

# Washington County



## Land & Water Resource Management Plan (2nd Revision 2011-2020)



*“Increasing awareness and promoting action to protect our land and water resources”*





# **WASHINGTON COUNTY LAND AND WATER RESOURCE MANAGEMENT PLAN (2<sup>nd</sup> REVISION 2011-2020)**

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*Mission Statement: To Increase Awareness and Promote Action to Protect the  
Land & Water Resources of Washington County*

**PREPARED UNDER THE JURISDICTION OF THE  
WASHINGTON COUNTY LAND CONSERVATION COMMITTEE:**

*John. W. Stern - Chairperson  
Michael R. Miller - Vice-Chairperson  
Raymond W. Heidtke - Secretary  
Michael C. Bassill - Member  
Melvin K. Ewert - Member  
Gerald J. Schulz - Member  
Peter I. Sorce - Member  
Ralph Dornacker, FSA Representative*

**LAND & WATER RESOURCE MANAGEMENT PLAN (2000-2005)  
ADOPTED BY: WASHINGTON COUNTY BOARD OF SUPERVISORS – SEPTEMBER 12, 2000**

**LAND & WATER RESOURCE MANAGEMENT PLAN (1<sup>ST</sup> REVISION 2006-2010)  
ADOPTED BY: WASHINGTON COUNTY BOARD OF SUPERVISORS – DECEMBER 13, 2005**

**LAND & WATER RESOURCE MANAGEMENT PLAN (2<sup>ND</sup> REVISION 2011-2020)  
APPROVED BY: WISCONSIN LAND AND WATER CONSERVATION BOARD – AUGUST 3, 2010  
PRESENTED TO: WASHINGTON COUNTY BOARD OF SUPERVISORS – OCTOBER 26, 2010**







# Washington County Board of Supervisors

*Herbert J. Tennies, Chair*

*Daniel W. Stoffel, First Vice-Chair*

*John W. Stern, Second Vice-Chair*

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June 10, 2010

Dear Washington County Citizen:

Our County has been blessed with abundant natural resources. We enjoy clear, clean water for drinking and our recreational activities. Our fertile soils provide us with plentiful crops and other resources which make Washington County a great place to live and raise our families. The County's natural resources provide a great quality of life for residents and visitors. As stewards of our natural resources, we are charged with the responsibility of protecting these gifts for our future generations.

This Land & Water Resource Management Plan serves as the basis for county conservation efforts. Citizens and government officials have devoted countless hours to the formulation of this plan. These individuals from diverse backgrounds, provided constructive feedback and thoughtful recommendations for this plan. Through this process many have contributed greatly to the planning efforts with the ultimate goal of protecting the valuable natural resources of this County.

Certainly, during these difficult economic conditions, the tax payer is not interested in spending substantial amounts of money for natural resource protection efforts; however, the future costs of remediation or restoration will be much greater if not protected now. It is in the public's best interest to support these conservation and preservation efforts so as to not further diminish our natural resources and drive costs higher. This plan will provide the necessary action steps and accountability measures with sufficient information for the Board of Supervisors to carefully and reasonably allocate the funding essential for the continuation of the work deemed important by the government, the Citizen Advisory Committee and the public.

As we face the challenges ahead, it is necessary to recognize the past efforts put forth by our citizens. We look especially to the farmer as the primary custodian of our soil and water resources. We should all take heed of the example set by the farmers as good stewards of the land. We must also recognize the efforts put forth by our citizens and elected officials for the stewardship efforts they have also implemented to date. This Land and Water Resource Management Plan is intended to build on these efforts and achieve the goals established.

Lastly, I encourage all Washington County citizens to become involved in the preservation and protection of our valued natural resources. This is an enormous task and government cannot attain the desired results alone. Let us all share in the responsibility of managing our natural resources, which we so value, and the benefits gained by good and sound stewardship efforts.

Sincerely,

Herbert J. Tennies, Chairperson  
Washington County Board of Supervisors



# ACKNOWLEDGEMENTS

The 2nd Revision to the Washington County Land & Water Resource Management Plan involved a diverse group of individuals with a wide range of backgrounds and expertise. Their input and involvement will continue to be a valuable resource in addressing the issues and achieving the goals set forth in this document.

## **Washington County Citizen Advisory Committee:**

Joseph Gonnering, Chairperson	Washington County Board Supervisor & Town of Trenton Chair & Town of Trenton Plan Commission
Ross Bishop, Vice-Chairperson	Washington County Farm Bureau & Washington County Farmer & Resident of the Town of Jackson
George Muth	Washington County Farm Bureau & Washington County Farmer & Resident of the Town of Farmington
Brian Russart	Milwaukee County Parks/UW-Extension & Resident of Village of Slinger
William Ripp, P.E.	City of Hartford - City Engineer
Shawn Graff	Ozaukee Washington Land Trust & Resident of Village of Slinger
Roger Walsh	Big Cedar Lake Protection & Rehabilitation District & Town of West Bend Property Owner
Karl Glunz	Friess Lake Advancement Association & Resident of the Village of Richfield
Kevin Dittmar	Milwaukee Metropolitan Builders Association

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John M. Jung (Vice-Chairperson)	Todd M. Healy
Charlene S. Brady (Secretary)	Michael R. Miller
Marilyn H. Merten	Ralph Dornacker, FSA Representative

## **2010-2012 Washington County Land Conservation Committee:**

John W. Stern (Chairperson)	Melvin K. Ewert
Michael R. Miller (Vice-Chairperson)	Gerald J. Schulz
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## ACRONYMS

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ACS	American Community Survey
AFOs	Animal Feeding Operations
AOA	As opportunity arises
BMPs	Best Management Practices
CAC	Citizen Advisory Committee
CAFOs	Concentrated Animal Feeding Operations
CO BOARD	Washington County Board
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
DATCP	Department of Agriculture, Trade and Consumer Protection
DOA	Wisconsin Department of Administration
DU	Ducks Unlimited
EM	County Emergency Management Department
EQIP	Environmental Quality Incentives Program
FPP	Farmland Preservation Program
FSA	Farm Service Agency
GIS	Geographic Information System
GISD	County Planning & Parks Department - Geographic Information Systems Division
HD	County Health Department
HEL	Highly Erodible Land
HWY	County Highway Department
IPAW	Invasive Plants Association of Wisconsin
LCC	Land Conservation Committee
LG	Washington County Local Governments
LO	Lakes Organizations
LT	Land Trusts
LUD	County Planning & Parks Department - Land Use Division
LWCD	County Planning & Parks Department - Land & Water Conservation Division
LWRM Plan	Land & Water Resource Management Plan
MMSD	Milwaukee Metropolitan Sewage District
MOU	Memorandum of Understanding
NC	Nature Centers
NOD	Notice of Discharge
NON	Notice of Noncompliance
NRCS	Natural Resources Conservation Service
NWF	National Wildlife Foundation
PCPC	Planning, Conservation and Parks Committee
PD	County Planning & Parks Department - Planning Division
POWTS	Private onsite wastewater treatment systems

## ACRONYMS

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PPD	County Planning & Parks Department
PWP	Priority Watershed Program
RO	River Organizations
SD	Washington County - Sheriff's Department
SEWISC	Southeastern Wisconsin Invasive Species Consortium, Inc.
SEWRPC	Southeastern Wisconsin Regional Planning Commission
SIP	Stewardship Incentive Program
SWRM	Soil and Water Resource Management Program
SSURGO	Soil Survey Geographic Database
SWWT	Southeastern Wisconsin Watersheds Trust
T	Soil Loss Tolerance
TCRC&D	Town & Country Resource Conservation and Development, Inc.
TRM	Targeted Resource Management
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UW	University of Wisconsin
UWEX	University of Wisconsin Extension
VOCs	Volatile organic compounds
WDNR	Wisconsin Department of Natural Resources
WEAL	University of Wisconsin - Water & Environmental Analysis Lab
WGNHS	Wisconsin Geological and Natural History Survey
WLI	Working Lands Initiative
WLWCA	Wisconsin Land and Water Conservation Association
WLWCB	Wisconsin Land and Water Conservation Board
WPDES	Wisconsin Pollution Discharge Elimination System
WRP	Wetland Reserve Program



## GLOSSARY

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**303(d) List** - The 303(d) list is prepared by the DNR under requirements of section 303(d) of the Clean Water Act and identifies waters which are not meeting water quality standards, including both water quality criteria for specific substances and the designated uses.

**ATCP 50** - The chapter of Wisconsin's Administrative Code that implements the Land and Water Resource Management Program as described in Chapter 92 of the state statutes.

**Best Management Practices (BMPs)** - The most effective practice or combination of practices for reducing nonpoint source pollution to acceptable levels.

**Citizen Advisory Committee** – A group of citizens formed to assist in the development and/or revisions to the Land & Water Resource Management Plan through recommendations to the Washington County Land Conservation Committee.

**Clean Sweep Program** - A county program that assists residents with the disposal of agricultural pesticides, household hazardous wastes, unwanted electronic goods and pharmaceuticals.

**Conservation Plan** - A record of decisions and intentions made by land users regarding the conservation of the soil, water and related natural resources of a particular unit of land.

**Conservation Reserve Enhancement Program (CREP)** - An add-on to the CRP program which expands and builds on CRP's success.

**Conservation Reserve Program (CRP)** - A provision of the federal Farm Bill that takes eligible cropland out of production and puts it into grass or tree cover for 10-15 years.

**Critical Sites** - Those sites that are significant sources of nonpoint source pollution upon which best management practices must be implemented.

**Environmental Quality Incentive Program (EQIP)** - Federal program to provide technical and cost sharing assistance to landowners for water quality protection.

**Eutrophication** - The process by which a body of water becomes enriched in dissolved nutrients (such as phosphates) that stimulate the growth of aquatic plant life usually resulting in the depletion of dissolved oxygen.

**Farm Service Agency (FSA)** - USDA agency that administers agricultural assistance programs including price supports, production controls and conservation cost sharing.

**Farmland Preservation Program (FPP)** - A DATCP land use program under Chapter 91, Wisconsin Statutes, that helps preserve farmland through local planning and zoning, promotes soil and water conservation and provides tax relief to participating farmers.

**Geographic Information System (GIS)** - A computerized system of maps and layers of data about land including soils, land cover, topography, field boundaries, roads and streams. Such combinations (or layers) of data are otherwise impossible to achieve.

**Highly Erodible Land (HEL)** - Land that has a high potential for soil erosion as defined by the NRCS.

**Hypoxia** - A deficiency of oxygen reaching the tissues of the body; typically associated with the eutrophic conditions caused by excess nutrients (particularly nitrogen) in salt water bodies.

**Land and Water Conservation Board (LWCB)** - The LWCB is an advisory body to the DATCP. The LWCB reviews the DATCP's plans and reports and makes policy recommendations.

**Land and Water Conservation Division (LWCD)** - A division of the Planning and Parks Department responsible for administering the conservation programs and policies of the Land Conservation Committee.

**Land Conservation Committee (LCC)** - The portion of county government empowered, by Chapter 92 of the Wisconsin Statutes, to conserve and protect the county's soil, water and related natural resources.

**Memorandum of Understanding (MOU)** - An agreement between two or more public entities that typically involves one providing the other with services, funding or assistance.

**Natural Resources Conservation Service (NRCS)** - Part of USDA, NRCS provides soil survey, conservation planning and technical assistance to local land users.

**Nonpoint Source Pollution (NPS)** - Pollution from many small or diffuse sources. Livestock waste finding its way into a stream and causing water pollution is an example of a non-point source pollution.

**Notice of Discharge (NOD)** – Issued by the DNR under s. NR 243.24 for having unacceptable practices that causes or have caused discharge of pollutants to waters of the state or that results in an operation's failure to comply with livestock performance standards and prohibitions NR-151.

**Town & Country Resource Conservation and Development, Inc. (RC&D)** - USDA program that focuses on utilizing and conserving natural resources for economic development, administered by NRCS.

**Soil and Water Resource Management Program (SWRM)** - DATCP program that provides counties with funds to hire and support Land & Water Conservation Division staff and to assist land users in implementing DATCP conservation programs.

**Soil Survey** - NRCS conducts the National Cooperative Soil Survey and publishes soil survey reports. Soils data is available digitally, for soil potential ratings, for interpretations and for Geographical Information Services.

**Stewardship Incentive Program (SIP)** – Local program created by the LCC in 2002 to utilize the proceeds of the annual LWCD Native Tree Sale Program as cost share support to local landowners, units of government and non-profit organizations which will encourage and enable them to implement soil erosion control and runoff management practices.

**Sustainable / Alternative Agriculture** - Agricultural practices that enhance environmental quality, provide food and fiber, and enhance the quality of life for farmers and society as a whole.

**Tolerant Soil Loss Rate ("T")** - Maximum erosion rate (tons/acre/year) at which a soil could maintain productivity.

**University of Wisconsin-Extension (UWEX)** - The outreach of the University of Wisconsin system responsible for formal and informal educational programs throughout the state.

**US Army Corps of Engineers (USACE)** - Federal agency responsible for issuing permits to allow alteration of wetlands.

**US Fish and Wildlife Service (USFWS)** - Federal agency that manages Horicon, Necedah, Trempealeau and Fox River National Wildlife Refuges. The FWS also works with participating LCCs to protect and restore wetlands through matching grants programs.

**Volatile Organic Compounds (VOCs)** - Organic solvents such as tetrachloroethylene, trichloroethylene and chloroform used for degreasing, dry-cleaning and other farm, industrial and domestic applications, many of which are considered to be carcinogens.

**Watershed** - The geographic area from which a particular river, stream or water body receives its water supply.

**Wetlands Reserve Program (WRP)** - A provision of the federal Farm Bill that compensates landowners for voluntarily restoring and protecting wetlands on their property.

**Wisconsin Department of Administration (DOA)** - The department of state government that provides the Governor with fiscal management information and policy alternatives for preparation of Wisconsin's budget. The department also analyzes administrative and fiscal issues faced by the state and recommends solutions.

**Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP)** - The state agency responsible for establishing statewide soil and water conservation policies and administering the state's soil and water conservation programs. The DATCP administers state cost sharing funds for a variety of LCC operations, including support for staff, materials and conservation practices.

**Wisconsin Department of Natural Resources (WDNR)** - The state agency responsible for managing state owned lands and protecting public waters. DNR also administers programs to regulate, guide and assist LCCs, LWCDs and individual land users in managing land, water, fish and wildlife.

**Wisconsin Land and Water Conservation Association (WLWCA)** - Membership organization that represents the state's 72 County Land Conservation Committees.

**Working Lands Initiative (WLI)** – A state program designed to achieve preservation of areas significant for current and future agricultural uses by expanding and modernizing the state's existing farmland preservation program, establishing agricultural enterprise areas (AEAs), and developing a purchase of agricultural conservation easement matching grant program (PACE).

## Chapter I

# INTRODUCTION

## PLAN BACKGROUND & PURPOSE ---

Conservation professionals throughout Wisconsin proposed the Land and Water Resource Management (LWRM) Plan concept in 1996. This idea originated partly in response to the State Legislative call to “redesign” the Nonpoint Pollution Abatement Program. More importantly, it evolved from the long-standing need to establish and implement locally led conservation programs. The Wisconsin Land and Water Conservation Association (WLWCA) promoted the concept during State legislative deliberations in 1997, and soon gained the support of the Department of Natural Resources (WDNR), the Department of Agriculture, Trade and Consumer Protection (DATCP) and the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS).

In fall of 1997, the Legislature amended Chapter 92.10 of the *Wisconsin Statutes* to give counties the authority to develop their own LWRM plans, which would serve as the foundation for future conservation efforts. These plans serve as a multi-year work plan which will:

- Identify local resources, concerns and priorities
- Integrate existing resource management programs, plans and funding sources
- Establish partnerships between agencies, municipalities and other organizations
- Incorporate an information and education strategy for each plan objective
- Identify a method to evaluate and monitor progress

As referenced throughout this plan, there are numerous local and regional plans which currently focus on natural resource protection. This document attempts to incorporate many elements of those plans.

Washington County’s first LWRM plan was approved in 2000 and revised in 2005. To meet current eligibility requirements for state conservation staff funding, work plans must be updated at least every five years, allowing an extension of the LWRM plan for an additional 5 years. This is the second revision of the original plan.

Natural Resource Best Management Practices (BMPs) have been effectively implemented throughout Washington County by the Land and Water Conservation Division (LWCD) staff over the past 25 years. Installation of these practices continues to be primarily funded through federal and state programs as well as through the County Stewardship Incentive Program supported through our annual Native Tree Sale Program. Soil and Water Conservation Practice achievements for the period 1985 – 2009 were included in this revision as Appendix A.



## **PLAN REVISION**

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In January of 2010, the LWCD and the Planning Division (PD) began revising the LWRM Plan. The planning process involved cooperating agencies including other Divisions of the Washington County Planning and Parks Department (PPD), University of Wisconsin-Extension (UWEX), WDNR, NRCS and DATCP. Participation from the public in the development of the plan is an integral part of the planning process.

The 2010 revision process included four Citizen's Advisory Committee (CAC) meetings which occurred on the following dates: February 16, March 16, April 7, and April 21, 2010. Participants included farmers, rural and city residents, a developer, and officials from local governments. Three of the nine CAC members had participated with previous LWRM plan development processes, which allowed continuity between plan revisions. The CAC committee members reviewed the accomplishments of the last LWRM plan, and recommended amendments/revisions to the work plan along with adding recommendations for work plan action items, ranking issues, goals and objectives. To ensure that national, regional and state resource issues and concerns were included in the County LWRM Plan, representatives from the NRCS, UWEX, WDNR, DATCP and Southeastern Wisconsin Regional Planning Commission (SEWRPC) participated as members of the work group. As a result, the committee was able to identify many commonalities between the county, regional, state and national priority issues, allowing for improved integration and coordination of efforts.

A public informational meeting / public hearing regarding the revised draft Land and Water Resource Management Plan was held on June 29, 2010 at 4:30 P.M.; the public hearing was published as a legal notice on June 15 and June 22, 2010 (Appendix B).

## **FRAMEWORK FOR IMPLEMENTATION**

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Citizen Advisory Committee members and the Land Conservation Committee established the following guiding principles for plan development and implementation:

- Recognize and account for the potential impacts of mandating conservation practices where substantial costs and management changes are required.
- Emphasize the positive economic and ecological benefits of natural resource management.
- Provide clear, concise and coordinated procedures to comply with state and local regulations.
- Coordinate the LWRM Plan activities with those of other state and local resource management efforts.
- Enhance collaboration between governmental units.

- Prioritize natural resource management efforts based upon the quality, sensitivity and level of impairment.
- Conduct informational and educational programming for all plan objectives.

Where applicable, these principles have been used in the development of the LWRM plan and serve as guidance for plan implementation.

## **TECHNICAL AND FINANCIAL ASSISTANCE** ---

One of the strengths of the LWCD is providing high quality engineering and technical assistance to farmers, residents, and local units of government for natural resource protection and remediation. A top priority for the Division will be to ensure that, through ongoing training and professional development, LWCD staff continues to provide sound, professional services based on the best available technology, information, and research.

Another practice is that of providing cost share assistance to farmers and other landowners who implement management practices that conserve natural resources. Cost share assistance is used to help cover out-of-pocket expenses or is provided in the form of an incentive payment. The County will continue to strive to provide adequate financial assistance, for both voluntary and regulated activities, and will try to attain sufficient funding to meet the goals of this plan.

## Chapter II

# DEMOGRAPHICS AND LAND USE

Land uses and trends in population and households are important considerations in the planning and management of land and water resources. The future demand for land, housing, and supporting community facilities depends directly on future population and households. This chapter provides information on historic, existing and projected population and households levels. Information on historic urban growth and land use trends is also included in this chapter. Much of the inventory data in this chapter is from *A Multi-Jurisdictional Comprehensive Plan for Washington County: 2035* which was adopted by the Washington County Board of Supervisors on April 15, 2008.

## POPULATION

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### POPULATION TRENDS

Washington County experienced rapid growth rates in the decades between 1940 and 1980, including population gains of over 35 percent in each of the two decades between 1950 and 1970. This rapid growth can be attributed to both the migration of new residents to Washington County and the natural increase of the existing population (more births than deaths). The historic and current population of Washington County is set forth in Table 1.

**Table 1:  
HISTORIC RESIDENT POPULATION LEVELS IN WASHINGTON COUNTY,  
SOUTHEASTERN WISCONSIN, AND THE STATE OF WISCONSIN: 1950-2009**

Washington County				Southeastern Wisconsin			Wisconsin		
Year	Population	Change from Preceding Census		Population	Change from Preceding Census		Population	Change from Preceding Census	
		Absolute	Percent		Absolute	Percent		Absolute	Percent
1950	33,902	5,472	19.2	1,240,618	172,919	16.2	3,434,575	296,988	9.5
1960	46,119	12,217	36.0	1,573,614	332,996	26.8	3,951,777	517,202	15.1
1970	63,839	17,720	38.4	1,756,083	182,469	11.6	4,417,821	466,044	11.8
1980	84,848	21,009	32.9	1,764,796	8,713	0.5	4,705,642	287,821	6.5
1990	95,328	10,480	12.4	1,810,364	45,568	2.6	4,891,769	186,127	4.0
2000	117,493	22,165	23.3	1,932,908	122,544	6.8	5,363,675	471,906	9.6
2009 <sup>a</sup>	131,066	13,573	11.6	1,993,690	60,782	3.1	5,688,040	324,365	6.0

<sup>a</sup>2009 Wisconsin Department of Administration Population Estimates

Source: U.S. Bureau of the Census and SEWRPC.

From 1990 to 2000, Washington County’s population grew just over 23 percent, adding approximately 22,000 new residents. The Wisconsin Department of Administration (DOA) estimates that the County population grew by just over 11 percent, from 117,496 to 131,066 residents between 2000 and 2009<sup>1</sup>, ranking Washington County among the six fastest growing counties in Wisconsin by percent change in population growth. Between 2000 and 2009, the Village of Jackson had the highest percent increase in population of 29.3 percent, followed by the Village of Kewaskum with an increase of 28.9 percent. The change in population by community is displayed in Table 2.

**Table 2:  
POPULATION BY COMMUNITY IN WASHINGTON COUNTY: 2000 – 2009<sup>a</sup>**

<b>Community</b>	<b>2000 Census</b>	<b>2009 Estimate</b>	<b>Numeric Change</b>	<b>Percentage Change</b>
Town of Addison	3,341	3,568	227	6.8%
Town of Barton	2,546	2,655	109	4.3%
Town of Erin	3,664	3,903	239	6.5%
Town of Farmington	3,239	3,566	327	10.1%
Town of Germantown	278	287	9	3.2%
Town of Hartford	4,031	3,997	(34)	-0.8%
Town of Jackson	3,516	3,922	406	11.5%
Town of Kewaskum	1,119	1,148	29	2.6%
Town of Polk	3,938	4,037	99	2.5%
Town of Trenton	4,440	4,878	438	9.9%
Town of Wayne	1,727	2,029	302	17.5%
Town of West Bend	4,834	4,884	50	1.0%
Village of Germantown	18,260	19,930	1,670	9.1%
Village of Jackson	4,938	6,386	1,448	29.3%
Village of Kewaskum	3,274	4,220	946	28.9%
Village of Newburg	1,027	1,114	87	8.5%
Village of Richfield	10,373	11,470	1,097	10.6%
Village of Slinger	3,901	4,772	871	22.3%
City of Hartford	10,895	13,900	3,005	27.6%
City of West Bend	28,152	30,400	2,248	8.0%
<b>Washington County</b>	<b>117,493</b>	<b>131,066</b>	<b>13,570</b>	<b>11.5%</b>

<sup>a</sup> Population estimates do not include portions of communities outside of Washington County

Source: U.S. Bureau of the Census and Wisconsin Department of Administration Population Estimates

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<sup>1</sup> Wisconsin Department of Administration Population Estimates

## **RACIAL COMPOSITION AND HISPANIC ORIGIN**

According to the U.S. Census Bureau, U.S. federal government agencies must adhere to standards issued by the Office of Management and Budget (OMB) in October 1997, which specify that race and Hispanic origin (also known as ethnicity) are two separate and distinct concepts. These standards generally reflect a social definition of race and ethnicity recognized in this country and they do not conform to any biological, anthropological, or genetic criteria. The standards include five minimum categories for data on race: "American Indian or Alaska Native," "Asian," "Black or African American," "Native Hawaiian or Other Pacific Islander," and "White." There are two minimum categories for data on ethnicity: "Hispanic or Latino" and "Not Hispanic or Latino." The concept of race reflects self-identification by people according to the race or races with which they most closely identify. Persons who report themselves as Hispanic can be of any race and are identified as such in the U.S. Census data tables.

The Decennial Census (also known as the Census of Population and Housing) is the most comprehensive census of the U.S. population conducted. It is conducted every 10 years beginning in 1790. The American Community Survey (ACS) replaces the long form of the decennial census from 2010. In December 2008, the Census Bureau introduced ACS multiyear estimates, specifically 3-year estimates. These estimates are based on data collected over a 3-year period of time and therefore they describe the average characteristics for that 3-year time period.

