

St. Croix County
Resource Conservation Division
Land and Water Resource Management Plan

April 2013

St. Croix County
Community Development Committee

In Cooperation With:

Citizens Advisory Committee

Farm Service Agency

Kinnickinnic River Land Trust

Natural Resources Conservation Service

St. Croix County Highway Department

St. Croix County Land and Water Conservation Department

St. Croix County Parks Department

St. Croix County Planning and Zoning Department

United States Fish and Wildlife Service

University of Wisconsin Extension

West Wisconsin Land Trust

Wisconsin Department of Natural Resources

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St. Croix County Land and Water Resource Management Plan Summary

1. Introduction

The St. Croix County Land and Water Resource Management Plan was developed to guide the Resource Conservation Division in its efforts to conserve natural resources while supporting sustainable economic and recreational use of these resources.

In 2013 the Land & Water Conservation Department was merged into the Community Development Department and changed its name to the Resource Conservation Department. At this time the Land & Water Conservation Committee became the Community Development Committee.

Resource Conservation Division

Mission

Promote sustainable land use management for long-term conservation of land, water, and other natural resources.

Goals established in the plan will help to guide department initiatives through the year 2018. They will also provide the basis for funding those initiatives from various private, local, state, and federal sources. The plan is organized into five sections.

Introduction:

Describes the plan development process and requirements, related plans and ordinances, and activities of the St. Croix County Resource Conservation Division.

Resource Assessment:

Provides information about soils, topography, groundwater, surface water, shorelands, wetlands, woodlands, prairies, native species, agricultural land, and population.

Plan Goals, Objectives, and Activities:

Provides a detailed implementation strategy for each of four major plan goals. For each goal, objectives and activities are identified and an educational strategy is outlined.

Plan Implementation:

Discusses how various departments and agencies will work together to implement the plan. A detailed plan of work for the first two years of implementation is included in an appendix to the plan. Potential funding sources are listed.

Monitoring and Evaluation:

Discusses methods for monitoring water quality and habitat and methods to inventory sources of pollution. It also describes how plan accomplishments will be tracked.

2. Public participation

Two groups assisted with plan development. A technical work group was made up of staff representing agencies whose work involves natural resource conservation in St. Croix County. The technical work group met three times to review plan goals, update the implementation strategy, and provide updated resource information.

A citizens advisory committee included individuals representing farmers, businesses, conservation organizations, local government, and concerned citizens. The citizens advisory committee met to review an updated implementation strategy and to comment on the draft plan. The two committees reviewed and provided comments on drafts of the plan document. A public hearing was held at 7 p.m. on December 4, 2008 at the Agricultural Service and Educational Center in Baldwin.

3. Assessment of water quality, soil erosion, and other nonpoint sources of water pollution

Surface water resources

Lakes, ponds, rivers, streams, and intermittent waterways make up the surface waters of St. Croix County. The St. Croix River drains 319 square miles while streams of the Lower Chippewa River Basin drain 133 square miles. Watersheds of landlocked lakes account for only 21 square miles in the county.

The lakes, rivers, and wetlands of the county are impacted by land use practices in the watersheds that drain to them. Most of the pollutants that enter surface water resources are carried in runoff from many diffuse, or nonpoint, sources. The major pollutants of concern are sediment carried from areas with bare soil such as crop fields and construction sites, and phosphorus attached to soil particles and dissolved in runoff water from fertilized fields and lawns and livestock operations.

Development impacts

The 2007 population estimate for St. Croix County is 79,020. Slightly less than 50% of these people live in incorporated areas. Population growth and development patterns are heavily influenced by the proximity of St. Croix County to the Twin Cities of Minneapolis/St. Paul, Minnesota.

The county's population has more than doubled in the last 50 years, with the majority of the growth occurring between 1970 and the present. The county currently has the fastest growth rate in the State of Wisconsin. Much of this growth is concentrated in the western portions of the county closest to the Twin Cities.

The communities in western St. Croix County are expected to experience significant growth into the next century. During the period from 2000 to 2030, the county is expected to grow by 68%, or by 43,000 people.

Rapid population growth and concurrent residential, commercial, and industrial development can lead to negative environmental impacts. Surface water and groundwater can become polluted. Wildlife habitat, quality farmland, and open space are lost to development. Recreation waters can be degraded and recreational lands can be lost or negatively impacted by increased use and development.

During home and road construction, when the protective cover of vegetation is removed, there are dramatic increases in the rates of soil loss and resulting sedimentation of water resources. Poor road construction can lead to ongoing erosion problems.

Urbanization disrupts the natural course of water as it moves across a watershed. Removing vegetation and constructing impervious surfaces such as roads, parking lots, driveways, sidewalks, and rooftops greatly increases the amount and rate of stormwater runoff. As a result, water levels fluctuate more in streams. These changes may bring flooding, increased water temperatures, decreased oxygen levels, greater channel erosion, and increased sedimentation. As this stormwater runoff crosses the urbanized landscape; it picks up fertilizers, pesticides, debris, salt, oil, grease, other toxic substances, and sediments causing decreased water quality.

Agricultural trends

St. Croix County had 176,568 acres of harvested cropland in the year 2002.¹ This amount has gradually decreased from 198,917 acres in 1987. However, during this same time period, there was a 23 percent increase in harvested acres of corn and a 181 percent increase in harvested acres of soybeans. At the same time, there was a significant decrease in acres of hay harvested (down 35 percent).

Over that same time period (1987 – 2002), dairy farms declined significantly dropping from 672 farms in 1987 to 255 farms in 2002. This decline has contributed to declines in acres of hay and increases in acres planted to row crops. The total number of milk cows in the county dropped from 35,500 to 21,837 from 1987 to 2002.

The 2007 transect survey estimates a countywide average soil loss of 3.2 tons per acre per year. The weighted average

tolerable soil loss for St. Croix County is 4.4 tons per acre. The tolerable soil loss rate, commonly referred to as “T,” is defined as the maximum average annual rate of soil erosion for each soil type that will permit a high level of crop productivity to be sustained economically and indefinitely (ATCP 50.01(16)).

The county had 50,521 acres in farmland preservation agreements for the tax year 2001. By the end of 2008, acreage will drop to approximately 17,800 acres.

Groundwater resources

Groundwater supplies the majority of potable water to the residents of St. Croix County. The Prairie du Chien Group is the uppermost, saturated bedrock in much of the county and is used extensively for private residential water supplies. Much of the county is a recharge area for this shallow aquifer. The depth to groundwater below the surface of the land is generally less under topographically low areas and greater in areas of higher elevation.

Groundwater can be adversely affected when contaminants are released into the aquifer or spilled upon the ground. Some factors influencing the susceptibility of an aquifer to pollution are depth to groundwater and bedrock, type of bedrock, sub-surface permeability, and the ability of the soil to attenuate or lessen the impact of pollutants. Closed depressions, especially those associated with Karst topography in St. Croix County, are extremely sensitive land features because of their close association with the groundwater. The pollutants released into or near these closed depressions are almost certain to reach groundwater.

¹ Agricultural statistics from USDA National Agricultural Statistics Service.
www.nass.usda.gov/census.

4. Summary of work plan

The following goals were developed to address concerns identified in the planning process:

Plan Goals

- I. ***Protect and improve groundwater quality and quantity to supply clean water for drinking and recharging surface waters and wetlands.***
- II. ***Protect and enhance surface waters and wetlands to preserve and restore water quality, ecological functions, and recreational and scenic values.***
- III. ***Protect and restore fish and wildlife habitats for native species, improved water quality, recreational opportunities, and natural beauty.***
- IV. ***Preserve agricultural land and soils for crop and livestock production, scenic values, and wildlife habitat.***

A detailed two-year work plan table is developed for each goal in Appendix B of the plan. The work plan identifies partners, staff hours, additional costs and evaluation tools for each activity.

Water quality objectives in consultation with DNR

The Department of Natural Resources prepares basin water quality management plans. Two river basins cross St. Croix County borders, and two plans address these basins. The *State of the St. Croix Basin* was completed in March 2002 and the *State of the Lower Chippewa River Basin* was completed in 2001. The basin plans were used as references in the preparation of this document. The water quality objectives and priorities of this plan were influenced by the basin plans and reviewed by Department of Natural Resources staff as part of their participation in the technical work group.

Recommendations from the basin plans are endorsed in the land and water resource management plan. These include:

- 1) Seek ways to assist communities in acquiring TRM grants to control non point source pollution.
- 2) Provide assistance on the development and implementation of land and water resource management plan goals and objectives.

The Department of Natural Resources is increasing emphasis upon development of reports and implementation plans for Total Maximum Daily Load (TMDL) projects. A TMDL is a plan to reduce the amount of specific pollutants reaching an impaired lake or stream to the extent that water quality standards will be met. Current TMDL projects in St. Croix County include Squaw Lake which is in implementation and Lake Mallalieu which is under development. This plan adopts the goals and objectives of the TMDL plans.

Performance standards

The Agricultural Performance Standards will be addressed through revisions of local ordinances during the implementation of this plan and implementation of the Agricultural Performance Standards strategy outlined in Appendix A.

NR 151 Agricultural Performance Standards

- Control cropland erosion to meet tolerable rates.
- Build, modify, or abandon manure storage facilities to accepted standards.
- Divert clean runoff away from livestock and manure storage areas located near streams, rivers, lakes or areas susceptible to groundwater contamination.
- Apply manure and other fertilizers according to an approved nutrient management plan.

Manure management prohibitions

- No overflow of manure storage facilities
- No unconfined manure piles near waterbodies
- No direct runoff from feedlots or stored manure into state waters
- No streambanks or shorelines trampled by livestock

NR151 Non Agricultural Performance Standards

Construction sites >1 acre – must control 80% of sediment load from sites

Stormwater management plans and practices on developed sites (>1 acre) must meet standards for:

- Total suspended solids
- Peak discharge rate
- Infiltration
- Riparian buffers

Developed urban areas (>1000 persons/square mile) must address the following:

- Public education
- Yard waste management
- Nutrient management
- Reduction of suspended solids

5. Progress tracking

Progress tracking involves both water quality monitoring and evaluation of progress toward meeting the goals of the land and water resource management plan.

Water quality and habitat monitoring

Recommendations related to improving water quality data for the land and water resource management plan are stated below.

- *The Department of Natural Resources should invest resources in monitoring lakes, rivers, and groundwater in St. Croix County.*
- *The Department of Natural Resources and St. Croix County should support efforts of lake groups and other organizations to pursue funding for lake and river management projects.*
- *The Department of Natural Resources and St. Croix County should encourage and support self-help monitoring programs.*

State and federal agencies that emphasize fish and wildlife habitat restoration and protection have many ongoing efforts to monitor habitats and species. The RCD does not intend to carry out habitat monitoring activities for the implementation of this plan. Instead it will support habitat restoration efforts and utilize monitoring data from other sources.

Plan evaluation

Plan evaluation assesses whether the objectives and activities of the plan are being accomplished. Evaluation measures are listed for each plan activity in Appendix B. Measures of plan success include resource monitoring, practice completion, assistance provided, compliance with standards, and educational activities completed. The RCD will report progress against evaluation criteria in the work plan each year.

Chapter 1. Introduction

The St. Croix County Land and Water Resource Management Plan was developed to guide the Resource Conservation Division in its efforts to conserve natural resources while supporting sustainable economic and recreational use of these resources.

Resource Conservation Division

Mission

Promote sustainable land use management for long-term conservation of land, water, and other natural resources.

Goals established in the plan will help to guide department initiatives through the year 2018. They will also provide the basis for funding those initiatives from various private, local, state, and federal sources.

A two-year work plan has been developed to begin implementation of the plan (see Appendix B). The RCD will continue to measure progress toward plan goals and update the workplan as needed.

Plan Development Process

The focus of the plan update was to review implementation strategies including the strategy to implement the NR151 Agricultural Performance Standards. Two groups assisted with plan development. A technical work group was made up of staff representing agencies whose work involves natural resource conservation in St. Croix County. The technical work group met three times to review plan goals, update the implementation strategy, and provide updated resource information.

A citizens advisory committee included individuals representing farmers, businesses, conservation organizations, local government, and concerned citizens. The citizens advisory committee met to review an updated implementation strategy and to comment on the draft plan. The two committees reviewed and provided comments on drafts of the plan document. A public hearing will be held at 7 p.m. on December 4, 2008 at the Agricultural Service and Educational Center in Baldwin.

The plan was not intended to contain an exhaustive inventory of natural resources in St. Croix County. Instead, it drew upon existing inventory information from previously prepared documents. Resource information contained in the 2003 natural resources plan was updated as needed.

Plan Requirements

This land and water resource management plan was developed to meet the requirements of the County Land and Water Resource Management Planning Program. The program was created through amendments to Chapter 92.10 of the Wisconsin Statutes in Wisconsin Act 27 (the 1997-1999 Biennial Budget Bill). The goal of the amendment was to create a planning process that would:

- rely on a locally led process for plan development and implementation;
- allow for maximum flexibility with various program grants and funding sources;
- encourage comprehensive watershed based efforts without excessive planning;
- reward innovation and cost effectiveness;

- require the seamless integration of programs and funding sources;
- make use of a wide variety of implementation tools; and
- ensure meaningful program evaluation and accountability.

In NR151 the Department of Natural Resources (DNR) established agricultural and non-agricultural performance standards and prohibitions to reduce runoff and protect water quality. In the revised ATCP 50, the Department of Agriculture, Trade and Consumer Protection (DATCP) identified conservation practices that farmers must follow to meet the DNR standards. These rule changes went into effect on October 1, 2002. ATCP 50 codified specific standards for the approval of the Land and Water Resources Management Plans. These standards require counties to consult with DNR and identify how they will assist landowners to achieve compliance with performance standards and prohibitions. Appendix A contains the Agricultural Performance Standards Implementation Strategy for St. Croix County.

As a requirement of the land and water resource management planning program, the St. Croix County Land and Water Conservation Committee must notify landowners and land users if soil erosion rate determinations are made, and provide an opportunity for these individuals to comment. Erosion rates for individual fields were not assessed in the preparation of this plan. Landowners were notified of the St. Croix County Land and Water Resource Management Plan contents in the notice for the public hearing. Landowners may receive individual determinations involving conditions on their property through a) conservation plans, b) compliance status reports and c) compliance status letters authorized under

the NR151 implementation strategy, and notices issued under NR151.09 or NR 151.095.

A public hearing was held for the St. Croix County Land and Water Resource Management Plan in early December 2008. Comments on the draft plan were read into the public record and incorporated into the final plan. The plan will be brought before the St. Croix County Board of Supervisors at the March 2009 meeting. The land and water resource management plan must be submitted to the Department of Agriculture, Trade, and Consumer Protection and the Department of Natural Resources for review. It will be submitted to the Wisconsin Land and Water Conservation Board in February 2009.

Performance Standards and Prohibitions

County land and water resource management plans are the local mechanism to implement the NR151 runoff standards. Through Wisconsin Act 27, the Wisconsin Legislature amended state statutes to allow county land conservation committees to develop implementation strategies for addressing local water quality priorities related to controlling erosion, sedimentation, and nonpoint source water pollution. The soil and water conservation standards for the St. Croix County Farmland Preservation Program and other county programs reflect the NR151 Agricultural Performance Standards.

Updates to the land division, zoning, animal waste, and shoreland ordinances will also consider the NR151 standards. In addition, several county-developed standards are part of the implementation strategy of this plan.

Related Plans

Priority watershed plans

St. Croix County administered the St. Croix Lakes Cluster Priority Watershed Project in the recent past. The Kinnickinnic River project will expire at the end of 2009. State funding is no longer available for future watershed projects. The watershed plans reported the results of water resources appraisals and pollution source inventories, included a strategy for protecting water resources, and provided financial assistance to reduce pollutant sources in the watershed.

Farmland preservation plan

The St. Croix County Farmland Preservation Plan was adopted in 1980. Farmland Preservation Standards were updated to reflect the NR151 agricultural soil and water conservation performance standards in March 2005.

The county had 50,521 acres in farmland preservation agreements for the tax year 2001. By the end of 2008, acreage will drop to approximately 17,800 acres. Additional acres zoned exclusive agricultural are eligible to participate in the Farmland Preservation Program (FPP) which totals (including acreage reported above) about 45,000 acres. Exclusive agricultural zoning allows only one structure per 35 acres.

Income tax relief is provided to farmland owners to encourage local governments to

develop farmland preservation policies. For the 2007 tax year, 243 individuals were paid credits that average about \$583 each in St. Croix County.

Recent declines in participation in the Farmland Preservation Program are linked to the Wisconsin Use Value Assessment Law enacted in 2003. This law limits property tax assessments on agricultural land and reduces farmer's property taxes. Statewide property tax reductions total about \$150 million per year compared to \$14.4 million per year in income tax credits under the Farmland Preservation Law. When farmers pay lower property taxes, they receive lower income tax credits for Farmland Preservation participation. They are also not required to comply with farmland preservation or conservation requirements to receive use value property tax benefits.

Soil erosion control plan

St. Croix County had its erosion control plan approved by the Department of Agriculture, Trade and Consumer Protection in 1988. County land and water resource management plans include the components of soil erosion control plans and replace them.

Land use planning

A comprehensive development management plan was approved in March 2000. The purpose of the development management plan is to create a comprehensive set of informational resources and a policy framework to assist the county and local units of government in managing development. The development management plan explores the physical and economic conditions of the county, identifies important development issues affecting the county, and articulates a countywide development policy to assist local and county

governments in building their capacity to deal with development issues.

Basin water quality management plans

The Department of Natural Resources prepares basin water quality management plans. Two river basins cross St. Croix County borders, and two plans address these basins. The *State of the St. Croix Basin* was completed in March 2002 and the *State of the Lower Chippewa River Basin* was completed in 2001. The basin plans were used as references in the preparation of this document. The water quality objectives and priorities of this plan were influenced by the basin plans and reviewed by Department of Natural Resources staff as part of their participation in the technical work group.

Recommendations from the basin plans are endorsed in the land and water resource management plan. The first DNR water quality priority was to maintain funding and support for the priority watershed projects. Recent priority watershed projects included St. Croix Lakes, Kinnickinnic River, and the South Fork of the Hay River. However, these priority watershed programs have since expired or will expire at the end of 2009. Remaining priorities include:

1. Seek ways to assist communities in acquiring TRM grants to control non point source pollution.
2. Provide assistance on the development and implementation of land and water resource management plan goals and objectives.

Total Maximum Daily Load Reports and Implementation Plans

The Department of Natural Resources is increasing emphasis upon development of reports and implementation plans for Total Maximum Daily Load (TMDL) projects. A TMDL is a plan to reduce the amount of specific pollutants reaching an impaired lake or stream to the extent that water quality standards will be met. As part of the TMDL, the amount of the impairing pollutant that the water can tolerate and still meet water quality standards must be identified and then "allocated" between point sources (waste load allocation) and nonpoint sources (load allocation).

Current TMDL projects in St. Croix County include Squaw Lake which is in implementation and Lake Mallalieu which is under development. There is also a TMDL report for Cedar Lake.

Cooperative Management Plan

In October 2001 the National Park Service (NPS), St Croix National Scenic Riverway, completed a *Cooperative Management Plan* which covers the 52 mile St. Croix River segment that runs from St. Croix Falls, WI / Taylors Falls, MN to the confluence with the Mississippi. This six-year planning effort was completed in cooperation with the Minnesota and Wisconsin Departments of Natural Resources. The *Watershed Stewardship Initiative* is an implementation strategy for the plan intended to raise awareness among watershed residents and riverway communities about shared stewardship of the riverway and its watershed.

St. Croix County Ordinances²

Comprehensive Zoning –Chapter 17

Chapter 17 of St. Croix County’s Land Use and Development Code of Ordinances regulates zoning. Land disturbance restrictions, stormwater management and erosion and sediment control plans and standards are part of the ordinance. The county’s zoning ordinance has been adopted by eighteen out of the twenty-one towns in St. Croix County. The county zoning ordinance was adopted in 1967 and a comprehensive revision was adopted in 1974. The Town of Hudson implements zoning through local ordinance. The Towns of Cady and Forest do not have zoning. All cities and villages in the county have a general zoning ordinance.

Lower St. Croix Riverway Overlay District – Subchapter III.V, Section 17.36

The Lower St. Croix River is included in the National Wild and Scenic Rivers Act. St. Croix County has adopted regulations to protect and preserve the scenic and recreational value of the riverway.

Floodplain - Chapter 17 Subchapter IV, Section 17.40

St. Croix County has adopted and implemented floodplain regulations within the county zoning ordinance. This section applies to land in all towns. In addition, the City of Hudson and the Villages of Roberts, Wilson, and Woodville have adopted floodplain ordinances.

Land Division – Chapter 13

Chapter 13 of St. Croix County’s Land Use and Development Code of Ordinances regulates land divisions in the county. Land disturbance restrictions, stormwater management, and erosion and sediment control standards are part of the ordinance. All of the villages and cities have adopted local land division ordinances.

Animal Waste – Chapter 11

Chapter 11 of St. Croix County’s Land Use and Development Code of Ordinances regulates animal waste. The ordinance was adopted in 1985 and is effective in all towns. The ordinance requires a permit for animal waste storage structures. Structures must be constructed according to Natural Resource Conservation Service standards. The animal waste ordinance was amended and approved 2012.

Nonmetallic Mining – Chapter 14

St. Croix County’s Chapter 14, Nonmetallic Mining, of St. Croix County’s Land Use and Development Code of Ordinances regulates all nonmetallic mining operations and sites within each town in the county. An operation and site restoration/revegetation plan is required. The ordinance was revised to comply with changes to state code in 2004 and again in 2007.

