed to control nonpoint sources of phosphorus are identified in Table 3 below. The cost of installing these BMPs to improve lake condition is estimated at about $12.5 million (Table 3). Administrative and technical assistance costs are estimated at about $1 million per year of implementation.

Table 3. Projected nonpoint source BMP implementation costs in the Red Cedar River Basin. Presented as total cost and ranked according to the ratio of cost/pound of P control (a measure of cost effectiveness) Source: Cook (1999).

BMP	Lbs P controlled	BMP total cost ($)	Cost/Lb P ($)
Applying tillage management	80,640	$2,600,000	$32.24
Traditional cropland BMPs	10,208	$350,000	$34.28
Applying P balancing	35,019	$1,560,000	$44.54
Manure spreading management	29,904	$1,680,000	$56.18
Milk house waste management	8,100	$900,000	$111.11
Stream buffers	3,107	$428,000	$137.75
Barnyard runoff management	13,764	$3,560,000	$258.65
Urban BMPs	1,766	$800,000	$453.00
Wetland restoration	1,055	$596,600	$565.49
Totals:	183,563	$12,474,600	

Funding sources involve a variety of agencies and programs. Improving water quality in the basin requires a strategy that encompasses financial and management arrangements to ensure adequate support for success. There is no one-size-fits-all method for this task. The financial and institutional organization of a nonpoint source dominated effort must utilize multiple avenues for securing funding and facilitating implementation activities. Current existing programs must be considered along with potential new programs that may be on the horizon. Appendix 2 reviews the current state of programming in nonpoint source control efforts and identifies current funding possibilities to address phosphorus control.

Federal USDA Programs

The majority of funding currently being used in the Red Cedar River Basin from federal sources is offered through various United States Department of Agriculture (USDA) offices. The Farm Service Agency (FSA) of the USDA provides financial assistance to farmers through numerous types of subsidy payments, often referred to as crop subsidies or crop payments. The Natural Resource Conservation Service (NRCS) is also a part of USDA, and provides federal financial and technical assistance for local landowners' conservation needs. The NRCS is most likely to have federal resources beneficial to basin water quality improvement. Examples of current federal programs supporting BMP cost sharing and administered through USDA and NRCS are:

Environmental Quality Incentives Program (EQIP). EQIP program funds are provided to participating states to create financial incentives for conservation and best management practices. Practices eligible for cost sharing include nutrient management and comprehensive nutrient management planning along with many other practices. Limited funding incentives for changing tillage practice are also available. NRCS funds are often the largest source of funding available to local landowners for cost sharing conservation projects. Each year the local NRCS office conducts several meetings to organize the administration of EQIP program activities and set funding priorities. Because some BMPs are more efficient and effective at controlling phosphorus loss it is important to identify them as high priority practices for agricultural areas that impact surface waters. Organizations can seek to participate in these planning meetings and work with the NRCS to help direct efforts toward improvement of Red Cedar River Basin water quality.

Conservation Innovation Grants (CIG) is a voluntary program intended to stimulate the development and adoption of innovative conservation approaches and technologies while leveraging Federal investment in environmental enhancement and protection, in conjunction with agricultural production. Under CIG, Environmental Quality Incentives Program funds are used to award competitive grants to non-Federal governmental or non-governmental organizations, Tribes, or individuals.

Conservation Reserve Enhancement Program (CREP). CREP funds are used to expand the traditional conservation reserve program and can involve easement acquisitions. These funds are used to retire lands from farming and do not fund BMPs on active farm land.

USEPA Targeted Watershed Grants.

Established in 2003 and administered by USEPA, the Targeted Watersheds Grant program is designed to encourage successful community-based approaches and management techniques to protect and restore the nation's watersheds. Implementation Grant projects that have been funded thus far focus on a broad array of methods for addressing watershed concerns including water quality trading, agricultural best management practices, wetland and riparian restoration, nutrient management, fish habitat restoration and public outreach and education. Each watershed organization involves a broad array of stakeholders and members including those from academia, local and state governments, tribes and non-profit organizations. Awards range from $100,000 to $1 million over one to four years. The grants require a 25% non-federal match. Applicants can chose between grants for making an economic analysis to actual program design and implementation.