As part of the 2000 Census, respondents were given the opportunity for the first time to specify more than one race when reporting their racial identity. About 99 percent of the population of Washington County reported only one race. This includes 97.7 percent reporting White; 0.4 percent reporting Black or African American and 0.6 percent reporting Asian. From 2000 to 2008, the largest percentage change in race was a 161.1 percent increase in the Black or African American population. Racial composition for Washington County is displayed in Table 3.

As indicated in Table 4, the Hispanic population comprised less than 2 percent of the total population in Washington County. In the 2000 Census, 1.3 percent of the County population reported "Hispanic or Latino" ethnicity and 98.7 percent reported "Not-Hispanic or Latino" ethnicity. From 2000 to 2008, the Hispanic population in Washington County increased by 964 persons, or by 63.0 percent.



**Table 3:  
WASHINGTON COUNTY POPULATION BY RACE**

<b>Race</b>	<b>2000</b>	<b>% of Pop</b>	<b>2008</b>	<b>% of Pop</b>	<b>2000-2008 Change</b>	<b>2000-2008 % Change</b>
White	114,778	97.7%	123,403	96.4%	8,625	7.5%
Black or African American	465	0.4%	1,214	0.9%	749	161.1%
American Indian and Alaska Native	296	0.2%	282	0.2%	-14	-4.7%
Asian	674	0.6%	1,113	0.9%	439	65.1%
Native Hawaiian and Other Pacific Islander	35	<0.1%	N/A <sup>a</sup>	N/A	N/A	N/A
Some other race	474	0.4%	685	0.5%	211	44.5%
Two or more Races	771	0.7%	1,283	1.0%	512	66.4%
<b>Totals</b>	<b>117,493</b>	<b>100.0%</b>	<b>127,980</b>	<b>99.9%</b>	<b>10,487</b>	<b>8.9%</b>

<sup>a</sup> 2006-2008 American Community Survey 3-Year Estimates for Native Hawaiian and Other Pacific Islander has a margin of error of +/- 123.

**Table 4:  
WASHINGTON COUNTY POPULATION BY HISPANIC ORIGIN**

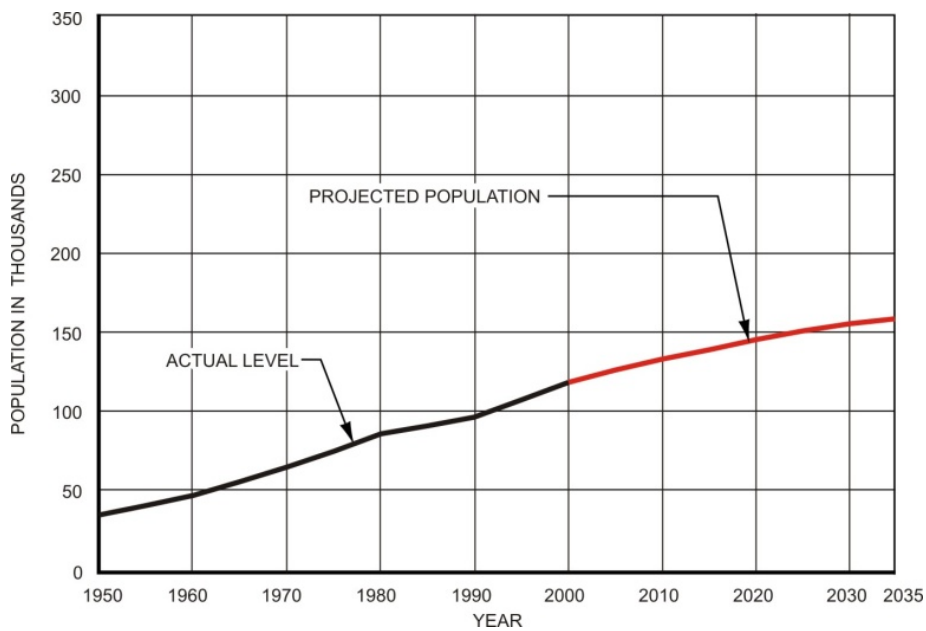
<b>Hispanic Origin</b>	<b>2000</b>	<b>% of Population</b>	<b>2008</b>	<b>% of Population</b>	<b>2000-2008 Change</b>	<b>2000-2008 % Change</b>
Hispanic or Latino (of any race)	1,529	1.3%	2,493	1.9%	964	63.0%
Not Hispanic or Latino	115,964	98.7%	125,487	98.1%	9,523	8.2%
<b>Totals</b>	<b>117,493</b>	<b>100.0%</b>	<b>127,980</b>	<b>100.0%</b>	<b>10,487</b>	<b>8.9%</b>

Source: 2000 US Census, 2006-08 American Community Survey and Washington County

## POPULATION PROJECTIONS

Population and household projections for the year 2035 were prepared by Southeastern Wisconsin Regional Planning Commission (SEWRPC) in 2004-2005. The projected population for Washington County in 2035 is 157,265 persons. This is a projected increase of 39,769 persons, or about 34 percent, over the 2000 population level of 117,496. Figure 1 shows the forecast growth between 2000 and 2035 in relation to historic population growth between 1950 and 2000.

**Figure 1:**  
**ACTUAL AND PROJECTED POPULATION IN**  
**WASHINGTON COUNTY: 1950-2035**



*Source: U.S. Bureau of the Census and SEWRPC.*

SEWRPC population projections anticipate change in the age structure over time. Although the number of persons in all age groups younger than 65 years of age will increase between 2000 and 2035, the percentage of the population in those age groups will decrease for the same time period. By 2030, all of the baby-boom generation will be over age 65. In 2035, persons 65 years of age and older would comprise about 24 percent of the County population, compared to about 11 percent in 2000. The aging of the large baby-boom generation may be expected to have a range of impacts, including impacts on the available labor force and the need for housing, health care, transportation, and other services for a more elderly population.

Existing and projected population totals for each urban service area and portions of the County outside planned urban service areas are set forth on Table 5. Planned urban service areas generally include existing sewer service areas and additional contiguous lands needed to accommodate anticipated urban development.

## **HOUSEHOLDS**

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### **HOUSEHOLD TRENDS**

The number of households, or occupied housing units, is important to land use planning. Households directly influence the demand for urban land as well as the demand for transportation and other public facilities and services, such as public sewer, water, and parks. A household includes all persons who occupy a housing unit – defined by the Census Bureau as a house, apartment, a mobile home, a group of rooms, or a single room that is occupied or intended for occupancy, as separate living quarters. Persons not living in households are classified by the Census Bureau as living in group quarters, such as correctional facilities, college dormitories, and military quarters<sup>2</sup>.

The number of households and the average household size in Washington County and each local government for 1980, 1990, and 2000 are set forth in Table 6. There were 43,842 households in Washington County in 2000, with an average household size of 2.65 persons, compared to an average household size of 2.52 persons in the Region.

As shown on Table 6, the number of households has increased in each local government and the County in each decade, with a few exceptions. While the number of households has increased steadily in most local governments, the average number of persons per household has decreased in each local government and the County between 1980 and 1990 and between 1990 and 2000.

This trend has occurred throughout Wisconsin, and reflects the fact that family sizes (average number of children per family) have decreased and unmarried persons have increasingly tended

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<sup>2</sup> Technical Report Number 11, *The Population of Southeastern Wisconsin*, SEWRPC, 2004

to establish their own households rather than live with family. The Town of Germantown had the highest average household size in the County, which indicates that there were relatively more families occupying homes in the Town than elsewhere in the County. Average household sizes are larger in towns than in cities and villages, which can be attributed to a higher percentage of single-family homes in the towns. Single-family homes are more likely to be occupied by families than are apartments.

According to the US Census Bureau 2005-2007 ACS, there were 50,050 households in Washington County in 2007.

**Table 5:  
POPULATION PROJECTION FOR WASHINGTON COUNTY  
UNDER THE REGIONAL LAND USE PLAN: 2035**

Sub-Area	Existing Population: 2000			Projected Population: 2035			2000 – 2035 Change	
	Sewered	Unsewered	Total	Sewered	Unsewered	Total	Number	Percent
<b>Urban Service Areas</b>								
Allenton	742	124	866	1,483	--	1,483	617	71.2
Germantown	14,851	1,395	16,246	23,807	--	23,807	7,561	46.5
Hartford	11,688	1,060	12,748	18,109	--	18,109	5,361	42.1
Jackson	5,008	481	5,489	9,886	--	9,886	4,397	80.1
Kewaskum	3,314	143	3,457	5,436	--	5,436	1,979	57.2
Newburg <sup>a</sup>	1,046	291	1,337	1,657	--	1,657	320	23.9
Slinger	4,472	606	5,078	8,038	--	8,038	2,960	58.3
West Bend <sup>b</sup>	30,359	1,364	31,723	44,591	--	44,591	12,868	40.6
Subtotal	71,480	5,464	76,944	113,007	--	113,007	36,063	46.9
<b>Unsewered Areas<sup>c</sup></b>								
Addison	--	2,475	2,475	--	2,527	2,527	52	2.1
Barton	--	1,839	1,839	--	2,024	2,024	185	10.1
Erin	--	3,664	3,664	--	4,655	4,655	991	27.0
Farmington	--	3,239	3,239	--	3,403	3,403	164	5.1
Germantown	--	2,292	2,292	--	2,249	2,249	43	1.9
Hartford	--	1,183	1,183	--	1,357	1,357	174	14.7
Jackson	--	3,165	3,165	--	3,228	3,228	63	2.0
Kewaskum	--	939	939	--	937	937	2	0.2
Polk	--	3,556	3,556	--	3,644	3,644	88	2.5
Richfield	--	10,373	10,373	--	11,786	11,786	1,413	13.6
Trenton	--	2,656	2,656	--	2,767	2,767	111	4.2
Wayne	--	1,727	1,727	--	1,897	1,897	170	9.8
West Bend	--	3,444	3,444	--	3,784	3,784	340	9.9
Subtotal	--	40,552	40,552	--	44,258	44,258	3,706	9.1
Washington County	71,480	46,016	117,496	113,007	44,258	157,265	39,769	33.8

<sup>a</sup>Includes only that portion of the Village of Newburg urban service area in Washington County. The 2000 population in the entire Newburg urban service area was 1,458 persons, and the projected 2035 population is 1,897 persons.

<sup>b</sup>The West Bend sewer service area serves portions of the Big Cedar Lake area.

<sup>c</sup>Areas located outside planned urban service areas.

Source: SEWRPC.

**Table 6:  
NUMBER OF HOUSEHOLDS AND AVERAGE HOUSEHOLD SIZE  
FOR WASHINGTON COUNTY COMMUNITIES: 1980-2000**

Community	1980			1990			2000		
	Number of Households	Percent of County Households	Average Household Size	Number of Households	Percent of County Households	Average Household Size	Number of Households	Percent of County Households	Average Household Size
<b>Towns</b>									
Addison	796	3.0	3.56	943	2.9	3.22	1,149	2.6	2.90
Barton	703	2.6	3.55	821	2.5	3.21	896	2.0	2.84
Erin	718	2.7	3.39	911	2.8	3.07	1,287	2.9	2.83
Farmington	677	2.5	3.52	789	2.4	3.20	1,116	2.5	2.90
Germantown	75	0.3	3.56	81	0.3	3.19	89	0.2	3.12
Hartford	988	3.7	3.31	1,105	3.3	2.93	1,397	3.2	2.88
Jackson	915	3.4	3.48	995	3.0	3.19	1,201	2.7	2.93
Kewaskum	366	1.4	3.40	356	1.0	3.19	394	0.9	2.84
Polk	1,057	4.0	3.28	1,136	3.4	3.10	1,352	3.1	2.89
Richfield	2,384	8.9	3.52	2,839	8.6	3.17	3,614	8.2	2.87
Trenton	1,112	4.2	3.52	1,236	3.7	3.25	1,520	3.5	2.91
Wayne	409	1.5	3.60	418	1.3	3.29	582	1.3	2.97
West Bend	1,033	3.9	3.10	1,629	5.0	2.56	1,611	3.7	2.74
<b>Villages</b>									
Germantown	3,428	12.8	3.13	4,931	15.0	2.77	6,904	15.8	2.63
Jackson	672	2.5	2.70	953	2.9	2.60	1,949	4.4	2.53
Kewaskum	787	3.0	3.00	925	2.8	2.72	1,212	2.8	2.64
Newburg <sup>a</sup>	226	0.8	3.04	290	0.9	2.94	398	0.8	2.80
Slinger	526	2.0	3.05	882	2.7	2.62	1,562	3.6	2.46
<b>Cities</b>									
Hartford <sup>b</sup>	2,550	9.5	2.75	3,051	9.2	2.64	4,279	9.8	2.51
West Bend	7,293	27.3	2.90	8,686	26.3	2.71	11,375	26.0	2.44
<b>Washington County<sup>c</sup></b>	26,715	100.0	3.14	32,977	100.0	2.86	43,842	100.0	2.65

<sup>a</sup>Includes that portion of the Village of Newburg located in Ozaukee County. There were 226 households in Washington County in 1980, 290 households in 1990, and 356 households in 2000.

<sup>b</sup>Includes that portion of the City of Hartford located in Dodge County. There were 2,550 households in Washington County in 1980, 3,051 households in 1990, and 4,276 households in 2000.

<sup>c</sup>Includes Washington County only.

Source: U. S. Census Bureau, SEWRPC and Washington County.

## HOUSEHOLD PROJECTIONS

Changes in the number and size of households will accompany changes in the size of the resident population. Taking the assumptions from the regional land use plan into consideration, the projected number of households for Washington County in 2035 is 62,849. This is a projected increase of 19,006 households, or about 43 percent, over the 43,843 households in 2000. Household projections for sewer service areas and their adjacent urban service areas and portions of the County outside sewer service areas are shown on Table 7.

**Table 7:  
HOUSEHOLD PROJECTIONS FOR WASHINGTON COUNTY  
UNDER THE REGIONAL LAND USE PLAN: 2035**

Sub-Area	Existing Population: 2000			Projected Population: 2035			2000 – 2035 Change		Average Household Size: 2035
	Sewered	Unsewered	Total	Sewered	Unsewered	Total	Total	Percent	
<b>Urban Service Areas</b>									
Allenton	285	46	331	604	--	604	273	82.5	2.42
Germantown	5,610	571	6,181	9,588	--	9,588	3,407	55.1	2.43
Hartford	4,594	374	4,968	7,467	--	7,467	2,499	50.3	2.37
Jackson	1,979	161	2,140	4,103	--	4,103	1,963	91.7	2.38
Kewaskum	1,228	59	1,287	2,136	--	2,136	849	66.0	2.46
Newburg <sup>a</sup>	362	105	467	632	--	632	165	35.3	2.61
Slinger	1,732	198	1,930	3,230	--	3,230	1,300	67.4	2.43
West Bend <sup>b</sup>	12,058	491	12,549	18,628	--	18,628	6,079	48.4	2.30
Subtotal	27,848	2,005	29,853	46,388	--	46,388	16,535	55.4	--
<b>Unsewered Areas<sup>c</sup></b>									
Addison	--	818	818	--	904	904	86	10.5	2.80
Barton	--	622	622	--	740	740	118	19.0	2.72
Erin	--	1,287	1,287	--	1,757	1,757	470	36.5	2.62
Farmington	--	1,116	1,116	--	1,264	1,264	148	13.3	2.69
Germantown	--	812	812	--	861	861	49	6.0	2.61
Hartford	--	408	408	--	514	514	96	23.5	2.69
Jackson	--	1,075	1,075	--	1,186	1,186	111	10.3	2.72
Kewaskum	--	320	320	--	346	346	26	8.1	2.71
Polk	--	1,216	1,216	--	1,334	1,334	118	9.7	2.68
Richfield	--	3,614	3,614	--	4,431	4,431	817	22.6	2.66
Trenton	--	882	882	--	987	987	105	11.9	2.77
Wayne	--	582	582	--	689	689	107	18.4	2.75
West Bend	--	1,238	1,238	--	1,458	1,458	220	17.8	2.59
Subtotal	--	13,990	13,990	--	16,461	16,461	2,471	17.7	--
Washington County	27,848	15,995	43,843	46,388	16,461	62,849	19,006	43.4	2.45

<sup>a</sup>Includes only that portion of the Village of Newburg urban service area in Washington County. There were 520 households in the entire Newburg urban service area in 2000. The projected number of households in 2035 is 735.

<sup>b</sup>The West Bend sewer service area serves portions of the Big Cedar Lake area.

<sup>c</sup>Areas located outside planned urban service areas.

Source: SEWRPC.

The projected average household size for the County in 2035 is 2.45 persons per household. This is a decrease of about 8 percent from the 2000 average of 2.65 persons per household. This household size decrease may be anticipated as a result of a combination of factors, including a continued change in household types, as well as the projected increase in the older population age groups for which average household sizes tend to be smaller than for the total population.

## **HISTORIC URBAN GROWTH**

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### **URBAN GROWTH RING ANALYSIS AND HISTORICAL URBAN GROWTH**

The SEWRPC utilizes an urban growth ring analysis and a land use inventory to inventory and monitor urban growth and development in the Region. The urban growth ring analysis delineates the outer limits of concentrations of urban development and depicts the urbanization of the Region over the past 150 years. The land use inventory places all land and water areas in the Region into one of 66 land use categories, providing a basis for analyzing specific urban and nonurban land uses. Both the urban growth ring analysis and the land use inventory for the Region have been updated to the year 2000 under the continuing regional planning program. Changes in land use between 2000 and 2006 were identified in *A Multi-Jurisdictional Comprehensive Plan for Washington County: 2035*.

The urban growth ring analysis shows the historical pattern of urban settlement, growth, and development of the County since 1850 for selected points in time. Areas identified as urban under this time series analysis include portions of the County where residential structures or other buildings were constructed in relatively compact areas, thereby indicating a concentration of residential, commercial, industrial, governmental, institutional, or other urban uses. These areas must be at least five acres in size. In the case of residential uses, such areas must include at least 10 homes over a maximum distance of one-half mile along a linear feature such as a street or lakeshore, or at least 10 homes located in a relatively compact group within a residential subdivision. Uses such as cemeteries, airports, public parks and golf courses do not meet the criteria for urban land uses because they lack the required concentration of buildings or structures. However, these land uses are identified as urban uses if they are surrounded on at least three sides by urban land uses that do meet the above criteria.

Historical urban growth in the County between 1850 and 2000 is shown in Map 1. Urban growth for the years prior to 1940 was identified using a variety of sources, including the records of local historical societies, subdivision plat records, farm plat maps, U.S. Geological Survey maps, and Wisconsin Geological and Natural History Survey records. Urban growth for the years 1950, 1963, 1975, 1985, 1995, and 2000 was identified using aerial photographs.

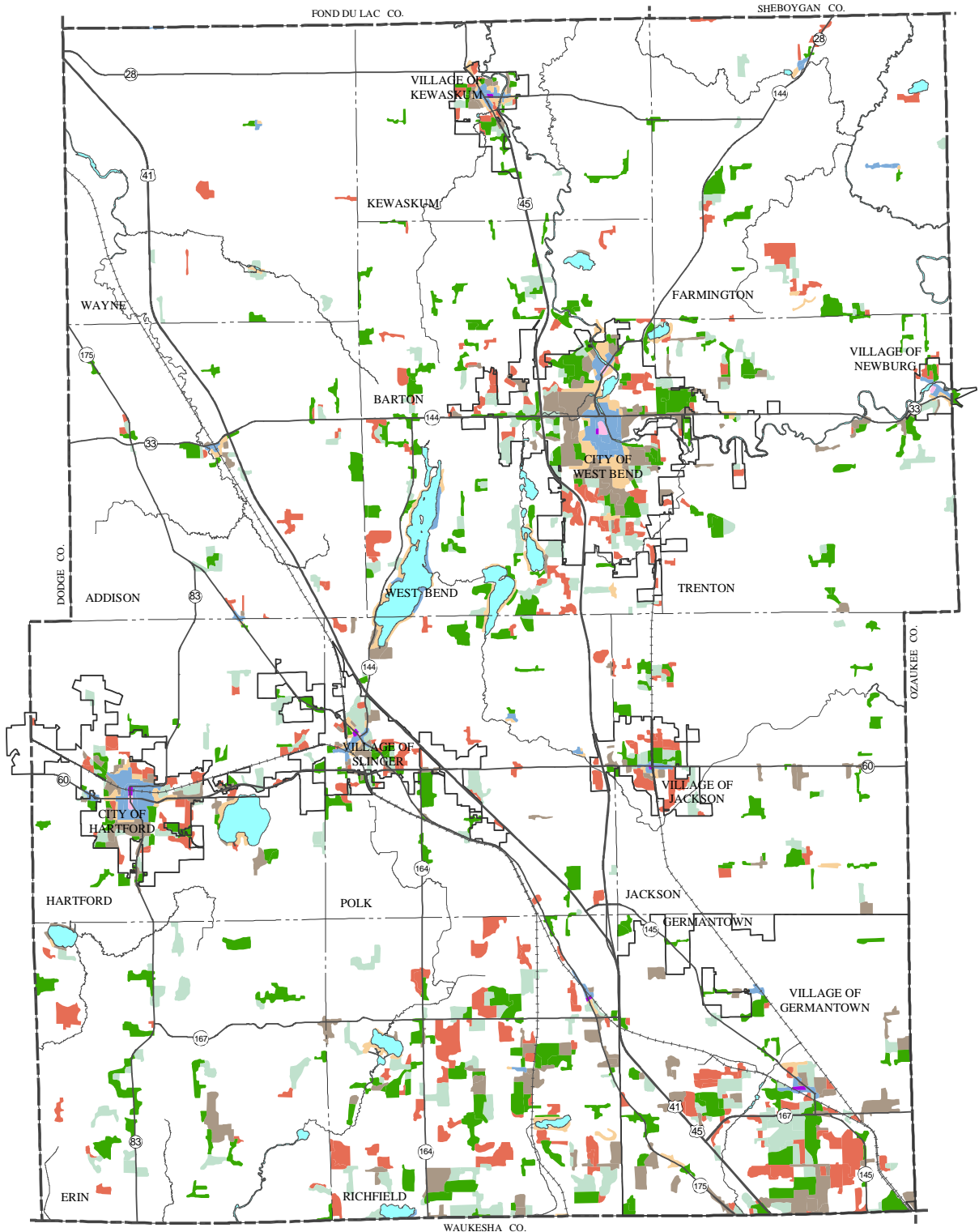
Small portions of the Cities of West Bend and Hartford, and the Villages of Slinger and Newburg were developed prior to 1850. In 1900, urban development was still largely confined to the Cities of Hartford and West Bend and Villages of Newburg and Slinger with additional development in the Villages of Germantown, Jackson, and Kewaskum. The period from 1900 to 1950 saw expansion of mainly the Cities of Hartford and West Bend. The period between 1950











and 1985 saw significant growth outward from existing urban areas and the development of lakeshores around Big Cedar Lake, Little Cedar Lake, and Pike Lake. The period from 1963 to 2000 saw significant urban growth in scattered locations throughout the County, particularly in the southern portion of the County in the Village of Germantown, and the Towns of Erin and Richfield. Moderate development in and around the City of West Bend and the other established urban centers in the northern portion of the County also occurred during this period.

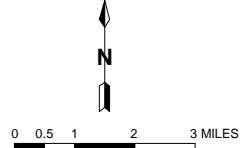
# Map 1

## HISTORICAL URBAN GROWTH IN WASHINGTON COUNTY: 1850 - 2000



	BEFORE 1850		1963 - 1975
	1850 - 1900		1975 - 1985
	1900 - 1950		1985 - 1995
	1950 - 1963		1995 - 2000

Source: SEWRPC.



# LAND USE

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## LAND USE TRENDS

The number of acres in various land use categories in Washington County for selected years from 1975 to 2000 is shown in Table 8. Table 8 also includes the acreage and percentage change in each land use category between 1975 and 2000, and for intervening time periods.

Between 1975 and 2000, the amount of land used for urban uses, including residential, commercial, industrial, and transportation uses, increased by about 21,000 acres, from about 28,000 acres to about 49,000 acres, or about 75 percent. The amount of land used for residential, commercial, and industrial purposes more than doubled during this time period.

The percentage of land classified as "nonurban" decreased by about 8 percent between 1975 and 2000. Much of the land developed for urban uses between 1975 and 2000 was converted from agricultural to urban use. The amount of land used for agriculture decreased by about 33,000 acres, or by about 19 percent. The number of acres in the "open lands" category, that is, lands that are vacant and apparently unused, increased by about 9,200 acres during the 1975 to 2000 period. Much of the increase in the "open lands" category is likely due to land being taken out of agriculture. The acreage of woodlands, wetlands, surface waters, and extractive sites increased slightly between 1975 and 2000.