Sanitary – Chapter 12

St. Croix County’s Chapter 12, Sanitary, of St. Croix County’s Land Use and Development Code of Ordinances regulates proper siting, design, installation, inspection, and management of all private onsite wastewater treatment systems (POWTS) and non-sanitation systems to protect the environment and health of the citizens of St. Croix County. This ordinance is effective countywide.

² These ordinances are available for viewing on the St. Croix County web site: www.co.saint-croix.wi.us/county_ordinance. Printed copies may be obtained from the County Clerk (715.386.4610).

The ordinance was rewritten to comply with changes to state code in 2005.

Citation – Chapter 1

St. Croix County’s Chapter 1, Citation, of St. Croix County’s Land Use and Development Code of Ordinances regulates appeals, fines, and enforcement procedures for County ordinances. Citation and enforcement authority rests with the County Community Development Department for the ordinances listed above. The Resource Conservation Division may provide technical assistance to meet appropriate chapter requirements, but the department does not have enforcement authority.

Related State Regulations

NR151

Implementation and enforcement of performance standards and prohibitions are covered under this state rule. St. Croix County’s implementation plan for NR151 Agricultural Performance Standards is included in Appendix A.

ATCP50

Conservation practices that farmers must follow to meet the DNR standards of NR151 are included in this regulation. It also guides appropriate practices and cost share procedures for implementation of additional conservation practices.

ATCP 50 also codified specific standards for the approval of the LWRM plans and requires counties to consult with DNR and identify how they will assist landowners to achieve compliance with performance standards and prohibitions.

Resource Conservation Division Activities

The Resource Conservation Division provides services and administers programs aimed at conserving natural resources in St. Croix County.

Financial and technical assistance

A variety of federal, state, and local programs encourage the installation of conservation practices such as vegetative buffers near water, wetland restoration, prairie plantings, and sedimentation basins. The department encourages participation, administers programs, and designs and inspects practices. Management plans for cropland rotations, best management practices, and fertilizer and manure applications are also prepared. Each of these programs requires that progress toward meeting program objectives be tracked.

Technical review for state and local regulatory programs

Resource Conservation Division staff review and recommend approval of plans for erosion control and stormwater management. This review occurs before land division, land use, and Board of Adjustment special exception permits can be issued. Staff members review animal waste facility operations before a large facility is permitted, when an animal waste storage facility is proposed, or when a complaint is received. Plans are also reviewed for the reclamation of nonmetallic mines.

Educational activities

Educational activities that emphasize protection of natural resources are provided as part of countywide programs. Conservation field days are offered throughout the county grades K-12.

Classroom presentations are given to various grade levels upon request. The department is involved with farm city day and the county fair, and has displays at sport shows and lake fairs. Staff members also assist with a statewide conservation camp each year.

Environmental services

These services include well water testing, sale of trees, prairie plants, and rain barrels, and rental of equipment that is used for various conservation practices.

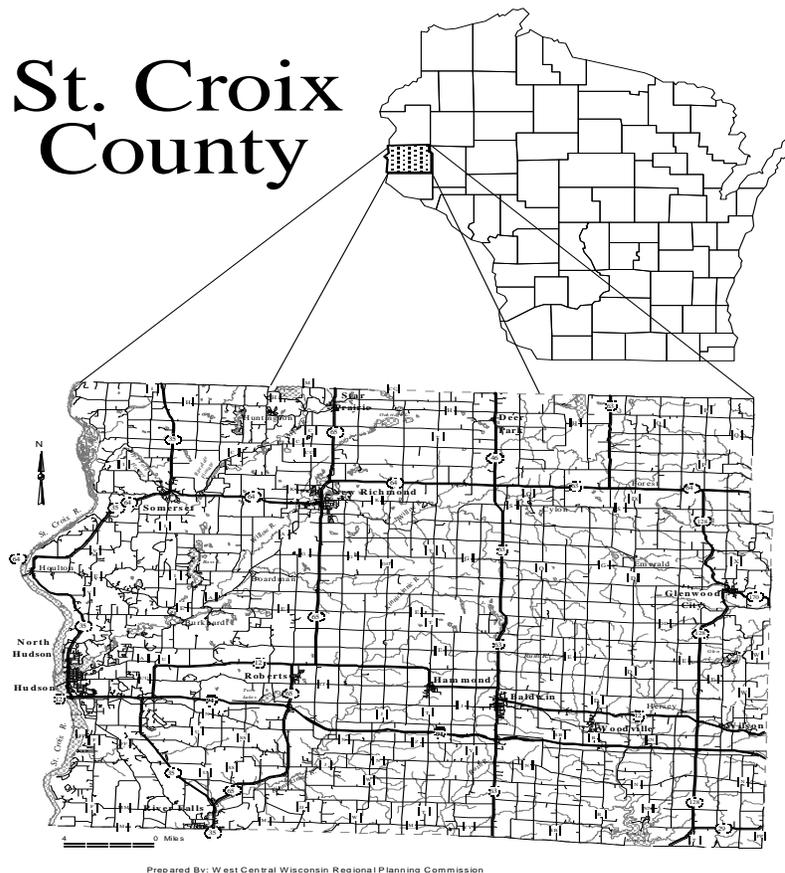
Environmental management of county properties

Current efforts focus on maintenance of the Glen Hills PL-566 Floodwater Control Structures. The department provides assistance with county projects such as construction of the recreational trail between Woodville and Spring Valley and development of Homestead Parklands on Perch Lake. Staff members also assist towns with improvements to boating access sites.

Chapter 2. Resource Assessment³

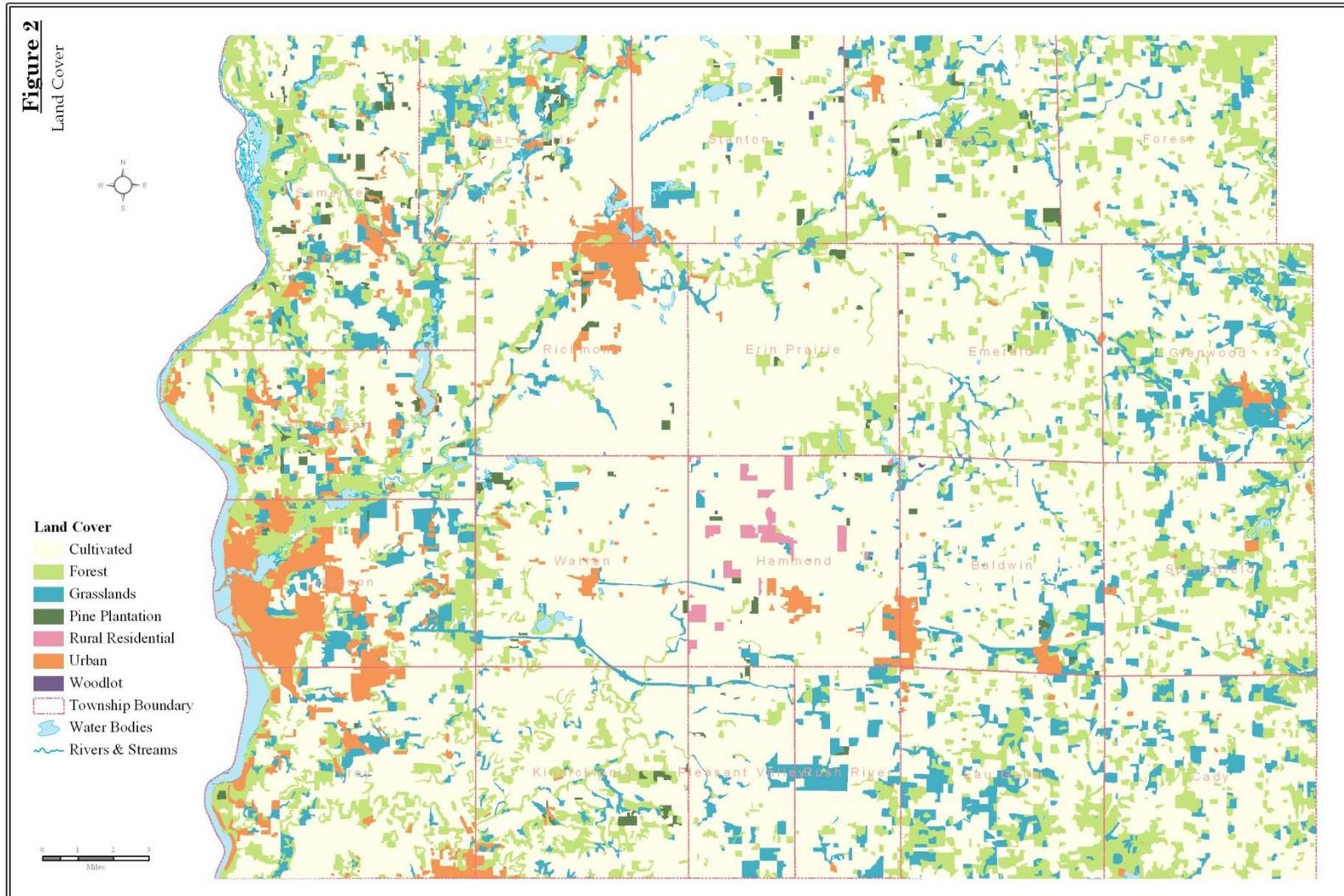
St. Croix County is located in west central Wisconsin and is separated from Minnesota by the St. Croix River. The county is bordered by Polk County to the north, Dunn County to the east, and Pierce County to the south. St. Croix County has a combined land and water area of approximately 469,760 acres or roughly 736 square miles. Agricultural land covers 70 percent of the county, forested land covers 15 percent, residential land covers 6 percent, transportation and utilities cover 4 percent, and wetlands and surface water cover 2 percent of the county as illustrated in Figure 2. The remaining land in the county consists of industrial, commercial, recreational, governmental, and institutional uses. The county is rectangular in shape and is about 33 miles east to west and 24 miles north to south.

Figure 1. St. Croix County Location



³ Much of this chapter is taken from the comprehensive development management plan written for the St. Croix County Planning and Zoning Department by the West Central Wisconsin Regional Planning Commission.

Figure 2. Land Cover



Soils and Topography

St. Croix County has a wide variety of soils ranging from heavy, poorly drained to light and droughty. Excessively drained and well-drained soils are generally found in the western half of the county. Moderately drained and somewhat poorly drained soils predominate in the eastern half. However, both extreme soil conditions are found throughout much of the county.

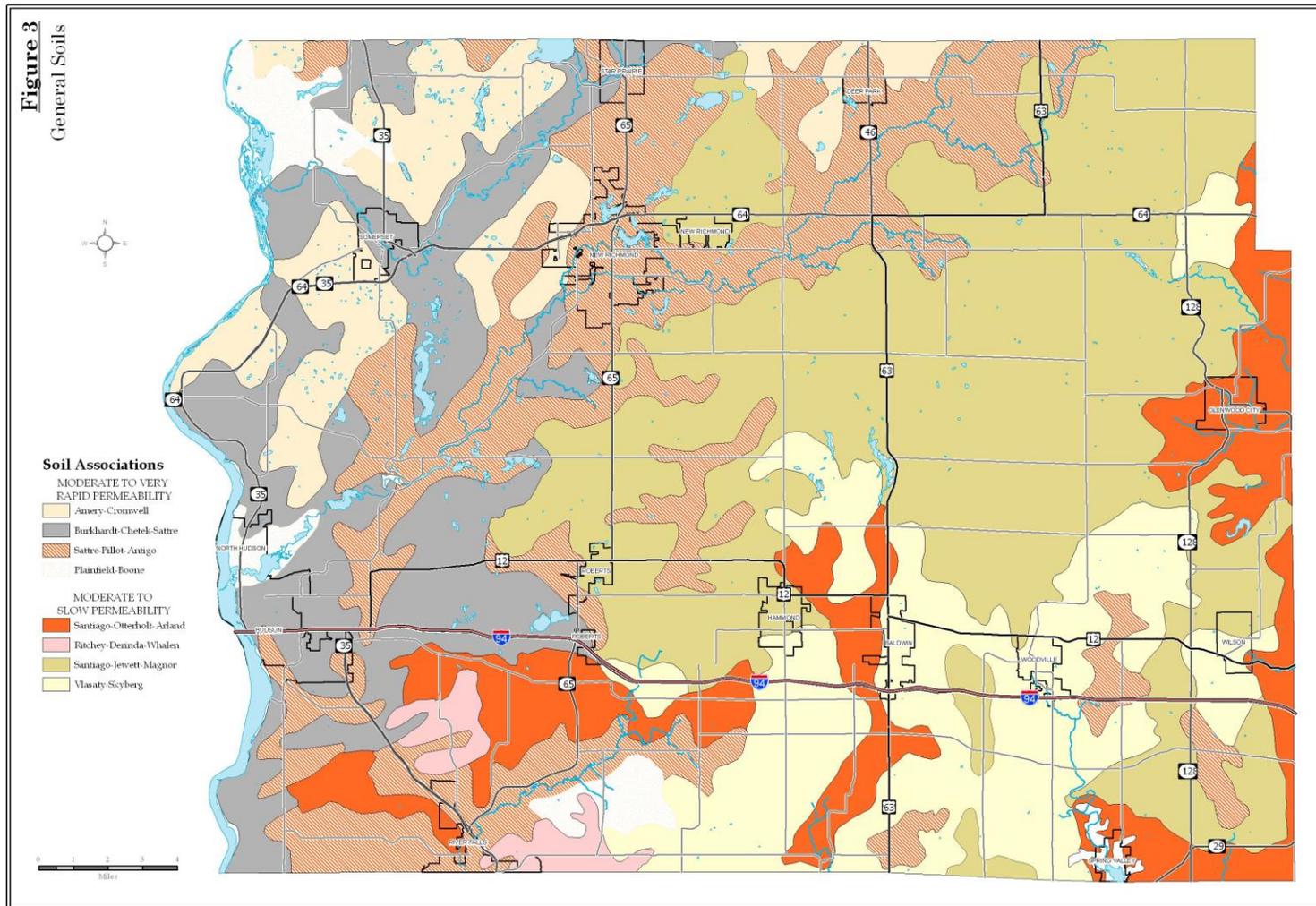
Widely varying soil types and complex slopes make the application of some best management practices troublesome. There are many areas of the county with poorly drained soils on relatively steep slopes combining erosion and drainage problems. The General Soils Map (Figure 3) shows the soil associations in the county. Soil associations are landscapes with distinctive patterns of soils in defined proportions. They typically consist of one or more major soils and at least one minor soil, and are named for the major soils. The map contains general soils information for the county and is not intended to provide information for site-specific applications. The county has a detailed digital soil survey available for planning or management purposes.

The state requirements for septic system siting are specified in Chapter COM 83 of the Wisconsin Administrative Code. This code relies heavily on the ability of the soil to efficiently absorb the effluent discharged from the septic system drain field. The Natural Resources Conservation Service soil interpretations for septic tank absorption fields consider the occurrence of most excessively drained soils over fractured bedrock or high water tables a limitation to septic system development because effluent can be readily transported to the groundwater in these situations. Hence, even though siting of septic

systems may be allowed by state code, doing so has the potential to threaten groundwater quality in some areas. The digital soil survey indicates that 633 square miles or about 87 percent of the total land area of the county is covered by soils unsuitable for septic or conventional on-site sewage disposal systems. However, there are likely locations on many of these sites where soils can meet septic system requirements.

The topography of St. Croix County ranges from gently rolling to hilly and rough. A large portion of the central part of the county is a rolling plain. Mesas of resistant rock formations in the southwestern portion of the county break up this plain. The northwestern portion and eastern fringe of the county contain the most rugged topography.

Figure 3. General Soils Map



Groundwater

Groundwater supplies the majority of potable water to the residents of St. Croix County. The principal sources of potable water supplies are the sand and gravel aquifer and the sandstone aquifer. The sand and gravel aquifer consists of unconsolidated sand and gravel in glacial drift and alluvium. These deposits occur throughout about one-fourth of the county, either at the land surface or buried under less permeable drift. The sand and gravel aquifer can yield sufficient water for private residential water supplies.

The sandstone aquifer includes all dolomite and sandstone bedrock younger than the Precambrian age. Precambrian rocks generally have low permeability and mark the lower limit of groundwater movement. The bedrock geology of St. Croix County is illustrated in Figure 4. The sandstone aquifer is continuous over the county and includes, from youngest to oldest rock formations, the Platteville Dolomite, the St. Peter Sandstone, the Prairie du Chien Dolomite, and Cambrian sandstones.

The Prairie du Chien Dolomite and the Cambrian sandstones are the major water-yielding rocks in the sandstone aquifer. The Prairie du Chien Dolomite is the uppermost, saturated bedrock in much of the county and is used extensively for private residential water supplies. Much of the county is a recharge area for this shallow aquifer. The ability of the Cambrian sandstone to store and yield water and its thickness make it the principal source of municipal water supplies. The Platteville Dolomite unit is mostly unsaturated. The St. Peter Sandstone is found in a small area and is

partly saturated and yields some water to wells.

The source of all groundwater recharge in St. Croix County is precipitation. Between one and ten inches of precipitation infiltrates and recharges the groundwater aquifers each year. The amount infiltrated depends mainly on the type of rock material at the land surface.

The altitude of the water table ranges from more than 1,100 feet in several places in the eastern quarter of the county to just over 675 feet along the St. Croix River. The water table is under the glacial drift and within the bedrock in about half of the county. The depth to groundwater below the surface of the land is generally less under topographically low areas and greater in areas of higher elevation. Figure 5 depicts depth to groundwater in St. Croix County.

Municipal water systems develop wellhead protection plans to identify sources of drinking water and protect the quality and quantity of those sources. The communities of Baldwin, Hammond, Hudson, Roberts, Somerset, Star Prairie, and Woodville have wellhead protection plans in place in St. Croix County. County water use in 2005 was 15.8 million gallons per day.⁴

Groundwater can be adversely affected when contaminants are released into the aquifer or spilled upon the ground. Some factors influencing the susceptibility of an aquifer to pollution are depth to groundwater and bedrock, type of bedrock,

⁴ This information along with more detailed groundwater information is available on the following website: <http://wi.water.usgs.gov>.

sub-surface permeability, and the ability of the soil to attenuate or lessen the impact of pollutants. High-risk activities, such as industries using hazardous materials, pose serious threats to groundwater and should be kept out of the immediate recharge areas of public and private water supply wells. High concentrations of septic systems can pollute groundwater with nitrates. Leaking underground storage tanks and leaching of fertilizers and pesticides from agricultural fields and lawns are additional sources of contamination of groundwater.

Closed depressions are extremely sensitive land features because of their close association with the groundwater. The pollutants released into or near closed depressions are almost certain to reach groundwater. Figure 6 shows the locations of closed depressions in the county.

Groundwater contamination potential for each watershed was ranked based on land coverage and groundwater sample analytical results in the Department of Natural Resources Groundwater database. The table below lists each watershed score and comments on what influenced the score. Higher scores mean a higher potential for groundwater contamination. Because of limited groundwater sample results available, most rankings are based upon land cover. All watersheds in St. Croix County ranked high for groundwater contamination potential with scores higher than 30.

Closed depressions are common features in St. Croix County. They have formed through two quite different geological processes: karst development and glaciation. Karst development occurs in regions with highly soluble bedrock and results in distinctive landforms such as sinkholes. St. Croix County is covered by several rather thick, soluble carbonate units, and has particularly well developed karst, especially in the eastern half of the county. Glacial action can also result in topography marked by closed depressions known as kettles or kettleholes. Kettles develop when large blocks of glacier ice are buried within glacial deposits and subsequently melt. Many of the depressions in the western and northwestern portions of the county are kettles that developed in the St. Croix moraine after it was deposited during the Wisconsinan glaciation.

Baker, Hughes, Huffman and Nelson, Closed Depression Map of St. Croix County, Wisconsin, 1991

Table 1. Groundwater Contamination Potential Ranking by Watershed.⁵

Watershed	Score	Comments	Urban Cover	Agricultural Cover
Kinnickinnic River	81.7	172 wells tested for nitrate, 25% exceeded the ES ⁶ and 60% exceeded the PAL ⁷ .	12%	49%
Lower Willow River	61.2	44 wells tested for nitrate, 20% exceeded the ES and 52% exceeded the PAL	3 %	38%
Upper Willow River	51.0		47%	NA ⁸
Lower Apple River	45.2	87 wells tested for nitrate, 32% exceeded the ES and 47% exceeded the PAL	NA	NA
Trout Brook	50.2	37 wells tested for nitrate, 8% exceeded the ES and 73% exceeded the PAL	NA	37%
South Fork of the Hay River	45.6	NA	0.2%	33%
Eau Galle River	40.5	NA	0.2%	40%
Wilson Creek	39.0	NA	1.5%	38%
Rush River	47.3	NA	0.3%	43%

⁵ These values are taken from the Department of Natural Resources State of the St. Croix River Basin (March 2002) and State of the Lower Chippewa Basin (2001).

⁶ ES: Groundwater enforcement standard per NR 140 Wis. Admin. Code. For nitrate the ES is 10 ppm

⁷ PAL: Groundwater Preventive Action Limit per NR 140 Wis. Admin. Code. For nitrate the PAL is 2 ppm.