State of Wisconsin Programs

Several State agencies supply funding and support to implement conservation projects designed to protect water and soil resources. The WDNR along with the WDATCP provide the majority of assistance to local units of government, which in turn assist private landowners.

WDNR Runoff Management Grants. The WDNR makes available several million dollars each year for Targeted Runoff Management Grants designed to assist in controlling runoff pollution. Local units of government can apply for these cost-share grants that provide up to 70% of total costs with a maximum of $150,000 per grant. Currently, these grants can only be used to fund structural practices and do not provide funding for staff, planning activities or “soft” practices such as nutrient management. County LCDs and municipalities are eligible applicants.

The WDNR’s Urban Nonpoint Source and Stormwater Management Grant Program provides additional funding opportunities to urban areas. Up to $150,000 of cost-sharing is available for

construction projects that control stormwater runoff, and up to $85,000 is available for stormwater planning.

WDNR Lake Management Grants. Lake Planning Grants provide funding to local units of government and lake management organizations for the collection and analysis of lake information. These grants are divided into small and large categories and recognize the diversity of lake organizations and their development.

Lake Protection and Classification Grants fund implementation activities that may take place after a lake management plan is developed. A 25% local share of costs can be matched with 75% from this grant program for eligible activities related to lake restoration and improvement projects. Best management practices that are recommended in an approved lake management plan are eligible for cost sharing. Some of the lake groups in the Red Cedar River Basin have applied for and received Lake Management Grants.

WDNR River Grants. These WDNR grants are designed to address river needs. Applicants are limited to $10,000 per grant for planning and $50,000 for implementation projects. There is a 75% state maximum share requiring a 25% local match. Some of the eligible planning activities include organizational work, information and education, water resource assessments, and nonpoint source evaluations. Priorities for implementation projects include purchase of land easements, development of local ordinances and restoration of in-stream or shoreland habitat. Funding for changing agricultural practices is also possible. Eligible applicants include local units of government, nonprofit conservation organizations, and qualified river management organizations.

Runoff Management Performance Standards. Ch. NR 151, Wis. Adm. Code, specifies a standards approach to runoff management and sets minimum performance standards for rural and urban land uses. These minimum standards apply statewide and provide a minimum level of water resource protection with which everyone is expected to comply. The rules are currently being modified to allow for the creation of alternative performance standards in areas where the statewide standards are not expected to achieve water quality standards. The rules are not supported by any dedicated funding, but allow local units of government to compete more effectively for state runoff management grant funds.

WDATCP Funding. Significant State funds to provide staff and support costs are provided to all counties in Wisconsin from this state agency. These funds are used to allow local land conservation departments to hire employees to work with various conservation programs. Many counties receive less than $100,000/year to help support staff at the county level. A funding source of $5,000,000-7,000,000 per year for cropland practices started in 2007 but has since been much reduced due to state budgetary constraints. If funding for this program is restored in the future, it could be accessed by Dunn and Barron Counties for nutrient management and tillage conversion, and would present an opportunity to make significant progress in lake improvement.

County Programs

Land and Water Resource Management Plans. All counties in Wisconsin have land and water resource management plans developed locally through a workgroup of interested participants and ultimately approved by the WDATCP. These plans identify resource goals and priorities within a county and establish a five-year schedule of activities to achieve goals. Citizens can participate in County Land and Water Resource Management planning by attending the public meetings for plan development. Because the plans include goal setting, work planning, and funding commitments they are important vehicles for successful lake improvement. These plans will

become increasingly important as competing interests within counties express needs for additional attention.

County Land Conservation Departments. Some county land conservation departments have created their own budgets to fund land and water conservation work with local landowners. These funds are being spent as cost-share grants to help area landowners install BMPs. Creating and funding these budget items is part of the planning that takes place within County LCDs. Most of these efforts are modest, but represent a shift in previous total dependence on federal and state funding to a more locally initiated program.