## EXISTING LAND USES: 2006

In an effort to obtain the most current information available, prior to developing the Land Use Element of *A Multi-Jurisdictional Comprehensive Plan for Washington County: 2035*, the 2000 land use inventory was updated to 2006. The 2006 land use inventory for the County is shown on Map 2 and quantitatively summarized in Table 9.

The 2006 generalized land use inventory differs somewhat from the detailed land use inventories conducted by SEWRPC in 2000 and prior years. The 2006 inventory is therefore not directly comparable to earlier SEWRPC land use inventories. The generalized inventory includes farmhouses as an agricultural use on parcels of 20 acres or larger that were being farmed in 2006, identifies entire parcels of five acres or less as residential if a house was on the property in 2006, and identifies entire parcels as commercial or industrial if the majority of a parcel was developed with a commercial or industrial use (in prior inventories, areas devoted to landscaping and other open space on residential lots of two acres or less and on commercial and industrial parcels were coded as "open lands"). Also, lands under development in 2006 are included in the future land use category. For example, lands platted for residential use that were not developed with homes are included in the residential category.



**Table 8:  
LAND USE TRENDS IN WASHINGTON COUNTY: 1975-2000**

Land Use Category	Area (Acres)				Change in Area							
	1975	1985	1995	2000 <sup>a</sup>	1975-1985		1985-1995		1995-2000		1975-2000	
					Acres	Percent Change	Acres	Percent Change	Acres	Percent Change	Acres	Percent Change
<b>Urban</b>												
Residential												
Single-Family.....	12,277	15,481	21,153	24,510	3,204	26.1	5,672	36.6	3,357	15.9	12,233	99.6
Two-Family.....	169	248	432	533	79	46.7	184	74.2	101	23.4	364	215.4
Multi-Family.....	230	338	667	760	108	47.0	329	97.3	93	13.9	530	230.4
Mobile Homes.....	66	73	110	114	7	10.6	37	50.7	4	3.6	48	72.7
Subtotal	12,742	16,140	22,362	25,916	3,398	26.7	6,222	38.5	3,554	15.9	13,174	103.4
Commercial.....	608	830	1,125	1,311	222	36.5	295	35.5	186	16.5	703	115.6
Industrial.....	674	891	1,340	1,549	217	32.2	449	50.4	209	15.6	875	129.8
Transportation, Communications, and Utilities												
Arterial Street Rights-of- Way.....	3,440	3,785	4,452	5,823	345	10.0	667	17.6	1,371	30.8	2,383	69.3
Nonarterial Street Rights-of-Way.....	6,210	6,446	7,088	8,339	236	3.8	642	10.0	1,251	17.6	2,129	34.3
Railroad Rights-of-Way....	952	952	952	878	--	--	--	--	-74	-7.8	-74	-7.8
Communications and Utilities and Other												
Transportation.....	461	545	570	575	84	18.2	25	4.6	5	0.9	114	24.7
Subtotal	11,063	11,728	13,062	15,042	665	6.0	1,334	11.4	1,980	15.2	3,979	36.0
Governmental and												
Institutional.....	1,108	1,242	1,375	1,477	134	12.1	133	10.7	102	7.4	369	33.3
Recreational.....	1,741	1,941	2,627	3,067	200	11.5	686	35.3	440	16.7	1,326	76.2
Urban Subtotal	27,936	32,772	41,891	48,936	4,836	17.3	9,119	27.8	7,045	16.8	21,000	75.2
<b>Nonurban</b>												
Natural Resource Areas												
Woodlands.....	21,806	21,755	22,417	23,057	-51	-0.2	662	3.0	640	2.8	1,251	5.7
Wetlands.....	42,062	41,313	42,304	42,771	-749	-1.8	991	2.4	467	1.1	709	1.7
Surface Water.....	4,286	4,345	4,410	4,507	59	1.4	65	1.5	97	2.2	221	5.2
Subtotal	68,154	67,413	69,131	70,335	-741	-1.1	1,718	2.5	1,204	1.7	2,181	3.2
Agricultural.....	174,560	168,133	152,735	141,755	-6,427	-3.7	-15,398	-9.2	-10,980	-7.2	-32,805	-18.8
Quarries.....	953	1,002	1,123	1,266	49	5.1	121	12.1	143	12.7	313	32.8
Open Lands.....	7,230	9,513	13,953	16,464	2,283	31.6	4,440	46.7	2,511	18.0	9,234	127.7
Nonurban Subtotal	250,897	246,061	236,942	229,820	-4,836	-1.9	-9,119	-3.7	-7,122	-3.0	-21,077 <sup>b</sup>	-8.4
<b>Total</b>	<b>278,833</b>	<b>278,833</b>	<b>278,833</b>	<b>278,756<sup>b</sup></b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>

<sup>a</sup> As part of the regional land use inventory for the year 2000, the delineation of existing land use was referenced to real property boundary information not available for prior inventories. This change increases the precision of the land use inventory and makes it more usable to public agencies and private interests throughout the Region. As a result of the change, however, year 2000 land use inventory data are not strictly comparable with data from the prior inventories. At the county level, the most significant effect of the change is to increase the transportation, communication, and utilities category due to the use of actual street and highway rights-of-way as part of the 2000 land use inventory, as opposed to the use of narrower estimated rights-of-way in prior inventories. This treatment of streets and highways generally diminishes the area of adjacent land uses traversed by those streets and highways in the 2000 land use inventory relative to prior inventories.

<sup>b</sup> The reported size of the County decreased by 77 acres between 1995 and 2000 due to the use of more precise cadastral maps.  
Source: SEWRPC.

Based on the 2006 inventory, 71,463 acres, or about 26 percent of the County, were in urban uses. A similar percentage, 25 percent or 70,189 acres, were encompassed in natural resource areas (woodlands, wetlands, and surface waters). Almost half of the County, about 47 percent or 129,754 acres, were in agricultural use.

## **PLANNED LAND USES: 2035**

The land use plan for Washington County for the year 2035 is presented on Map 3. Table 10 sets forth the number of acres and percent of the County in each land use category on the Land Use Plan Map. The plan map indicates where certain types of urban development should be encouraged while preserving agricultural and environmentally significant land and resources. The Washington County land use plan map is a compilation of the land use plan maps prepared by each of the cities, towns, and villages in the county. The Town of Barton Land Use Plan for the year 2035, however, uses a “phased plan” approach to land use planning.

## **UTILITIES**

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### **UTILITY SYSTEMS**

Development in Washington County is supported by private and public utilities that provide residents and businesses with electric power, natural gas, communication, water, and sewage and solid waste management facilities and services, and community facilities that provide educational, recreational, administrative, and other services.

Utility systems are among the most important and permanent elements of urban growth and development. Sanitary sewerage is particularly important to land use patterns because of its strong influences on the location and density of urban development. Proper land use planning can serve to discourage development to prevent the need to serve some areas, while encouraging development to make serving other areas more feasible, in both cases minimizing environmental impacts and public expenditures. Inappropriate land use planning can serve to inadvertently create a need for new or expanded sewerage utilities, water supply utilities, or both where such a need could have been avoided through more appropriate development.



**Table 9:  
EXISTING LAND USES IN  
WASHINGTON COUNTY: 2006**

Land Use Category <sup>a</sup>	Acres	Percent of Subtotal (Urban or Nonurban)	Percent of Total
<b>Urban</b>			
Residential			
Single-Family.....	35,845	50.2	12.8
Two-Family.....	754	1.1	0.3
Multi-Family.....	1,397	1.9	0.5
Subtotal	37,996	53.2	13.6
Commercial.....	2,342	3.3	0.8
Industrial.....	2,954	4.1	1.0
Transportation and Utilities.....			
Street Rights-of-Way.....	15,073	21.1	5.4
Railroad Rights-of-Way.....	729 <sup>b</sup>	1.0	0.3
Other Transportation and Utilities <sup>c</sup> .....	736	1.0	0.3
Subtotal	16,538	23.1	6.0
Governmental and Institutional <sup>d</sup>	2,478	3.5	0.9
Recreational.....	6,314	8.8	2.3
Open Lands (Urban) <sup>e</sup> .....	1,543	2.2	0.5
Open Lands in Conservation Subdivisions <sup>f</sup> .....	1,298	1.8	0.5
Urban Subtotal	71,463	100.0	25.6
<b>Nonurban</b>			
Natural Resource Areas			
Woodlands.....	22,948	11.1	8.2
Wetlands.....	42,739	20.6	15.4
Surface Water.....	4,502	2.2	1.6
Subtotal	70,189	33.9	25.2
Agricultural <sup>g</sup> .....	129,754	62.6	46.6
Extractive.....	1,415	0.7	0.5
Open Lands (Rural) <sup>h</sup> .....	5,935	2.8	2.1
Nonurban Subtotal	207,293	100.0	74.4
<b>Total</b>	<b>278,756</b>	<b>--</b>	<b>100.0</b>

Note: This table, and the accompanying map, is more general than the land use inventory conducted in 2000. The two inventories are therefore not directly comparable, due to the inclusion of farmhouses as an agricultural use on parcels of 20 acres or larger, the identification of entire parcels of five acres or less as residential areas if a house was on the property in 2006, and the identification of entire parcels as commercial or industrial if the majority of a parcel was developed with a commercial or industrial use (in prior inventories, areas devoted to landscaping and other open space on commercial and industrial parcels would have been coded as "open lands."). Also, lands under development in 2006 are included in the underlying category. For example, lands planned for residential use but not yet developed are included in the residential category.

<sup>a</sup>Parking included in associated use.

<sup>b</sup>The number of acres of railroad right-of-way decreased by 142 acres between 2000 and 2006 due to development of the Eisenbahn Trail on a former railroad right-of-way.

<sup>c</sup>"Other Transportation" includes bus depots, airports, truck terminals, and transportation facilities not classified as street or railroad rights-of-way.

<sup>d</sup>Includes public and private schools, government offices, police and fire stations, libraries, cemeteries, religious institutions, hospitals, nursing homes, and similar facilities.

<sup>e</sup>Includes residual lands or outlots attendant to existing urban development that are not expected to be developed.

<sup>f</sup>This category includes common open space in conservation subdivisions that will be maintained as open space in perpetuity.

<sup>g</sup>Farmhouses are categorized as agricultural uses on parcels of 20 acres or larger in agricultural use.

<sup>h</sup>Includes lands in rural areas that are not being farmed and other lands that have not been developed.

Source: SEWRPC.

**Table 10:  
PLANNED LAND USES IN  
WASHINGTON COUNTY: 2035**

Land Use Category	Acres	Percent of Subtotal (Urban or Nonurban)	Percent of Total
<b>Urban</b>			
Suburban Density Residential <sup>a</sup> ...	31,155	35.5	11.2
Medium-Density Urban Residential <sup>b</sup> .....	13,737	15.7	4.9
High-Density Urban Residential <sup>c</sup>	2,542	2.9	0.9
Subtotal	47,434	54.1	17.0
Mixed Use.....	3,453	3.9	1.3
General Commercial.....	4,064	4.6	1.5
Office/Professional Services.....	568	0.7	0.2
Business/Industrial.....	2,261	2.6	0.8
Industrial.....	3,971	4.5	1.4
Governmental and Institutional..	2,876	3.3	1.0
Park and Recreation.....	5,893	6.7	2.1
Street and Highway Rights-of-Way.....	15,661	17.9	5.6
Other Transportation and Utilities.....	1,464	1.7	0.5
Urban Subtotal	87,645	100.0	31.4
<b>Nonurban</b>			
Farmland Protection.....	28,849	15.1	10.4
Agricultural and Rural Residential <sup>d</sup> .....	80,529	42.1	28.9
Extractive.....	1,757	0.9	0.6
Former Landfill Identified on Local Government Land Use Plan Map.....	32	-- <sup>e</sup>	-- <sup>e</sup>
Primary Environmental Corridor	55,232	28.9	19.8
Secondary Environmental Corridor.....	9,424	4.9	3.4
Isolated Natural Resource Area..	6,265	3.3	2.3
Wetlands <sup>f</sup> .....	1,192	0.6	0.4
Other Conservancy Lands to be Preserved <sup>g</sup> .....	3,319	1.8	1.2
Surface Water.....	4,512	2.4	1.6
Nonurban Subtotal	191,111	100.0	68.6
<b>Total</b>	<b>278,756</b>	<b>--</b>	<b>100.0</b>
<b>Overlay Categories</b>	<b>Acres</b>	<b>Percent of Subtotal</b>	<b>Percent of Total</b>
100-Year Floodplain (1981) .....	43,810	--	--
Former Landfill.....	-- <sup>h</sup>	--	--

<sup>a</sup>Average density equating to one home per 1.0 to 4.9 acres.

<sup>b</sup>Average density equating to one home per 10,000 to 43,559 square feet.

<sup>c</sup>Average density of less than 10,000 square feet per home.

<sup>d</sup>Allows agricultural uses and residential uses with an average density of one home per 5.0 to 34.9 acres. Local government ordinances may specify a maximum lot size for homes located in agricultural areas, in addition to a minimum parcel size or density.

<sup>e</sup>Less than 0.05 percent.

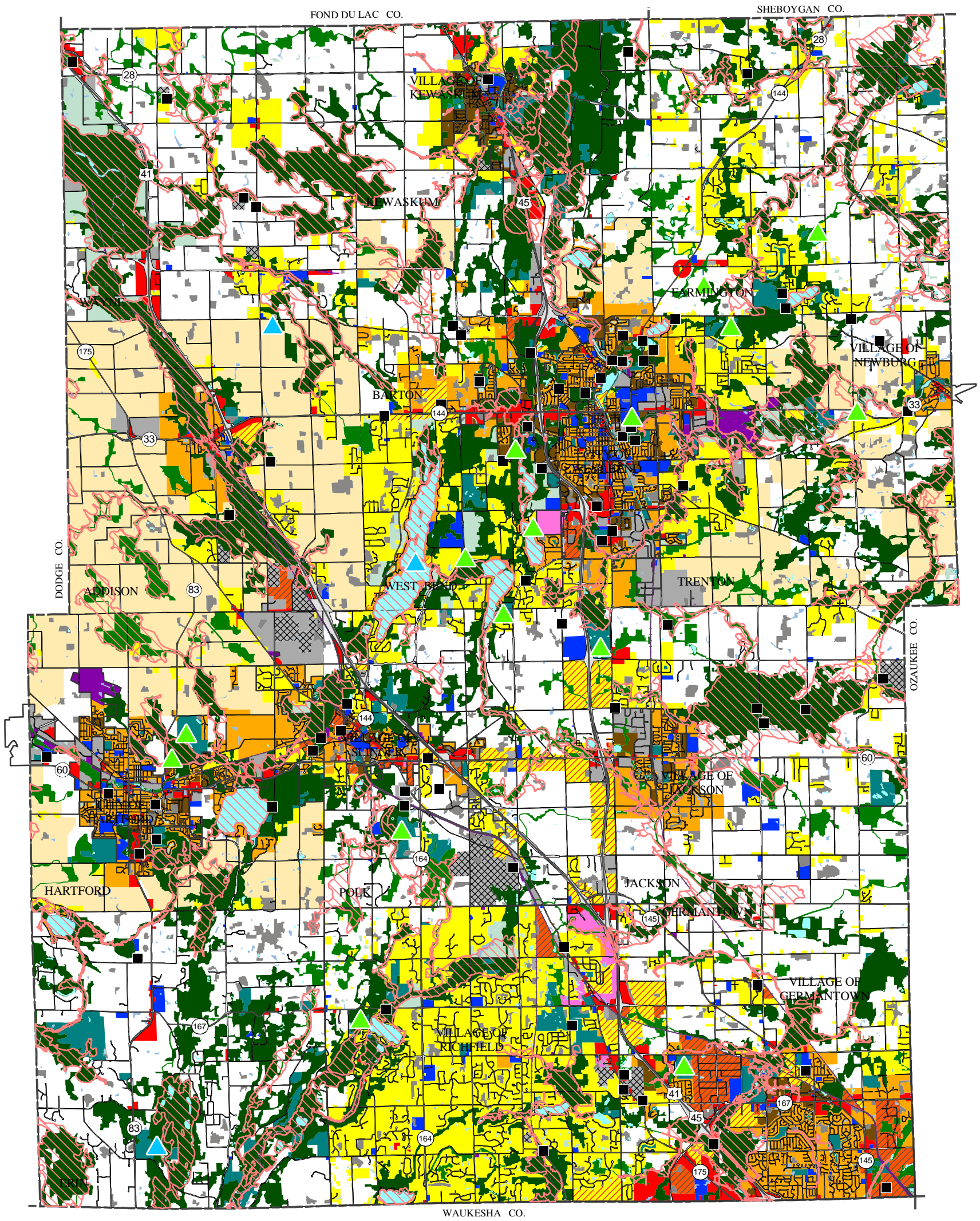
<sup>f</sup>Includes only those wetlands outside primary and secondary environmental corridors and isolated natural resource areas.

<sup>g</sup>Includes woodlands, critical species habitat sites, common open space within conservation subdivisions, publicly-owned land not developed with intensive recreational or other uses, and similar lands outside primary and secondary environmental corridors, isolated natural resource areas, and wetlands.

<sup>h</sup>Includes 75 closed landfills encompassing 464 acres. See Table 70 in Chapter IV for a list of closed landfills listed on the DNR registry of waste disposal sites.

Source: SEWRPC.

# Map 3 WASHINGTON COUNTY LAND USE PLAN: 2035



- |   |                                    |   |   |   |  |
|---|------------------------------------|---|---|---|--|
|  | FARMLAND PROTECTION                |  | PARK AND RECREATION   |  | FORMER LANDFILL IDENTIFIED IN WISCONSIN DEPARTMENT OF NATURAL RESOURCES REGISTRY |
|  | AGRICULTURAL AND RURAL RESIDENTIAL |  | TRANSPORTATION AND UTILITIES (EXCEPT FOR STREETS AND HIGHWAYS)                  |  | EXISTING COUNTY PARK AND OUTDOOR RECREATION SITES                                |
|  | SUBURBAN DENSITY RESIDENTIAL       |  | EXTRACTIVE  |  | PROPOSED COUNTY PARK   |
|  | MEDIUM DENSITY URBAN RESIDENTIAL   |  | FORMER LANDFILL IDENTIFIED ON LOCAL GOVERNMENT LAND USE PLAN MAP                |  | STREET AND HIGHWAY RIGHT-OF-WAY  |
|  | HIGH DENSITY URBAN RESIDENTIAL     |  | PRIMARY ENVIRONMENTAL CORRIDOR  |   |  |
|  | MIXED USE                          |  | SECONDARY ENVIRONMENTAL CORRIDOR  |   |  |
|  | GENERAL COMMERCIAL                 |  | ISOLATED NATURAL RESOURCE AREA  |   |  |
|  | OFFICE / PROFESSIONAL SERVICES     |  | WETLANDS OUTSIDE OF ENVIRONMENTAL CORRIDORS AND ISOLATED NATURAL RESOURCE AREAS |   |  |
|  | BUSINESS / INDUSTRIAL              |  | OTHER CONSERVANCY LANDS TO BE PRESERVED   |   |  |
|  | INDUSTRIAL                         |  | SURFACE WATER   |   |  |
|  | GOVERNMENTAL AND INSTITUTIONAL     |  | 100 - YEAR FLOODPLAIN (FROM 1981 FLOOD INSURANCE STUDY)                         |   |  |



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## **SANITARY SEWER SERVICES**

About 50,129 acres, or 18 percent of the County, were within existing sanitary sewer service areas in 2006. Map 4 shows sewer service areas within the County, which include the Cities of Hartford and West Bend and surrounding areas; the Villages of Jackson, Kewaskum, Newburg, and Slinger and surrounding areas; portions of the Village of Germantown; and the unincorporated hamlet of Allenton in the Town of Addison. The Village of Germantown is located within the Milwaukee Metropolitan Sewerage District (MMSD) and wastewater from the Village is treated at MMSD sewage treatment plants in Milwaukee County. Each of the other cities and villages operates its own sewage treatment plant. The Allenton Sanitary District operates the sewage treatment plant that serves the Allenton area.

The Town of West Bend has three areas served by sewer. These areas, which are served through contracts with the City of West Bend, are located just east of Big Cedar Lake and include Cedar Lake Homes and the West Bend Country Club. The Washington County Fair Park in the Town of Polk is served by sewers from the Village of Jackson through a contract with the Village. St. Joseph's Hospital also has a contract with the Village of Jackson for sewer services. Sewers were extended to the hospital after 2000, the date of the inventory shown on Map 4. About 15,084 acres, or about 5 percent of the County, were served by public sanitary sewers in 2000. An estimated 71,500 residents, or about 61 percent of Washington County residents, were served.

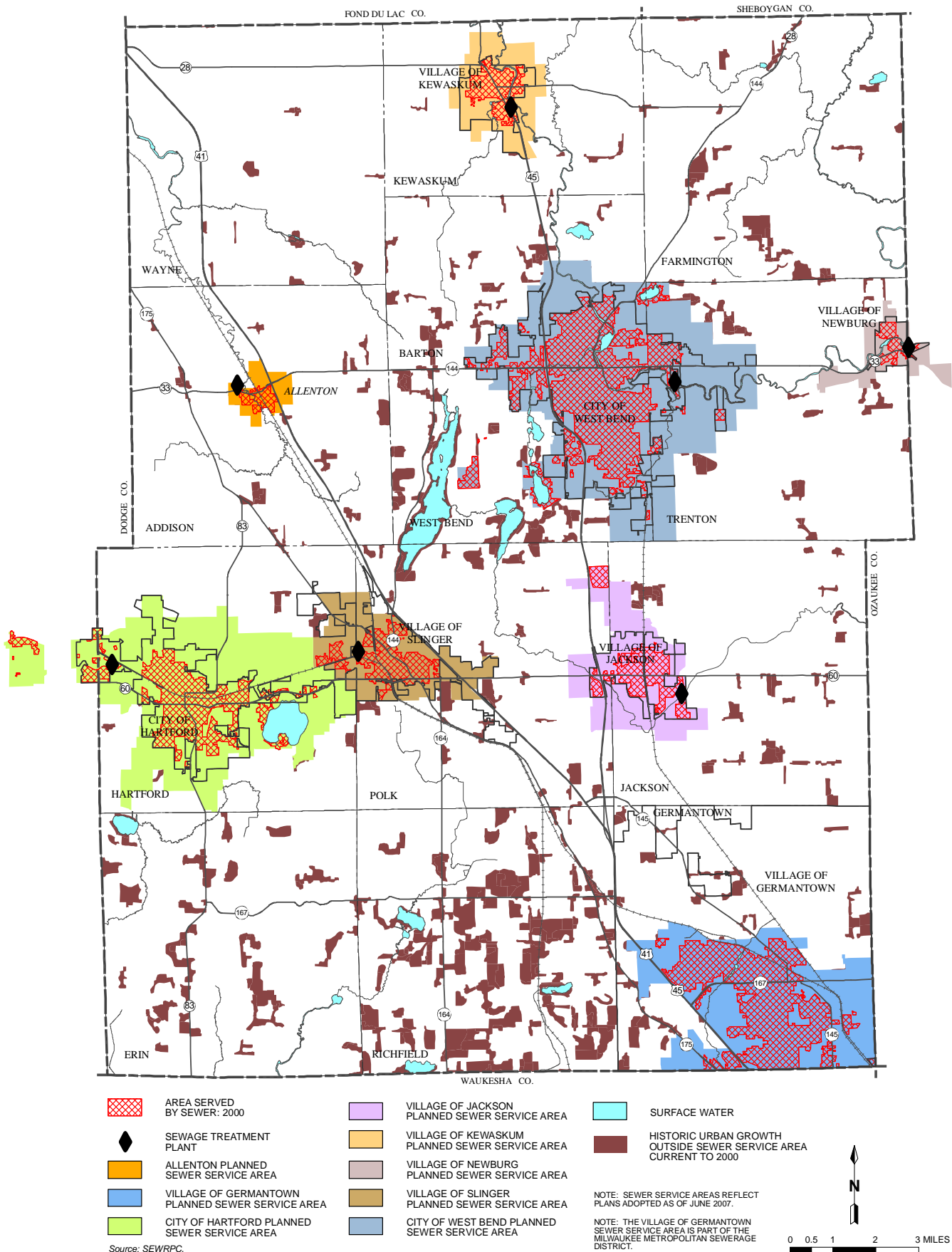
## **PRIVATE ON-SITE WASTEWATER TREATMENT**

Washington County regulates private onsite wastewater treatment systems (POWTS) for any development in the County that is not served by sanitary sewer. Development in this case applies to residential, commercial, and industrial uses. Map 4 also shows the urban development, prior to 2000, that has occurred outside of the sewer service areas that are served by onsite wastewater treatment systems. There are several different types of POWTS including at-grade, conventional systems, constructed-wetland, dripline, in-ground pressure, mound systems, and holding tank systems. All wastewater must discharge into a public or private sewerage system. The ability of soil to accept wastewater from a development differs depending on the type of soil. For this reason, all development proposed to be served by a POWTS requires a soil test to determine if the soils present in a specific location are suitable for the proposed development and what method of on-site wastewater treatment is most suitable. Permits were issued for 10,913 POWTS in Washington County between 1980 and 2006.