⁸ Not available in basin plan

Figure 4. Bedrock Geology

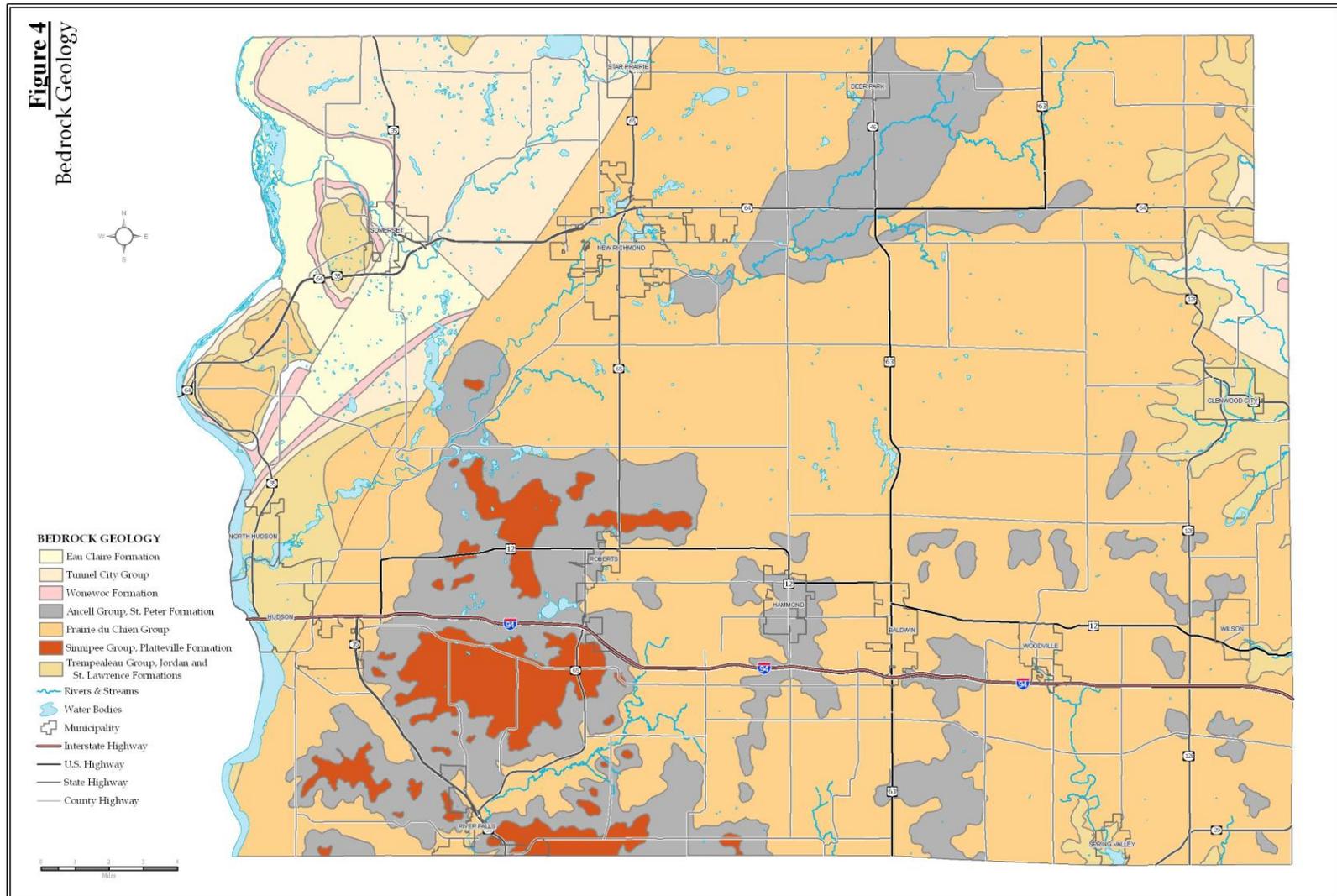
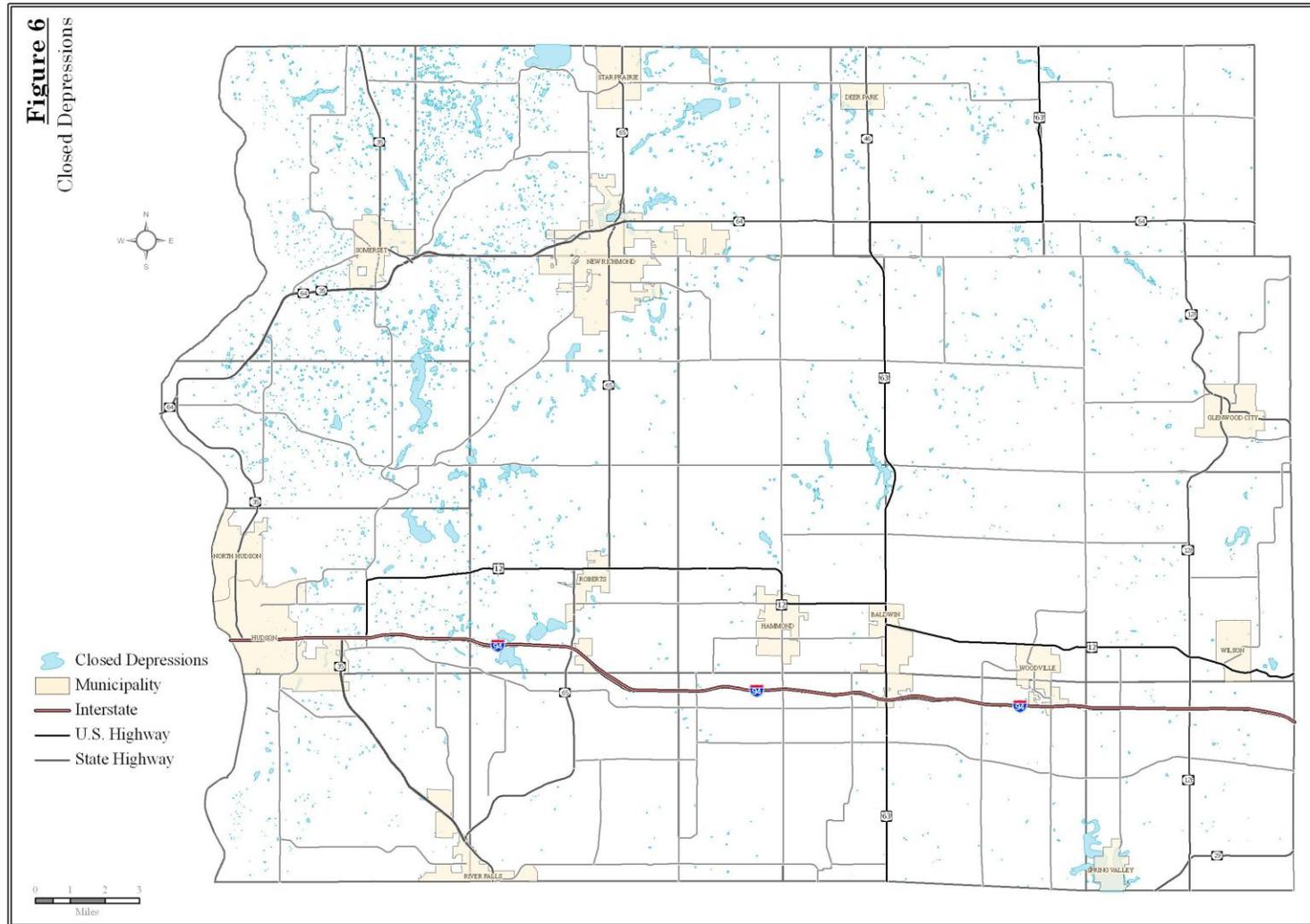


Figure 6. Closed Depressions



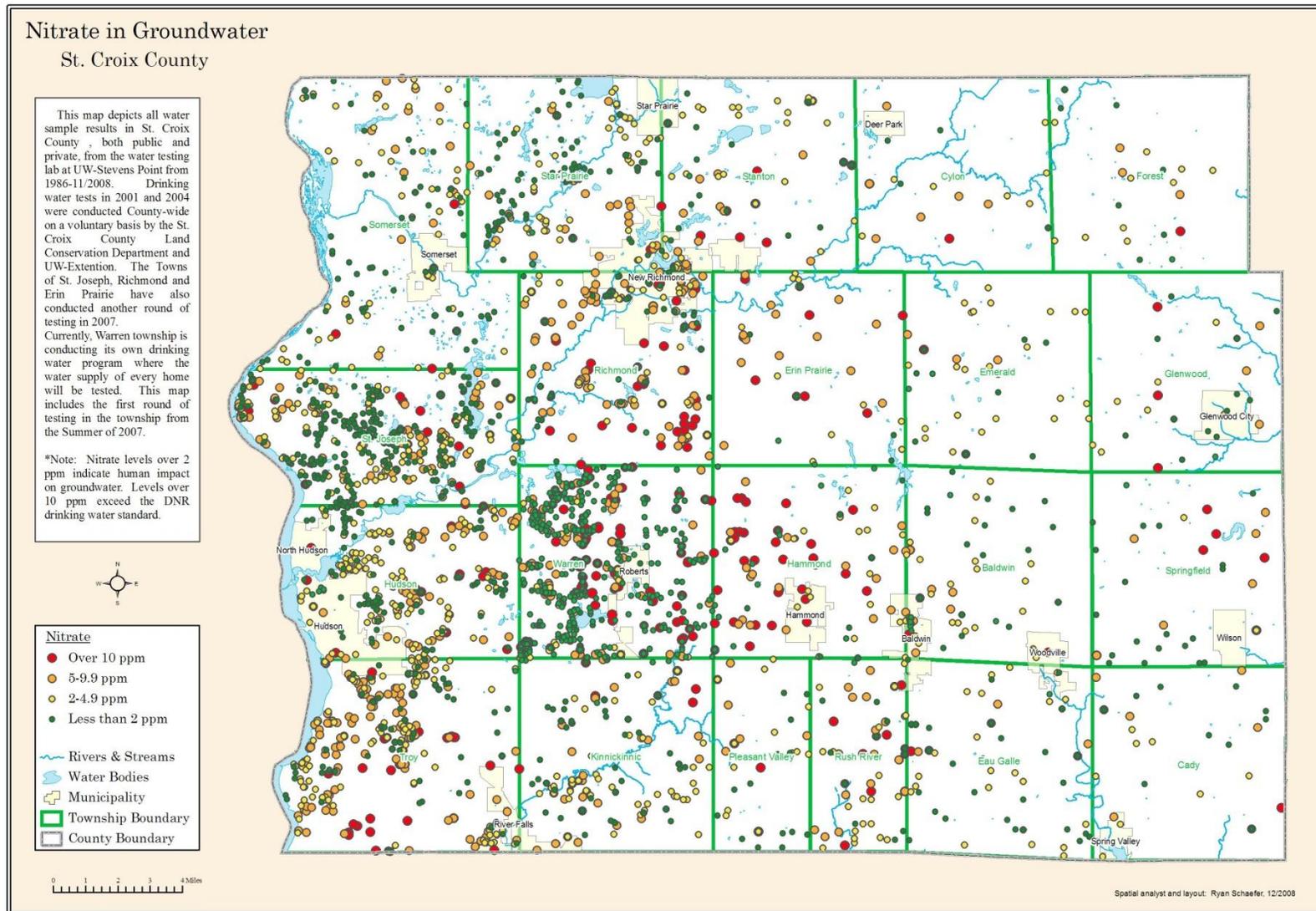
Drinking Water Testing Program

The groundwater / drinking water testing program was developed to provide information and education on the use and quality of drinking water for the rural residents in St. Croix County. This program was a cooperative effort between UW Extension, St. Croix County Public Health Department, St. Croix County Resource Conservation Division, UW Stevens Point Environmental Task Force Lab and local Towns.

Between 1999 and 2007, staff worked with 21 individual towns and rural residents to conduct this voluntary drinking water program. Landowners could choose to pay for three different water tests: the homeowner's test, metals test, triazine screening, or a combination of their choice. All costs for water tests were the responsibility of the landowner. Nearly 1200 households participated. The program was repeated from 2004 – 2007 and will continue through 2011. The objective is to continue to provide information to rural landowners on the quality of their drinking and allow comparison between testing periods. Figure 7 illustrates countywide nitrate drinking water results from 2004 – 2007.

Staff provided information on proper water sampling techniques during the distribution of testing kits. UW Stevens Point staff provides an informative ground water quality session for landowners in each town or group of towns when the test results were distributed to the landowners. A similar voluntary drinking water program is planned by the cooperating agencies on a regular cycle.

Figure 7. Drinking Water Test Results



Surface Waters

Lakes, ponds, rivers, streams, and intermittent waterways make up the surface waters of St. Croix County. There are also many artificial drainage ways where the natural water flow has been altered by human activity. Sediment, nutrients, and other pollutants are carried in runoff water from watersheds that drain to these surface water features. The county is well-drained with relatively fewer lakes and ponds than counties to its north. Figure 8 illustrates major surface water features with the watershed boundaries.

The surface waters of St. Croix County occupy two major basins of northwestern Wisconsin. The St. Croix basin covers the western two-thirds of the county. The Chippewa River basin covers the remaining third of the county. Both the St. Croix and Chippewa River Basins are part of the Mississippi River basin. The Apple River, Trout Brook, Upper and Lower Willow Rivers, and Kinnickinnic River watersheds are located within the St. Croix River basin. The South Fork of the Hay River, the Eau Galle River, Wilson Creek, and the Rush River watersheds are within the Lower Chippewa River basin. In each of these watersheds, there are numerous intermittent streams or dry washes and other surface drainage features that carry water only during spring runoff or extreme storm events.

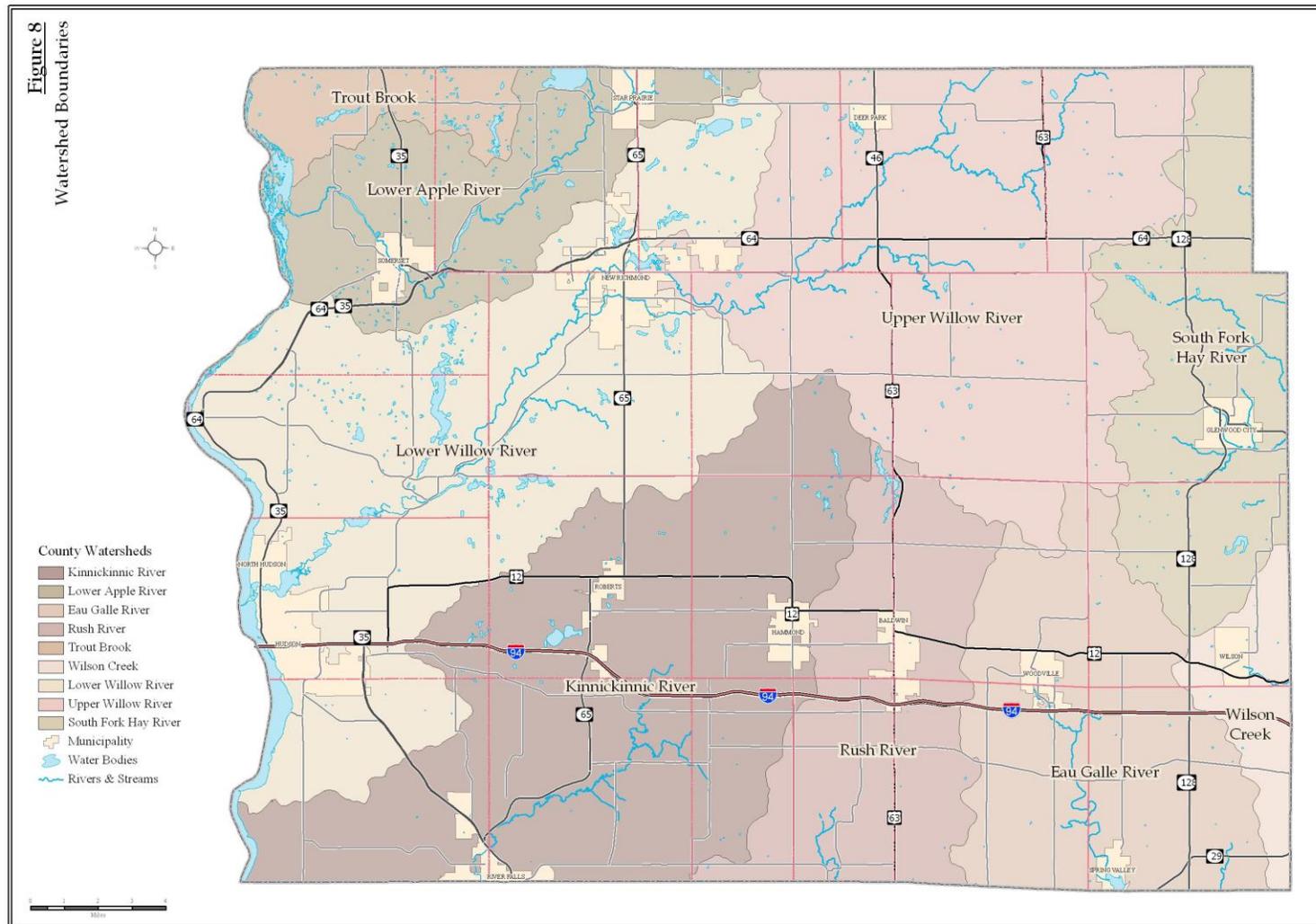
In St. Croix County, the St. Croix River drains 319 square miles, while streams of the Lower Chippewa River watershed drain 133 square miles. Watersheds of landlocked lakes account for only 21 square miles in the county. The remaining 263 square miles of the county lack measurable surface waters and are not connected to any stream watershed.

Numerous closed depressions and high water tables make this area very sensitive to septic system effluent and pollutants in runoff.

At 9,336 acres, the Minnesota-Wisconsin boundary water of Lake St. Croix is the lake with the largest surface acreage in St. Croix County. About half of this lake is within Wisconsin's borders. Bass Lake is the largest inland lake at 293 acres. Perch Lake is the deepest with a maximum depth of 63 feet. The stream with the greatest gradient is Spring Brook with a drop of 85 feet per mile, and the stream with the lowest gradient is the St. Croix River with a drop of 0.2 foot per mile.

The St. Croix River is the most significant surface water feature in the county. The segment of the river adjacent to St. Croix County is part of the Lower St. Croix National Scenic Riverway designated by Congress. The National Park Service and the Wisconsin Department of Natural Resources are responsible for working with local jurisdictions to manage the riverway in a manner consistent with the National Wild and Scenic River Act and the Federal Lower St. Croix River Act. St. Croix County enforces zoning provisions in the riverway district consistent with federal and state law and regulations.

Figure 8. Watersheds



Portions of the St. Croix River and the Kinnickinnic River have been designated as Outstanding Resource Waters by the Department of Natural Resources. Bass Lake and Perch Lake are also designated as Outstanding Resource Waters. Portions of the St. Croix, Apple and Willow Rivers, and Parker Creek and the entire length of Cady Creek are designated as Exceptional Resource Waters. Outstanding and Exceptional Resource Waters are protected through Department of Natural Resources (DNR) regulation. These waters may not be lowered in quality due to DNR permitted activities, such as wastewater treatment plants. (NR 102.10 and 102.11)

The lakes, rivers, and wetlands of the county are impacted by land use practices in the watersheds that drain to them. Most of the pollutants that enter surface water resources are carried in runoff from many diffuse, or nonpoint, sources. The major pollutants of concern are sediment carried from areas with bare soil such as crop fields and construction sites, and phosphorus attached to soil particles or dissolved in runoff water from fertilized fields and lawns and livestock operations.

Watershed and Lake Evaluations

Nine watersheds are contained completely or partially within St. Croix County. Five of these are part of the St. Croix River Basin and four watersheds drain to the Lower Chippewa River. St. Croix County and the Department of Natural Resources chose the Kinnickinnic River, the South Fork of the Hay River, and the St. Croix Cluster Lakes of Bass, Perch, Pine, and Squaw as priorities by selecting these areas for priority watershed projects.

Department of Natural Resource statewide watershed rankings are found in the state of the basin plans. Watersheds with a high ranking have impaired and/or threatened waters. Those with a medium ranking tend to have waters that are a mixture of those fully and those partially meeting uses.

The Eau Galle River, Kinnickinnic River, Lower Apple River, Lower Willow River, South Fork of the Hay River, Upper Willow River, and Wilson Creek watersheds were ranked high. The Rush River watershed was ranked medium. The Trout Brook watershed was not ranked.

Individual lakes and rivers within St. Croix County were also ranked during the development of DNR water basin plans. A high ranking indicates that the lake has documented problems or threats related to water quality and is likely to be responsive to watershed protection efforts. Because almost all watersheds and all significant lakes ranked high in the Department of Natural Resources ranking, it is difficult to use these rankings to prioritize within St. Croix County.

Table 2. St. Croix County Waterbodies With a “High” Basin Plan Rating

<u>Lake or Stream</u>	<u>Watershed</u>
Cedar Lake Squaw Lake	Lower Apple River
Bass Lake Perch Lake	Lower Willow River
Pine Lake (Baldwin)	Kinnickinnic River
Pine Creek	Rush River

Impaired waters, also known as 303(d) listed waters, are compiled in a 2008 draft list by the Department of Natural Resources. The list, required by the Environmental Protection Agency under the Clean Water Act, identifies water bodies that do not meet water quality standards. The Department of Natural Resources uses the 303(d) list as the basis for establishing strategies to improve water bodies using total maximum daily loads. A total maximum daily load was developed for Squaw Lake in St. Croix County in August 2000. A site-specific phosphorus concentration goal of 130 micrograms per liter was identified for Squaw Lake as part of this process. A TMDL implementation report is also developed for Cedar Lake. A TMDL report is now under development for Lake Mallalieu.