Appendix 3: Water Quality Improvement Projects sponsored by local government units around WI

Burnett County

- Incentives for maintaining natural shoreline with protective covenant – $250, small yard sign, annual tax break ($50), "classy" shirt. http://www.burnettcounty.com/burnett/lwcd/preserve.html
- Technical & financial assistance for shoreland restoration. http://www.burnettcounty.com/burnett/lwcd/restore.html

Langlade-Lincoln Counties – 2007 Lake Protection Grant to implement comprehensive lake protection program, including hiring specialist, inspections, ordinance revisions, I&E, workshops, restoration demonstration sites.
http://dnr.wi.gov/lakes/grants/projectdetail.asp?projectSeqNo=19244074

St. Croix County –

- Cost shared riparian residential soil testing program, promoted no-P fertilizer.
- Sponsors rain barrel program & prairie plant sales http://www.co.saint-croix.wi.us/Departments/LandWater/programs_services.htm

Dane County –

- Classified all lakes & streams, and developed a management program based on the classification system. http://dnr.wi.gov/lakes/grants/projectdetail.asp?projectSeqNo=10100385
- Established ordinance regulating phosphorus in lawn fertilizer http://www.danewaters.com/management/phosphorus.aspx
- Office of Lakes & Watersheds in LWCD, active website http://www.danewaters.com/ http://www.myfairlakes.com/

Summaries for all Lakes grants awarded:
http://dnr.wi.gov/lakes/grants/awarded.asp?startyear=2008

Lake Districts
Green Lake Sanitary District – sends out reminder cards to owners of septic systems and holding tanks regarding required inspection & pumping schedules.
http://www.dotnet.com/~glsd/index.html

Lower Long Lake District (Chippewa Co) – Lake protection grant to promote adoption of its "community shoreland performance standards" by shoreland property owners on Long Lake in Chippewa County. Major project elements to include: 1) contracting with a shoreland specialist to: a) promote installation of vegetative buffers- rain gardens and other run-off protection practices- b) aid in planning for practice installation- c) promote long-term commitments to maintenance of practices; 2) seek bids for construction of practices; 3) bulk order native plants; 4) implement rain barrel loan and purchase program; 5) administer program- including cost shares with participants; 6) conduct training and outreach. http://dnr.wi.gov/lakes/grants/projectdetail.asp?projectSeqNo=24791976

Beaver Dam, Fox Lake and Lake Sinissippi lake groups collaborated to have a representative of their groups appointed by the Dodge County Board to serve on the Land Conservation

Committee (LCC). Their aim was to enhance LCC understanding of interrelationships between agricultural practices and water quality.

Mead Lake District in Clark County commissioned an engineering firm to survey all septic systems on the lake and worked with County Zoning officials to have the necessary corrections made.

Long Lake District in Chippewa County provided consultant services and cost shares for lakeshore restoration to a more natural state.

Burnett County Lakes and Rivers Association worked with County Government to implement a tax credit for natural shorelines.

Little Green Lake District provided cost share for implementation of sedimentation basins in the watershed to reduce pollutant delivery

Lake Tri Lakes Association in Adams County worked with the **Town of Rome** to pass an ordinance banning phosphorus containing lawn fertilizer.

During a lake drawdown for dam repairs the **Chetek Lakes Association** in Barron County worked with city of officials to examine the exposed shoreline for evidence of failing septic systems.

Cedar Lake in St Croix County is experimenting with physical manipulation of lake stratification to reduce internal phosphorus loading.

Friends of Devils Lake worked in conjunction with the State Park and DNR to install & maintain a siphon to improve lake trophic condition.

Numerous Countywide Lake Associations worked with County officials to advocate lake classification and tiered zoning at the county level.

Silver Lake District provided cost-sharing for a stream diversion, carp eradication and alum treatment.

Balsam Lake District bought out a cattle farm and installed wetland/detention basins.

English Lake District diverted a farm tile into a created wetland.

Town of Stone Lake built a WQ pretreatment pond (urban stormwater)

Town of Delton sponsored sediment trap construction for Mirror Lake.

Several towns have helped sponsor a land acquisition project, more for protection but sometimes, it corrects a problem.

Towns can be the grant applicant to help less sophisticated lake groups manage money and can contribute cost share as well.

Towns can enact boating ordinances to reduce sediment re-suspension in shallow areas and they can address septic issues and enact stormwater ordinances.