## **WATER SUPPLY SYSTEMS**

In 2000, the total estimated use of water in Washington County was 13.38 million gallons per day (mgd). This figure includes water supplied by public utilities and water obtained from private wells. The largest portion of that use was by residential land uses, which consumed 5.64 mgd. Other water uses included 2.55 mgd by industrial uses, 1.84 mgd by commercial uses, 0.62 mgd by agricultural uses, 0.31 mgd for irrigation, and 2.42 mgd by governmental or institutional land uses and water lost to the system.

# Map 4 PLANNED SANITARY SEWER SERVICE AREAS AND AREAS SERVED BY SANITARY SEWER IN WASHINGTON COUNTY



Map 5 shows portions of the County served by public water utilities and private water supply systems, and those areas where development depends on the use of private wells. Portions of Washington County served by public water utilities encompassed about 13,800 acres, or about 5 percent of the County, in 2000. An estimated 66,800 County residents, or about 57 percent of the County population, were served by public water utilities in 2000. There are seven public water utilities in the County serving the Allenton Sanitary District, the Cities of Hartford and West Bend, and the Villages of Germantown, Jackson, Kewaskum, and Slinger. Table 11 sets forth the total acres served in 2006, the amount of water pumped in 2004, and gallons per person per day used in 2004 by each public water utility.

**Table 11:  
PUBLIC AND PRIVATE WATER UTILITY SERVICE IN WASHINGTON COUNTY**

Number on Map 5	Utilities	Acres (2006)	Total Annual Pumpage in Gallons (2004)	Gallons Per Person Per Day
	<b>Public</b>			
1	Allenton Sanitary District	205.1	29,753,000	79.3
2	City of Hartford Water Utility .....	2,198.9	593,559,000	119.4
3	City of West Bend Water Utility .....	5,183.8	1,095,604,000	93.4
4	Slinger Utility	860.8	128,229,000	78.4
5	Village of Germantown Water Utility .....	3,654.5	686,175,000	97.8
6	Village of Jackson Water Utility .....	1,044.7	216,055,000	88.7
7	Village of Kewaskum Municipal Water Utility .....	640.4	121,264,000	78.9
	<b>Total Public</b>	<b>13,788.2</b>	<b>2,870,639,000</b>	<b>--</b>
	<b>Private</b>			
8	Carriage Hills Apartments	1.1	-- <sup>a</sup>	-- <sup>a</sup>
9	Cedar Lake Home 5 & 9	139.3	-- <sup>a</sup>	-- <sup>a</sup>
10	Hilltop Highlands 1 through 6 .....	38.9	-- <sup>a</sup>	-- <sup>a</sup>
11	Jamestown East Homeowners Association .....	24.3	-- <sup>a</sup>	-- <sup>a</sup>
12	Maple Terrace Mobile Home Park .....	10.9	-- <sup>a</sup>	-- <sup>a</sup>
13	Voigts Lakeside Estates	3.9	-- <sup>a</sup>	-- <sup>a</sup>
14	Walsh Subdivision 2	8.8	-- <sup>a</sup>	-- <sup>a</sup>
15	Wheel Estates Mobile Home Park .....	14.5	-- <sup>a</sup>	-- <sup>a</sup>
	<b>Total Private</b>	<b>241.7</b>	<b>--<sup>a</sup></b>	<b>--<sup>a</sup></b>
	<b>Total</b>	<b>14,029.9</b>	<b>--<sup>a</sup></b>	<b>--<sup>a</sup></b>

<sup>a</sup> Private water utilities are not metered, data is not available.

Source: SEWRPC.



## *Chapter III*

# **AGRICULTURAL AND NATURAL RESOURCES**

## **INTRODUCTION**

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The conservation and wise use of agricultural and natural resources are fundamental to achieving strong and stable physical and economic development as well as maintaining community identity. This plan recognizes that agricultural and natural resources are limited and very difficult or impossible to replace if damaged or destroyed. Information on the characteristics and location of agricultural and natural resources in the County is necessary to avoid serious environmental problems and to ensure protection of natural resources.

A clean and healthy environment contributes to the overall quality of life for the citizens of Washington County. Therefore, it is critical to the prosperity of Washington County that the use and management of our natural resources be carefully tailored to the capacity of the underlying resource.

This chapter provides inventory information on existing agricultural and natural resources in Washington County, which are most directly related to land and water resources planning. Information regarding soil types, existing farmland, topography, nonmetallic mining resources, water resources, woodland resources, natural areas, critical species habitats and environmental corridors is included in this chapter. Much of the inventory data in this chapter is from *A Multi-Jurisdictional Comprehensive Plan for Washington County: 2035* which was adopted by the Washington County Board of Supervisors on April 15, 2008.

## **AGRICULTURAL RESOURCES**

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### **SOILS**

The soil survey can play an important role in land use decisions. The information contained in the soil survey can help identify which areas of the County are suitable for agricultural use, areas with limitations for development due to wet soils or bedrock near the surface, and areas where marketable nonmetallic mineral deposits may be present.

The USDA Soil Conservation Service, now the Natural Resources Conservation Service (NRCS), issued a soil survey for Washington County in 1971.<sup>3</sup> Soils were identified and mapped and organized by soil association, soil series, and soil type. The soil survey results, including the attributes of each soil type, are now available on the NRCS website as part of the Soil Survey Geographic (SSURGO) database. Unless otherwise noted, the soil information in this chapter was obtained from the SSURGO database.

## SOIL ASSOCIATIONS

A soil association is a landscape that has a distinctive pattern of soils. It normally consists of one or more major soils and at least one minor soil, and is named for the major soils. Map 6 shows soil associations in Washington County and those portions of the Village of Newburg and City of Hartford that extend outside the County. The map provides a general idea of the soils in the County and is useful for comparing different parts of the County. Planning decisions should be based on the more detailed soils information, including soil mapping units and interpretations for various land uses, contained in the soil survey. The seven soil associations in Washington County are briefly described below:

The ***Brookston-Pella-Lamartine association*** consists of generally poorly-drained soils that have a subsoil of clay loam or silty clay loam, formed in loess and underlying loam to sandy loam glacial till. This association encompasses about 8 percent of the County in scattered locations, generally along streams and trending diagonally across the County from northwest to southeast.

The ***Casco-Fox-Rodman association*** consists of well-drained soils that have a subsoil of gravelly sandy loam to clay loam, very shallow to moderately deep over gravel and sand, on outwash terraces. This association encompasses about 15 percent of the County. These locations are generally on lower elevations within the Kettle Moraine in the north-central and southwestern portions of the County.

The ***Casco-Hochheim-Sisson association*** contains well-drained soils that have a subsoil of loam to clay loam over lake-laid silt and fine sand in gravel and sand outwash, or in sandy loam glacial till on uplands. This association is located in the eastern part of the County in the townships of Farmington, Trenton, and Jackson, encompassing about 10 percent of the County. The portion of the Village of Newburg in Ozaukee County, about 53 acres, is also within this soil association.

The ***Colwood-Boyer-Sisson association*** contains both well- and poorly-drained soils that have a subsoil of sandy loam or silty clay loam over lake-laid silt and fine sand or gravel and sand

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<sup>3</sup> Documented in the Soil Survey, Washington County, Wisconsin, USDA Soil Conservation Service, June 1971.

outwash on plains and dissected terraces. This association is located in the northeastern part of the County and encompasses about 5 percent of the County.

The ***Hochheim-Theresa association*** contains well-drained soils that have a subsoil of clay loam, formed in loess with underlying sandy loam to loam glacial till on uplands. This is the predominant soil association, encompassing about 44 percent of the County. Much of the central and western parts of the County are in this soil association.

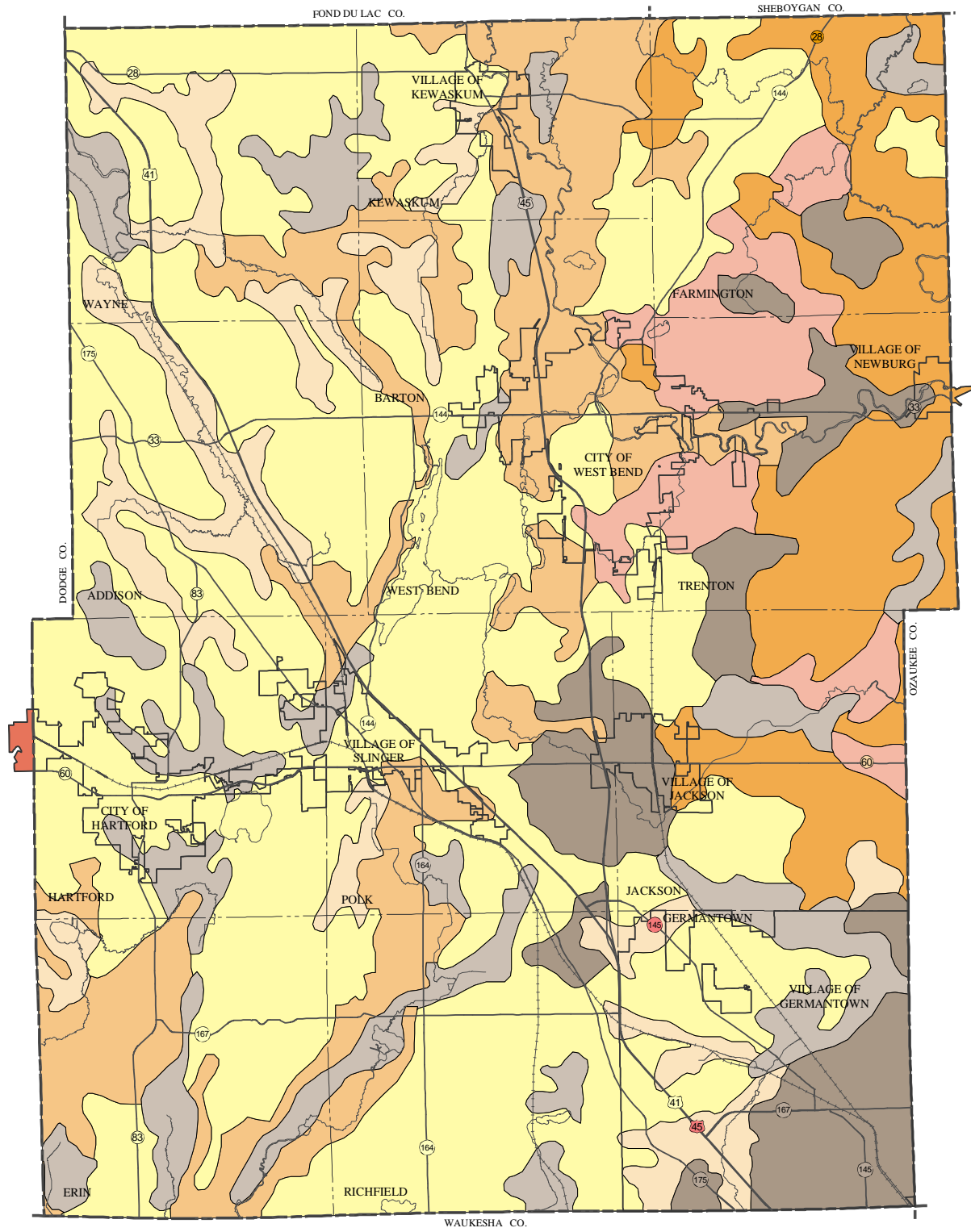
The ***Houghton-Palms-Adrian association*** contains very poorly drained organic soils along drainageways, in depressions, and in old lakebeds. This association encompasses about 10 percent of the County in scattered locations.



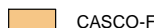

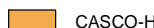


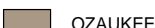
The ***Ozaukee-Martinson-Saylesville association*** contains generally well-drained soils that have a subsoil of silty clay loam to clay over silty clay loam glacial till or lake-laid silt and clay on ground moraines and lacustrine basins. This association is located in the eastern half of the County and encompasses about 8 percent of the County.



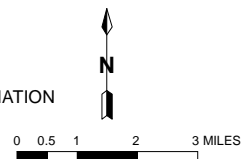
# Map 6

## GENERAL SOIL ASSOCIATIONS IN WASHINGTON COUNTY



- |   |   |
|---|---|
|  BROOKSTON-PELLA-LAMARTINE ASSOCIATION |  THERESA-LAMARTINE-HOCHHEIM ASSOCIATION    |
|  CASCO-FOX-RODMAN ASSOCIATION          |  HOCHHEIM-THERESA ASSOCIATION              |
|  CASCO-HOCHHEIM-SISSON ASSOCIATION     |  HOUGHTON-PALMS-ADRIAN ASSOCIATION         |
|  COLWOOD-BOYER-SISSON ASSOCIATION      |  OZAUKEE-MARTINTON-SAYLESVILLE ASSOCIATION |

Source: USDA - Natural Resources Conservation Service and SEWRPC.



## **SOIL SUITABILITY FOR AGRICULTURAL PRODUCTION**

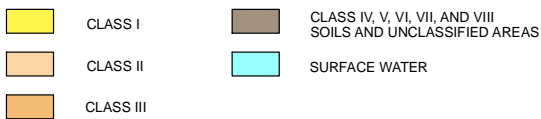
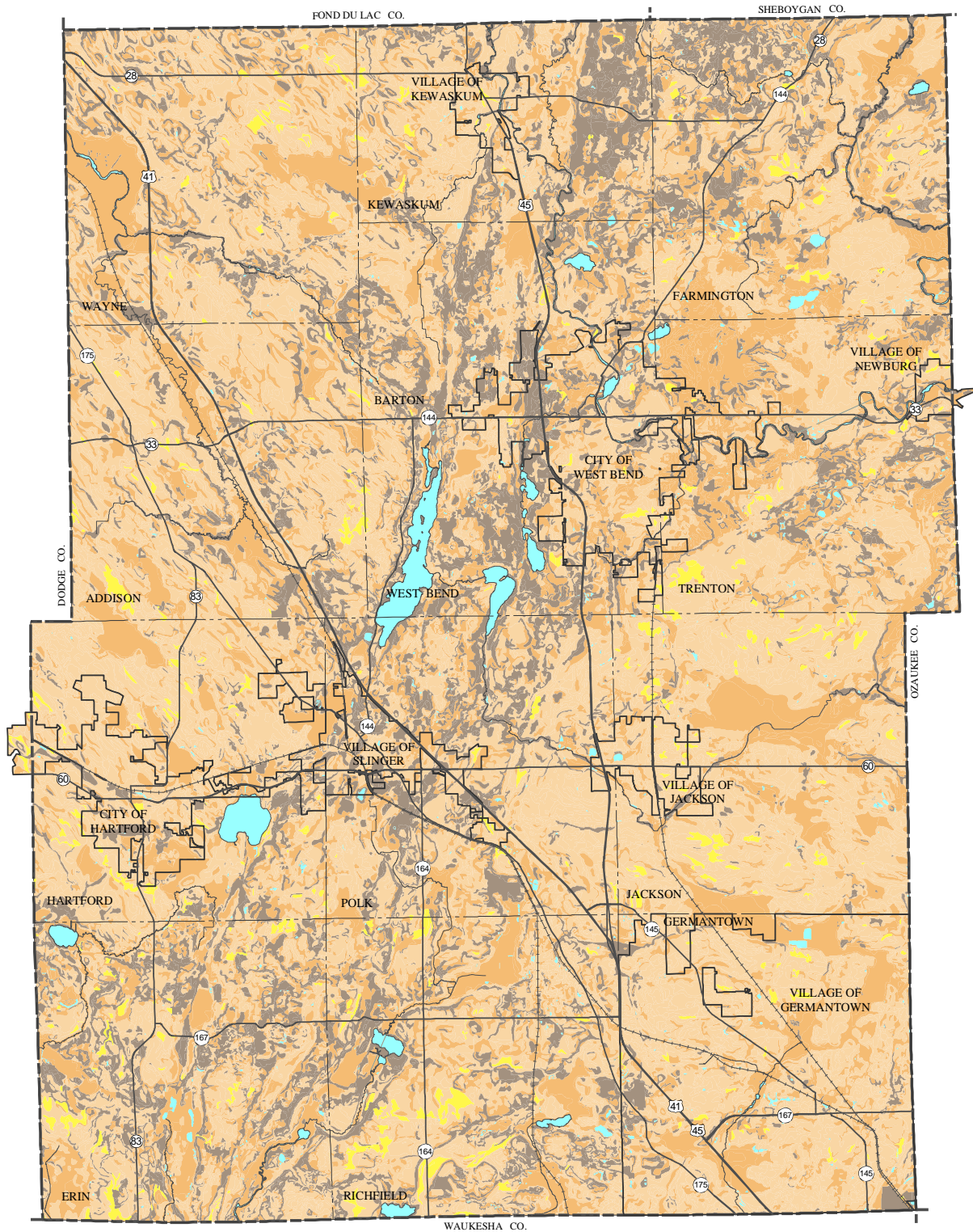
The NRCS has classified the agricultural capability of soils based on their general suitability for most kinds of farming. These groupings are based on the limitations of the soils, the risk of damage when used, and the way in which the soils respond to treatment. Generally, lands with Class I and II soils are considered “National Prime Farmlands” and lands with Class III soils are considered “Farmlands of Statewide Significance.” Class I soils have few limitations, the widest range of use, and the least risk of damage when used. The soils in the other classes have progressively greater natural limitations. Class II soils have some limitations that reduce the choice of plants that can be grown, or require moderate conservation practices to reduce the risk of damage when used. Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both, and Class IV soils have very severe limitations. Class V, VI, and VII soils are considered suitable for pasture but not for crops, and Class VIII soils are so rough, shallow, or otherwise limited that they do not produce economically worthwhile yields of crops, forage, or wood products. The locations of soil classifications are set forth in Map 7.

## **FARMLAND TRENDS**

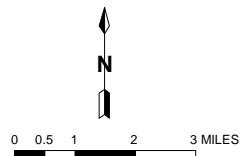
Agricultural lands in 2000 were identified by Southeastern Wisconsin Regional Planning Commission (SEWRPC) as part of the regional land use inventory conducted as part of the regional planning program. The land use inventory identified croplands, pasture lands, orchards, nurseries, specialized farming, and non-residential farm buildings. Farm residences, together with a 20,000 square foot dwelling site, are classified as single-family residential land uses. Based on the land use inventory, about 141,755 acres, or about 222 square miles, representing almost 51 percent of the County, were in agricultural use in 2000. It should be noted that this figure includes lands actually used for agriculture (primarily cultivated lands and lands used for pasture) and excludes the wetland and woodland portions of farm fields. Table 12 sets forth the number of acres occupied by farmland in each local government and the County in 2000.

# Map 7

## AGRICULTURAL SOIL CAPABILITY IN WASHINGTON COUNTY



Source: USDA - Natural Resources Conservation Service and SEWRPC.



**Table 12:  
EXISTING AGRICULTURAL LANDS IN  
WASHINGTON COUNTY COMMUNITIES: 2000**

Local Government	Cultivated Lands (acres)	Percent of Total	Pasture Land and Unused Agricultural Land (acres)	Percent of Total	Orchards, Nurseries, and Specialty Crops (acres)	Percent of Total	Farm Buildings (acres)	Percent of Total	Total (acres)
<b>Partnering Governments</b>									
Town of Addison	13,426	87.5	1,647	10.7	--	0.0	265	1.7	15,338
Town of Barton	5,279	78.5	1,298	19.3	17	0.3	129	1.9	6,723
Town of Erin	5,824	57.9	4,052	40.3	33	0.3	156	1.6	10,065
Town of Farmington	11,789	84.1	1,907	13.6	27	0.2	294	2.1	14,017
Town of Germantown	617	86.5	83	11.7	--	0.0	13	1.8	713
Town of Hartford	10,152	90.6	833	7.4	--	0.0	216	1.9	11,201
Town of Kewaskum	6,058	83.3	1,072	14.7	2	0.0	145	2.0	7,277
Village of Kewaskum	267	83.3	51	16.0	--	0.0	2	0.7	320
Town of Polk	9,072	87.3	1,043	10.0	35	0.3	236	2.3	10,386
Town of Trenton	9,353	82.2	1,731	15.2	58	0.5	242	2.1	11,384
Town of Wayne	12,014	85.7	1,761	12.6	1	0.0	248	1.8	14,024
<b>Non-Partnering Governments</b>									
City of Hartford	905	87.0	119	11.5	--	0.0	17	1.6	1,041
City of West Bend	1,183	83.9	214	15.2	--	0.0	13	0.9	1,410
Village of Germantown	7,349	74.8	2,101	21.4	165	1.7	208	2.1	9,823
Village of Jackson	433	94.7	16	3.4	1	0.2	7	1.6	457
Village of Newburg	112	82.1	18	13.2	--	0.0	6	4.8	136
Village of Slinger	913	88.2	100	9.7	7	0.6	15	1.5	1,035
Town of Jackson	11,281	83.2	1,499	11.1	457	3.4	322	2.4	13,559
Town of Richfield	7,117	75.3	2,064	21.8	116	1.2	156	1.6	9,453
Town of West Bend	2,518	74.2	799	23.5	13	0.4	63	1.9	3,393
Washington County	115,662	100.0	22,408	100.0	932	100.0	2,753	100.0	141,755
Percent of Total Lands	81.6	--	15.8	--	0.6	--	2.0	--	100.0

Source: SEWRPC.

Table 12 shows the area devoted to farmland use in 2000, categorized as follows:

- Cultivated Lands, which includes lands used for the cultivation of crops including row crops, grain crops, vegetable crops, and hay.
- Pasture Land and Unused Agricultural Lands, which includes lands used as pasture, or lands which were formerly cultivated or used for pasture which have not yet succeeded to a wetland or woodland plant community.
- Orchards, Nurseries, and Specialty Crops, which includes lands used for orchards, nurseries, sod farms, and specialty crops such as mint, ginseng, and berry fields. Greenhouses are not included in this category, but are shown as commercial on the land use map in Chapter II.
- Farm Buildings, which includes barns, silos, and other buildings used to store farm equipment or supplies or house farm animals.

Cultivated lands were the predominant type of agricultural use in the County and in each local government, accounting for about 82 percent of agricultural land in the County in 2000.

## **DECLINING FARMLAND**

Farming in Wisconsin has undergone considerable change in the last few decades. According to the Wisconsin Agricultural Statistical Service, the state has seen an 18 percent decline in the number of acres of land in farmland production between 1980 and 2007. Washington County saw about a 38 percent decline in the number of acres of land in farmland production between 1972 and 2007. Chart 1 illustrates the decline in the number of acres of land in farmland production.

Agriculture is the largest single land use in the County, comprising about 129,754 acres, or about 47 percent of the area in the County in 2006<sup>4</sup>.

## **NUMBER AND SIZE OF FARMS**

Table 13 sets forth the number of farms by size category<sup>5</sup> in Washington County and Wisconsin. There were 831 farms in the County in 2007. The average farm size was 156 acres compared to 194 acres for farms in the State. The largest percentage of farms in the County, 33.9 percent, was between 10 and 49 acres, and a similar but slightly smaller percentage, 33.6 percent, was between 50 and 179 acres. Only about 7 percent of farms were more than 500 acres in size.

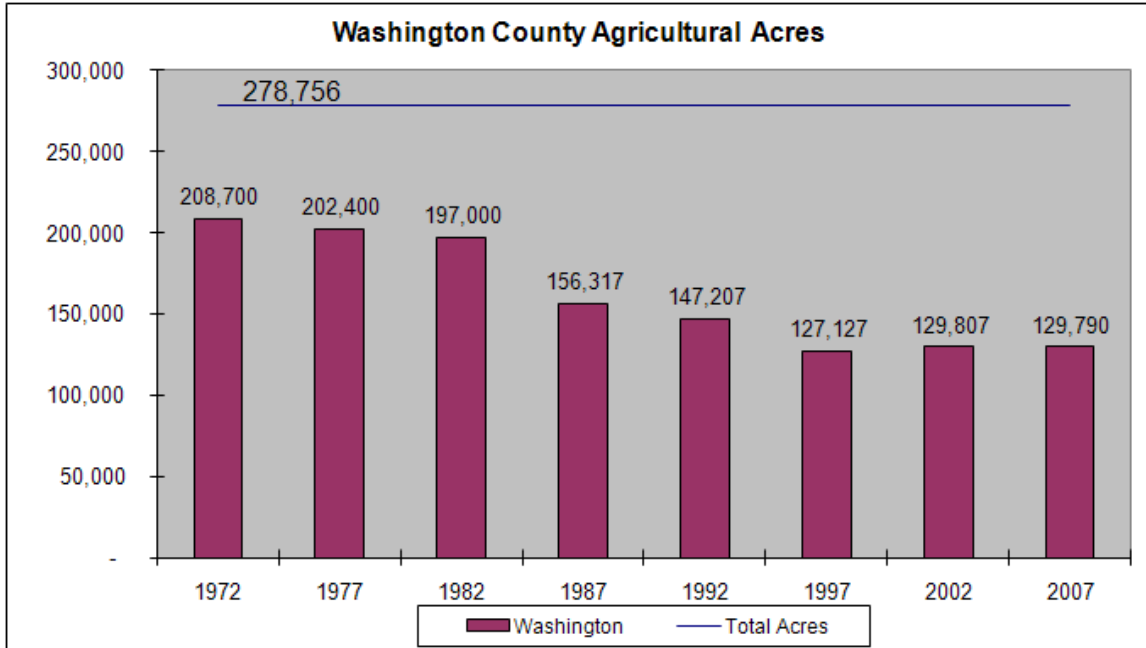
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<sup>4</sup> *A Multi-Jurisdictional Comprehensive Plan for Washington County: 2035*. These 2006 figures derive from a more general land use inventory than the land use inventory conducted in 2000. The two inventories are therefore not directly comparable, due to the inclusion of farmhouses as an agricultural use on parcels of 20 acres or larger, the identification of entire parcels of five acres or less as residential areas if a house was on the property in 2006, and the identification of entire parcels as commercial or industrial if the majority of a parcel was developed with a commercial or industrial use (in prior inventories, areas devoted to landscaping and other open space on commercial and industrial parcels would have been coded as “open lands.”). Also, lands under development in 2006 are included in the underlying category. For example, lands platted for residential use but not yet developed are included in the residential category.