Table 3. Impaired Waters ((303)(d) List) in St. Croix County.

<u>Lake</u>	<u>Watershed</u>	<u>Impact Type</u>
Squaw Lake	Lower Apple River Watershed	nutrients, turbidity
Lake Mallalieu	Willow River Watershed	excess algae, pH
Cedar Lake	Lower Apple River Watershed	nutrients, turbidity, sediment
Willow River	Willow River Watershed	low dissolved oxygen
Glen Lake	S. Fork Hay River Watershed	mercury in fish
Eau Galle River	Eau Galle River Watershed	excess algae, pH
Twin Lakes	Kinnickinnic River Watershed	excess algae, pH
Lake George		excess algae, pH
Lake St. Croix		eutrophication
St. Croix River		contaminated fish tissue

Shorelands

Lands within 1,000 feet of the ordinary high water mark of navigable lakes ponds, or flowages and within 300 feet of the ordinary high water mark of navigable rivers or streams or landward edge of the floodplain (which ever is greater) are designated as shorelands.

Vegetation in the shorelands can provide a natural buffer which helps protect surface waters from overland runoff and contaminants. If shorelands are disturbed, their ability to slow runoff and filter contaminants is reduced. Shorelands also provide critical habitat for a variety of plants and animals and enhance the aesthetic quality of water bodies.

Wisconsin requires counties to protect and prevent the loss and erosion of these valuable resources by adopting and enforcing a shoreland ordinance. The authority to enact and enforce this provision comes from Chapter 59.69 of the Wisconsin Statutes. Wisconsin Administrative Code NR115 dictates the shoreland management program. County ordinances can be more, but not less, stringent than NR115.

Wetlands

A wetland is defined by state statute as "an area where water is at, near, or above the land surface long enough to be capable of supporting aquatic or hydrophytic (water-loving) vegetation and which has soils indicative of wet conditions." Wetlands may be seasonal or permanent and include swamps, marshes, and bogs.

Wetlands can make lakes, rivers, and streams cleaner and drinking water safer. They provide valuable habitat for both aquatic and terrestrial animals and

vegetation. In addition, some wetlands replenish groundwater supplies.

Groundwater is also commonly discharged from wetlands. This discharge water can be important in maintaining stream flows, especially during dry months.

Groundwater discharged through wetlands can contribute to high quality water in lakes and streams. Draining and filling of wetlands or development near wetlands can remove these natural functions and values.

All construction projects involving wetlands should be reviewed according to local, state, and federal regulations before they begin. Particular attention must be given to wetlands within shorelands to ensure protection from development. The St. Croix County shoreland zoning ordinance restricts development of wetlands five acres and greater within the shoreland zone. The federal government and the Department of Natural Resources (DNR) restrict development in wetlands through Section 404 of the Clean Water Act and NR103, respectively. DNR has an inventory of wetlands of two acres and larger. However, all wetlands meeting the state definition are subject to DNR regulations. Federal regulations may apply in addition to or instead of state regulations.

Woodlands

Woodlands provide habitat for a variety of plants and animals, as well as adding scenic beauty to the landscape. Large continuous blocks of forested land are important habitat for a variety of plants and animals. Woodlands managed according to approved forest management practices can support varying and sometimes complementary objectives, such as timber production and wildlife habitat.

Development can destroy the capacity of woodlands to provide wood products, habitat, and scenic beauty. The value of woodlands for habitat, production, and scenery should be considered before woodlands are converted to other uses.

DNR manages three forestry tax law programs that provide tax incentives to encourage managing private forestlands for forest crop production while recognizing a variety of other objectives. St. Croix County has 13,640 acres enrolled in Managed Forest Law programs with 984 acres in Forest Crop Law as of September 2008.

Prairie and Other Grasslands

Much of St. Croix County was originally covered by prairie. However, little native prairie remains today. Prairies vary due to soils and climates, but all are dominated by grasses and sedges. Prairies are home to a rich diversity of plants and animals. Native prairies are a threatened plant community in Wisconsin. Only about 13,000 acres (0.5%) of the original 3.1 million acres remain.

The drastic changes in prairie habitat over the past 150 years have had negative

impacts on many plants and animals. Many species of plants associated with Wisconsin prairies are endangered, threatened, or of special concern. Two species are known to no longer exist in the state. Many grassland birds face similar outcomes. The list of special concern species is growing, and birds once considered common in the state, such as several species of sparrows and the meadowlark, are declining drastically.

Although the majority of prairie mammals have been able to adapt to the loss of prairie habitat, some are threatened by agricultural practices and development. Prairie-associated reptiles and amphibians have been affected as well. About half have apparently adapted to the loss of prairie. Three reptiles found in prairies are on the state's endangered species list, one is listed as threatened, and two are of special concern. Little is known about the invertebrates of Wisconsin's native prairies with the exception of a few well-recognized and studied species such as the Karner blue butterfly.

There are few high quality prairie remnants remaining. However, it will take more than the preservation of these remnants to recover or retain the biodiversity this ecosystem can offer. Degraded areas that were once prairie can often be restored with moderate effort to yield a habitat suitable for most of the associated plant and animal species. Even certain managed agricultural and livestock practices can accommodate the maintenance of the open habitats needed by many grassland species.

Oak Savanna

Oak savanna was originally present in St. Croix County. Wildfire and possibly bison and elk maintained these grasslands with scattered oaks. Only scant remnants of the ecosystem exist today.

Oak savannas were home to an abundant variety of plants and animals, and were probably optimum habitat for many game species and songbirds. However, oak savanna is presently one of the most threatened plant communities in the world. Less than 500 acres of oak savanna are listed in Wisconsin's Natural Heritage Inventory.

There is no inventory of oak savanna remnants in St. Croix County. However, some of the identified grasslands have the potential for savanna restoration.

Rare or Endangered Species and Communities

The DNR Bureau of Endangered Resources maintains databases of endangered plants and animals. The Bureau urges that special notice be taken to protect any and all endangered resources from development. Rare or endangered species and communities are generally very sensitive to encroachment of development and changes in their surroundings. Development on or near the locations of rare or endangered species can threaten their survival.

The following table lists rare, threatened and endangered species in St. Croix County.

Table 4. Rare, Threatened, and Endangered Species in St. Croix County

PLANTS		
Common Name	Species Name	Wisconsin Status⁹
Arrow-Headed Rattle-Box	<i>Crotalaria sagittalis</i>	Special Concern
Bird's-Eye Primrose	<i>Primula mistassinica</i>	Special Concern
Brook Grass	<i>Catabrosa aquatica</i>	Endangered
Carolina Anemone	<i>Anemone caroliniana</i>	Endangered
Dotted Blazing Star	<i>Liatris punctata var nebraskana</i>	Endangered
Ground-Plum	<i>Astragalus crassicaarpus</i>	Endangered
Hill's Thistle	<i>Cirsium hilli</i>	Threatened*
Hooker Orchis	<i>Platanthera hookeri</i>	Special Concern
James Cristatella	<i>Polanisia jamesii</i>	Special Concern
Kitten Tails	<i>Besseya bullii</i>	Threatened
Large Roundleaf Orchid	<i>Platanthera orbiculata</i>	Special Concern
Prickly Hornwort	<i>Ceratophyllum echinatum</i>	Special Concern
Prairie Fame-Flower	<i>Talinum rugospermum</i>	Special Concern*
Prairie Turnip	<i>Pediomelum esculentum</i>	Special Concern
Prairie Bush Clover	<i>Lespedeza leptostachya</i>	Endangered**
Rock Stitchwort	<i>Minuartia dawsonensis</i>	Special Concern
Rough Rattlesnake-Root	<i>Prenanthes aspera</i>	Endangered
Short's Rock-Cress	<i>Arabis shortii</i>	Special Concern
Silky Prairie-Clover	<i>Dalea villosa</i>	Special Concern
Small-flowered Woolly Bean	<i>Strophostyles leiosperma</i>	Special Concern
Small Skullcap	<i>Scutellaria parvula var parvula</i>	Endangered
Snow Trillium	<i>Trillium nivale</i>	Threatened
Torrey Sedge	<i>Carex torreyi</i>	Special Concern
Uniform Bramble	<i>Rubus uniformis</i>	Special Concern
Wild Licorice	<i>Glycyrrhiza lepidota</i>	Special Concern
Yellow Evening Primrose	<i>Calylophus serrulatus</i>	Special Concern
Yellow Gentian	<i>Gentiana alba</i>	Threatened

⁹Wisconsin Status:

Endangered: continued existence in Wisconsin is in jeopardy.

Threatened: appears likely, within the foreseeable future, to become endangered.

Special Concern: species for which some problem of abundance or distribution is suspected but not yet proven.

* = Candidate for federal listing.

** = Federally Endangered or Threatened.

Last Revised: April 2008

ANIMALS			
Common Name	Species Name	Wisconsin Status	Taxa
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Special Concern**	Bird
Black-Crowned Night-Heron	<i>Nycticorax nycticorax</i>	Special Concern	Bird
Great Egret	<i>Casmerodius albus</i>	Threatened	Bird
Henslow's Sparrow	<i>Ammodramus Hanslowii</i>	Threatened	Bird
Loggerhead Shrike	<i>Lanius ludovicianus</i>	Endangered*	Bird
Red-Necked Grebe	<i>Podiceps grisegena</i>	Endangered*	Bird
Red-Shouldered Hawk	<i>Buteo lineatus</i>	Threatened	Bird
Melissa Blue	<i>Lycaeides melissa melissa</i>	Special Concern	Butterfly
Regal Fritillary	<i>Speyeria idalia</i>	Endangered*	Butterfly
Smoky Shadowfly	<i>Neurocordulia molesta</i>	Special Concern	Dragonfly
Sand Snaketail	<i>Ophiogomphus smithi</i>	Special Concern	Dragonfly
Tiger Beetle	<i>Cicindela patruela patruela</i>	Special Concern	Invert.
American Eel	<i>Anguilla rostrata</i>	Special Concern	Fish
Banded Killifish	<i>Fundulus diaphanous</i>	Special Concern	Fish
Blue Sucker	<i>Cycleptus elongates</i>	Threatened*	Fish
Crystal Darter	<i>Ammocrypta asprella</i>	Endangered*	Fish
Gilt Darter	<i>Percina evides</i>	Threatened	Fish
Goldeye	<i>Hiodon alosoides</i>	Endangered	Fish
Greater Redhorse	<i>Moxostoma valenciennesi</i>	Threatened*	Fish
Mud Darter	<i>Etheostoma asprigene</i>	Special Concern	Fish
Pugnose Minnow	<i>Opsopoeodus emiliae</i>	Special Concern	Fish
Redside Dace	<i>Clinostomus elongates</i>	Special Concern	Fish
River Redhorse	<i>Moxostoma carinatum</i>	Threatened	Fish
Skipjack Herring	<i>Alosa chrysochloris</i>	Endangered	Fish
Shoal Chub	<i>Macrhybopsis aestivalis</i>	Threatened	Fish
Weed Shiner	<i>Notropis texanus</i>	Special Concern	Fish
Western Sand Darter	<i>Ammocrypta clara</i>	Special Concern	Fish
Paddlefish	<i>Polyodon spathula</i>	Threatened	Fish
Buckhorn	<i>Tritogonia verrucosa</i>	Threatened	Mussel
Butterfly	<i>Ellipsaria lineolata</i>	Endangered	Mussel
Ebony Shell	<i>Fusconaia ebena</i>	Endangered	Mussel
Eastern Elliptio	<i>Elliptio complanata</i>	Special Concern	Mussel
Elephant Ear	<i>Elliptio crassidens</i>	Endangered	Mussel
Elktoe	<i>Alasmidonta marginata</i>	Special Concern*	Mussel
Higgins' Eye	<i>Lampsilis higginsii</i>	Endangered**	Mussel
Monkeyface	<i>Quadrula metanevra</i>	Threatened	Mussel
Purple Wartyback	<i>Cyclonaias tuberculata</i>	Endangered	Mussel
Round Pigtoe	<i>Pleurobema sintoxia</i>	Special Concern	Mussel
Salamander Mussel	<i>Simpsonaias ambigua</i>	Threatened*	Mussel
Snuffbox	<i>Epioblasma triquetra</i>	Endangered	Mussel
Spectacle Case	<i>Cumberlandia monodonta</i>	Endangered*	Mussel
Washboard	<i>Megalonaias nervosa</i>	Special Concern	Mussel
Winged Mapleleaf	<i>Quadrula fragosa</i>	Endangered**	Mussel
Timber Rattlesnake	<i>Crotalus horridus</i>	Special Concern	Snake
Wood Turtle	<i>Clemmys insculpta</i>	Threatened	Turtle
Blandings Turtle	<i>Emydoidea blandingii</i>	Threatened	Turtle

Natural communities

Important examples of the following natural community types have been found in St. Croix County. Although communities are not legally protected, they are critical components of Wisconsin's biodiversity and may provide the habitat for rare, threatened and endangered species.

Alder Thicket
Bird Rookery
Dry Cliff
Dry Prairie
Dry Mesic Prairie
Emergent Aquatic
Emergent Marsh
Floodplain Forest
Lake--Shallow, Hard, Seepage
Lake--Shallow, Soft, Seepage
Mesic Prairie
Moist Cliff
Northern Dry-Mesic Forest
Northern Sedge Meadow
Northern Wet Forest
Oak Opening
Sand Prairie
Southern Dry Forest
Southern Dry-Mesic Forest
Southern Hardwood Swamp
Southern Mesic Forest
Southern Sedge Meadow
Spring Pond
Springs And Spring Runs, Hard
Wet Prairie

Agricultural Land

St. Croix County had 176,568 acres of harvested cropland in the year 2002.¹⁰ This amount has gradually decreased from 198,917 acres in 1987. However, during this same time period, there was a 23 percent increase in harvested acres of corn and a 181 percent increase in harvested acres of soybeans. At the same time there was a significant decrease in acres of hay harvested (down 35 percent).

Over that same time period (1987 – 2002), dairy farms declined significantly dropping from 672 farms in 1987 to 255 farms in 2002. This decline has contributed to decreases in acres of hay and increases in acres planted to row crops. During that same time period the total number of milk cows in the county dropped from 35,500 to 21,837.

A transect survey of cropland cover and practices is conducted annually according to standard methods. This inventory, begun in 1999, provides information about erosion rates from cropland and assists in targeting areas for conservation practices.

The 2007 transect survey estimates a countywide average soil loss of 3.2 tons per acre per year. The weighted average tolerable soil loss for St. Croix County is 4.4 tons per acre. The tolerable soil loss rate, commonly referred to as “T,” is defined as the maximum average annual rate of soil erosion for each soil type that will permit a high level of crop productivity to be sustained economically and indefinitely (ATCP 50.01(16)). Average soil erosion rates by watershed are presented in Table 5.

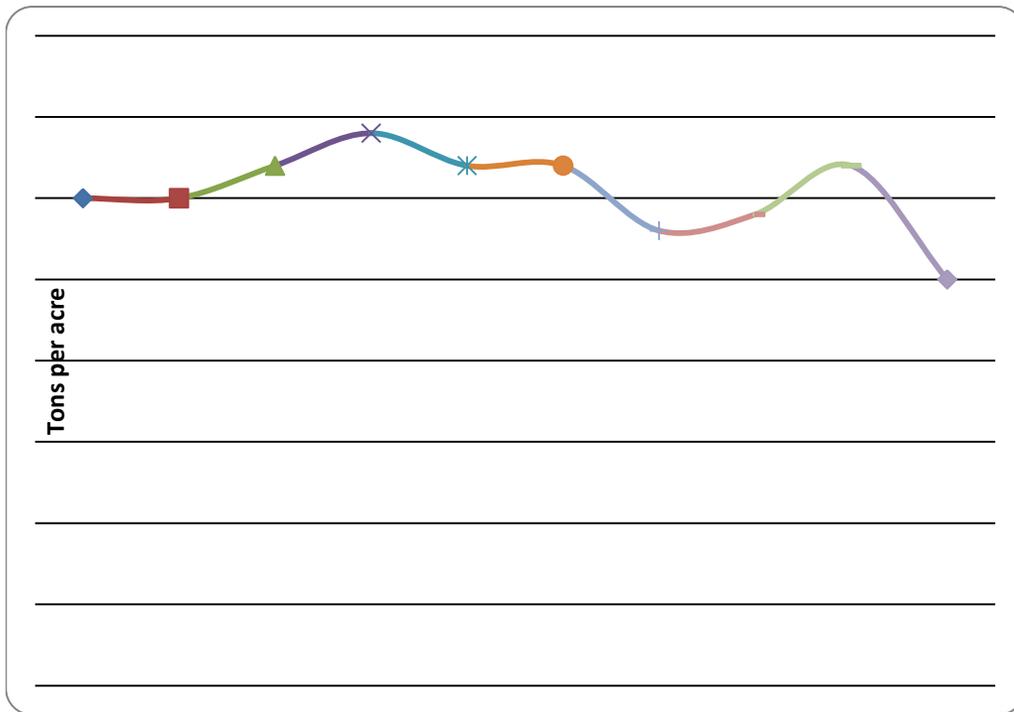
The soil and water conservation standard for the St. Croix County Farmland Preservation Program and other county programs is for each crop field to achieve a soil loss at or below the tolerable soil loss rate. The Farmland Preservation Program standards were updated to reflect the Agricultural Performance Standards in 2005.

¹⁰ Agricultural statistics from USDA National Agricultural Statistics Service.
www.nass.usda.gov/census.

Table 5. Average watershed soil loss.¹¹

Watershed	1999	2000	2002	2003	2004	2005	2006	2007
Kinnickinnic River	2.9	2.8	3.6	3.0	2.8	2.7	2.6	3.1
Lower Willow River	3.8	3.7	4.2	4.7	4.2	4.1	4.3	4.6
Upper Willow River	3.1	3.4	4.1	3.3	3.6	3.1	3.2	3.6
Lower Apple River	2.6	2.6	2.3	2.4	2.7	2.3	2.2	2.1
Trout Brook	3.3	4.6	4.1	2.6	3.6	3.2	5.1	0.9
Eau Galle River	1.7	1.9	1.8	1.4	1.4	1.1	1.0	1.3
Wilson Creek	0.9	0.8	0.6	1.1	1.9	1.8	3.2	3.5
South Fork Hay River	3.4	3.3	3.4	3.7	3.8	3	3.4	3.4
Rush River	2.8	2.8	2.9	NA	3.2	3	2.6	2.7

Figure 9. St. Croix County Average Annual Soil Loss



¹¹ Tons of soil loss per acre per year. Information from transect survey. Results for 2001 are not available. Land and Water Conservation Department and Department of Agriculture Trade and Consumer Protection.

Population

The 2007 population estimate for St. Croix County is 79,020. A little less than 50% of these people live in incorporated areas. St. Croix County is part of the Minneapolis-St. Paul Metropolitan Statistical Area (MSA) that had a total of 2,968,806 people in 2000. Population growth and development patterns in St. Croix County are heavily influenced by its proximity to the Twin Cities of Minneapolis/St. Paul, Minnesota.

The county's population has more than doubled in the last 50 years, with the majority of the growth occurring between 1970 and the present. The county currently has the fastest growth rate in the State of Wisconsin, and this is projected to continue through 2030. Much of this growth is concentrated in the western portions of the county closest to the Twin Cities.

The communities in western St. Croix County are expected to experience significant growth into the next century. Other communities near or along major highway and bridge improvements will also have significant population gains. The Towns of Hammond and Richmond and Villages of Hammond, Roberts, and Somerset had growth rates over 40% from 2000 -2007. The county's overall growth rate in this same period was 25%.¹²

During the period from 2000 to 2030, the county is expected to grow by 68%, or by 43,000 people. This will equate to approximately 17,200 housing units over the same time period. Over half of these are expected to be in incorporated areas,

and the remaining will be rural homes.

The large increase in numbers of housing units and building lots in land divisions demonstrates rapid residential growth in the county. The U.S. Census reported 24,265 housing units in St. Croix County in the year 2000. 1099 housing units were authorized by building permit in the same year. There were 92 major land divisions reviewed by the Land and Water Conservation Department in 2001 and 2002. A total of 1827 lots were reviewed and approved in both minor and major land divisions in the same period.

Land division development remained at these high levels from 2003 through 2005 with an average of about 30 major land divisions and an average of 4,500 acres converted to land divisions each year. Land division development slowed considerably in 2006 with only nineteen major land divisions and in 2007 with only six. Acreage converted dropped as well to 2,747 acres in 2006 and 1,211 acres in 2007.

Rapid population growth and concurrent residential and commercial development can lead to many negative environmental impacts. Surface water and groundwater can become polluted. Wildlife habitat, quality farmland, and open space are lost to development. Recreation waters can be degraded and recreational lands lost or negatively impacted by increased use. During home and road construction, when the protective cover of vegetation is removed, there are dramatic increases in the rates of soil loss and resulting sedimentation of water resources. Poor road construction can lead to ongoing erosion problems.

¹²Demographic Services. Wisconsin Department of Administration.