<sup>5</sup> Data included in this section includes lands owned by the farmer, not lands the farmer may rent.



**Chart 1:**



Source: Wisconsin Agricultural Statistics Service

**Table 13:  
FARM SIZE IN WASHINGTON  
COUNTY AND WISCONSIN: 2007**

Size (acres)	Washington County		State of Wisconsin	
	Number	Percent	Number	Percent
Less than 10 acres	78	9.3	4,861	6.2
10 to 49 acres	282	33.9	19,895	25.4
50 to 179 acres	279	33.6	29,765	37.9
180 to 499 acres	134	16.1	17,837	22.7
500 to 999 acres	41	4.9	4,149	5.3
1,000 acres or more	17	2.0	1,956	2.5
<b>Total</b>	<b>831</b>	<b>100.0</b>	<b>78,463</b>	<b>100.0</b>

Source: USDA-National Agricultural Statistics Service, 2007 Census of Agriculture.

In the time period from 2002 to 2007, the number of farms and the total number of cattle and calves in Washington County declined by 2 percent and 13 percent respectively while the acreage of farmlands remained nearly the same.



## NATURAL RESOURCES

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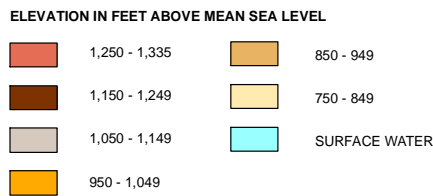
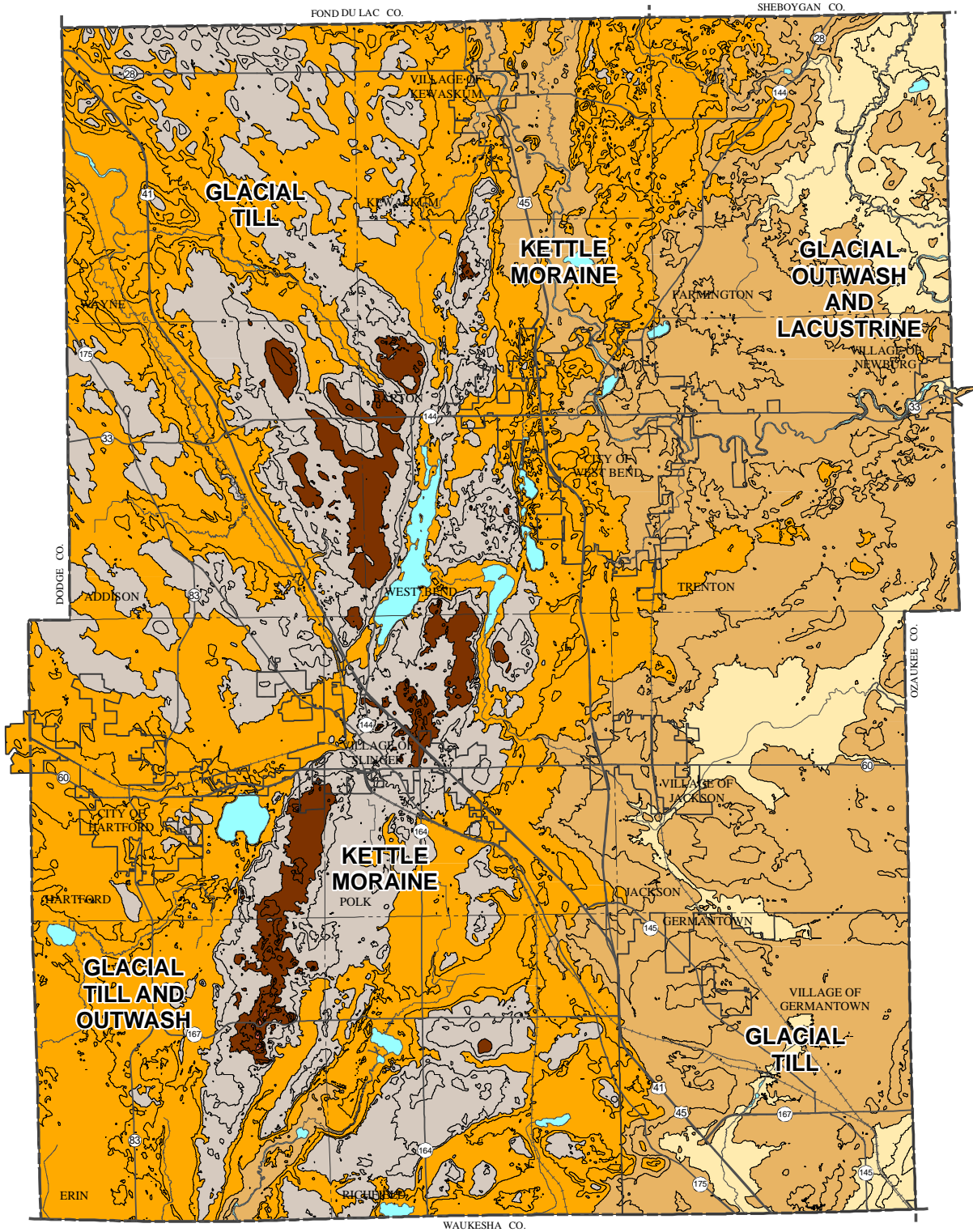
### TOPOGRAPHY AND GEOLOGY

The dominant landform in Washington County is the Kettle Moraine, an interlobate glacial deposit or moraine, formed between the Green Bay and Lake Michigan lobes of the continental glacier that moved across the Great Lakes area approximately 11,000 years ago. The Kettle Moraine is oriented in a general northeast-southwest direction across the County. Some of its features include kames, or conical hills; kettles, which are depressions that mark the site of buried glacial ice blocks that became separated from the ice mass and melted to form depressions; eskers, or long, narrow ridges of drift deposited in tunnels of ice; and abandoned drainageways. It forms some of the most attractive and interesting landscapes within the County. The Kettle Moraine area is the location of the highest elevation in the County and the location of the greatest local elevation differences, or relief. The remainder of the County is covered by a variety of glacial landforms and features, including rolling landscapes of material deposited beneath the glacial ice; terminal moraines, consisting of material deposited at the forward edges of the ice sheet; lacustrine basins, which are former glacial lakes; outwash plains formed by the action of flowing glacial meltwater; and drumlins, which are elongated teardrop-shaped mounds of glacial deposits that formed parallel to the flow of the glacier; and eskers. Except for a few isolated spots where dolomite bedrock is exposed at the surface, the entire County is covered with glacial deposits ranging from large boulders to fine grain clays.

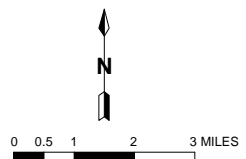
Generalized landforms and topographic characteristics in about 100 foot interval contours are shown on Map 8. Surface elevations range from a low of about 755 feet above sea level in the southeast portion of the Village of Germantown at the Ozaukee-Washington County line to a high of 1,332 feet above sea level at Holy Hill in the Town of Erin. Powder Hill in the Town of Hartford is 1,330 feet above sea level, and is the second highest point in the County, along with another hilltop in the Holy Hill area which is also at the 1,330-foot elevation. Both Holy Hill and Powder Hill are located in the Kettle Moraine.

Map 8

PHYSIOGRAPHIC FEATURES AND GENERALIZED TOPOGRAPHIC CHARACTERISTICS IN WASHINGTON COUNTY



Source: U.S. Geological Survey, USDA - Natural Resources Conservation Service, and SEWRPC.





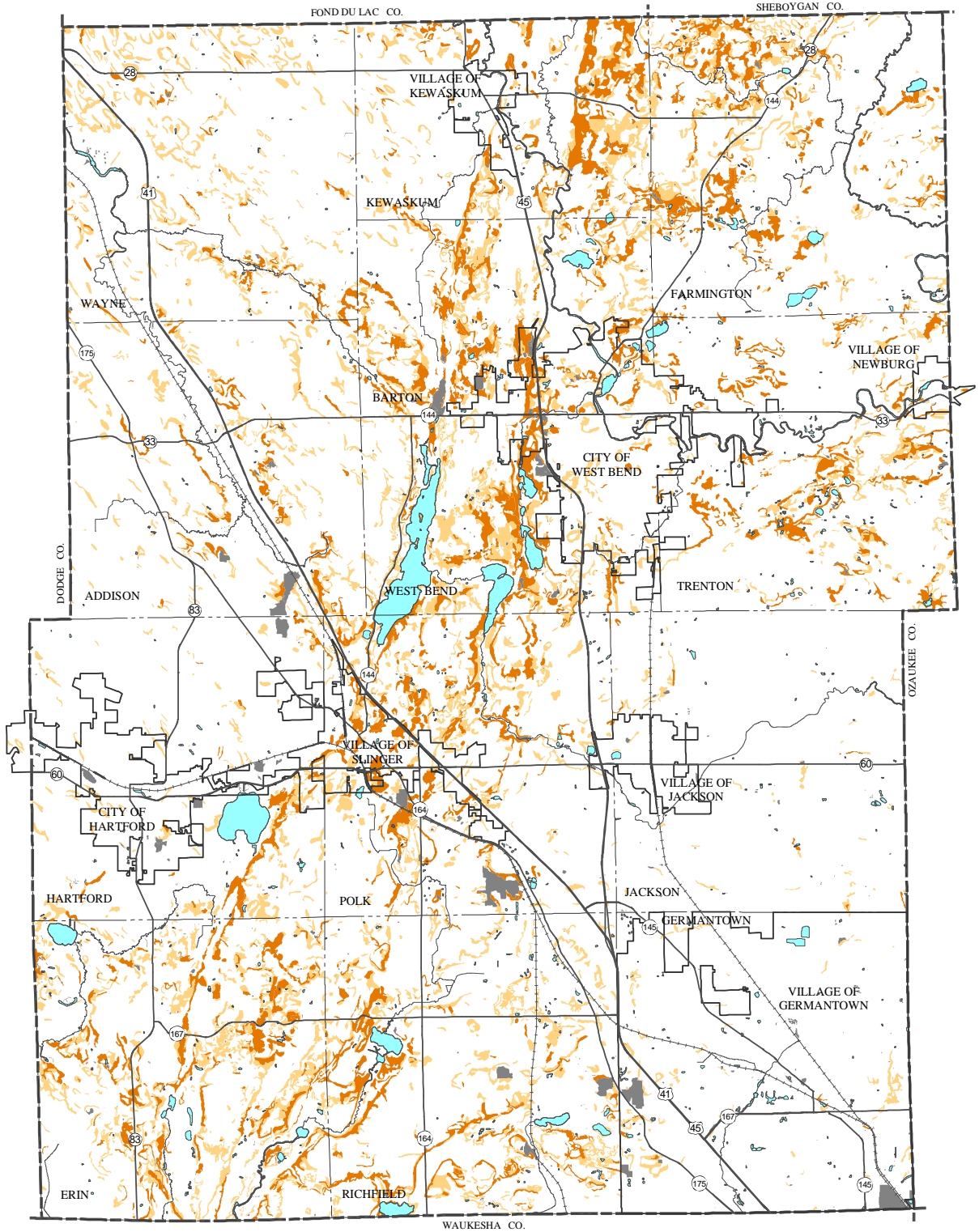
Topographical features, particularly slopes, have a direct bearing on the potential for soil erosion and the sedimentation of surface waters. Slope steepness affects the velocity and, accordingly, the erosive potential of runoff. As a result, steep slopes place moderate to severe limitations on urban development and agricultural activities, especially in areas with highly erodible soil types such as the Kettle Moraine. Map 9 indicates portions of Washington County that have slopes exceeding 12 percent, with many such areas located along the Kettle Moraine and in the northeastern portion of the County. Over 15,460 acres, or about 6 percent of the County, have slopes of 20 percent or greater; while over 19,400 acres, or about 7 percent of the County, have slopes from 12 to 20 percent. Poorly planned hillside development in areas of steep slopes can lead to high costs for public infrastructure development and maintenance and construction and post-construction erosion problems. Steeply sloped agricultural land may make the operation of agricultural equipment difficult or even hazardous. Development or cultivation of steeply sloped lands is also likely to negatively impact surface water quality through related erosion and sedimentation.

## **NONMETALLIC MINERAL RESOURCES**

Nonmetallic minerals include sand, gravel, crushed stone, building or dimension stone, peat, and clay. Nonmetallic mines (extractive sites and pits) in Southeastern Wisconsin provide sand, gravel, and crushed limestone or dolomite for structural concrete and road building; peat for gardening and horticulture; and dimension stone for use in buildings, landscaping, and monuments. Nonmetallic mineral resources are important economic resources that should be taken into careful consideration whenever land is being considered for development. Mineral resources, like other natural resources, occur where nature put them, which is not always convenient or desirable. Wise management of nonmetallic mineral resources is important to ensure an adequate supply of aggregate at a reasonable cost for new construction and for maintenance of existing infrastructure in the future.

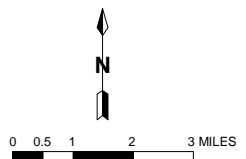
According to the U. S. Geological Survey, each person in the United States uses an average of 9.5 tons of construction aggregate per year (construction aggregate includes sand, gravel, crushed stone, and recycled crushed concrete). Construction of one lane-mile of Interstate Highway uses 20,000 tons of aggregate. Aggregate is heavy and bulky, and is therefore expensive to transport. Having sources of aggregate relatively close (within 25 miles) of a construction project lessens the overall cost of construction. The cost of a ton of aggregate can more than double when it has to be hauled 25 miles or more.

**Map 9**  
**SLOPE ANALYSIS FOR WASHINGTON COUNTY**



- SLOPES RANGING FROM 0 TO 12 PERCENT
- SLOPES RANGING FROM 12 TO 20 PERCENT
- SLOPES 20 PERCENT OR GREATER
- AREAS FOR WHICH SLOPE DATA ARE NOT AVAILABLE FROM SOIL SURVEY
- SURFACE WATER

Source: USDA - Natural Resources Conservation Service and SEWRPC.



## POTENTIAL SOURCES OF SAND, GRAVEL, CLAY AND PEAT

Map 10 shows the location of potential commercially workable sources of sand, gravel, clay, and peat in Washington County. The Wisconsin Geological and Natural History Survey (WGNHS) identified these resources using a variety of sources, including geologic studies,<sup>6</sup> data from Road Material Survey records collected by WGNHS for the Wisconsin Department of Transportation, information on existing extractive sites, and information on closed extractive sites that were recently active. The sand and gravel potential is categorized as high, medium, and low by the WGNHS based on the glacial geology (Mickelson and Syverson, 1997)<sup>7</sup>. The areas categorized as “outwash deposits” have the highest potential for significant deposits of sand and gravel, and account for 83,588 acres, or 30 percent of the County. These areas are generally coincident with the Kettle Moraine. Areas categorized as “glacial till” have medium to low potential for yielding commercial workable sources of sand and gravel, and encompass 106,991 acres, or 38 percent of the County. All of the existing extractive sites in the County are located within areas in these two categories. The areas categorized as “glacial lake deposits” contain clay deposits useful for construction, and account for 35,044 acres, or 13 percent of the County. The majority of such areas are located in the eastern portion of the County. Areas categorized as “peat and organic sediment” may contain economic deposits of peat, and account for 27,693 acres, or 10 percent of the County. These areas are scattered throughout the County, generally in association with wetlands, which limits access to the peat due to regulatory constraints.

## SURFACE WATER RESOURCES

Surface water resources, consisting of lakes and streams and their associated wetlands, floodplains, and shorelands, form important elements of the natural resource base of the County. Their contribution to economic development, recreational activity, and scenic beauty is immeasurable. The number of acres of surface waters, wetlands, and floodplains in the County and each local government is listed in Table 14.

Both surface water and groundwater are interrelated components of a single hydrologic system. The groundwater resources are hydraulically connected to the surface water resources inasmuch as the former provide the base flow of streams and contribute to inland lake levels. The groundwater resources constitute the major source of supply for domestic, municipal, and industrial water users in Washington County.

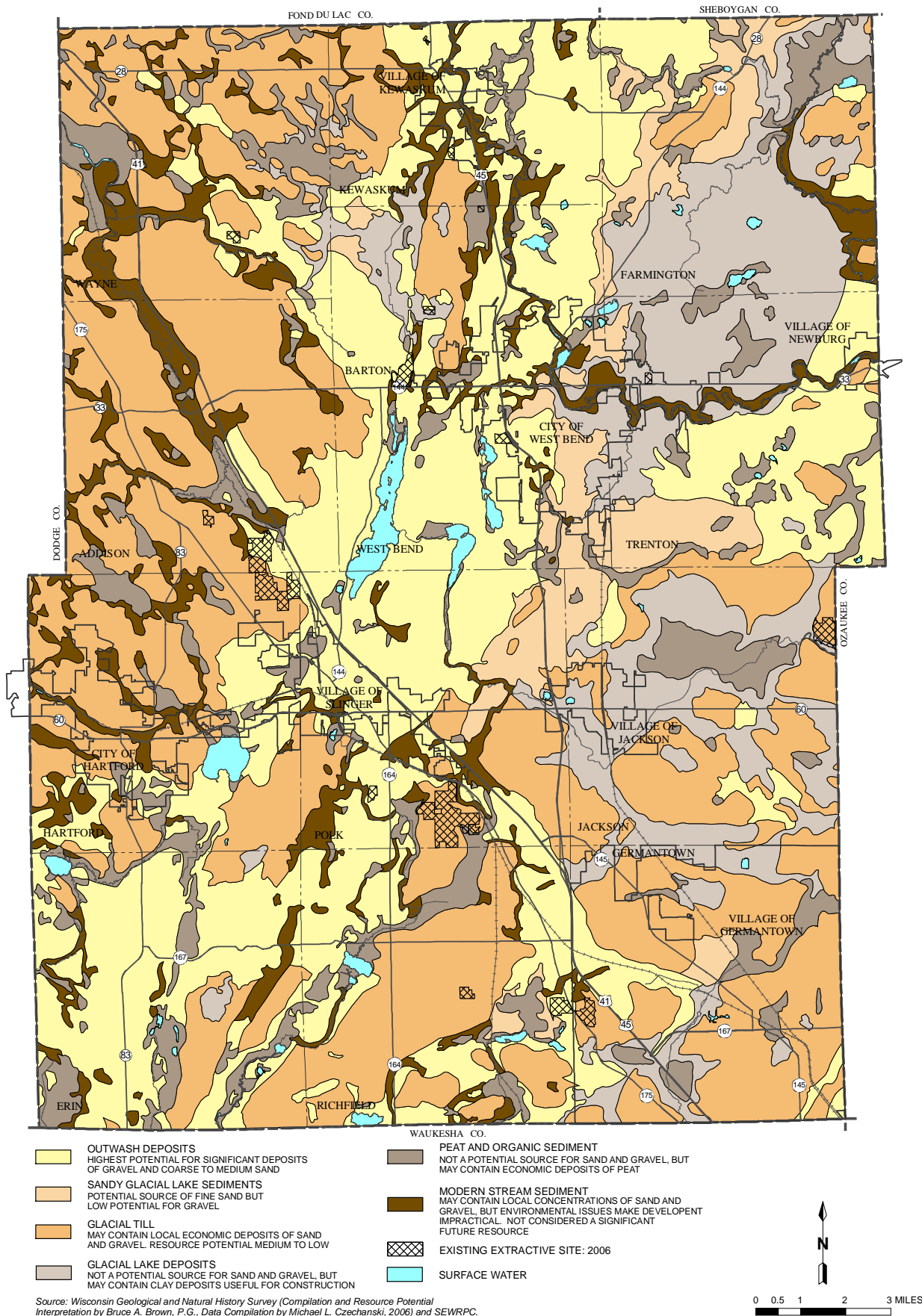
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<sup>6</sup> Bedrock geology from Preliminary Bedrock Maps of Washington County (WOFR 2004-17) by T. Evans, K. Massie-Ferch, and R. Peters, WGNHS.

<sup>7</sup> Mickelson, D. M. and K. M. Syverson, Quaternary Geology of Ozaukee and Washington Counties, Wisconsin, WGNHS Bulletin 91, 1997.

Map 10

POTENTIAL SOURCES OF SAND, GRAVEL, CLAY, AND PEAT IN WASHINGTON COUNTY



Source: Wisconsin Geological and Natural History Survey (Compilation and Resource Potential Interpretation by Bruce A. Brown, P.G., Data Compilation by Michael L. Czechanski, 2006) and SEWRPC.

**Table 14:  
SURFACE WATER,  
WETLANDS, AND FLOODPLAINS IN  
WASHINGTON COUNTY COMMUNITIES**

Area	Surface Water (acres in 2000) <sup>a</sup>	Floodplains (acres in 2002) <sup>b</sup>	Wetlands (acres in 2000) <sup>a</sup>
<b>Partnering Governments</b>			
Town of Addison	21	3,768	3,398
Town of Barton	219	1,639	1,685
Town of Erin	330	3,567	4,213
Town of Farmington	374	4,151	3,343
Town of Germantown	6	368	192
Town of Hartford	505	2,733	2,660
Town of Kewaskum	88	2,930	2,350
Village of Kewaskum	26	71	93
Town of Polk	264	2,227	1,840
Town of Trenton	272	3,118	3,745
Town of Wayne	92	6,072	5,637
<b>Non-Partnering Governments</b>			
City of Hartford	27	295	700
City of West Bend	193	639	757
Village of Germantown	182	2,148	3,709
Village of Jackson	18	137	116
Village of Newburg	24	0	31
Village of Slinger	23	197	406
Town of Jackson	63	5,089	4,383
Town of Richfield	415	2,623	2,460
Town of West Bend	1,361	2,039	1,054
Washington County	4,507	43,810	42,770

<sup>a</sup>The area within surface water and wetlands is based on the 2000 SEWRPC land use inventory and city and village limits as of January 1, 2006.

<sup>b</sup>The area within floodplains is based on the Washington County shoreland zoning maps adopted in 2002.

Source: Federal Emergency Management Agency and SEWRPC.