Figure 10. St. Croix Population 2000

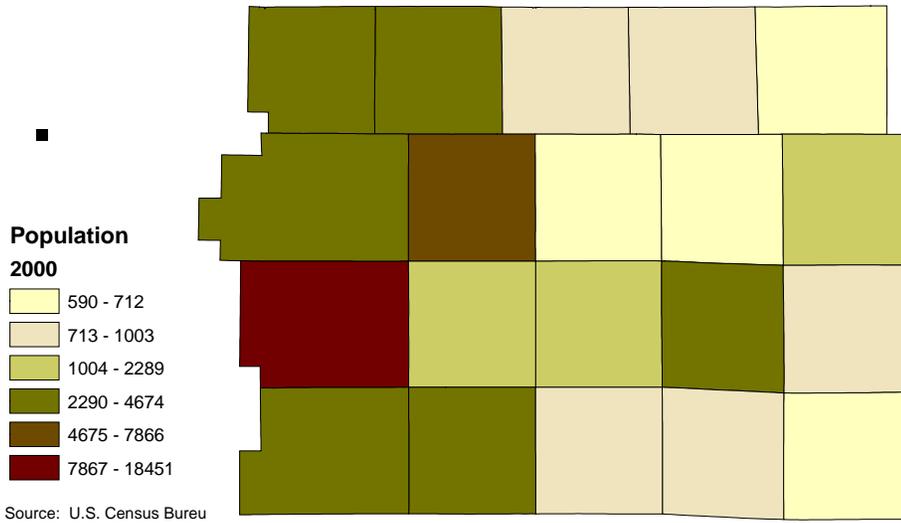
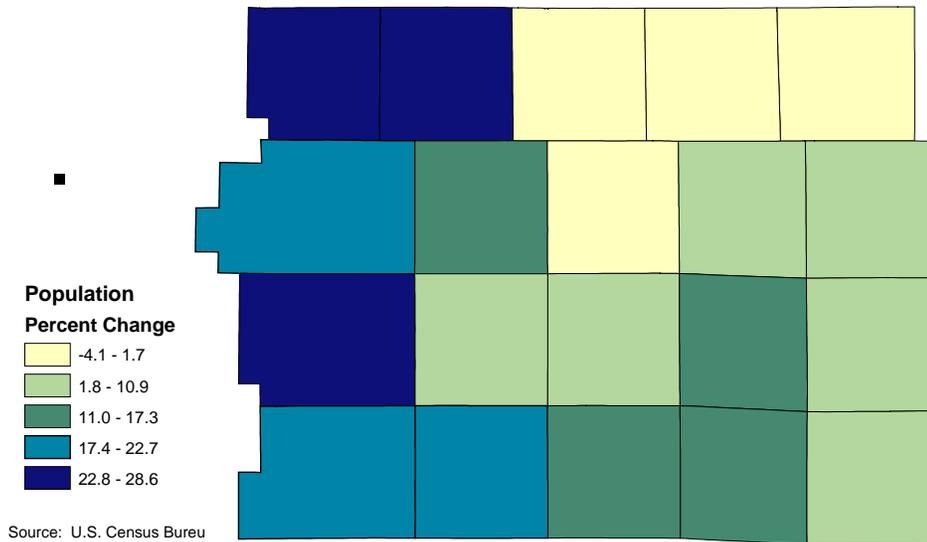


Figure 11. Percent Population Change- 1990-2000



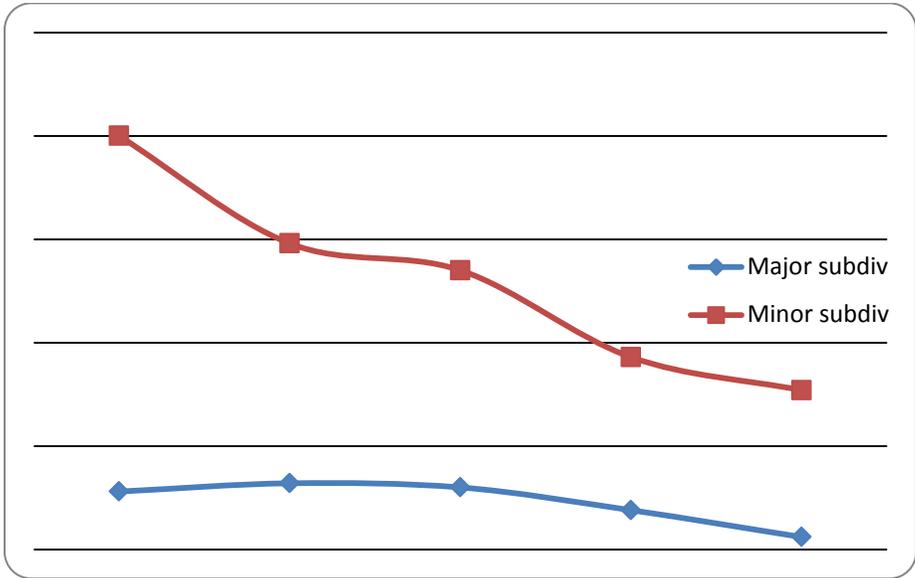
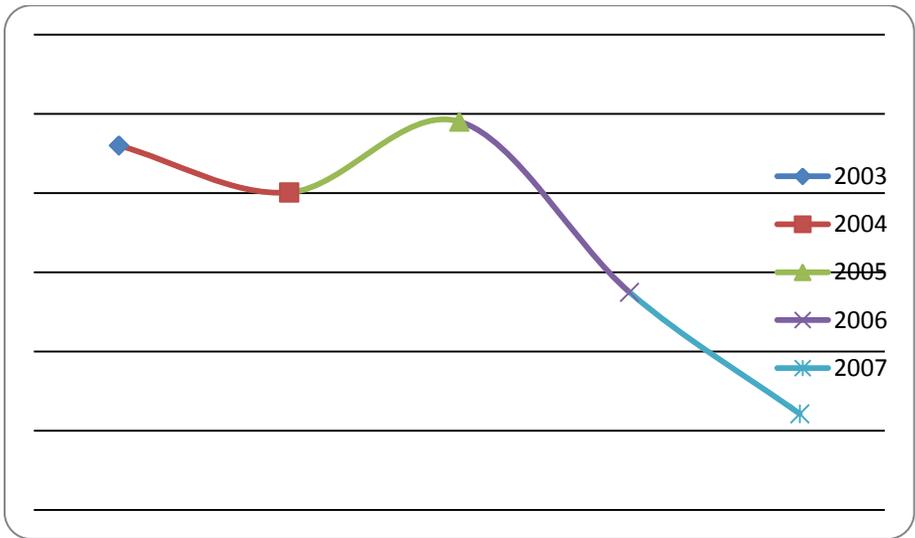


Figure 13. Acres Converted to Land Divisions



Urbanization and other human activities disrupt the natural course of water as it moves across a watershed. Removing vegetation and constructing impervious surfaces such as roads, parking lots, driveways, sidewalks, and rooftops greatly increases the amount and rate of stormwater runoff. As a result, water levels fluctuate more in streams. With less infiltration, there is decreased base flow and greater runoff during and after storms. These changes may bring flooding, increased water temperatures, decreased oxygen levels, greater channel erosion, and increased sedimentation. As stormwater runoff crosses the urbanized landscape; it picks up fertilizers, pesticides, debris, salt, oil, grease, other toxic substances, and sediments and carries them to surface waters.

Identification of Concerns

The University of Wisconsin Extension and the Land and Water Conservation Department conducted a public opinion survey in preparation for the original planning process in 1999. The resource management plan survey was conducted by telephone interviews with 324 randomly selected households throughout St. Croix County. The margin of error is plus/minus 5.5 percent.

Some of the key results:

Nearly 100 percent of St. Croix County residents thought it was important to maintain their environment. At the same time, about two-thirds thought there was room for improvement in the fish and wildlife habitat in the county.

- ✓ A majority of county residents thought that surface and groundwater quality was “good.” However, only about 10 percent thought surface and groundwater quality was “excellent,” which suggests that a large majority believed that there has been some degradation in the natural level of water quality in the county.
- ✓ Over 90 percent of county residents thought that the local environment can be protected without damaging the economy.
- ✓ Nearly two-thirds of county residents were willing to have a portion of their current property taxes be used to help fund conservation projects in the county.

Prioritization of concerns

The 1999 citizens advisory committee

worked together with the technical work group to identify and prioritize natural resource concerns. These concerns are listed in priority order below.

- Protection of groundwater quality
- Nutrient/sediment pollution of water bodies
- Loss/degradation of upland habitat
- Loss of agricultural land
- Loss/degradation of aquatic and riparian habitat
- Availability of recreational lands for hunting, hiking, biking, canoeing, sightseeing
- Loss of rural character
- Loss of wetlands
- Loss of soil resources
- Loss of quality of woodlands
- Wildlife damage to agricultural crops and livestock
- Odor, truck traffic, noise
- Excessive use of natural resources
- Noise/light pollution
- Air pollution
- Visual pollution
- Loss of sand and gravel resources
- Wind erosion

The Land and Water Conservation Committee reviewed the concerns and decided that the plan would be based upon the top five concerns. (There was a considerable drop off in ranking after these top five.) There was a need to prioritize with limited staff and other resources. The top five concerns are also consistent with statutory direction from the state for local land conservation departments. Implementation of the plan including goals and objectives, the information and education strategy, the two-year work plan, and monitoring and evaluation focused on the top five concerns identified. Some of the other individual concerns will be addressed

through the goals developed for the priority concerns.

Other concerns that received lower priority may at times be given attention because they may be most critical at a particular site. Concerns that were not prioritized are also often addressed as part of required on-going agency efforts.

The 2003 citizens advisory committee and technical work group reviewed the concerns identified in 1999 and the goals and objectives based upon these concerns. The groups agreed that the concerns were still valid and the goals should remain in place. Some modifications and additions were made to plan objectives. The technical work group review included extensive review by the Department of Natural Resources.

The current plan update focused upon review of the goals and objectives and implementation of activities. Activity priorities were reviewed by both the Technical Work Group and the Citizens Advisory Committee.

Chapter 3. Goals, Objectives, and Activities

The goals established in this plan represent priorities for natural resource management in St. Croix County. The goals are listed in priority order based upon concerns identified in a 1999 survey and developed in the 2000 planning process. The 2008 citizens advisory committee and technical work group reviewed and approved the goals and objectives from the 2003 plan. The goals, objectives, and activities will be implemented over a five-year planning period beginning in the year 2009 and will be reviewed again for second five year period ending in 2018.

Plan Goals

- I. Protect and improve groundwater quality and quantity to supply clean water for drinking and recharging surface waters and wetlands.***
- II. Protect and enhance surface waters and wetlands to preserve and restore their water quality, ecological functions, and recreational and scenic values.***
- III. Protect and restore fish and wildlife habitats while enhancing water quality, recreational opportunities, and natural beauty.***
- IV. Preserve agricultural land and soils for crop and livestock production, scenic values, and wildlife habitat.***

Information and Education Strategy

Information and education activities will be critical to reaching each plan goal. In order to reach the goals, many individuals in the county must make behavioral changes. People will not make these changes unless they understand the importance of natural resources, the ways to protect them, and are aware of assistance available.

An information and education strategy is outlined in the boxes following the objectives and other activities for each goal statement. In the information and education strategy, target audiences and key messages are identified, and the recommended activities to deliver those messages are listed. New messages and activities may be developed as the plan is implemented. Initial implementation of the information and education strategy is outlined in the two-year work plan. The strategy will be evaluated and modified along with other components of the work plan each year.

Targeted information and education activities are used for each of the plan goals. Educational tools that are common to more than one program are listed below. A given educational strategy may use several of these educational tools.

General recommendations for the educational program follow:

- A. *A part-time environmental education/volunteer coordinator gives focus to and coordinates natural resource educational efforts in St. Croix County.*
- B. *Staff that deal directly with the public by answering the telephone or greeting clients are trained to distribute appropriate educational materials and refer clients to the appropriate staff person, department, or agency.*
- C. *Outreach to the public about the skills and resources available through the RCD helps the department carry out its mission effectively.*

Common Educational Tools

Newsletter articles

Newspaper articles

Advertising – newspaper, radio, TV

Conservation column

Clearinghouse for information/brochures/videos

Outdoor classroom presentations

Poster and speech contests

Slide shows (train the trainer)

Student/volunteer presentations/seminars

Staff presentations

Displays at county fair, farm city day, sport shows, and other events

Radio public service announcements and interviews

Cable television

Direct mail and mailing inserts

Workshops

County web site with a special page for youth

Field trips and service projects for youth

Seminars, shows, fairs (co-sponsor with environmental groups)

Tours and demonstrations of best management practices

Questionnaires

Implementation Strategies

An implementation strategy is provided for each goal in the following section. The objectives are the detailed and measurable steps toward reaching each goal. Activities are the means for reaching the objectives. Priority activities are shown in bold lettering. The objectives that correlate with each activity are identified in parenthesis following the activity. Implementation of activities to be completed in 2013-2015 are detailed in the work plan in Appendix B. Remaining activities are included in the timeline in Appendix C. Additional lower priority activities were considered, but eliminated from the plan because of resource constraints. An information and education strategy is also included for each goal.

OVERALL ACTIVITIES

- 1. Coordinate RCD activities with other county departments, neighboring counties, and state and federal agency partners.**
- 2. Utilize existing resource plan goals and priorities in county decision-making processes.**
- 3. Implement changing state and federal regulations locally.**
- 4. Provide input to federal and state policies and programs.**
- 5. Provide software, hardware, staff training, and data for an integrated geographic information system (GIS).**

GOAL I. Protect and improve groundwater quality and quantity to supply clean water for drinking and recharging surface waters and wetlands.

Objectives

- A. Quality drinking water is available to residents of St. Croix County.
- B. Groundwater is protected from contaminated surface water.
- C. Groundwater is conserved so that adequate supplies of groundwater are available.
- D. RCD conservation practices are designed to protect groundwater quality and quantity.
- E. Land surface infiltration capacity is conserved or enhanced to preserve natural recharge of groundwater supplies.
- F. Groundwater data is expanded, updated, and utilized.

Standards to Establish

Animal waste facility design standards for groundwater protection
Stormwater design requirements for high-risk industries/businesses and on-site infiltration
Geolocate new wells
Private On-site Wastewater Treatment Systems (POWTS)/shared septic systems
Infiltration standards (pervious surface) standards for clean water runoff

Targeted Best Management Practices

Nutrient and pest management plans (includes a conservation plan)
Filling and sealing of wells
Sinkhole treatment
Riparian and wetland buffers
Animal waste facilities
Animal waste facility abandonment
Stormwater detention basins
Stormwater infiltration devices
Wetland restoration
Wellhead protection areas

Activities¹³

- 1. Evaluate parcels, notify regarding compliance status, offer cost sharing, provide technical assistance, and participate in enforcement actions to implement the NR151 Agricultural Performance Standards, in accordance with the priority farm strategy. The Agricultural Performance Standards Memorandum of Understanding is included in Appendix A. (Objectives A, B, C, D)**
- 2. Implement best management practices by providing technical assistance and promoting and administering federal, state and RCD cost share programs. (A, B, C, D, E)**
- 3. Promote low impact development such as conservation design land divisions. Consider new techniques to encourage use of low impact development which may include shared wells and septic systems and maintaining pervious cover such as undeveloped outlots and permanently preserved open space. (A, B, D, E)**

¹³ Note that activities in bold lettering are priority activities for implementation.

4. **Review stormwater design, maintenance plans, and land use permits for groundwater concerns under the land division and the zoning ordinances. (A, B, C, E)**
5. **Update county construction site erosion control and stormwater ordinance. Develop county enforcement authority for long-term monitoring and maintenance of stormwater facilities. Consider infiltration/impervious surface standards to maintain groundwater recharge. (A – F)**
6. **Monitor installed best management practices emphasizing compliance checks for nutrient management. (A, B, C, D)**
7. **Develop a county groundwater management plan or complete elements of the plan which might include the following:**
 - **assess and map the location of groundwater recharge areas**
 - establish wellhead protection areas
 - identify and encourage groundwater conservation measures
 - provide opportunities for regional stormwater infiltration ponds
 - plan for regional water-supply needs
 - assist in the implementation of municipal wellhead protection plans
 - implement groundwater/wellhead protection in local ordinances
 - encourage and cost-share for the proper fill and sealing of wells.
 - require the fill and sealing of any unused wells at time of property sale.
 - establish special stormwater requirements for high-risk industries (as allowed in NR 151). (A, B, C, E, F)
8. Review nonmetallic mining operation and reclamation plans. Participate in revisions to the ordinance as needed. (B, E)
9. Assist St. Croix County municipalities in the development of a regional wastewater management plan. (A, B)
10. Promote programs that increase infiltration of runoff water including CRP, CREP, SAFE, WRP, and WHIP. (E)

Evaluation/Monitoring

11. **Inventory and map sinkholes, closed depressions, glacial surficial geology, areas with unacceptable drinking water test results, nonmetallic mines, unused wells, manure storage facilities, stormwater ponds, and landfills. (F)**
12. **Continue home well sampling. Track results in a database. (F)**
13. Combine groundwater data from various agencies and incorporate into GIS layers. Evaluate groundwater quality and track inventory results by aquifer. (F)

14. Use groundwater data to analyze the effectiveness of various land uses and conservation practices in the protection of groundwater quality and quantity. (D, F)

GROUNDWATER EDUCATIONAL STRATEGY

Audience

Urban property owners
Developers
Suburban and rural property owners with private wells
Agricultural business owners: farmers, cooperatives
Private and public well operators (city and village workers)
Owners of public wells such as golf courses, parks, schools, campgrounds, trailer parks
Well drillers, plumbers
Septic installers and pumpers
Youth groups (scouts, 4-H, FFA), students
Chemical suppliers – Kmart, WalMart, Target, etc.
Municipal governments
Realtors and appraisers

Messages

Proper application amounts and techniques: read labels, follow directions, measure properly, dispose of containers correctly
Identify chemicals that cause nitrate problems
Septic systems need regular maintenance (pumping)
Prevent nitrate contamination of groundwater with proper application of agricultural chemicals.
Forced leaching is a problem – avoid over-watering after applying chemicals.
Explain health hazards of nitrates, volatile organic chemicals, and bacteria
St. Croix County's geology and soils make most of the county a recharge area. Don't dump oil, anti-freeze, other hazardous liquids on the ground.
Use environmentally friendly alternatives to chemicals, pesticides, etc.
Clean sweep programs provide the opportunity to properly dispose of hazardous chemicals.
Sinkholes are direct conduits to groundwater and should be protected from runoff.
Wetlands protect groundwater. They should be protected and restored.
Identify and monitor landfills and dumps
Landscaping alternatives to large, manicured lawns protect groundwater because there is less runoff, less fuel consumption, and less chemical application. These methods also save time.
How and why to appropriately fill and seal wells
Groundwater recharges surface water.
Encourage infiltration to maintain groundwater level
Nutrient management plans will be required for municipalities and private sites with more than five acres of turf.
Ground water is a limited resource. Conserve groundwater supplies through water conservation measures.

Activities

Increase promotion of cost sharing for filling and sealing wells
Simple models and hands-on activities such as well testing kits to educate school children
Individual well tests supported with groundwater information
Groundwater information distributed with land use permits

GOAL II. Protect and enhance surface waters and wetlands to preserve and restore their water quality, ecological functions, and recreational and scenic values.

Objectives

- A. Maintain/improve the water quality and clarity of St. Croix County lakes and streams.
 - Reduce phosphorus loading by 20% in the portions of the St. Croix River Basin within St. Croix County.
 - Achieve established water quality objectives for additional water bodies such as:
 - Willow/Lake Mallalieu (TMDL)
 - Squaw Lake (TMDL)
 - Cedar Lake (TMDL)
- B. Land infiltration capacity is conserved and/or enhanced to maintain surface water quality.
- C. Conserve and/or enhance warm and coldwater fisheries.
- D. Restore and/or conserve ecological functions of wetlands, forest, and riparian buffers.
- E. Maintain and enhance recreational and scenic values associated with surface waters and wetlands.
- F. Establish water quality goals and implement best management practices using watershed-based management.
- G. Prevent the establishment and spread of invasive species within surface waters and uplands.

Applicable Standards

Crop fields

Nutrient management planning for all cropland

Soil loss from crop fields limited to “tolerable soil loss” or below

Reduce soil phosphorus levels to not exceed crop requirements

NR 151 Agricultural Performance Standards

- Control cropland erosion to meet tolerable rates.
- Build, modify, or abandon manure storage facilities to accepted standards.
- Divert clean runoff away from livestock and manure storage areas located near streams, rivers, lakes or areas susceptible to groundwater contamination.
- Apply manure and other fertilizers according to an approved nutrient management plan.

Manure management prohibitions

- No overflow of manure storage facilities
- No unconfined manure piles near waterbodies
- No direct runoff from feedlots or stored manure into state waters
- No streambanks or shorelines trampled by livestock

Overview of Approach to Administer NR151 Agricultural Performance Standards

The process that will be used to administer the standards is that outlined in state planning guidance titled: *Implementation Strategy for NR151, Agricultural Performance Standards and Prohibitions*, (April 2002, Appendix E, Land and Water Resource Management Guidelines).

The specific roles and responsibilities of St. Croix County and state agencies in implementing these standards are outlined in a Memorandum of Understanding (MOU) between the County and the Wisconsin Department of Natural Resources, which was adopted in January 2005. This agreement will be used to assure compliance with the agricultural nonpoint performance standards. A copy of the MOU is provided as Appendix A.

Under this program approach, the St. Croix County Land and Water Conservation Department (RCD) will conduct status reviews of cropland and animal production areas for compliance with NR151 Agricultural Performance Standards and Prohibitions as part of existing cost sharing and permitting programs. In conducting the evaluation, the RCD will determine which of the state standards apply to parcels being evaluated and determine the extent of compliance for each of the applicable standards.

Upon completion of the evaluation, the RCD will review the results with the landowner and provide the opportunity for review, comment, and appeal. In circumstances where full compliance has not yet been achieved, the RCD will work with the landowner to secure technical assistance and cost-share funding available to pursue compliance.

Farms subject to regulatory enforcement of the state standards include:

1. Operations which require permits under the St. Croix County Animal Waste Management Ordinance to install or alter manure storage facilities.
2. Operations enrolled in the Farmland Preservation Program.
3. Livestock operations which are new or expanding and which require zoning or special exception permits for livestock expansion through the (St. Croix County Land Use and Development Code of Ordinances (Chapter 17)).
4. Operations which are subject to state jurisdiction under WI Stats. 281 and Wis. Administrative Rules NR243 or NR151 that are found to be out of compliance with the NR151 agricultural standards, as determined by a site evaluation conducted as part of routine permit monitoring or in response to a public complaint.

Priorities for Servicing Farms

Currently there is high demand for administrative, technical, cost-sharing, and regulatory services administered through the Land and Water Conservation Committee. To most efficiently and cost effectively meet these demands, the priority categories of farms and water resource areas where efforts will be most focused are identified below.

High Priority for Services

- St. Croix County farms located within the St. Croix River Basin, for practices that meet or exceed the performance standards for nutrient management, in order to achieve the basin nutrient reduction goal.
- Farms located within watersheds of impaired waters where TMDL reports or implementation plans have been or are being prepared, with highest priority for practices that address the identified impairments. Impaired waters in St. Croix County that meet these criteria at this time include the Willow River (Lake Mallalieu), Cedar Lake, and Squaw Lake. For these waters, excessive nutrients are the primary pollutant.
- Status reviews for compliance with NR151 Standards for farms located in the county that are in cost sharing, permitting, or other programs that require compliance with one or more of the state standards:
 - Animal Waste Management Ordinance
 - Livestock Siting Special Exception permits
 - Farmland Preservation Program participants
 - Participants in other voluntary cost sharing programs (DNR, SWRM, DATCP SEG, TRM, or other programs)
- In responding to public complaints or staff observations, highest priority is assigned to:
 - Sites or farms identified above as high priority for services
 - Sites or farms where there is an immediate threat to fish, wildlife, and habitat
 - Sites or farms where resource impacts are severe, and compliance can be achieved cost-effectively

- Technical and administrative support for local units of government undertaking initiatives to improve water quality.

Medium Priority for Services

- Farms located within watersheds of ORW or ERW waters.
- Farms located within watersheds of impaired waters where TMDL reports or implementation plans are not yet being prepared.
- In responding to public complaints or staff observations, medium priority is assigned to:
 - Sites or farms identified above as medium priority for services
 - Sites or farms where impacts are less severe and/or achieving compliance is just moderately cost-effective.

Low Priority for Services

- All other operations

Additional Standards

Shorelands and floodplains

Erosion limited to “tolerable soil loss” or less

Minimum 35-foot vegetative buffer widths

Nutrient management policies established

Developed areas

NR151 Non Agricultural Performance Standards

Construction Sites >1 acre – must control 80% of sediment load from sites

Stormwater management plans and practices on developed sites (>1 acre) must meet standards for:

- Total suspended solids
- Peak discharge rate
- Infiltration
- Riparian buffers

Developed urban areas (>1000 persons/square mile) must address the following:

- Public education
- Yard waste management
- Nutrient management
- Reduction of suspended solids

Additional infiltration standards for clean water runoff

Use the following storm events for stormwater design

10-year for sediment and nutrient control

25-year storm for erosion control

100-year for flood control

Vegetative buffer requirements (in land division ordinance)

Lakes and streams

Specific water quality and clarity objectives for St. Croix County lakes

Develop Lakes and streams classification system

Targeted Best Management Practices (BMPs)

BMPs to reduce agricultural soil erosion: grassed waterways, strip cropping filter strips, no-till, etc.

Nutrient management plans

Clean water diversion

Riparian and wetland buffers

Infiltration basins

Conservation plans

Rain gardens

Conservation easements

Construction site erosion control practices

Stormwater basins

General Activities¹⁴

- 1. Implement best management practices by providing technical assistance and promoting and administering federal, state, and county cost share programs. (Objectives A - F)**
- 2. Provide technical assistance and promote cooperative projects between the county, private non-profit conservation organizations, lake associations and districts, and the state and federal government. Encourage preservation of riparian and other resource areas through conservation easements and land acquisition. Complete in-stream, bank restoration, and stream restoration projects. (A - G)**
3. Conduct lakes and streams classification including dry runs. Develop a management strategy and implement standards in the shoreland ordinance and other ordinances. (A-E)

Agricultural Activities

- 4. Evaluate land parcels, notify landowners of compliance status, offer cost sharing, provide technical assistance, and participate in enforcement actions to implement the NR151 Agricultural Performance Standards in accordance with the priority farm strategy. The Agricultural Performance Standards Memorandum of Understanding is included in Appendix A. (Objectives A, C, D, F)**
- 5. Promote Federal Farm Bill programs (WHIP, CRP, CREP, SAFE, WRP, FRPP, and EQIP). (A - F)**
6. Update and implement county animal waste ordinance as needed or required by state statute or regulation. (A, C)
7. Review applications under the state agricultural facility siting regulations. (A)
8. Provide training for farmer developed nutrient management plans. (A)

¹⁴ Note that activities in bold lettering are priority activities for implementation.

Non-agricultural Activities

- 9. Develop a county stormwater and construction site erosion control ordinance. Include county enforcement authority for long-term monitoring and maintenance of stormwater facilities.** Consider techniques and standards to address thermal pollution of cold water streams. (A-F)

- 10. Review land division plans and assist municipalities with their review of plans. Encourage conservation design land divisions to maintain open space.** (A – E)

11. Develop stormwater management plan and/or complete plan elements listed below:
 - Map land uses and model pollutant loading
 - Recommend appropriate stormwater management methods
 - Provide homeowner education
 - Encourage woodland owners and forestry service providers to conduct forest management according to DNR recommendations and guidelines. (A-E)

12. Review performance standards of riverway ordinance. (A, E)

13. Develop no-phosphorus fertilizer ordinance for urban and rural lawns. (A)

14. Assist in floodplain review. (A, B, D)

Evaluation/Monitoring

- 15. Develop a GIS system to input conservation plans, practices, and resource needs.** (F)

- 16. Complete transect survey for soil loss.** (A)

- 17. Conduct ongoing inventories to identify sensitive areas such as dry runs, small wetlands, and other waterbodies to provide information for land division ordinance plan review, stormwater planning, and land use permit review.** (A - F)

18. Inventory/monitor lakes and streams for aquatic invasive species. (G)

AGRICULTURAL EDUCATIONAL STRATEGY

Target Audience

Farmers
Agricultural product and service providers
FFA, 4-H, other youth groups
Sportsmen's groups
General public
Contractors/excavators
Realtors
Nonprofit organizations

Messages

Statewide standards are in place to protect surface and groundwater quality.
Cost sharing is available to implement state performance standards.
Inform landowners about procedures and agency roles regarding compliance with NR151 Agricultural Performance Standards.
Establish expectations for compliance and consequences for non-compliance.
Soil is an important resource.
Soil erosion impacts surface water and wetlands.
Farmers are carrying out conservation efforts.
Keep nutrients where they are beneficial.
Impacts of winter spreading
Nutrients impact water quality.
Managing nutrients is a challenge.
Wetland functions and values
Wetland rules and regulations
How to care for wetlands
Buffer strips protect waterways, streams, and wetlands.
Promote sustainable agriculture concepts and practices.
Rotational grazing is economically viable and benefits herd health and the environment.
Financial assistance is available to protect soil and water resources and help your business.
Follow UWEX recommendations and nutrient management standards for phosphorus crop requirements .
Alternative waste treatment systems are under development.

Educational Activities

Distribute information prepared by DNR regarding NR151 via news media, newsletters, public information meetings, and one-on-one contacts.
One-on-one work with farm operators (e.g., conservation planning, nutrient management plans)
Spring and fall radio spots
Signage at manure application sites
Distribution of information about program opportunities
Press releases and advertisements to promote programs
Farmer training

NONAGRICULTURAL EDUCATIONAL STRATEGY

Target Audience

Municipalities	UDC inspectors
Developers	Forestry service providers
Property owners	Tourism businesses
Regulators (including townships)	Golf course owners and managers
Homeowner's associations	Non profit organizations
Schools, clubs, youth groups	Lake associations and districts
Sports clubs	

Messages

Impervious (hard) surfaces increase runoff and water pollution.
Define terms such as impervious, eutrophic, trophic, nutrient, sediment, and best management practices.
Promote on-site infiltration (e.g., porous surfacing, rain gardens, infiltration basins).
Designing and planning for the 100 year storm event provides a greater level of safety.
Describe the difference between a 25 year and 100 year storm event.
Encourage town and other municipal road departments to use the Wisconsin County Highway Association's Standard Erosion Control Reference Plan.
Describe conservation practices
Trout need cold water
Explain dissolved oxygen
Protect sensitive trout resources and the cold water ecosystem.
Water quality in the lake depends on upland land use.
Inhibit algae growth by decreasing phosphorus runoff
Describe the sources of nutrients (i.e., septic systems, fertilizers)
Lawn care chemicals can negatively impact surface water.
Describe the impacts of nutrients on water quality (species, appearance, odor).
Promote good vegetative buffers
Explain the importance of shoreland vegetation
Describe characteristics of a good vegetative buffer and how to establish one
Describe stream buffers and lake buffers
Importance of wetlands to surface water
Explain the benefits of wetlands
Explain testing equipment and methods
Tourism is good for the local economy.
Prevention is preferable to restoration.
Manage forestlands to protect surface and groundwater quality.
DNR foresters can provide woodland advice and may offer cost sharing for sustainable forestry practices.
Construction site erosion control is required and critical for protection of water resources.
Aquatic invasive species threaten to take over native species habitat and create nuisance conditions. Aquatic plants may not be carried on boats and trailers into lakes and streams.
Promote the St. Croix River Basin 20% phosphorus reduction initiative

Educational Activities

Presentations at town meetings (e.g., stormwater management planning)
Support volunteer monitoring efforts
Workshops (e.g., erosion control, rain gardens)
Rain barrel distribution
Demonstration projects
Tours and fieldtrips/open houses
Clean Boats/Clean Waters program

GOAL III. Protect and restore fish and wildlife habitats while enhancing water quality, recreational opportunities, and natural beauty.

Objectives

- A. Reduce fragmentation of habitat and preserve and restore habitat corridors.
- B. Preserve remnants of native habitats and restore habitat areas.
- C. Protect agricultural lands adjacent to priority habitat areas.
- D. Preserve and restore shoreland, wetland, and aquatic habitat.
- E. Control and eradicate invasive species.
- F. Encourage species diversity.
- G. Establish county land management practices as models for habitat protection.
- H. Increase collection of plant, animal, and community natural heritage data.
- I. Encourage sustainable forestry practices.

Standards to Establish

- Priorities for agricultural land protection
- Acreage and community type objectives for protection
- Shoreland and wetland buffer

Targeted Best Management Practices

- Riparian buffers
- Filter strips
- Conservation design development (incorporate grassland targets)
- Conservation easements
- Wisconsin Forestry Best Management Practices for Water Quality

Activities¹⁵

- 1. Provide technical assistance and participate in cooperative projects between the county, private non-profit conservation organizations, and the state and federal government for habitat restoration and land protection. These projects may include wetland, forest, prairie, and stream and lake restoration projects. (Objectives A – H)**

¹⁵ Note that activities in bold lettering are priority activities for implementation.

2. **Promote and coordinate land management activities of the DNR Western Prairie Habitat Restoration Area and other state and federal habitat protection and restoration programs including the SAFE (State Acres for Wildlife Enhancement) practice. (A-F)**
3. **Assist the planning and zoning department and towns in the development of a local purchase of development rights and/or transfer of development rights program for natural community and agricultural land protection. (A, B, C, D, F)**
4. **Sell native trees, shrubs, and prairie plants. Coordinate with DNR foresters to compliment DNR tree sale and planting. (B, D, F, G)**
5. **Review and update RCD cost-sharing practices and standards to support habitat improvements. (B, D, F, G)**
6. **Encourage preservation of habitat areas in land division review including encouraging conservation design land divisions with contiguous wildland corridors to connect habitats. (A, B, D, F, H)**
7. **Monitor county-held conservation easements annually and enforce them as needed. (A, B, C, D, F, H)**
8. Encourage use of county woodlands and conservation sites including the Kinnickinnic and Stanton Forests and the Huntington property on the Apple River. (G)
9. Provide input for management policies and practices on county-owned and managed lands (including road rights-of way) to ensure prairie remnants, forests, and other natural communities are preserved and managed in a sustainable manner. Review county-owned land management policies periodically. (G)
10. Encourage appropriate deer harvest by assisting with venison donation program. (B, D, F)
11. Refer woodland owners and forestry service providers to DNR foresters for forest tax law information, technical assistance, forest management planning, and cost share opportunities. (I)

Evaluation/Monitoring

12. Assist with inventory and update of environmental corridors, environmental sensitive areas, and quality habitats such as native community remnants as information is available. (A, B, C, D)
13. Map conservation areas (publically owned and privately owned – non profit) throughout the county. (A, B, C, D, F)

HABITAT EDUCATIONAL STRATEGY

Audience

Residential landowners
Landowners/farmers
Contractors/developers
Sportsmen's groups/other recreation groups
Youth groups such as 4-H, FFA
Schools
Nonprofit organizations
Local officials

Aquatic Habitat Messages

What actions cause soil erosion, runoff heat shock, excessive nutrient loading
Aquatic habitat is destroyed by sediment carried in runoff.
Shoreline and aquatic habitats are home to a diverse variety of creatures; if we preserve their homes, we can enjoy their presence.
Shoreline regulations are in place to protect habitat for fish and wildlife, stabilize the shoreline, and limit visual impacts of development.
Technical assistance is available to restore shoreline habitat.

Upland Habitat Messages

Keep undeveloped land for diverse wildlife, surface and ground water quality, soil erosion control, recreation, economics, and natural beauty.
Rotational grazing provides quality pasture, healthy cattle, and enhances wildlife habitat.
Agricultural land adjacent to natural habitat areas enhances their wildlife and recreational benefits.
Prairies provide habitat for threatened songbirds and mammals.
Native plant species provide habitat for birds and animals and create natural beauty.
Prairie and woodland was historically prevalent in St. Croix County.
Grasslands and forests are important wildlife areas.
Blocks of wooded and grassland habitat are better than small, scattered, fragmented pieces.
Where a block of habitat exists, keep it intact.
Contiguous wildland corridors to connect habitats are essential to sustain healthy populations of terrestrial wildlife.
Wisconsin MFL program may present sustainable forestry alternatives to agricultural land owners.
Forest management can compliment farming operations or replace grazing or cultivation of less productive land.

Activities

Encourage use of conservation easements and other land protection tools.
Promote available government programs such as CRP, CREP, SAFE, WHIP, FRPP, MFL, WFLGP, and WRP
Utilize maps and other knowledge of native community remnants to encourage landowners to preserve those communities.
Support and promote a model "Green Development." Include consideration of habitat, fill and seal wells, POWTS, recycling, composting, low-impact lawns, etc.
Technical assistance to landowners of small tracts
Promotion of public access on private lands (similar to DNR Project Respect)
Habitat driving tours
School involvement (e.g., trees, prairies, wetlands, New Richmond schools environmental learning center)
Species identification workshops
Stewardship recognition program

GOAL IV. Preserve agricultural land and soils for crop and livestock production, scenic values, and wildlife habitat.

Objectives

- A. Preserve potentially productive agricultural land.
- B. Discourage development of prime agricultural land.
- C. Maintain agricultural land adjacent to designated habitat areas.
- D. Encourage preservation of scenic and open space areas.
- E. Maintain soil productivity through appropriate agricultural practices.

Standards to establish

Priorities for agricultural land protection

Reduce soil loss to below “tolerable soil loss” on agricultural land.

Activities¹⁶

- 1. Assist the planning and zoning department and towns in developing a purchase and transfer of development rights program for agricultural land. (Objectives A, B, C, D)**
- 2. Implement the Farmland Preservation Program using conservation planning and soil erosion control practices. (A – E)**
- 3. Partner with other agencies and organizations to protect agricultural land from development.** This activity includes working with local land trusts in purchase of development rights (PDR) initiatives and seeking alternative federal, state, and local funding sources to purchase development rights. **(A – D)**
- 4. Assist and provide resource information to protect agricultural land as part of town comprehensive land use planning including identification of areas of exceptional agricultural production viability. (A – D)**
- 5. Encourage protection of agricultural land in conservation design developments. (A – D)**
- 6. Encourage implementation of BMPs and sustainable farming practices to maintain soil productivity. (E)**
7. Compensate farmers for wildlife damage to crops. (C, D)

¹⁶ Note that activities in bold lettering are priority activities for implementation.

8. Support and encourage the implementation of the State’s “Working Lands Initiative Program.”
9. Investigate new options for use of the agricultural land evaluation site assessment system (LESA) tool. This tool aids in identifying areas most appropriate for farming. (A – D)

AGRICULTURAL LAND EDUCATIONAL STRATEGY

Audience

Farmers
Agricultural product and service providers
Builders
Developers
General public

Messages

Farming is an important part of St. Croix County’s economy.
Loss of agricultural land is occurring at an alarming rate.
Agricultural land demands fewer services than residential or commercial land.
Tools are available to protect farmland.
Protecting agricultural land protects open spaces.
Agricultural land provides wildlife habitat.
Protecting farmland promotes good land use planning.

Educational Activities

Funds to teachers for innovative projects
Training courses for teachers
Volunteer training to promote federal and state conservation programs
Partnerships between sports groups and farmers

Chapter 4. Plan Implementation

The land and water resource management plan is a five-year strategic plan for the St. Croix County Resource Conservation Division (RCD). Although the plan is developed to guide the RCD, cooperation of natural resource agencies and organizations will be sought in its implementation.

Partners

The RCD frequently work together with other departments and agencies to carry out plan activities. One way this occurs is through promotion of available federal, state, and local programs. For example, the RCD promotes the Farm Service Agency's State Acres for Wildlife Enhancement program (SAFE) to encourage restoration of prairie habitat, and the Natural Resource Conservation Service's Environmental Quality Incentives Program (EQIP) to implement agricultural best management practices. Initiatives with the U.S. Fish and Wildlife Service and the Department of Natural Resources restore prairie and wetland habitat and enhance stream habitat.

Improved communication will enhance coordination of activities. The RCD will seek to improve communication by undertaking the following activities:

Identify RCD programs and cooperating/interested agencies.

Establish coordination based upon specific priority programs.

Provide cross education to increase the understanding of various programs, agency roles, and terminology.

Schedule presentations about programs on a regular basis

Distribute packets of resource materials

Expand mailing list for Community Development Committee (CDC) minutes

Post CDC minutes on St. Croix County web site

Utilize basin partner teams to provide updates on various programs.

Expand the regular invited guest list for the CDC meetings.

Support staff time allocated to sharing information. Stress the importance of active communication and working together.

Investigate opportunities for a closer working relationship between the RCD and the county planning and zoning departments.

Work Plan and Timeline

A two-year work plan was developed to implement the objectives contained in this document. It is included in Appendix B. The work plan identifies partners, staff hours, additional costs, and evaluation tools for each activity. Staff needs are estimated only for the St. Croix County Resource Conservation Division. The document will be updated for a two-year period each year.

A timeline is established for activities that will be implemented over the next five years in Appendix C.

Potential Funding Sources

The St. Croix County Natural Resource Management Plan is a document that can be used by all of the partners that work to protect natural resources in St. Croix County. A combination of private, local, state, and federal funding sources will be sought to implement the priorities of the plan. As funding opportunities arise, the plan goals and objectives will be referenced to develop project applications. A partial list of potential funding sources is outlined below. The lead agency to pursue funding will depend upon the individual activity being pursued.

The priority watershed program is phasing out with the implementation of this plan.

Watershed Project	Implementation Period Ends
Horse Creek	2009
Kinnickinnic River	2009

The 1999 survey of St. Croix County residents conducted for the 2000 plan indicated that over two-thirds were willing to have their tax dollars support conservation practices.

Local residents, staff, and elected officials should also use their influence to structure the development of state and federal grant programs whenever possible.

Private Sources

- Private Foundations
- Individual Contributions
- Volunteer Hours
- Lake Associations and Districts
- Conservation Organizations
 - Kinnickinnic River Land Trust
 - West Wisconsin Land Trust
 - Star Prairie Land Preservation Trust
 - Sportsmen's Alliance and associated sportsmen's clubs
 - Ducks Unlimited
 - Kinni Bass Masters
 - Pheasants Forever
 - Trout Unlimited
 - Wisconsin Waterfowler's Association

Local Government Sources

St. Croix County Department Budgets

State Government Sources

Department of Natural Resources

Priority Watershed Program

Targeted Runoff Management

Stewardship Grants

Lakes Planning Grants

Lakes Protection Grants

Aquatic Invasive Species Grants

River and Stream Planning and Protection Grants

DNR Wildlife Sources

Pheasant Stamp

Segregated Funds (general license)

Wisconsin Waterfowl Stamp

Turkey Stamp

Trout Stamp (Inland)

Department of Agriculture, Trade and Consumer Protection

Priority Watershed Program

Land and Water Resource Management Plan Funds

University of Wisconsin Extension

Wisconsin Environmental Education Board Grants Programs

Cooperative Educational Services Administration

Wisconsin Geologic and Natural History Survey

Wisconsin Groundwater Resource Center

Federal Sources

United States Department of Agriculture

Farm Service Agency

Conservation Reserve Program (CRP)

Conservation Reserve Enhancement Program (CREP)

State Acres for Wildlife Enhancement (SAFE)

Rural Development Administration

Natural Resources Conservation Service

Environmental Quality Incentives Program (EQIP)

Farm and Ranchland Protection Program (FRPP)

Wildlife Habitat Incentives Program (WHIP)

Wetland Reserve Program (WRP)

North American Waterfowl Conservation Act (NAWCA)

Environmental Protection Agency

Environmental Education Grants

319 (Clean Water Act) Grants

Five Star Grants

U. S. Fish and Wildlife Service

North American Waterfowl Conservation Act (NAWCA)

Partners for Fish and Wildlife

National Park Service

Chapter 5. Monitoring and Evaluation

This chapter addresses both water quality and habitat monitoring for evaluation of progress toward meeting plan goals and tracking of plan activities. Although they are interrelated, each has a distinct function. An objective of this plan is to develop a geographic information system to track progress toward plan goals and completion of plan activities.