## **WATERSHEDS AND SUBWATERSHEDS**

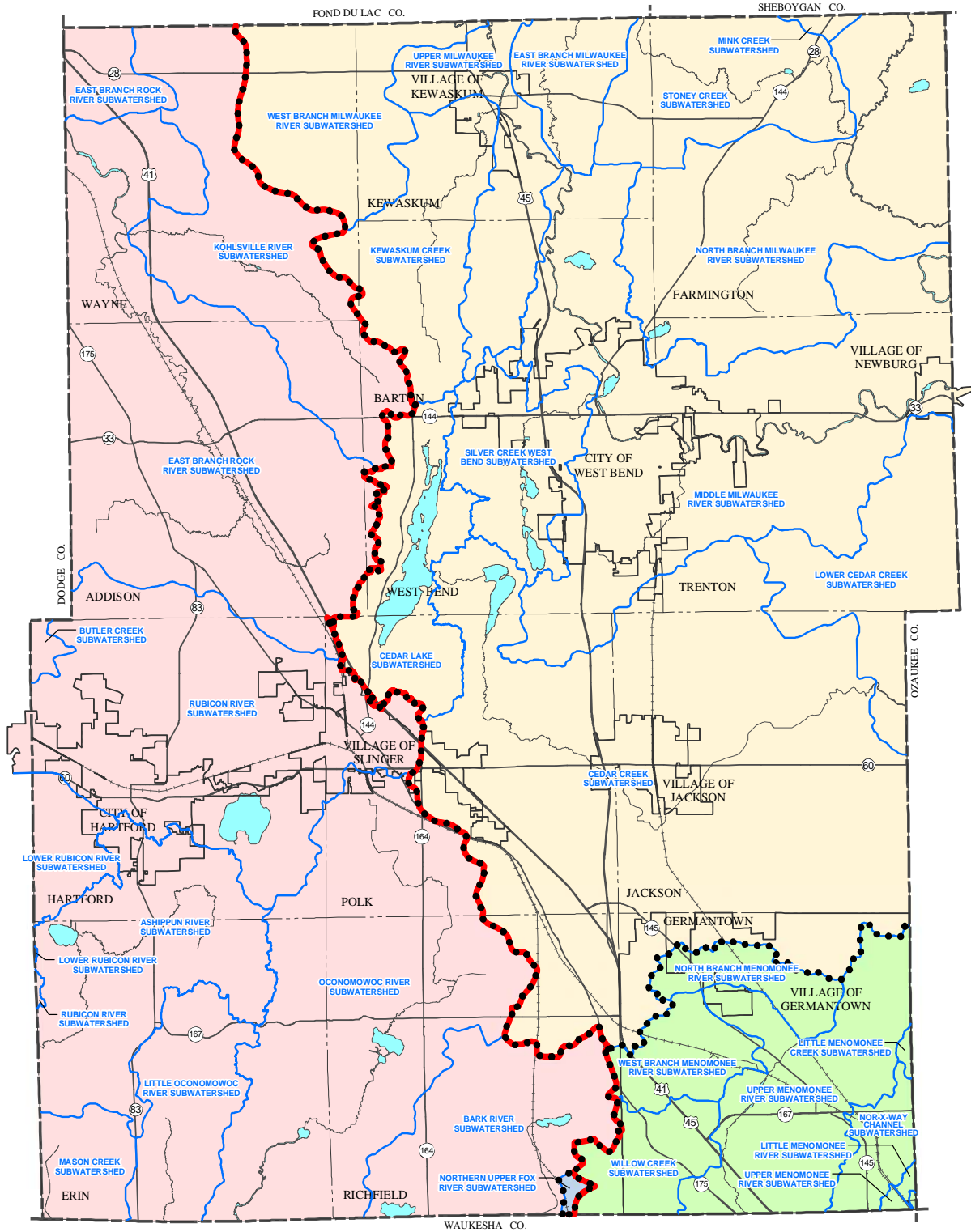
A subcontinental divide that separates the Mississippi River and the Great Lakes – St. Lawrence River drainage basins crosses Washington County from the Town of Wayne on the north to the Town of Richfield on the south, as shown on Map 11. About 164,684 acres, or 59 percent of the County, are located east of the divide and drain to the Great Lakes – St. Lawrence River system; the remaining 114,072 acres, or 41 percent of the County, drain west to the Mississippi River.

The Great Lakes – St. Lawrence River drainage basin includes the Milwaukee River watershed, which encompasses about 52 percent of the County, and the Menomonee River watershed, which encompasses about 7 percent of the County. The Mississippi River drainage basin includes the Rock River watershed, which encompasses about 41 percent of the County, and the Fox River watershed, which encompasses less than one-tenth of 1 percent of the County.

These drainage systems form the basis for management actions undertaken and supported by the Regional Water Quality Management Planning Program and the Wisconsin Department of Natural Resources (WDNR) Priority Watershed Program.

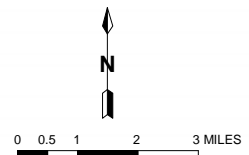
# Map 11

## WATERSHED FEATURES IN WASHINGTON COUNTY



- |   |   |
|---|---|
| <span style="display: inline-block; width: 15px; height: 10px; background-color: #f0e68c; border: 1px solid black;"></span> MILWAUKEE RIVER WATERSHED | <span style="display: inline-block; width: 15px; border-top: 2px dashed red;"></span> SUBCONTINENTAL DIVIDE                               |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: #f08080; border: 1px solid black;"></span> ROCK RIVER WATERSHED      | <span style="display: inline-block; width: 15px; border-top: 2px dotted black;"></span> MAJOR WATERSHED BOUNDARIES                        |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: #add8e6; border: 1px solid black;"></span> FOX RIVER WATERSHED       | <span style="display: inline-block; width: 15px; border-bottom: 1px solid blue;"></span> SUBWATERSHED BOUNDARIES                          |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: #90ee90; border: 1px solid black;"></span> MENOMONEE RIVER WATERSHED | <span style="display: inline-block; width: 15px; height: 10px; background-color: #add8e6; border: 1px solid black;"></span> SURFACE WATER |

Source: SEWRPC.





## LAKES AND STREAMS

Major streams are defined as those which maintain, at a minimum, a small continuous flow throughout the year except under unusual drought conditions. There are over 200 miles of such streams in Washington County. As noted above, the County includes portions of the Menomonee River, the Milwaukee River, and the Rock River watersheds, along with a very small portion of the Fox River Watershed. The major stream in the Menomonee River watershed, which is located in the southeast portion of the County, is the Menomonee River. Major streams in the Milwaukee River watershed, which generally includes the area in the eastern half of the County, include the Milwaukee River, East Branch Milwaukee River, North Branch Milwaukee River, Kewaskum Creek, Cedar Creek, Little Cedar Creek, North Branch Cedar Creek, Evergreen Creek, Quaas Creek, Silver Creek, Stony Creek, and Wallace Creek. Major streams in the Rock River watershed, which generally includes the area in the western half of the County, are the East Branch Rock River, Ashippun River, Coney River, Kohlsville River, Limestone Creek, Mason Creek, Oconomowoc River, Little Oconomowoc River, Bark River, and Rubicon River. Major streams are shown on Map 12. The lengths and water quality characteristics of the streams are listed in Table 15.

There are 13 major lakes (that is, lakes of 50 or more acres) located entirely within Washington County, which are shown on Map 12 and listed in Table 16. Major lakes in the Milwaukee River watershed are Barton Pond, Big Cedar Lake, Little Cedar Lake, Green Lake, Lucas Lake, Silver Lake, Smith Lake, Lake Twelve, and Wallace Lake. Major lakes in the Rock River watershed are Bark Lake, Druid Lake, Friess Lake, and Pike Lake. One other major lake in the Rock River watershed, Lake Five, is located partially in Washington and partially in Waukesha County. There are no major lakes within that portion of the Menomonee River watershed or the Fox River Watershed lying in Washington County. Together, these major lakes have a combined surface area of about 2,563 acres in Washington County. The three largest lakes are Big Cedar Lake, with a surface area of about 957 acres; Pike Lake, with a surface area of about 469 acres; and Little Cedar Lake, with a surface area of about 266 acres.





**Table 15:  
MAJOR STREAMS IN WASHINGTON COUNTY**

<b>Watershed and Stream</b>	<b>Stream Length (miles)</b>	<b>Mean Width (feet)</b>	<b>Mean Depth (feet)</b>	<b>Drainage Area (acres)</b>	<b>Percent of Land Area</b>
<b>Menomonee River Watershed</b>					
Goldendale Creek (West Branch of Menomonee River)	4.2	8	0.50	2,967	1.07
North Branch of Menomonee River (upstream STH 145)	10.0	--	--	2,400	0.86
Menomonee River (downstream STH 145 to CTH Q)	3.8	18	1.85	9,466	3.40
Little Menomonee River	9.7*	--	--	257	0.09
Nor-X-Way Channel	4.5	--	--	1,904	0.68
Willow Creek	3.2*	12	0.50	3,441	1.24
Subtotal	35.4	--	--	20,436	7.34
<b>Milwaukee River Watershed</b>					
Cedar Creek (to CTH M)	17.8	32	1.75	58,962	21.17
Cedar Creek North Branch	7.3	10	1.00	--	--
Kewaskum Creek	6.4	12	0.85	7,561	2.71
Lehner Creek	2.0	7	0.85	--	--
Little Cedar Creek	7.2	9	0.67	--	--
Milwaukee River	23.9	83	1.50	34,440	12.36
Milwaukee River East Branch	5.0	42	2.00	3,300	1.18
Milwaukee River North Branch	8.5	53	4.00	18,057	6.48
Milwaukee River West Branch	11.1	8	0.50	7,966	2.86
Quaas Creek	4.9	11	0.67	--	--
Silver Creek	4.0	9	0.50	5,811	2.09
Stony Creek	10.0	11	0.55	7,740	2.78
Wallace Creek	8.6*	12	1.30	--	--
Subtotal	116.7	--	--	144,124.5	51.74
<b>Rock River Watershed</b>					
Allenton Creek	3.4	6	1.04	--	--
Ashippun River	9.5	11	1.25	11,437	4.11
Bark River	2.5*	12	1.50	8,932	3.21
Coney Creek	6.2	2	0.33	--	--
Kohlsville Creek	10.2	12	1.00	12,388	4.45
Limestone Creek	5.8	17	0.70	--	--
Little Oconomowoc River	5.7	13	0.85	5,730	2.06
Mason Creek	6.5	4	0.50	2,555	0.92
Oconomowoc River	9.1*	15	1.30	21,510	7.72
Rock River East Branch	18.7	33	2.00	28,626	10.28
Rubicon River	7.8	17	1.17	22,827	8.19
Wayne Creek	6.5	9	0.67	--	--
Subtotal	91.9	--	--	114,006	40.93
<b>Total</b>	<b>244.0</b>	<b>--</b>	<b>--</b>	<b>278,566.2</b>	<b>100.00</b>

\*Lengths include areas outside Washington County. Source: SEWRPC

**Table 16:  
LAKES WITHIN WASHINGTON COUNTY**

<b>Lake</b>	<b>Surface Area (acres)</b>	<b>Volume (acre-feet)</b>	<b>Maximum Depth (ft.)</b>	<b>Mean Depth (ft.)</b>
Allis	9	--	34	--
Amy Bell	26	520	37	20
Bark	62	868	34	14
Barton Pond	67	201	5	3
Beck	16	--	8	--
Big Cedar	932	31,688	105	34
Boltonville Millpond	10	50	10	5
Brickyard	1	--	4	--
Druid	120	3,000	53	25
Ehne	18	90	15	5
Erler	37	518	34	14
Five	102	--	23	--
Friess	117	3,159	48	27
Gilbert	44	132	30	3
Green	71	1,207	37	17
Hartford Millpond	11	--	8	--
Hasmer	15	255	34	17
Hawthorn	8	--	12	--
Hickey	10	--	14	--
Keowns Pond	1	--	15	--
Kewaskum Millpond	5	--	8	--
Kohlsville Millpond	6	--	7	--
Lehner	3	45	22	15
Lent	8	--	7	--
Lenwood	15	285	38	19
Little Cedar	246	3,198	56	13
Little Drickens	9	--	20	--
Little Friess	15	240	34	16
Lohr Pond	7	--	8	--
Lowe	23	253	23	11
Lucas	78	468	15	6
Malloy	5	--	24	--
Mayfield Pond	8	--	4	--
McConville	14	--	37	--
Miller	3	--	16	--
Mud T10N R19E S19	23	--	10	--
Mud T9N R19E S24	5	15	5	3
Mueller	14	210	33	15
Murphy	16	--	37	--
Newburg Pond	7	--	8	--
Paradise Valley	9	--	35	--
Pike	522	--	45	--
Proschinger	6	--	23	--
Quaas	7	--	12	--

**Table 16: (continued)**

<b>Lake</b>	<b>Surface Area (acres)</b>	<b>Volume (acre-feet)</b>	<b>Maximum Depth (ft.)</b>	<b>Mean Depth (ft.)</b>
Radtke	10	70	14	7
Rockfield Quarry Pond	3	--	27	--
Silver	118	2,360	47	20
Smith	86	258	5	3
Tilly	13	312	48	24
Twelve	53	318	20	6
Wallace	52	572	35	11
Werner Pond	9	--	8	--
<b>Total</b>	<b>3,075</b>	<b>50,292</b>	<b>--</b>	<b>--</b>

*Source: Wisconsin Department of Natural Resources and SEWRPC.*

Lakes and streams are readily susceptible to degradation through improper land use development and management. Water quality can be degraded by excessive pollutant loads, including nutrient loads, which enter from malfunctioning and improperly located onsite waste treatment systems, from sanitary sewer overflows, from construction and other urban runoff, and from careless agricultural practices. The water quality of lakes and streams may also be adversely affected by the excessive development of riparian areas and by the filling of peripheral wetlands, which remove valuable nutrient and sediment traps while adding nutrient and sediment sources. It is important that existing and future development in riparian areas be managed carefully to avoid further water quality degradation and to enhance the recreational and aesthetic values of surface water resources.

## **WETLAND RESOURCES**

Wetlands generally occur in depressions and near the bottom of slopes, particularly along lakeshores and streambanks, and on large land areas that are poorly drained.<sup>8</sup>

Wetlands may, however, under certain conditions, occur on slopes and even on hilltops. Wetlands perform an important set of natural functions which include support of a wide variety of desirable, and sometimes unique, forms of plant and animal life; water quality protection; stabilization of

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<sup>8</sup> The definition of “wetlands” used by SEWRPC is the same as that of the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency. Under this definition, wetlands are areas that are inundated or saturated by surface water or groundwater at a frequency, and with a duration sufficient to support, and that under normal circumstance do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. This definition differs somewhat from the definition used by the WDNR. Under the WDNR definition, wetlands are areas where water is at, near, or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation and which has soils indicative of wet conditions. As a practical matter, application of either the WDNR definition or the EPA-Army Corps of Engineers-SEWRPC definition has been found to produce relatively consistent wetland identification and delineations in the majority of the situations in southeastern Wisconsin.

lake levels and streamflows; reduction in stormwater runoff by providing areas for floodwater impoundment and storage; and protection of shorelines from erosion.

Wetlands identified in the SEWRPC regional land use inventory encompassed about 42,770 acres, or 15 percent of the County, in 2000. Wetlands, which are shown on Map 12, are based on the Wisconsin Wetlands Inventory completed in 1982, updated to the year 2000 as part of the regional land use inventory.

Wetlands form a vital part of the landscape in Washington County, in that they perform an important set of natural functions that make them ecologically and environmentally invaluable resources including:

- Support of a wide variety of desirable, and sometimes rare, forms of plant and animal life
- Stabilization of lake levels and streamflows
- Entrapment and storage of plant nutrients in runoff, thus reducing the rate of enrichment of surface waters and noxious weed and algae growth
- Contribution to the atmospheric oxygen and water supplies
- Reduction in stormwater runoff by providing areas for floodwater impoundment and storage
- Protection of shorelines from erosion
- Entrapment of soil particles suspended in runoff and reduction in stream sedimentation
- Provision of groundwater recharge and discharge areas
- Opportunities for certain scientific, educational, and recreational pursuits

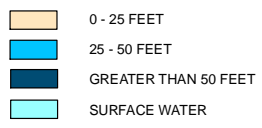
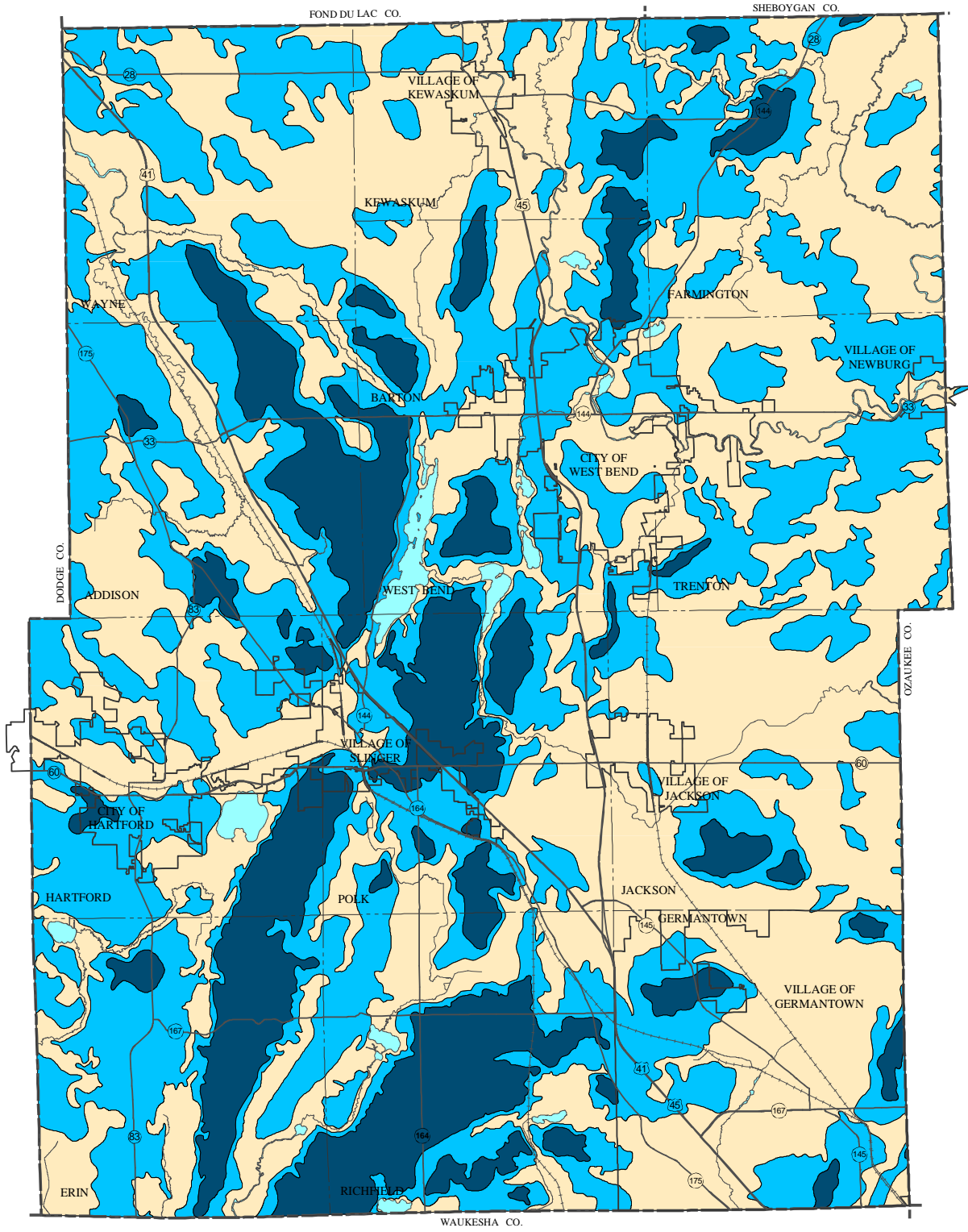
## **GROUNDWATER RESOURCES**

Groundwater resources constitute another key element of the natural resource base of the County. Groundwater not only sustains lake levels and wetlands and provides the base flow of streams, but also provides the water supply for domestic, municipal, and industrial water users in Washington County. Map 13 depicts the depth to the water table, or groundwater, in Washington County.

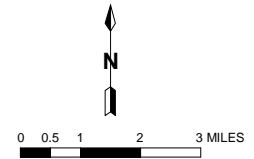
Groundwater occurs within three major aquifers that underlie the County and the remainder of southeastern Wisconsin. From the land's surface downward, they are: 1) the sand and gravel deposits in the glacial drift which interacts extensively with the surface water system of the County; 2) the shallow Silurian dolomite strata in the underlying bedrock (formerly known as the Niagara dolomite aquifer) which is the primary source of most domestic water supplies (wells between 100-400 ft. deep); and 3) the deeper sandstone, dolomite, siltstone, and shale strata which is a part of a large regional aquifer that is used as a source of water supply for major concentrations of urban development throughout southeastern Wisconsin and northeastern Illinois. Because of their proximity to the land's surface and hydraulic interconnection, the first two aquifers are commonly referred to collectively as the "shallow aquifer," while the latter is referred to as the deep aquifer. Within the County, the shallow and deep aquifers are separated by the Maquoketa shale, which forms a relatively impermeable barrier between the two aquifers.

Map 13

DEPTH TO SHALLOW WATER TABLE IN WASHINGTON COUNTY



Source: Wisconsin Geological and Natural History Survey and SEWRPC.



## **FOREST RESOURCES**

With sound management, woodlands can serve a variety of beneficial functions. In addition to contributing to clean air and water and regulating surface water runoff, woodlands help maintain a diversity of plant and animal life. The destruction of woodlands, particularly on hillsides, can contribute to excessive stormwater runoff, siltation of lakes and streams, and loss of wildlife habitat. Woodlands identified in the SEWRPC land use inventory are shown on Map 14. Woodlands are defined as upland areas of one acre or more in area, having 17 or more trees per acre, each deciduous tree measuring at least four inches in diameter 4.5 feet above the ground, and having canopy coverage of 50 percent or greater. Coniferous tree plantations and reforestation projects are also classified as woodlands. In 2000, woodlands encompassed over 23,000 acres, or about 8 percent of the County<sup>9</sup>.

The quality of life within an area is influenced by the overall quality of the environment, as measured in terms of clean air, clean water, scenic beauty, and diversity. In addition to contributing to clean air and water, the maintenance of woodlands can contribute to the maintenance of a diversity of plant and animal life in association with human life. Woodlands can and should be maintained for their total values: scenic, wildlife, open space, educational, recreational, and watershed protection, as well as for their forest products.

## **WILDLIFE HABITAT**

Wildlife habitat provides opportunities for recreational, educational, and scientific activities. In 1985, the Regional Planning Commission in cooperation with the WDNR inventoried wildlife habitat areas remaining in the Southeastern Wisconsin Region.

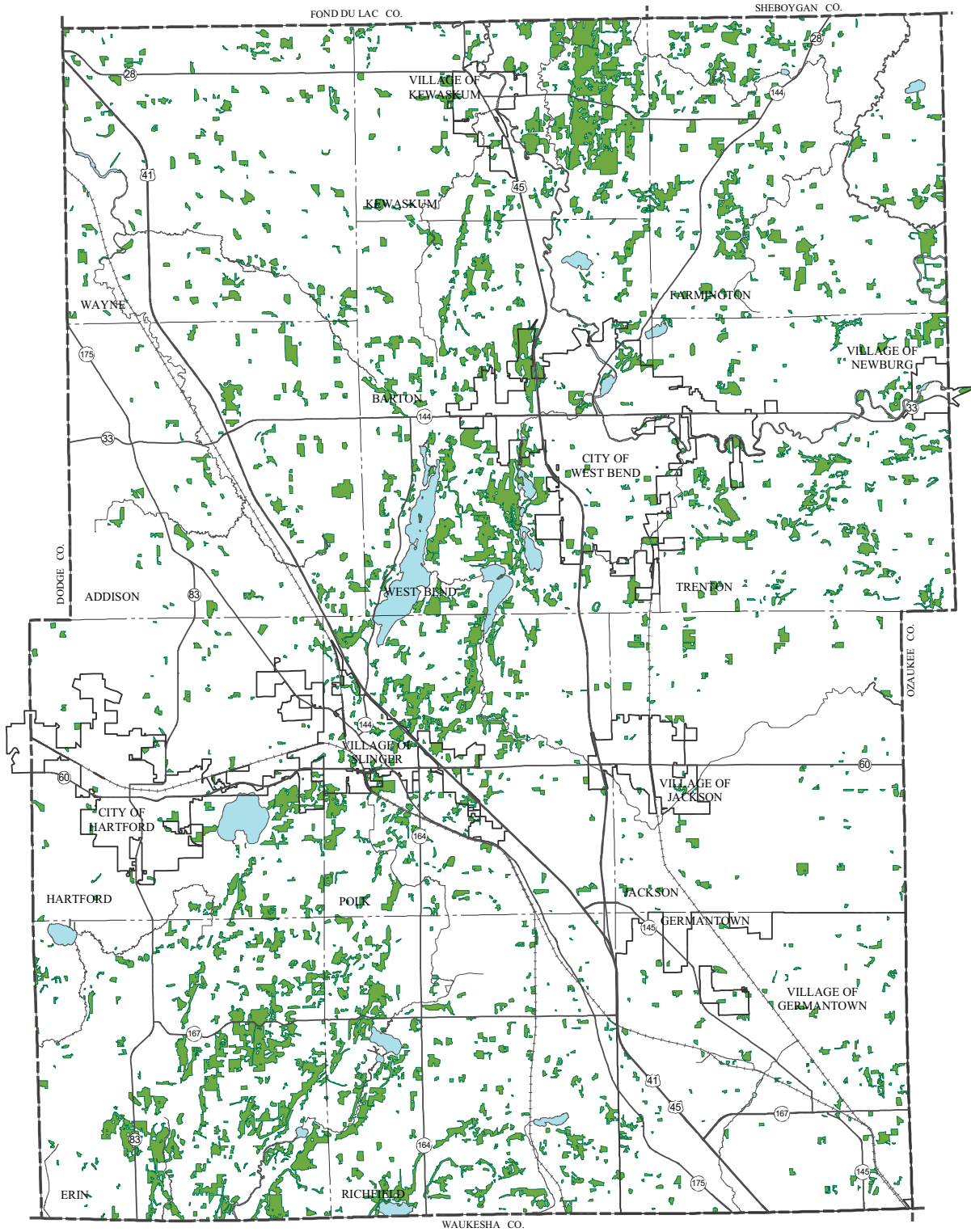
The wildlife habitat areas in Washington County were categorized as Class I, II, or III habitat areas. Class I wildlife habitat areas contained a good diversity of wildlife, were adequate in size to meet all of the habitat requirements for the species concerned, were generally located in proximity to other wildlife habitat areas, and met the diversity, territorial requirements, vegetation, location, and disturbance criteria. Class II wildlife habitat areas generally fail to meet one of the five criteria in the preceding list for a high value wildlife area. However, they retained a good plant and animal diversity. Class III wildlife habitat areas were remnant in nature, and they generally failed to meet two or more of the five criteria for a high-value wildlife habitat, but nevertheless, were important if they were located in close proximity to other medium or high-value habitat areas.

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<sup>9</sup> This data includes upland woods only, not lowland woods classified as wetlands, such as tamarack swamps.

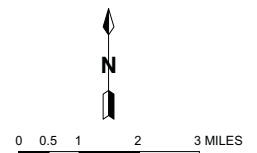


# Map 14 WOODLANDS IN WASHINGTON COUNTY



- UPLAND WOODLANDS: 2000
- NOTE: DOES NOT INCLUDE LOWLAND WOODS, SUCH AS TAMARACK SWAMPS.
- SURFACE WATER

Source: Washington County and SEWRPC.





As illustrated on Map 15, in 1985, there were 86,651 acres of wildlife habitat, or approximately 31 percent of the land area in the County. Of those areas, approximately 38,700 acres, or about 14 percent, are classified as Class I habitat; 27,800 acres, or 10 percent, are classified as Class II habitat; and 20,300 acres or, 7 percent, are classified as Class III habitat.

## **NATURAL AREAS**

A comprehensive inventory of natural resources and important plant and animal habitats was conducted by SEWRPC in 1994 as part of the regional natural areas and critical species habitat protection and management plan. The inventory systematically identified all remaining high-quality natural areas, critical species habitat, and sites having geological significance within the Region. Ownership of identified natural areas and critical species habitat sites in the County were reviewed and updated in 2007.

Natural areas are tracts of land or water so little modified by human activity, or sufficiently recovered from the effects of such activity, that they contain intact native plant and animal communities believed to be representative of the landscape before European settlement. Natural areas are classified into one of three categories: natural areas of statewide or greater significance (NA-1), natural areas of countywide or regional significance (NA-2), and natural areas of local significance (NA-3). Classification of an area into one of these three categories is based on consideration of the diversity of plant and animal species and community type present, the structure and integrity of the native plant or animal community, the uniqueness of the natural features, the size of the site, and the educational value.

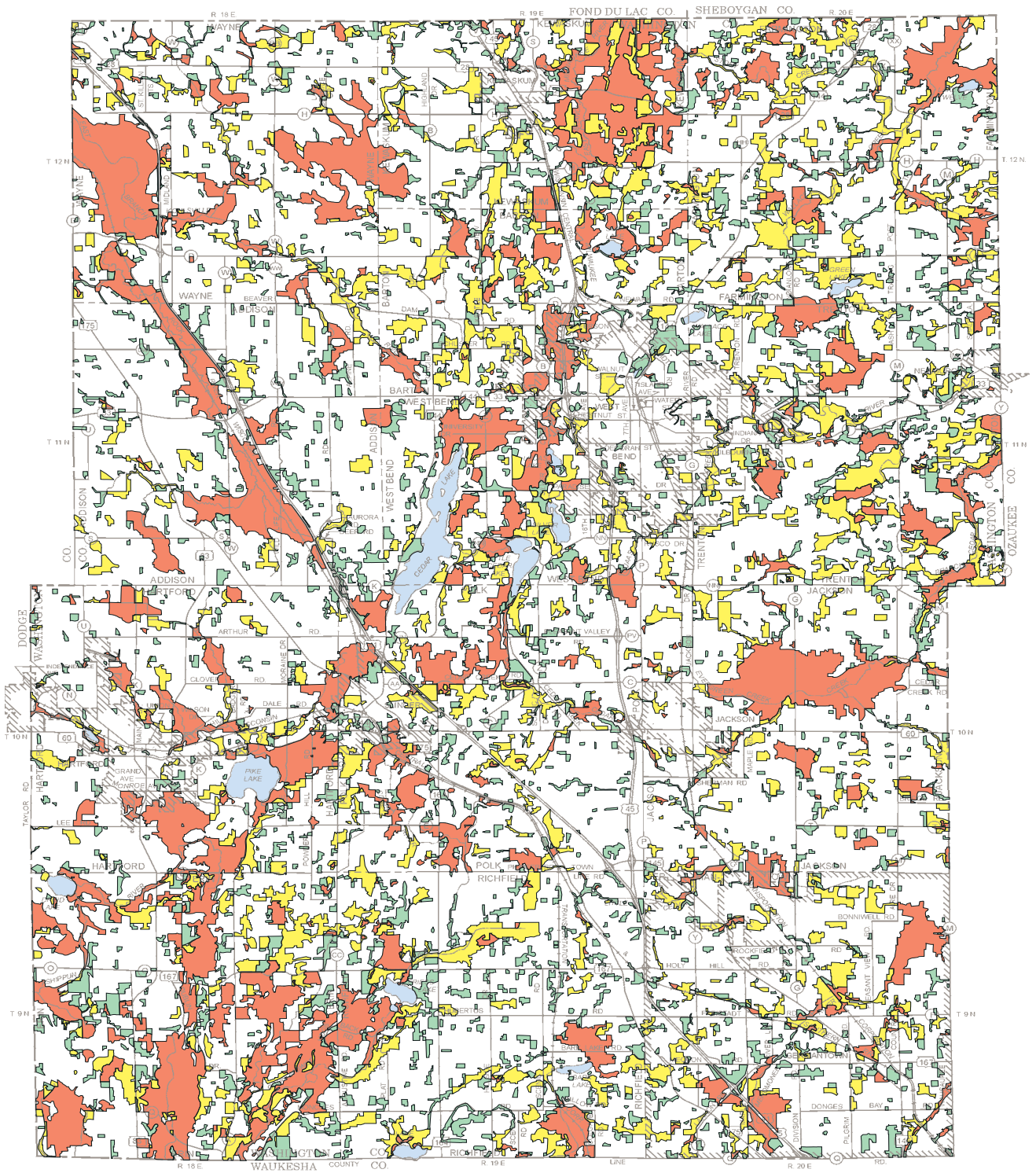
A total of 91 natural areas, encompassing about 16,061 acres, or about 6 percent of the County, have been identified. Of the 91 identified sites, seven are classified as NA-1 sites and encompass about 1,660 acres, 29 are classified as NA-2 sites and encompass about 6,361 acres, and 55 are classified as NA-3 sites and encompass about 8,040 acres. Natural areas are shown on Map 16 and described in Table 17.

## **CRITICAL SPECIES HABITAT AND AQUATIC SITES**

Critical species habitat sites consist of areas outside natural areas that are important for their ability to support rare, threatened, or endangered plant or animal species. Such areas constitute “critical” habitat considered to be important to the survival of a particular species or group of species of special concern. Thirteen sites supporting rare or threatened plant and animal species have been identified in Washington County. These sites encompass an area of 356 acres, or less than 1 percent of the County, and are shown on Map 17 and described in Table 18.

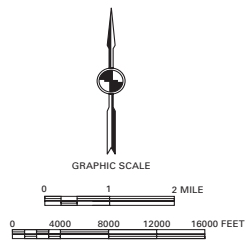
There are also 73 aquatic habitat sites supporting threatened or rare fish, herptile, or mussel species in the County, including 188 miles of rivers and streams and 2,749 acres of lake waters. Aquatic habitat sites are shown on Map 17 and described in Table 19.

Map 15: WILDLIFE HABITAT IN WASHINGTON COUNTY: 1985



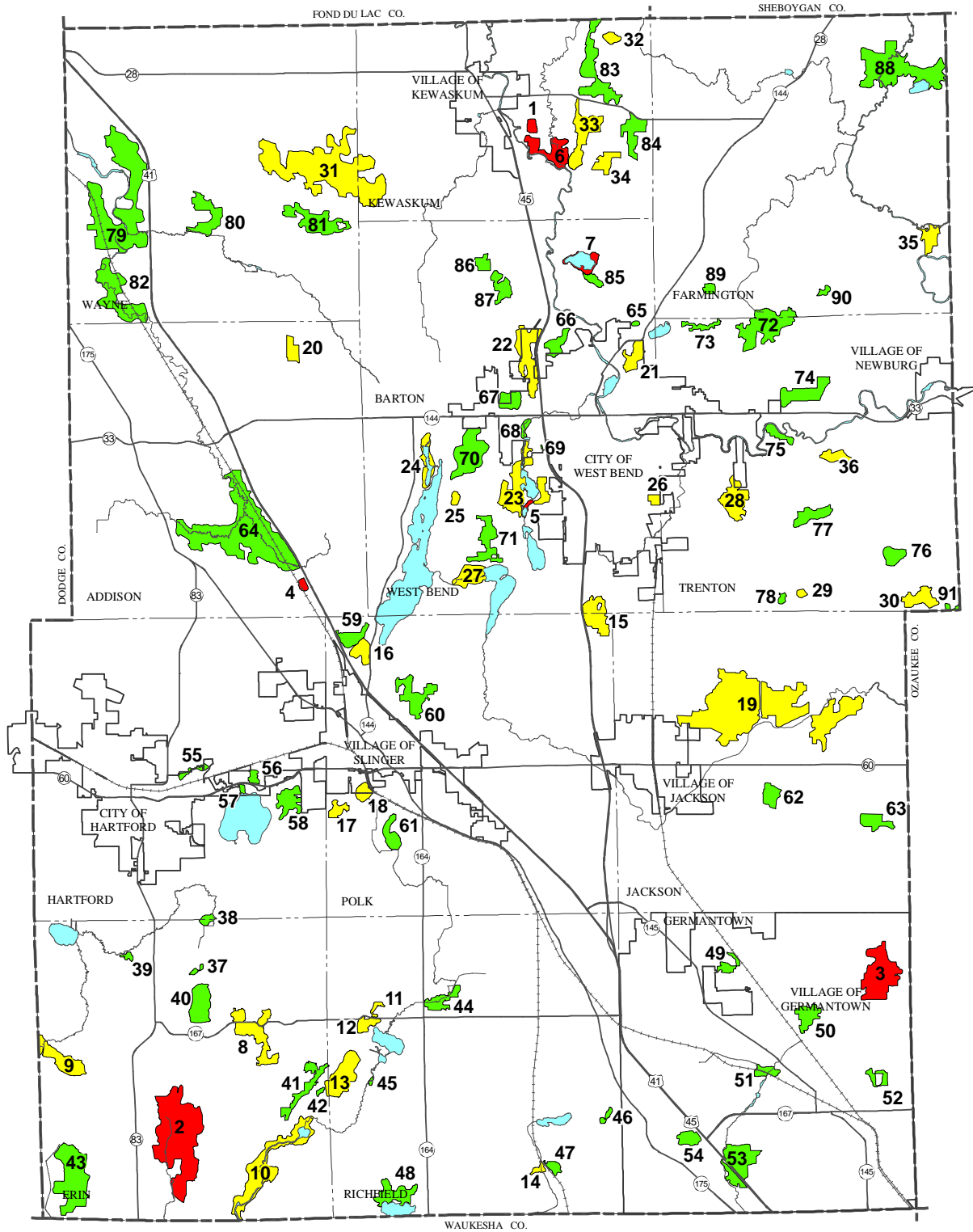
- CLASS I WILDLIFE HABITAT AREA
- CLASS II WILDLIFE HABITAT AREA
- CLASS III WILDLIFE HABITAT AREA
- SURFACE WATER

NOTE WILDLIFE HABITAT MAY BE LOCATED WITHIN SURFACE WATER FEATURES AND CONSISTS OF DEEP MARSH AREAS HAVING SUBMERGENT, EMERGENT, AND FREE-FLOATING VEGETATION.



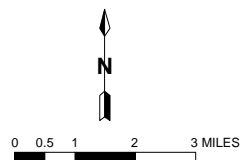
Map 16

NATURAL AREAS IN WASHINGTON COUNTY: 1994



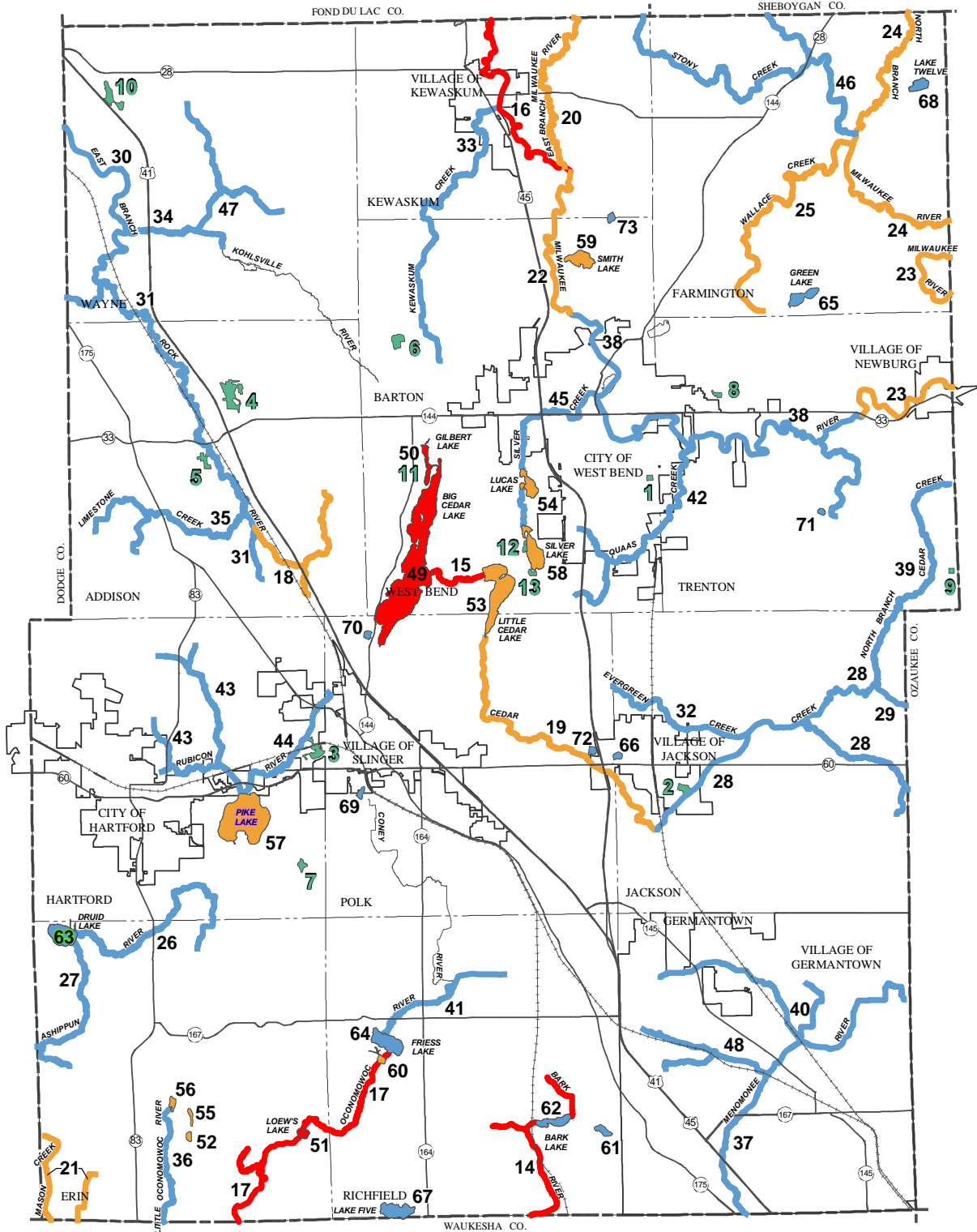
- NATURAL AREAS OF STATEWIDE OR GREATER SIGNIFICANCE (NA-1)
- NATURAL AREAS OF COUNTYWIDE OR REGIONAL SIGNIFICANCE (NA-2)
- NATURAL AREAS OF LOCAL SIGNIFICANCE (NA-3)
- 50** NATURAL AREA REFERENCE NUMBER (SEE TABLE 17)
- SURFACE WATER

Source: Wisconsin Department of Natural Resources and SEWRPC.



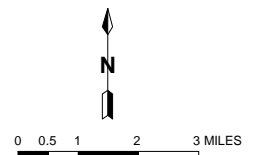
Map 17

CRITICAL SPECIES AND AQUATIC HABITAT SITES IN WASHINGTON COUNTY: 1994



- |  |   |  |   |
|--|---|--|---|
|  | CRITICAL SPECIES HABITAT SITES                                |  | AQUATIC RIVERS OR STREAMS OF STATEWIDE OR GREATER SIGNIFICANCE (AQ-1)   |
|  | CRITICAL SPECIES HABITAT SITE REFERENCE NUMBER (SEE TABLE 18) |  | AQUATIC RIVERS OR STREAMS OF COUNTYWIDE OR REGIONAL SIGNIFICANCE (AQ-2) |
|  | AQUATIC AREAS OF STATEWIDE OR GREATER SIGNIFICANCE (AQ-1)     |  | AQUATIC RIVERS OR STREAMS OF LOCAL SIGNIFICANCE (AQ-3)                  |
|  | AQUATIC AREAS OF COUNTYWIDE OR REGIONAL SIGNIFICANCE (AQ-2)   |  | AQUATIC HABITAT SITE REFERENCE NUMBER (SEE TABLE 19)                    |
|  | AQUATIC AREAS OF LOCAL SIGNIFICANCE (AQ-3)                    |  |   |

Source: Wisconsin Department of Natural Resources and SEWRPC.



**Table 17:  
NATURAL AREAS IN WASHINGTON COUNTY: 2007<sup>a</sup>**

Number on Map 16	Area Name	Classification Code <sup>b</sup>	Location	Ownership	Size (acres)	Description and Comments
1	Kewaskum Maple-Oak Woods State Natural Area	NA-1 (SNA, RSH)	T12N, R19E Sections 10 and 15 Town of Kewaskum	Department of Natural Resources and private	33	An extremely rich and relatively undisturbed southern mesic and dry-mesic forest, located just east of the Milwaukee River on undulating morainal topography. The northern two-thirds constitute a designated State Natural Area, which consists of two tracts separated by pine plantation. A number of regionally uncommon species are present. Kettle depressions hold water part of the year
2	Murphy Lake-McConville Lake Wetland Complex	NA-1 (RSH)	T9N, R18E Sections 21, 22, 27, 28, 33, and 34 Town of Erin	The Nature Conservancy and other private	889	Large wetland complex surrounding undeveloped hard-water seepage lakes located in a large glacial basin. The variety of plant communities includes shrub-carr, alder thicket, lowland hardwoods, sedge meadow, deep and shallow marsh, and both young and mature tamarack forest. Good to excellent quality overall
3	Germantown Swamp	NA-1	T9N, R20E Sections 1 and 12 Village of Germantown	Village of Germantown and private	374	Located along the headwaters of the Menomonee River, this is a large low-lying woods that has apparently suffered only minimal human disturbance, although ditching near the perimeter has had some effect. This is predominantly a southern low-land hardwoods of silver and red maple, green ash, American elm, and bass-wood, but with substantial inclusions of northern wet-mesic forest of yellow birch, tamarack, and white cedar. At the north end is an upland stand of sugar maple and beech. The ground flora contains a mixture of northern and southern elements. The large size of the woods, together with its relatively undisturbed nature and unique combination of species, makes this a valuable site. A severe wind-storm in late June 1991 toppled a large number of trees, mostly yellow birch and silver maple
4	Aurora Road Fen	NA-1 (RSH)	T11N, R18E Section 35 Town of Addison	Wisconsin Department of Transportation and private	22	High-quality calcareous fen, with sedge meadow and tamarack relict associated with cold trout stream that is tributary to the Rock River. Location of swamp metal-mark, a State-designated threatened butterfly species. Threatened by surrounding incompatible land use
5	Paradise Lake Fen	NA-1 (RSH)	T11N, R19E Sections 22 and 27 Town of West Bend	Department of Natural Resources and private	22	Undeveloped nine-acre lake with good-quality calcareous sedge mat and deep and shallow marsh
6	Milwaukee River Floodplain Forest State Natural Area	NA-1 (SNA)	T12N, R19E Sections 14 and 15 Town of Kewaskum	Department of Natural Resources and private	188	One of the best riverine forests remaining in the Region. Quality varies, but some areas are relatively undisturbed. Upland "islands" contribute to a rich and diverse ground flora
7	Smith Lake and Wetlands	NA-1 (RSH)	T12N, R19E Sections 26 and 35 Town of Barton	Department of Natural Resources, Town of Barton, and private	132	Shallow lake rich in aquatics bordered by sedge meadow, tamaracks, and good-quality calcareous fens on northeast and east sides
--	Subtotal - 7 sites	NA-1	--	--	1,660	--
8	Holy Hill Woods	NA-2	T9N, R18E Sections 2, 11, and 14 Town of Erin	Carmelite Fathers, Ozaukee Washington Land Trust, and other private	258	Moderate- to good-quality, medium-aged southern mesic and dry-mesic woods located on gently sloping to steep interlobate kettle moraine topography. Dominated by sugar maple, red oak, red maple, white ash, white oak, and basswood. Total wooded area is large, but dissected by highways. However, it remains as one of the larger, better-quality upland hardwood forests locally
9	Toland Swamp	NA-2	T9N, R18E Sections 18, 19, and 20 Town of Erin	Private	192	Large, wooded wetland mixture of shrub-carr, lowland hardwoods, and tamarack relict, with a history of disturbance
10	Loew Lake Wetland Complex	NA-2 (RSH)	T9N, R18E Sections 24, 25, 26, 34, and 35 Town of Erin	Department of Natural Resources and private	481	Undeveloped drainage lake and wetland corridor associated with the upper Oconomowoc River. The diverse wetland communities are in generally good condition, and include sedge meadow, lowland hardwoods, emergent aquatics, shrub-carr, and tamarack swamp. Swamp metalmark butterfly and queen snake have been documented

**Table 17: (continued)**

Number on Map 16	Area Name	Classification Code <sup>b</sup>	Location	Ownership	Size (acres)	Description and Comments
11	Daniel Boone Bogs	NA-2 (RSH)	T9N, R19E Sections 7 and 8 Town of Richfield	Daniel Boone Conservation League and other private	21	A pair of good-quality, relatively undisturbed sphagnum bogs located within a dry-mesic forest matrix. A number of uncommon species are present, including common bog arrow-grass ( <i>Triglochin maritimum</i> ), a State-designated special concern species
12	Glacier Hills Park Bogs and Upland Woods	NA-2 (RSH)	T9N, R19E Sections 7, 17, and 18 Town of Richfield	Washington County and private	60	Steep, interlobate kettle moraine topography supporting two good-quality bogs in kettle hole depressions. Southern mesic and dry-mesic hardwood forest covers the surrounding uplands, with small stands of dry hill prairie containing the State-designated threatened kittentails ( <i>Besseyia bullii</i> )
13	Friess Lake Tamarack Swamp	NA-2	T9N, R18E Section 24 Town of Erin T9N, R19E Sections 18 and 19 Town of Richfield	Private	228	Large, mostly wooded, wetland complex, consisting of young to medium-aged tamarack swamp, shrub-carr, and shallow marsh. South portion divided by high east-west crevasse fill
14	Colgate Fen-Meadow	NA-2 (RSH)	T9N, R19E Sections 26 and 35 Town of Richfield	Private	23	Good-quality fen-sedge meadow complex, with tamarack relict, bordering the headwaters of the Bark River
15	Mud Lake Swamp	NA-2 (RSH)	T10N, R19E Section 1 Town of Polk T11N, R19E Section 35 Town of West Bend	Wisconsin Department of Transportation and private	186	Good-quality, undeveloped calcareous head-water lake surrounded by lowland hardwoods and tamarack swamp. Fen and bog floral elements are present. Adversely affected by construction of USH 45
16	Big Cedar Lake Bog	NA-2	T10N, R19E Section 6 Town of Polk	Private	89	Good-quality, relatively large sphagnum bog, surrounded by a tamarack fringe. Regionally uncommon species are present. Some past attempts at ditching
17	Mud Lake Upland Woods	NA-2	T10N, R19E Section 19 Town of Polk	Private	54	Relatively undisturbed southern dry-mesic woods on rolling morainal topography. Dominated by red and white oaks, with an admixture of red maple, sugar maple, bass-wood, and white ash. Few exotics present. Threatened by encroaching residential development. A good example of this forest type
18	Mud Lake Meadow	NA-2 (RSH)	T10N, R19E Section 19 Village of Slinger T10N, R19E Section 19 Town of Polk	Private	59	Good-quality open meadow to the east and north of a small, shallow, alkaline seepage lake. Dominated by wire-grass sedges. Fen elements are present, as well as a few scattered patches of tamaracks. A site of unusual species composition
19	Jackson Swamp	NA-2 (RSH)	T10N, R20E Sections 1, 2, 8, 9, 10, 14, 15, 16, and 17 Town of Jackson	Department of Natural Resources and private	1,571	Large forested wetland, consisting mainly of disturbed lowland hardwood swamp with green ash and red and silver maples. There are smaller, higher-quality inclusions of white cedar-dominated northern wet-mesic forest. Changes in hydrology have allowed reed canary grass to invade canopy gaps. The large forest interior is invaluable for a number of native breeding birds
20	St. Anthony Beech Woods	NA-2	T11N, R18E Section 2 Town of Addison	Private	68	An old-growth remnant of the once-extensive mesic woods, dominated by mature beech and sugar maple. Located on a moderate, east-facing slope. Not undisturbed, but in good condition
21	Lac Lawrann Conservancy Upland Woods and Wetlands	NA-2 (RSH)	T11N, R19E Sections 1 and 12 City of West Bend	City of West Bend and private	101	A good-quality wet- and dry-mesic hardwood forest, with a deep and shallow marsh, shrub-carr, and floating sedge mat around a pond. The area contains a good example of kame and esker formation. Location of the State-designated threatened forked aster ( <i>Aster furcatus</i> )
22	Blue Hills Woods	NA-2 (RSH)	T11N, R19E Section 3 and 10 City of West Bend, T11N, R19E Sections 3 and 10 Town of Barton	City of West Bend, Department of Natural Resources, Ozaukee Washington Land Trust, and other private	264	Relatively large, good-quality mesic and dry mesic woods on glacial topography of significant relief. Recovering from past grazing and selective cutting. Recently disturbed by construction of USH 45 along east edge