Water Quality Monitoring

Recommendations related to improving water quality data for the land and water resource management plan are stated below.

- *The Department of Natural Resources should invest resources in monitoring lakes, rivers, and groundwater in St. Croix County in accordance with DNR's Water Resources Monitoring Strategy and as outlined in the basin plans.*
- *The Department of Natural Resources and St. Croix County should support efforts of lake groups and other organizations to pursue funding for lake and river management projects.*
- *The Department of Natural Resources and St. Croix County should encourage and support self-help monitoring programs.*

A partial list of current efforts to monitor water resources is included below. Much of this information has not been compiled for St. Croix County.

Water Quality Monitoring Efforts

Program	Resource	Responsible Agency
Self Help Lakes Monitoring	Lakes	DNR, Lakes Organizations
Lakes Planning Grant Studies	Lakes	DNR, Lakes Organizations
Chemical Measurements	Lakes/Streams	DNR, USGS
Habitat Assessments	Streams	DNR, USGS
Biological Assessments	Lakes/Streams	DNR
Nitrate Testing	Groundwater	RCD, County Health Dept.
Water Action Volunteers	Rivers/Streams	RCD, UWEX

Habitat Monitoring

State and federal agencies that emphasize fish and wildlife habitat restoration and protection have many ongoing efforts to monitor habitats and species. Some of these efforts are listed below. The RCD does not intend to carry out habitat monitoring activities for the implementation of this plan. Instead it will support habitat restoration efforts and utilize monitoring data from other sources.

Habitat Monitoring Efforts

<u>Resource</u>	<u>Responsible Agency</u>
Restored wetlands	USFWS, DNR
Restored prairies	DNR, Pheasants Forever
Rare, threatened, and endangered plant and animal species	DNR
Christmas bird count	Audubon
Sandhill crane count	Intl. Crane Foundation
Frog and toad survey	DNR
Breeding bird survey	DNR
Deer count	DNR
Woodcock/grouse survey	DNR
Pheasant count	Sportsmen's Alliance/DNR
Breeding waterfowl survey	USFWS
Grassland bird survey	USFWS

Citizen Monitoring

Volunteer citizen monitoring will be encouraged to assist in evaluating progress toward goals and to increase public involvement. Participation in the Department of Natural Resources Self Help Lakes Monitoring Program will be encouraged to monitor progress toward improving lake water quality. Bass Lake, Lake Mallalieu, Perch Lake, Squaw Lake and Cedar Lake currently have active volunteers. Citizen monitoring is supported by the Kinnickinnic River Land Trust, Kinnickinnic River Priority Watershed project, University of Wisconsin River Falls, Water Action Volunteers, and Trout Unlimited.

Inventories

Inventories track changes in land use or land management practices that affect water quality or habitat. Several methods are currently used by resource agencies to track these changes.

<u>Inventory Method</u>	<u>Resource/Source</u>	<u>Responsible Agency</u>
BARNY	Barnyards	RCD
Transect Survey	Cropland	RCD
National Resource Inventory	Land Use	NRCS
LandSat Photos	Land Cover	DNR
CRP Acres	Cropland	FSA
Location	Animal waste facilities	RCD
Water quality/quantity	Springs	RCD
Location	Nonmetallic mines	RCD/Zoning/DNR
Location	Closed and sealed wells	RCD/DNR

Additional inventory activities are part of the implementation of this plan:

Goal I

- ✓ Continue home well sampling. Track results in a data base.
- ✓ Inventory and map sinkholes, closed depressions, glacial surficial geology, areas with unacceptable drinking water test results, nonmetallic mines, unused wells, manure storage facilities, stormwater ponds, and landfills.

Goal II

- ✓ Conduct ongoing inventories to identify sensitive areas such as dry runs, small wetlands, and other waterbodies to provide information for land division ordinance plan review, stormwater planning, and building permit review.

Goal III

- ✓ Assist with inventory and update of environmental corridors, environmental sensitive areas, and quality habitats such as native community remnants as information is available.
- ✓ Assist in the development of plant and animal community inventories.
- ✓ Map conservation areas (publically and privately/nonprofit owned) throughout the county.

Plan Evaluation

Plan evaluation assesses whether the objectives and activities of the plan are being accomplished. Evaluation measures are listed for each plan activity in the work plan tables in Appendix B. The Resource Conservation Division will take responsibility each year to collect information from cooperating agencies and summarize it in a report. This evaluation report will be used in yearly planning sessions to develop a work plan for the next two calendar years.

Measures of success and/or evaluation methods are relatively straightforward for most of the objectives. However, evaluating the success of the information and education objectives poses special challenges. Without an extensive investment of time and money, it is often difficult to measure if an educational technique is effective. Did a particular event such as a workshop change an attitude or behavior; did information in a brochure or video lead to the change; or did an individual act independently of the information and education program?

Measures of success will vary by activity. Most activities are geared toward meeting objectives in a few general categories:

- promoting the availability of financial and technical assistance;
- teaching best management practice techniques;
- increasing understanding about the importance of protecting natural resources; and
- convincing people to change behaviors to protect natural resources.

The first two categories are relatively easy to evaluate. Effectiveness of promotional techniques will be tracked by simply asking people how they heard about the program when they sign up for an activity or inquire about a management practice. Knowledge of management techniques gained from workshops and other activities will be evaluated with questionnaires prior to and after events. Assessing understanding and behavioral change that result from educational activities is more difficult. Activities in these categories usually seek to reach a relatively broad audience, and many factors influence an individual's values and behaviors.

APPENDIX B

2014 – 2016 Work Plan

St. Croix County Natural Resources Plan St. Croix County Resource Conservation Division

This work plan covers a two-year period. The work plan will be updated at least every two years through the plan implementation period. The work plan is based upon the goals, objectives, and activities in chapter 3. Note that some activities included in this work plan do not have staff hours and additional costs included because they will begin after 2015. The timeline in Appendix C illustrates when each activity will occur.

Partners

DATCP = Department of Agricultural Trade and Consumer Protection
DNR = Department of Natural Resources
FSA = Farm Service Agency
HIGHWAY = St. Croix County Highway Department
NRCS = Natural Resource Conservation Service
ORGS = Nonprofit organizations

PARKS = St. Croix County Parks Department
COMM DEV = St. Croix County Community Development Dept
USFWS = United States Fish and Wildlife Service
UWEX = University of Wisconsin Extension
WCRPC = West Central Wisconsin Regional Planning Commission
Lakes = Local Lake Organizations

GOAL 1. Protect and improve groundwater quality to supply clean water for drinking and recharging surface waters and wetlands.							
Activity¹⁷	Objectives	Partners¹⁸	Staff Hours 2014	Add. Costs 2014	Staff Hours 2015	Add. Costs 2015	Evaluation Tools
Develop additional tools for industrial mining operations that protect groundwater	A, B, D, E	COMM DEV DNR	100	\$50	100	\$50	<ul style="list-style-type: none"> ▪ Amend non-metallic mine ordinance
Agricultural performance standards strategy – see Appendix A a. records inventory b. on-site review	A, B, C, D, E	NRCS	500	\$2000	500	\$2500	<ul style="list-style-type: none"> ▪ Facilities reviewed ▪ Facilities in compliance ▪ Reference new standard checks: PI and Gully Erosion
Implement BMPs w/TA and/or federal and state cost-sharing	A, B, C, D, E	DNR DATCP USFWS NRCS FSA	500	\$2000	500	\$2000	<ul style="list-style-type: none"> ▪ Practices completed ▪ Acres restored ▪ Dollars invested ▪ P loading reductions
Promote low impact development	A, B, E	COMM DEV	30	\$200	30	\$200	<ul style="list-style-type: none"> ▪ Acres/community type preserved (20 acres) ▪ Shared wells and septic systems
Review stormwater and land use permits for groundwater concerns	A, B, D, E	COMM DEV	100	\$200	100	\$200	<ul style="list-style-type: none"> ▪ Stormwater permits reviewed (5) ▪ Land use permits reviewed (5)
Monitor installed BMPs	A, B, C, D	DNR NRCS FSA	200	\$200	200	\$200	<ul style="list-style-type: none"> ▪ Nutrient management plans reviewed (5) ▪ BMPs reviewed (5)

¹⁷ Activity numbers and objective letters correspond with those detailed for each goal in Chapter 3. See Chapter 3 for more detailed activity and objective descriptions.

¹⁸ LWCD is the lead agency except where another is indicated as lead with an asterisk.

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GOAL 1. Protect and improve groundwater quality to supply clean water for drinking and recharging surface waters and wetlands.							
Activity¹⁷	Objectives	Partners¹⁸	Staff Hours 2014	Add. Costs 2014	Staff Hours 2015	Add. Costs 2015	Evaluation Tools
Review nonmetallic mine operation and reclamation plans	B, E	DNR NRCS COMM DEV	200	\$200	200	\$200	<ul style="list-style-type: none"> ▪ Plans reviewed ▪ Acres managed under plans
Maintain groundwater test database.	F	COMM DEV DNR UWEX	40	\$100	40	\$100	<ul style="list-style-type: none"> ▪ Map layers completed (2 Towns)
Continue home well sampling and track results	F	UWEX COMM DEV	40	\$1000	40	\$1000	<ul style="list-style-type: none"> ▪ Water tests offered in coordination with POWT's reminder notice ▪ Data base updated (2 Towns upon completion of sampling)
Utilize GIS with appropriate activities	E	COMM DEV	50	\$100	50	\$100	<ul style="list-style-type: none"> ▪ Layers developed (1) ▪ Applications (2) ▪ Use of Stillwater Bridge mitigation funds
Coordinate activities with other departments/counties/agencies	A, B, C, D, E, F	All	25	\$0	25	\$0	<ul style="list-style-type: none"> ▪ Coordinated activities ▪ 5 separate activities
Implement state and federal regulations locally	A, B, C, D, E	NRCS DNR DATCP	20	\$25	20	\$25	<ul style="list-style-type: none"> ▪ Regulations implemented ▪ Reference new standard checks: PI and Gully Erosion
Provide input to federal and state	A, B, C, D, E	LWCD	5	\$0	5	\$0	<ul style="list-style-type: none"> ▪ Programs and policies reviewed (3 separate responses)
Develop a comprehensive data set of all municipal well head protection areas and data set of high capacity wells.	A, B, C, D, E, F	DNR COMM DEV					<ul style="list-style-type: none"> ▪ Quantify groundwater use annually

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GOAL 1. Protect and improve groundwater quality to supply clean water for drinking and recharging surface waters and wetlands.							
Activity¹⁷	Objectives	Partners¹⁸	Staff Hours 2014	Add. Costs 2014	Staff Hours 2015	Add. Costs 2015	Evaluation Tools
Develop construction site erosion and stormwater ordinance	B, C, D	COMM DEV					<ul style="list-style-type: none"> ▪ Ordinance developed (1) ▪ Use of Stillwater Bridge mitigation funds
Identify Karst features and develop a strategy to protect groundwater	A, B, D	DNR					<ul style="list-style-type: none"> ▪ Map Karst features: visual inspection or GIS created
Identify Springs and Headwaters	E	DNR					<ul style="list-style-type: none"> ▪ Map developed
TOTAL			1810	\$6075	1810	\$6575	

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GOAL II. Protect and enhance surface waters and wetlands to preserve their ecological functions and recreational and scenic values.

Activity¹⁹	Objectives²⁰	Partners²¹	Staff Hours 2014	Add. Costs 2014	Staff Hours 2015	Add. Costs 2015	Evaluation Tools
Development of Producer led and performance based management strategy for Willow River-Dry Run	A, B, F	NRCS UW Ext. WDNR DATCP ORGS Lakes	1400	\$5000	1400	\$5000	<ul style="list-style-type: none"> ▪ # of producers involved ▪ Lbs. of P reduced ▪ Project evaluation survey
Update Shoreland Zoning Ordinance	A-F	COMM DEV	500	\$500	80	\$100	<ul style="list-style-type: none"> ▪ Ordinance updated
Implement TMDL Plans: Lake Mallalieu/Willow River, Squaw Lake, St. Croix Basin, Red Cedar Basin	A, B, F	NRCS UW Ext. WDNR DATCP ORGS Lakes	100	\$500	100	\$500	<ul style="list-style-type: none"> ▪ Lbs. of P reduced ▪ BMPs implemented
Implement Lake Management Plans: Lake Mallalieu, Squaw Lake, Cedar Lake, Bass Lake	A, B, D, E, F, G	DATCP NRCS DNR Lakes	300	\$2000	600	\$3000	<ul style="list-style-type: none"> ▪ Lbs. of P reduces ▪ BMPs implemented

¹⁹ Activity numbers correspond with those detailed for each goal in Chapter 3. See Chapter 3 for more detailed activity descriptions.

²⁰ Objective letters correspond with those detailed for each goal in Chapter 3. See Chapter 3 for objective descriptions.

²¹ LWCD is the lead agency except where another is indicated as lead with an asterisk.

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GOAL II. Protect and enhance surface waters and wetlands to preserve their ecological functions and recreational and scenic values.

Activity¹⁹	Objectives²⁰	Partners²¹	Staff Hours 2014	Add. Costs 2014	Staff Hours 2015	Add. Costs 2015	Evaluation Tools
Agricultural performance standards strategy – see Appendix A c. records inventory d. on-site review	A, B, F	NRCS	500	\$2000	700	\$2000	<ul style="list-style-type: none"> ▪ Facilities reviewed ▪ Facilities in compliance ▪ Reference new standard checks: PI and Gully Erosion
Implement BMPs w/TA and/or federal and state cost-sharing	A, B, F	DNR DATCP USFWS NRCS FSA	500	\$2000	700	\$2000	<ul style="list-style-type: none"> ▪ Practices completed ▪ Acres restored ▪ Dollars invested ▪ P loading reductions
Provide technical assistance and promote cooperative projects for land preservation and habitat restoration and protection	A, C, D, E, G	Lakes ORGS DNR FSA NRCS USFWS	40	\$500	40	\$500	<ul style="list-style-type: none"> ▪ Acres preserved (20) ▪ Acres restored by habitat type ▪ Stream feet restored (200)
Complete transect survey for soil loss	A	NRCS DATCP	80	\$600	80	\$600	<ul style="list-style-type: none"> ▪ Soil loss data by watershed (Annually)
Review state agricultural facility siting standards	A	DATCP	160	\$400	160	\$400	<ul style="list-style-type: none"> ▪ Applications reviewed
Review subdivision plans and assist municipalities in plan review	A-E	COMM DEV	500	\$200	500	\$200	<ul style="list-style-type: none"> ▪ Plans reviewed (10)
Review performance standards of river way ordinance	E	DNR COMM DEV	200	\$400	200	\$400	<ul style="list-style-type: none"> ▪ Permits/plans reviewed

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GOAL II. Protect and enhance surface waters and wetlands to preserve their ecological functions and recreational and scenic values.							
Activity¹⁹	Objectives²⁰	Partners²¹	Staff Hours 2014	Add. Costs 2014	Staff Hours 2015	Add. Costs 2015	Evaluation Tools
Continue surface water level monitoring	C, D, E	DNR	50	\$200	50	\$200	<ul style="list-style-type: none"> ▪ Dataset of water levels
Assist in floodplain review	A, B, D	COMM DEV	100	\$100	100	\$100	<ul style="list-style-type: none"> ▪ Permits/plans reviewed
Use GIS to track projects & monitor implemented projects	F	DNR COMM DEV	80	\$200	80	\$200	<ul style="list-style-type: none"> ▪ GIS layers: conservation plans; bmp installation; priority resource needs (1 map to track projects)
Coordinate activities with other departments/counties/agencies	A, B, F	All	25	\$0	25	\$0	<ul style="list-style-type: none"> ▪ Coordinated activities ▪ 5 separate activities
Implement state and federal regulations locally	A, G	NRCS DNR DATCP	20	\$25	20	\$25	<ul style="list-style-type: none"> ▪ Regulations implemented (3) ▪ Reference new standard checks: PI and Gully Erosion
Provide input to federal and state	A, G	LWCD	5	0	5	0	<ul style="list-style-type: none"> ▪ Programs and policies reviewed (3 separate responses)
Develop construction site erosion and stormwater ordinance	A, B, C, F	COMM DEV					<ul style="list-style-type: none"> ▪ Ordinance developed (1) ▪ Use Stillwater Bridge Mitigation Funds
Inventory to ID sensitive areas: dry runs, small wetlands	A – F	NRCS DNR					<ul style="list-style-type: none"> ▪ GIS mapping layers updated (1 Town annually)
TOTAL			4560	\$14625	4840	\$15225	

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GOAL III. Protect and restore fish and wildlife habitats for native species, improved water quality, recreational opportunities, and natural beauty.

Activity²²	Objectives²³	Partners²⁴	Staff Hours 2014	Add. Costs 2014	Staff Hours 2015	Add. Costs 2015	Evaluation Tools
Provide technical assistance and promote cooperative projects for land preservation and habitat restoration and protection	A, B, C, D, E, G	Lakes ORGS DNR FSA NRCS USFWS	40	\$500	40	\$500	<ul style="list-style-type: none"> ▪ Acres preserved (20) ▪ Acres restored by habitat type ▪ Stream feet restored (200)
Sell native trees, shrubs, and prairie plants	B, D, F, G	DNR	400	\$1000	400	\$1500	<ul style="list-style-type: none"> ▪ Quantity sold (25,000)
Review and update LWCD cost share practices and standards for habitat protection	B, D, F, G	NRCS FSA	5	\$0	5	\$0	<ul style="list-style-type: none"> ▪ Practices and/or standards reviewed (annually)
Encourage habitat preservation in land divisions	A, B, D, F, H	COMM DEV	10	\$40	10	\$40	<ul style="list-style-type: none"> ▪ Land divisions reviewed for habitat protection (3)
Encourage use of county-owned properties	G	UWEX DNR	40	\$100	40	\$100	<ul style="list-style-type: none"> ▪ County Farm hunting data ▪ Coordinate with Healthier Together initiative ▪ Field Days #'s

²² Activity numbers correspond with those detailed for each goal in Chapter 3. See Chapter 3 for more detailed activity descriptions.

²³ Objective letters correspond with those detailed for each goal in Chapter 3. See Chapter 3 for objective descriptions.

²⁴ LWCD is the lead agency except where another is indicated as lead with an asterisk.

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GOAL III. Protect and restore fish and wildlife habitats for native species, improved water quality, recreational opportunities, and natural beauty.

Activity²²	Objectives²³	Partners²⁴	Staff Hours 2014	Add. Costs 2014	Staff Hours 2015	Add. Costs 2015	Evaluation Tools
Review county land management policies	G	PARKS HIGHWAY COMM DEV	20	\$0	20	\$0	<ul style="list-style-type: none"> ▪ Policies revised/developed
Assist with venison donation program	B, D, F	DNR HEALTH	100	\$100	100	\$100	<ul style="list-style-type: none"> ▪ Deer processed ▪ People who received venison Contracts
Coordinate activities with other departments/counties/agencies	A, B, D, E, G, H, I	All	25	\$0	25	\$0	<ul style="list-style-type: none"> ▪ Coordinated activities ▪ 5 separate activities
Implement state and federal regulations locally	A, C, D, E, I	NRCS DNR DATCP	20	\$25	20	\$25	<ul style="list-style-type: none"> ▪ Regulations implemented (3) ▪ Use Stillwater Bridge Mitigation Funds
Provide input to federal and state	A-I	LWCD	5	\$0	5	\$0	<ul style="list-style-type: none"> ▪ Programs and policies reviewed (3 separate responses)
Utilize GIS with appropriate activities	H	COMM DEV	50	\$100	50	\$100	<ul style="list-style-type: none"> ▪ Layers developed (1) ▪ Applications (2) ▪ Use Stillwater Bridge Mitigation Funds
Develop datasets and monitor county-held conservation easements	A, B, C, D, F H	DNR COMM DEV PARKS			40	\$0	<ul style="list-style-type: none"> ▪ Easements reviewed (annually/by complaint) ▪ Database compiled
Develop invasive species mgt plan: aquatic and terrestrial	E						<ul style="list-style-type: none"> ▪ Terrestrial plan developed ▪ Aquatic plan developed
Develop a guide for habitat preservation in rural developments	A, B, C, D, E, I						<ul style="list-style-type: none"> ▪ Guide developed ▪ # of Guides passed out to landowners

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GOAL III. Protect and restore fish and wildlife habitats for native species, improved water quality, recreational opportunities, and natural beauty.

Activity²²	Objectives²³	Partners²⁴	Staff Hours 2014	Add. Costs 2014	Staff Hours 2015	Add. Costs 2015	Evaluation Tools
Develop purchase and/or transfer of development rights program for natural community and agricultural land protection	A, B, C, D	COMM DEV* NRCS					<ul style="list-style-type: none"> ▪ Program developed (Pilot project) ▪ Acres/community type protected ▪ Acres of prime farmland protected ▪ Use Stillwater Bridge Mitigation Funds
TOTAL			715	\$2225	755	\$2365	

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GOAL IV. Preserve agricultural land and soils for crop and livestock production, scenic values, and wildlife habitat.							
Activity²⁵	Objectives²⁶	Partners²⁷	Staff Hours 2014	Add. Costs 2014	Staff Hours 2015	Add. Costs 2015	Evaluation Tools
Amend Ag Zoning Ordinance	A, B, E	COMM DEV Towns	500	\$1000	100	\$200	▪ Ordinance Amended
Administer and implement Farmland Preservation Program	A - E	DATCP NRCS	700	\$1000	1000	\$1500	▪ Acres and participants ▪ (As enrolled) ▪ 25% spot checked annually
Partner to protect agricultural land	A - D	NRCS FSA NRCS ORGS COMM DEV TOWNS	500	\$1000	500	\$1000	▪ Acres of farmland protected (80)
Encourage agricultural land preservation as part of town planning	A - D	TOWNS COMM DEV	100	\$500	100	\$500	▪ Town plans developed w/farmland protection (2 Towns)
Conservation design developments	A - D	COMM DEV	20	\$50	20	\$50	▪ Acres of farmland protected (40)
Install BMPs for soil productivity	E	NRCS DATCP FSA	500	\$1000	500	\$1500	▪ Conservation plans completed (10) ▪ BMPs installed (10)
Compensate farmers for wildlife damage to crops	C, D	DNR	200	\$800	200	\$800	▪ Acres mitigated ▪ Practices installed ▪ Compensation provided Plans or ordinance

²⁵ Activity numbers correspond with those detailed for each goal in Chapter 3. See Chapter 3 for more detailed activity descriptions.

²⁶ Objective letters correspond with those detailed for each goal in Chapter 3. See Chapter 3 for objective descriptions.

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GOAL IV. Preserve agricultural land and soils for crop and livestock production, scenic values, and wildlife habitat.							
Activity²⁵	Objectives²⁶	Partners²⁷	Staff Hours 2014	Add. Costs 2014	Staff Hours 2015	Add. Costs 2015	Evaluation Tools
							created
Coordinate activities with other departments/ counties/ agencies	A-E	All	25	\$0	25	\$0	<ul style="list-style-type: none"> ▪ Coordinated activities ▪ 5 separate activities
Implement state and federal regulations locally	A, B, E	NRCS DNR DATCP	20	\$25	20	\$25	<ul style="list-style-type: none"> ▪ Regulations implemented (3) ▪ Reference PI and Gully Standards
Provide input to federal and state	A-E	LWCD	5	\$0	5	\$0	<ul style="list-style-type: none"> ▪ Programs and policies reviewed (3 separate responses)
Utilize GIS with appropriate activities	A-E	COMM DEV	50	\$100	50	\$100	<ul style="list-style-type: none"> ▪ Layers developed (1) ▪ Applications (2) ▪ Use Stillwater Bridge Mitigation Funds
Develop purchase and/or transfer of development rights program for natural community and agricultural land protection	A, B, D	COMM DEV* NRCS					<ul style="list-style-type: none"> ▪ Program developed (Pilot project) ▪ Acres/community type protected ▪ Acres of prime farmland protected ▪ Use Stillwater Bridge Mitigation Funds
TOTAL			2620	\$4575	2520	\$5675	

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Educational Activities							
Activity	Objectives	Partners	Staff Hours 2014	Add. Costs 2014	Staff Hours 2015	Add. Costs 2015	Evaluation Tools
Promote Federal Farm Bill and State programs (WHIP, CRP, CREP, SAFE, WRP, FRPP, EQIP, MFL, WFLGP). I.E. press releases, written info, verbal referrals.	II, III, and IV	NRCS FSA DNR DATCP	20	\$50	20	\$50	<ul style="list-style-type: none"> ▪ Program referrals ▪ Acres enrolled in St. Croix County (10 landowner contacts)
Training courses for teachers	All goals	UWEX DNR	20	\$50	20	\$50	<ul style="list-style-type: none"> ▪ Use of curriculum ▪ Program participation
One-on-one with landowners	All goals	NRCS FSA	500	\$1000	500	\$1500	<ul style="list-style-type: none"> ▪ Program participation
Conservation column, other written information	All goals	UWEX DNR	40	\$50	40	\$50	<ul style="list-style-type: none"> ▪ Columns, articles completed
Volunteer programming, coordination and training	All goals	UWEX DNR	20	\$50	20	\$50	<ul style="list-style-type: none"> ▪ No. of volunteers ▪ Monitoring completed
Displays, tours, signs	All goals	UWEX DNR	200	\$200	200	\$200	<ul style="list-style-type: none"> ▪ Displays completed and used ▪ Signs ▪ Tours completed
Awards and recognition (poster and speech contest)	All goals	DATCP	40	\$100	40	\$100	<ul style="list-style-type: none"> ▪ Awards given
Workshops, demonstrations, radio, and presentations	All goals	DATCP UWEX NRCS	100	\$100	100	\$100	<ul style="list-style-type: none"> ▪ Program participation ▪ Events completed ▪ Survey results
Groundwater information with well test results and land use permits	Goal I	UWEX COMM DEV	20	\$100	20	\$100	<ul style="list-style-type: none"> ▪ Results and info packets provided ▪ No of permits w/info
Distribute NR 151 information	Goal II	DATCP DNR	20	\$200	20	\$200	<ul style="list-style-type: none"> ▪ Landowners provided w/info
Provide groundwater outreach &	Goal I	DNR	20	\$200	20	\$200	<ul style="list-style-type: none"> ▪ Programs (# of attendees)

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education		UWEX					▪ Web page data updated
590 nutrient management training	Goal II	UWEX	300	\$500	300	\$1000	▪ Ag producers attending
TOTAL			1300	\$2600	1300	\$3600	

Other LWCD Activities and Summary				
Activity	Staff Hours 2014	Add. Costs 2014	Staff Hours 2015	Add. Costs 2015
Office Administration and Clerical Support	1500	\$500	1500	\$500
Glen Hills Dam Maintenance	300	\$1000	300	\$1000
Goal I: Groundwater	1810	\$6075	1810	\$6575
Goal II: Surface Water	4560	\$14,625	4840	\$15,225
Goal III: Habitat	715	\$2225	755	\$2365
Goal IV: Agriculture	2620	\$4575	2520	\$5675
Education	1300	\$2600	1300	\$3600
TOTAL	12,805	\$31,600	13,025	\$34,940
Staff Costs		\$423,720		\$450,000

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APPENDIX C: Time Line for Activity Implementation

Activity	2014	2015	2016	2017	2018
<i>GOAL 1. Protect and improve groundwater quality to supply clean water for drinking and recharging surface waters and wetlands.</i>					
Develop additional tools for industrial mining operations that protect groundwater	→				
Agricultural performance standards strategy – see Appendix A	→				
Implement BMPs w/TA and/or federal and state cost-sharing	→				
Promote low impact development	→				
Review stormwater and land use permits for groundwater concerns	→				
Monitor installed BMPs	→				
Review nonmetallic mine operation and reclamation plans	→				
Maintain groundwater test database.	→				
Continue home well sampling and track results	→				
Utilize GIS with appropriate activities	→				
Coordinate activities with other departments/counties/agencies	→				
Implement state and federal regulations locally	→				
Provide input to federal and state	→				
Develop a comprehensive data set of all municipal well head protection areas and data set of high capacity wells.		→			
Develop construction site erosion and stormwater ordinance			→		
Identify Karst features and develop a strategy to protect groundwater				→	
Identify Springs and Headwaters					→

Activity	2014	2015	2016	2017	2018
<i>GOAL II. Protect and enhance surface waters and wetlands to preserve their ecological</i>					
Development of Producer led and performance based management strategy for Willow River-Dry Run		→			
Update Shoreland Zoning Ordinance		→			
Implement TMDL Plans: Lake Mallalieu/Willow River, Squaw Lake, St. Croix Basin, Red Cedar Basin					→
Implement Lake Management Plans: Lake Mallalieu, Squaw Lake, Cedar Lake, Bass Lake					→
Agricultural performance standards strategy – see Appendix A					→
Implement BMPs w/TA and/or federal and state cost-sharing					→
Provide technical assistance and promote cooperative projects for land preservation and habitat restoration and protection					→
Complete transect survey for soil loss					→
Review state agricultural facility siting standards					→
Review subdivision plans and assist municipalities in plan review					→
Review performance standards of riverway ordinance					→
Continue surface water level monitoring					→
Assist in floodplain review					→
Use GIS to track projects & monitor implemented projects					→
Coordinate activities with other departments/counties/agencies					→
Implement state and federal regulations locally					→
Provide input to federal and state					→
Develop construction site erosion and stormwater ordinance			→		
Inventory to ID sensitive areas: dry runs, small wetlands					→

Activity	2014	2015	2016	2017	2018
GOAL III. Protect and restore fish and wildlife habitats for native species, improved water quality, recreational opportunities, and natural beauty.					
Provide technical assistance and promote cooperative projects for land preservation and habitat restoration and protection					→
Sell native trees, shrubs, and prairie plants					→
Review and update LWCD cost share practices and standards for habitat protection					→
Encourage habitat preservation in land divisions					→
Encourage use of county-owned properties					→
Review county land management policies					→
Assist with venison donation program					→
Coordinate activities with other departments/counties/agencies					→
Implement state and federal regulations locally					→
Provide input to federal and state					→
Utilize GIS with appropriate activities					→
Develop datasets and monitor county-held conservation easements		→			
Develop invasive species mgt plan: aquatic and terrestrial			→		
Develop a guide for habitat preservation in rural developments				→	
Develop purchase and/or transfer of development rights program for natural community and agricultural land protection					→
GOAL IV. Preserve agricultural land and soils for crop and livestock production, scenic values, and wildlife habitat.					
Amend Ag Zoning Ordinance		→			
Administer and implement Farmland Preservation Program					→
Partner to protect agricultural land					→
Encourage agricultural land preservation as part of town planning					→
Conservation design developments					→
Install BMPs for soil productivity					→
Compensate farmers for wildlife damage to crops					→
Coordinate activities with other departments/ counties/ agencies					→
Implement state and federal regulations locally					→
Provide input to federal and state					→
Utilize GIS with appropriate activities					→
Develop purchase and/or transfer of development rights program for natural community and agricultural land protection					→

APPENDIX D. References

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APPENDIX E. Glossary

ANIMAL WASTE MANAGEMENT:

Practices designed to minimize the impacts of animal manure on surface and groundwater resources. These practices include barnyard runoff management, nutrient management, and manure storage facilities

AQUIFER:

A water-bearing stratum of permeable rock, sand, or gravel.

AREAWIDE WATER QUALITY MANAGEMENT PLAN (208 PLAN):

A plan to document water quality conditions in a drainage basin and make recommendations to protect and improve basin water quality. Each basin in Wisconsin must have a plan prepared for it, according to section 208 of the Clean Water Act.

BASIN PLAN:

See "Areawide Water Quality Management Plan."

BEST MANAGEMENT PRACTICES (BMPs):

The most effective, practical measures to control nonpoint sources of pollutants that run off from land surfaces.

BUFFER STRIPS:

Strips of grass, shrubs, trees, and other vegetation between disturbed areas and a stream, lake, or wetland.

CONSERVATION DESIGN DEVELOPMENT:

Grouping homes on part of a property to maintain a large amount of open space on the remaining land.

CONSERVATION EASEMENT:

A legal document that limits the use of land for purposes such as farming, open space, or wildlife habitat. A landowner may sell or donate an easement to a government agency or a private land trust.

COST-EFFECTIVE:

A level of treatment or management with the greatest incremental benefit for the money spent.

ECOSYSTEM:

A biological community interacting with its nonliving surroundings.

ENVIRONMENTAL PROTECTION AGENCY (USEPA):

The federal agency responsible for enforcing federal environmental regulations. The Environmental Protection Agency delegates some of its responsibilities for water, air, and solid waste pollution control to state agencies.

EROSION:

Wearing away of the land surface by wind or water.

EUTROPHIC:

Refers to a nutrient-rich lake. Large amounts of algae and weeds characterize a eutrophic lake (see also "Oligotrophic" and "Mesotrophic").

EUTROPHICATION:

The process of nutrient enrichment of a lake leading to increased overall production of aquatic organisms. Eutrophication can be accelerated by human activity such as agriculture and improper waste disposal.

FECAL COLIFORM:

A group of bacteria used to indicate the presence of other bacteria that cause disease. The number of coliform is particularly important when water is used for drinking and swimming.

FISHABLE AND SWIMMABLE:

Refers to the water quality goal set for the nation's surface waters by Congress in the Clean Water Act. All waters were to meet this goal by 1984.

GROUNDWATER:

Water that fills internal passageways of underground, porous geologic formations (aquifers) and flows in response to gravity and pressure. Often used as the source of water for communities and industries.

HABITAT:

The place or type of site where a plant or animal naturally lives and grows.

HERBICIDE:

A type of pesticide that is specifically designed to kill plants and can also be toxic to other organisms.

MACROPHYTE:

A rooted aquatic plant.

MESOTROPHIC:

Refers to a moderately fertile nutrient level of a lake between the oligotrophic and eutrophic levels. (See also "Eutrophic" and "Oligotrophic.")

MILLIGRAMS PER LITER (mg/l):

A measure of the concentration of a substance in water. For most pollution measurements this is the equivalent of "parts per million."

MITIGATION:

The effort to lessen the damages from a particular project through modifying a project, providing alternatives, compensating for losses, or replacing lost values.

NONPOINT SOURCE POLLUTION (NSP):

Pollution whose sources cannot be traced to a single point such as a municipal or industrial wastewater treatment plant discharge pipe. Nonpoint sources include eroding farmland and construction sites, urban streets, and barnyards. Pollutants from these sources reach water bodies in runoff, which can best be controlled by proper land management.

NUTRIENT MANAGEMENT PLAN:

A guidance document that provides fertilizer and manure spreading recommendations for crop fields based upon soil test results and crop needs. Plans are sometimes referred to as NRCS 590 plans for the Natural Resources Conservation Service Standard that guides their preparation.

OLIGOTROPHIC:

Refers to an unproductive and nutrient-poor lake. Such lakes typically have very clear water. (See also "Eutrophic" and "Mesotrophic.")

ORDINARY HIGH WATER MARK:

The point on the bank or shore up to which the water leaves a distinct mark on the shore or bank from its presence, wave action, or flow. The mark may be indicated by erosion, destruction of or change in vegetation, or another easily recognizable characteristic.

PESTICIDE:

Any chemical agent used to control specific organisms. Pesticides include insecticides, herbicides, fungicides, etc.

PHOSPHORUS:

A nutrient that, when reaching lakes in excess amounts, can lead to overfertilized conditions and algae blooms.

POINT SOURCES:

Sources of pollution that have discrete discharges, usually from a pipe or outfall.

POLLUTION:

The presence of materials or energy whose nature, location, or quantity produces undesired environmental effects.

PRIME AGRICULTURAL LAND:

Farmland that has gentle slopes and well-drained soils and requires a minimum of conservation practices. It is the easiest land to farm. Class I and II soils, as defined by the Natural Resources Conservation Service are considered prime agricultural soils.

PRIORITY WATERSHED:

A drainage area selected to receive state money to help pay the cost of controlling nonpoint source pollution.

PRIVATELY OWNED WASTEWATER TREATMENT SYSTEMS (POWTS): means a sewage treatment and disposal system serving a single structure with a septic tank and soil absorption field located on the same parcel as the structure. This term also means an alternative sewage system approved by the department including a substitute for the septic tank or soil absorption field, a holding tank, a system serving more than one structure or a system located on a different parcel than the structure. A private sewage system may be owned by the property owner or by a special purpose district.

PRODUCTIVITY:

A measure of the amount of living matter supported by an environment over a specific period of time. Often described in terms of algae production for a lake.

PUBLIC PARTICIPATION:

The active involvement of interested and affected citizens in governmental decision-making.

PURCHASE OF DEVELOPMENT RIGHTS:

The voluntary sale of the rights to develop a piece of property. The sale price is determined by an appraisal. The land may be restricted to farming or open space.

REDUCED TILLAGE:

Planting row crops while only slightly disturbing the soil. With reduced tillage, a protective layer of plant residue stays on the surface and erosion rates decrease.

RIPARIAN:

Belonging or relating to the bank of a lake, river, or stream.

RIPRAP:

Broken rock, cobbles, or boulders placed on the bank of a stream to protect it against erosion.

RUNOFF:

Water from rain, snowmelt, or irrigation that flows over the ground surface and returns to streams and lakes. Runoff can collect pollutants from air or land and carry them to receiving waters.

SEDIMENT:

Soil particles suspended in and carried by water as a result of erosion.

SEPTIC SYSTEM:

Sewage treatment and disposal for homes not connected to sewer lines. Usually the system includes a tank and drain field. Solids settle to the bottom of the tank. Liquid percolates through the drain field. A type of privately owned wastewater treatment system (POWTS).

STORM SEWERS:

A system of sewers that collect and transport rain and snow runoff. In areas that have separated sewers, such stormwater is not mixed with sanitary sewage.

SUSPENDED SOLIDS (SS):

Small particles of solid pollutants suspended in water.

TOLERABLE SOIL LOSS:

The tolerable soil loss rate, commonly referred to as “T,” is the maximum average annual rate of soil erosion for each soil type that will permit a high level of crop productivity to be sustained economically and indefinitely (ATCP 50.01(16)).

TOTAL MAXIMUM DAILY LOADS:

The maximum amount of a pollutant that can be discharged into a stream without causing a violation of water quality standards.

TRANSFER OF DEVELOPMENT RIGHTS:

Property rights that may not be used on the land from which they come. TDRs may be sold to be used on a designated site in a receiving (growth) area. When TDRs are sold, the land they came from is then restricted to farming.

TROPHIC STATUS:

The level of growth or productivity of a lake as measured by phosphorus content, algae abundance, and depth of light penetration.

TURBIDITY:

Lack of water clarity. Turbidity is usually closely related to the amount of suspended solids in water.

UNIFORM DWELLING CODE:

A statewide building code enforced in municipalities with more than 2500 residents specifying requirements for electrical, heating, ventilation, fire, structural, plumbing, construction site erosion, and other construction related practices.

UNIVERSITY OF WISCONSIN-EXTENSION (UWEX):

A special outreach and education branch of the state university system.

VARIANCE:

Government permission for a delay or exception in the application of a given law, ordinance, or regulation. Also, see water quality standard variance.

WASTE:

Unwanted materials left over from manufacturing processes; refuse from places of human or animal habitation.

WATER QUALITY CRITERIA:

A measure of the physical, chemical, or biological characteristics of a water body necessary to protect and maintain different water uses (fish and aquatic life, swimming, etc.).

WATER QUALITY STANDARDS:

The legal basis and determination of the use of a water body and the water quality criteria; physical, chemical, or biological characteristics of a water body that must be met to make it suitable for the specified use.

WATER QUALITY STANDARD VARIANCE:

When natural conditions of a water body preclude meeting all conditions necessary to maintain full fish and aquatic life and swimming, a variance may be granted.

WATERSHED:

The land area that drains into a lake or stream.

WETLANDS:

Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a variety of vegetative or aquatic life. Wetland vegetation requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas.

WISCONSIN ADMINISTRATIVE CODE:

The set of rules written and used by state agencies to implement state statutes. Administrative codes are subject to public hearing and have the force of law.

WISCONSIN NONPOINT SOURCE WATER POLLUTION ABATEMENT GRANT PROGRAM:

A state cost-share program established by the state legislature in 1978 to help pay the costs of controlling nonpoint source pollution. Also known as the nonpoint source element of the Wisconsin Fund or the Priority Watershed Program.

APPENDIX F. List of Commonly Used Initials

BMP	Best Management Practice
BOA	Board of Adjustment
FSA	Farm Service Agency (United States Department of Agriculture)
CDC	Community Development Committee
CREP	Conservation Reserve Enhancement Program
CRP	Federal Conservation Reserve Program
DATCP	Wisconsin Department of Agriculture, Trade, and Consumer Protection
DNR	Wisconsin Department of Natural Resources
EQIP	Environmental Quality Incentives Program (USDA)
FFA	Future Farmers of America
FPP	Farmland Protection Program
FRPP	Farm and Ranchlands Protection Program (USDA)
GIS	Geographic Information System
LWCC	Land and Water Conservation Committee
LWCD	Land and Water Conservation Department
LWCB	Land and Water Conservation Board
LWRMP	Land and Water Resource Management Plan
NAWCA	North American Waterfowl Conservation Act
NPS	National Park Service
NRCS	Natural Resources Conservation Service
PDR	Purchase of Development Rights
POWTS	Privately Owned Wastewater Treatment Systems
SAFE	State Acres for Wildlife Enhancement
RCD	Resource Conservation Division
TDR	Transfer of Development Rights
TA	Technical Assistance
TMDL	Total Maximum Daily Load
USFWS	United States Fish and Wildlife Service
USEPA	United States Environmental Protection Agency
USDA	United States Department of Agriculture
USGS	United States Geological Survey
UWEX	University of Wisconsin-Extension
UWRF	University of Wisconsin River Falls
WAV	Water Action Volunteer
WHIP	Wildlife Habitat Incentives Program
WPDES	Wisconsin Pollutant Discharge Elimination System [permit system]
WRP	Wetland Reserve Program