**Table 17: (continued)**

Number on Map 16	Area Name	Classification Code <sup>b</sup>	Location	Ownership	Size (acres)	Description and Comments
23	Silverbrook Lake Woods	NA-2 (RSH)	T11N, R19E Sections 15, 21, 22, and 27 Town of West Bend T11N, R19E Section 15 City of West Bend	Girl Scouts of Milwaukee Area, Inc., Washington County, University of Wisconsin – Washington County, Town of West Bend, Cedar Lakes Conservation Foundation, and other private	404	A large area surrounding Silver-brook Lake, consisting mainly of good-quality southern mesic to dry-mesic hardwoods. Fairly diverse ground flora. Low area contains tamaracks and lowland hardwoods. Residences are beginning to encroach on south and west. Important to preserve as an intact block of relatively contiguous woods
24	Gilbert Lake Tamarack Swamp	NA-2	T11N, R19E Sections 17 and 20 Town of West Bend	Department of Natural Resources, Cedar Lakes Conservation Foundation and other private	130	A lightly developed lake surrounded by a wetland complex of tamarack swamp, bog, sedge meadow, and cattail marsh
25	Hacker Road Bog	NA-2	T11N, R19E Section 20 Town of West Bend	Department of Natural Resources	25	Good-quality sphagnum bog, bordered by sedge meadow, shallow marsh, and shrub-carr
26	Muth Woods	NA-2 (RSH)	T11N, R19E Section 24 City of West Bend	City of West Bend and private	30	A good-quality, medium-aged stand of southern mesic hardwoods, with an exceptionally rich and diverse ground flora that includes some uncommon species. A depression near the center of the woods contains lowland hardwoods
27	Little Cedar Lake Wetlands	NA-2	T11N, R19E Sections 32 and 33 Town of West Bend	Cedar Lakes Conservation Foundation and other private	134	Extensive wetlands at west end of Little Cedar Lake, containing good-quality deep and shallow marsh, sedge meadow, shrub-carr, tamarack relicts, and lowland hardwoods
28	Schoenbeck Woods	NA-2	T11N, R20E Sections 20 and 29 Town of Trenton T11N, R20E Section 20 City of West Bend	Private	196	Relatively large, moderate- to good-quality forested tract, consisting of lowland hardwoods, shrub-carr, southern mesic forest, and southern dry-mesic forest
29	Bellin Bog	NA-2	T11N, R20E Section 33 Town of Trenton	Private	17	A good-quality sedge mat and tamarack swamp, with many fen elements, that border a shallow, undeveloped pond
30	Reinartz Cedar Swamp	NA-2	T11N, R20E Sections 35 and 36 Town of Trenton	Private	121	Good-quality northern wet-mesic forest, dominated by white cedar, tamarack, yellow and paper birch, red maple, and black ash. A number of species with more northerly affinities are present. Uplands to the east support a disturbed mesic woods
31	Wayne Swamp	NA-2	T12N, R18E Sections 13, 14, 23, and 24 Town of Wayne T12N, R19E Sections 18 and 19 Town of Kewaskum	Private	1,136	A large depression in rolling moraine supports several wetland communities, including second-growth lowland hardwoods, northern wet-mesic forest, shrub-carr, and tamarack-fen, with southern mesic forest on isolated uplands
32	Kettle Moraine Drive Bog	NA-2	T12N, R19E Section 1 Town of Kewaskum	Department of Natural Resources and private	39	A good-quality forested bog of tamarack and lack spruce over a layer of ericads, with yellow and paper birch established in older areas. A number of regionally uncommon species are present
33	Glacial Trail Forest	NA-2	T12N, R19E Sections 11 and 14 Town of Kewaskum	Department of Natural Resources and private	223	One of the largest intact tracts of contiguous southern mesic and dry-mesic forest remaining in the Region. Located on steep, irregular kettle moraine topography. Good overall quality; recovering from past selective cutting. Important to maintain as intact as possible
34	St. Michael's Woods	NA-2	T12N, R19E Sections 13, 14, and 24 Town of Kewaskum	Department of Natural Resources and private	85	Rolling interlobate moraine supporting southern mesic to dry-mesic hardwoods, dominated by sugar maple, red oak, and basswood. Moderately rich ground flora. Relatively recent selective logging
35	North Branch Woods	NA-2	T12N, R20E Section 25 Town of Farmington	Department of Natural Resources and private	96	Good-quality wooded tract bordering the North Branch of the Milwaukee River. Consists of southern mesic and wet-mesic hardwoods. Threatened by future logging operations

**Table 17: (continued)**

Number on Map 16	Area Name	Classification Code <sup>b</sup>	Location	Ownership	Size (acres)	Description and Comments
36	Myra Wetlands	NA-2	T11N, R20E Section 15 Town of Trenton	Private	69	Good-quality wetland complex of shallow lake, marsh, sedge meadow, shrub-carr, and lowland hardwoods
--	Subtotal - 29 sites	NA-2	--	--	6,361	--
37	Hults Bog and Marsh	NA-3	T9N, R18E Sections 3 and 10 Town of Erin	Private	14	Small, moderate-quality sphagnum bog-tamarack swamp and associated shallow marsh. Marsh is stopover spot for migrating waterfowl
38	CTH E Wetlands	NA-3	T9N, R18E Section 3 Town of Erin T10N, R18E Section 34 Town of Hartford	Private	28	Wetland complex of shrub-carr, sedge meadow, and shallow marsh that has suffered from past disturbance
39	Erin Sedge Meadow	NA-3	T9N, R18E Sections 4 and 5 Town of Erin	Town of Erin and private	17	Moderate-quality sedge meadow
40	Thompson Swamp	NA-3	T9N, R18E Section 10 Town of Erin	Private	182	Large but disturbed wetland complex of lowland hardwoods, shrub-carr, sedge meadow, and tamarack relict. Contains some northern species, including white pine
41	Donegal Road Woods	NA-3	T9N, R18E Sections 13 and 24 Town of Erin T9N, R19E Section 18 Town of Richfield	Department of Natural Resources and private	141	Large, irregularly shaped dry-mesic woods on steep, southeast-facing slopes
42	St. Augustine Road Sedge Meadow	NA-3	T9N, R18E Section 24 Town of Erin	Private	10	Good-quality southern sedge meadow
43	Mason Creek Swamp	NA-3	T9N, R18E Sections 30 and 31 Town of Erin	University of Wisconsin-Milwaukee and private	431	Large lowland hardwoods area
44	CTH J Swamp	NA-3	T9N, R19E Section 9 Town of Richfield	Friess Lake School District and private	100	Moderate- to good-quality complex of shrub-carr, lowland hardwoods, and mesic hardwoods, with scattered spring seepages
45	Hubertus Road Sedge Meadow	NA-3	T9N, R19E Section 19 Town of Richfield	Private	7	Good-quality southern sedge meadow bordering the Oconomowoc River
46	Amy Bell Lake and Lowlands	NA-3	T9N, R19E Sections 24 and 25 Town of Richfield	YMCA	20	Small, undeveloped lake with a narrow bog fringe, associated with a tamarack relict and shrub-carr that have suffered from past disturbance
47	Colgate Shrub-Carr	NA-3	T9N, R19E Sections 26 and 35 Town of Richfield	Private	37	Shrub-carr surrounding small, shallow lake; disturbed by access road
48	Lake Five Woods	NA-3 (RSH)	T9N, R19E Sections 31 and 32 Town of Richfield	Private	152	Low- to moderate-quality mesic, dry-mesic, and xeric woods on steep kettle moraine terrain on north side of Lake Five. Depression contains small seepage pond and disturbed wetland plant communities. Small patches of dry hill prairie are located within the xeric woods and contain the State-designated threatened kittentails ( <i>Besseya bullii</i> ). Threatened by surrounding development
49	Faber-Pribyl Woods	NA-3	T9N, R20E Sections 4 and 9 Village of Germantown	Private	39	Small but good-quality remnant of mesic woods which still exhibits characteristics of an old-growth forest. Dominated by sugar maple and bass-wood, with some beech. Adjoining wet-mesic woods to north are of lesser quality
50	Hoelz Swamp	NA-3	T9N, R20E Sections 10, 11, 14, and 15 Village of Germantown	Private	109	A moderate-quality lowland hardwoods within the headwaters area of the Menomonee River. Dominated by silver and red maple and yellow birch, with some northern forest understorey elements. Valuable for watershed protection
51	Lake Park Swamp	NA-3	T9N, R20E Sections 21 and 22 Village of Germantown	Village of Germantown and private	54	A disturbed silver maple-dominated lowland hardwood forest, important for protection of two intermittent streams tributary to the Menomonee River



**Table 17: (continued)**

Number on Map 16	Area Name	Classification Code <sup>b</sup>	Location	Ownership	Size (acres)	Description and Comments
52	Schoessow Woods	NA-3 (RSH)	T9N, R20E Section 24 Village of Germantown	Village of Germantown and private	51	A relatively small but good-quality mix upland age, Very good species diversity, including two State-designated special concern species: American gromwell ( <i>Lithospermum latifolium</i> ) and goldenseal ( <i>Hydrastis canadensis</i> ). Threatened by residential subdivisions
53	USH 41 Swamp	NA-3	T9N, R20E Sections 28 and 33 Village of Germantown	Milwaukee Metropolitan Sewerage District and other private	256	An extensive floodplain forest dominated by silver maple, with green ash, black ash, and American elm. Due to Dutch elm disease, dissection by USH 41-45, a logging history, and artificial drainage, its ecological value is low. Important for protection of Menomonee River tributaries
54	Kleinman Swamp	NA-3	T9N, R20E Section 29 Village of Germantown	Department of Transportation and private	71	Lowland hardwood forest of silver maple and some yellow birch. Low ecological value
55	Rubicon Lowlands	NA-3	T10N, R18E Sections 15 and 22 City of Hartford T10N, R18E Sections 15, 21, and 22 Town of Hartford	Washington County, City of Hartford, and private	30	Moderate-quality southern sedge meadow along the Rubicon River
56	STH 60 Swamp	NA-3	T10N, R18E Section 14 City of Hartford T10N, R18E Sections 14 and 23 Town of Hartford	Hartford Community Conservation Club and other private	31	Lowland hardwood swamp of moderate quality, containing some northern elements. Dominated by yellow birch and black ash
57	Pike Lake Sedge Meadow	NA-3 (RSH)	T10N, R18E Section 23 City of Hartford <sup>c</sup>	Town of Hartford	12	Good-quality southern sedge meadow and shallow marsh at north end of Pike Lake
58	Pike Lake Woods	NA-3	T10N, R18E Section 24 Town of Hartford	Department of Natural Resources	131	Low- to medium-quality dry-mesic woods that has suffered from past disturbance, including grazing and selective logging. The irregular kettle moraine topography includes a prominent wooded kame at the southeast corner
59	Mueller Woods	NA-3	T10N, R19E Section 6 Town of Polk	Private	90	Relatively large dry-mesic woods of moderate quality, located on rolling moraine with some deep kettle holes. Evidence of past grazing and selective logging. Site has recently been disturbed by road and residence in interior, and highway construction along western border
60	Slinger Upland Woods	NA-3	T10N, R19E Sections 8 and 9 Town of Polk	Department of Natural Resources and private	191	Relatively large area of disturbed southern mesic and dry-mesic hardwoods on kettle and kame topography
61	Heritage Trails Bog	NA-3	T10N, R19E Sections 20 and 29 Town of Polk	Washington County and private	94	Relatively undisturbed tamarack bog within an interlobate morainal depression. Other associated communities include lowland hardwoods and shrub-carr
62	Kowalske Swamp	NA-3	T10N, R20E Section 22 Town of Jackson	Private	83	Young to medium-aged northern wet-mesic hardwoods, disturbed by past selective cutting and windthrow. The ground flora is relatively diverse. A knoll at the north-east corner supports upland mesic woods
63	Sherman Road Swamp	NA-3	T10N, R20E Section 25 Town of Jackson	Private	96	A lowland hardwood swamp dominated by red maple, green ash, and American elm on level terrain
64	Allenton Swamp	NA-3	T11N, R18E Sections 22, 26, 27, 28, and 35 Town of Addison	Department of Natural Resources and private	1,091	Large, disturbed wetland complex along the Rock River, including southern sedge meadow, lowland hardwoods, shrub-carr, emergent aquatics, and relict tamaracks
65	Newark Road Wetland	NA-3	T11N, R19E Section 1 Town of Barton	Private	9	A kettle-hole wetland
66	Sunset Park Wetlands	NA-3	T11N, R19E Sections 2 and 3 City of West Bend T11N, R19E Sections 2 and 3 Town of Barton	City of West Bend and private	85	Disturbed wetland complex containing shallow marsh, fresh (wet) meadow, and a good stand of tag alder ( <i>Alnus rugosa</i> )

**Table 17: (continued)**

Number on Map 16	Area Name	Classification Code <sup>b</sup>	Location	Ownership	Size (acres)	Description and Comments
67	Albecker Park Wetlands	NA-3	T11N, R19E Sections 9 and 10 City of West Bend T11N, R19E Section 9 Town of Barton	City of West Bend and private	91	Shallow marsh and disturbed fresh (wet) meadow complex with some shrub-carr and scattered lowland hardwoods. Disturbances include water-level changes due to past draining efforts and filling
68	Silver Creek Marsh	NA-3	T11N, R19E Section 15 City of West Bend	Washington County and private	27	Good-quality deep and shallow marsh and sedge meadow
69	University Fen	NA-3 (RSH)	T11N, R19E Section 15 City of West Bend	City of West Bend	1	A small, moderate-quality calcareous fen and lowland hardwood forest recently disturbed by adjacent highway construction
70	CTH Z Upland Woods and Wetlands	NA-3 (RSH)	T11N, R19E Sections 16, 17, 20, and 21 Town of West Bend	Cedar Lake Conservation Foundation and other private	281	Mature mesic hardwood forest on rough interlobate moraine, dominated by sugar maple, red oak, beech, and basswood. The moderately rich herb layer includes several uncommon species. Threatened by ongoing logging operations. Adjacent large wetland complex of shrub-carr, sedge meadow shallow marsh, and tamarack relict is divided by CTH Z
71	Ziegler Woods	NA-3	T11N, R19E Section 28 Town of West Bend	Private	172	Large tract of southern mesic to dry-mesic hardwoods, dominated by sugar maple and red oak, on irregular glacial terrain. Past disturbance includes grazing and selective logging; more recently, wide horse and all-terrain-vehicle trails have degraded the site, allowing a number of exotic species to invade
72	Sandy Knoll Swamp	NA-3	T11N, R20E Sections 4 and 5 Town of Trenton T12N, R20E Section 33 Town of Farmington	Washington County and private	343	Large, patchy lowland hardwood forest with areas of tamarack. Some portions contain good-quality wet-mesic forest ground flora. Past disturbances include selective cutting and clear-cutting, and water-level changes due to ditching
73	Sandy Knoll Wetlands	NA-3	T11N, R20E Sections 5 and 6 Town of Trenton	Washington County and private	47	A small but good-quality wetland complex containing tamaracks, low-land hardwoods, shrub-carr, shallow marsh, and sedge fen associated with a spring-fed stream
74	Poplar Road Lacustrine Forest	NA-3	T11N, R20E Sections 9 and 10 Town of Trenton	Private	182	A disturbed lowland hardwoods stand dominated by ash, swamp white oak, and silver maple. Several ephemeral ponds occur on the site, and upland southern mesic forest dominated by basewood occur as islands [Revised 8/24/06 – ANCR]
75	Fellenz Hardwood Swamp	NA-3	T11N, R20E Section 16 Town of Trenton	Ozaukee Washington Land Trust and private	58	A southern wet to wet-mesic hardwood forest, located within the Milwaukee River floodplain. Disturbances include selective cutting and excessive siltation
76	Paradise Drive Tamarack Swamp	NA-3 (RSH)	T11N, R20E Sections 26 and 35 Town of Trenton	Ozaukee Washington Land Trust and private	81	Northern wet-mesic forest, tamarack swamp, and shrub-carr of moderate quality
77	Camp Wowitan Wetlands	NA-3 (RSH)	T11N, R20E Sections 21, 22, 27, and 28 Town of Trenton	YMCA and other private	109	Relatively undeveloped lake and wetland complex with a well-developed esker. A good-quality calcareous fen, tamarack swamp, and mesic forest occur on the site
78	Schalla Tamarack Swamp	NA-3	T11N, R20E Section 33 Town of Trenton	Private	17	A tamarack swamp
79	Theresa Swamp	NA-3	T12N, R18E Sections 17, 18, 19, 20, 29, and 30 Town of Wayne	Department of Natural Resources and private	952	Lowland hardwood forest bordering the Rock River, composed of large silver maple, plus black ash, green ash, American elm, and swamp white oak. Canopy has been opened by Dutch elm disease
80	Wayne Creek Swamp	NA-3	T12N, R18E Sections 21, 22, 27, and 28 Town of Wayne	Private	181	Disturbed lowland hardwood forest along Wayne Creek. Openings in canopy from Dutch elm disease
81	Stockcar Swamp	NA-3 (RSH)	T12N, R18E Sections 23, 24, 25, and 26 Town of Wayne	Private	245	Forested wetland of northern lowland hardwoods, tamarack-fen, shrub-carr, and alder thicket, of moderately good quality. A number of uncommon species are present
82	Rock River Marsh	NA-3	T12N, R18E Sections 30, 31, and 32 Town of Wayne	Department of Natural Resources and private	339	Shallow marsh within the Rock River floodplain, dominated by cattails. Bisected by railway right-of-way

**Table 17: (continued)**

Number on Map 16	Area Name	Classification Code <sup>b</sup>	Location	Ownership	Size (acres)	Description and Comments
83	Kettle Moraine Drive Woods	NA-3 (RSH)	T12N, R19E Sections 2, 11, and 12 Town of Kewaskum T13N, R19E Section 35 Town of Auburn	Department of Natural Resources and private	290 (plus 30 in Fond du Lac County)	Long, north-south-trending, irregularly shaped southern mesic and dry-mesic forest that is recovering from past grazing and selective cutting. Located on steep-sided, gravelly ridges of the interlobate kettle moraine. Forest is mostly second-growth. Important as linkage between other large forest blocks to the north and south
84	STH 28 Woods	NA-3	T12N, R19E Sections 12 and 13 Town of Kewaskum	Private	148	Good-quality southern mesic hardwoods, dominated by sugar maple, ironwood, and basswood, located on kettle moraine topography. Recent cutting, roads, trails, and new homesite construction are threatening the integrity of the woods
85	Smith Lake Swamp	NA-3	T12N, R19E Section 35 Town of Barton	Private	38	Mixed lowland hardwood and conifer swamp bordering Smith Lake
86	Lange Hardwoods	NA-3	T12N, R19E Section 28 Town of Barton	Private	53	Good-quality southern mesic hardwood forest on steep kettle moraine topography
87	Wildwood Hardwood Swamp	NA-3	T12N, R19E Sections 33 and 34 Town of Barton	Private	98	A lowland hardwood forest area
88	Milwaukee River Swamp	NA-3	T12N, R20E Sections 1, 2, 11, and 12 Town of Farmington	Private <sup>d</sup>	546	A large but disturbed wetland complex of lowland hardwoods, northern wet-mesic forest, shrub-carr, and sedge meadow bordering the Milwaukee River
89	Lizard Mound Woods	NA-3	T12N, R20E Sections 31 and 32 Town of Farmington	Washington County and private	29	Mature dry-mesic hardwoods dominated by sugar maple, red oak, basswood, white ash, beech, and white oak. Contains Indian effigy mounds of statewide significance
90	Green Lake Bog	NA-3	T12N, R20E Section 34 Town of Farmington	Private	19	Small but good-quality undeveloped bog lake bordered by sphagnum mat, conifer swamp, and mesic hardwoods
91	Cedar-Sauk Low Woods	NA-3	T11N, R20E Section 36 Town of Trenton T10N, R21E Sections 5 and 6 Town of Cedarburg T11N, R21E Sections 31 and 32 Town of Saukville	Private	14 (plus 204 in Ozaukee County)	Lowland hardwood forest of silver maple, green and black ash, and American elm, with evidence of abundant past disturbances, including grazing, power-line right-of-way, and two highways. Stream flows through area from Cedarburg Bog
--	Subtotal - 55 sites	NA-3	--	--	8,040	--
--	Total - 91 sites	--	--	--	16,061	--

<sup>a</sup>Inventory conducted in 1994; ownership information updated in 2007.

<sup>b</sup>NA-1 identifies Natural Area sites of statewide or greater significance.  
NA-2 identifies Natural Area sites of countywide or regional significance.  
NA-3 identifies Natural Area sites of local significance.

SNA, or State Natural Area, identifies those sites officially designated as State Natural Areas by the State of Wisconsin Natural Areas Preservation Council.

RSH, or Rare Species Habitat, identifies those sites which support rare, threatened, or endangered animal or plant species officially designated by the Wisconsin Department of Natural Resources (WDNR).

<sup>c</sup>The Pike Lake Sedge Meadow natural area is located in the City of Hartford, but is owned by the Town of Hartford.

<sup>d</sup>The DNR has acquired a conservation easement over a portion of the Milwaukee River Swamp natural area. The entire natural area is located within the project boundary of the North Branch Milwaukee River Wildlife and Farming Heritage Area.

Source: Wisconsin Department of Natural Resources, Wisconsin Geological and Natural History Survey, and SEWRPC. Sites were identified as part of the regional natural areas plan, documented in SEWRPC Planning Report No. 42, A Regional Natural Areas and Critical Species Habitat Protection and Management Plan for Southeastern Wisconsin, September 1997.

**Table 18:  
CRITICAL SPECIES HABITAT SITES LOCATED OUTSIDE  
NATURAL AREAS IN WASHINGTON COUNTY: 2007<sup>a</sup>**

Number on Map 17	Site Name and Classification Code <sup>b</sup>	Location	Site Area (acres)	Ownership	Species of Concern <sup>c</sup>
1	High School Woods (CSH-P)	T11N, R19E, Section 24; City of West Bend	9	West Bend School District	Ginseng ( <i>Panax quinquefolius</i> ) (R)
2	Jackson Woods (CSH-P)	T10N, R20E, Section 20; Village of Jackson	25	Village of Jackson and private	American gromwell ( <i>Lithospermum latifolium</i> ) (R)
3	Unnamed Wetland (CSH-B)	T10N, R18E, Section 13; Village of Slinger and Town of Hartford	46	Private	Black tern (R) (Colony)
4	St. Anthony Maple Woods (CSH-P)	T11N, R18E, Section 10; Town of Addison	98	Private <sup>d</sup>	American gromwell ( <i>Lithospermum latifolium</i> ) (R)
5	Doll Woods (CSH-P)	T11N, R18E, Section 16; Town of Addison	29	Town of Addison and private	American gromwell ( <i>Lithospermum latifolium</i> ) (R)
6	Riesch Woods (CSH-P)	T11N, R19E, Section 6; Town of Barton	36	Private	American gromwell ( <i>Lithospermum latifolium</i> ) (R)
7	Werner Pond <sup>e</sup> (CSH-B)	T10N, R18E, Section 25; Town of Hartford	17	Private	Black tern (R) (Colony)
8	Cameron Property (CSH-P)	T11N, R20E, Section 8; Town of Trenton	11	Private	Small yellow lady's slipper ( <i>Cypripedium parviflorum</i> ) (R)
9	Fechters Woods (CSH-P)	T11N, R20E, Section 36; Town of Trenton	6	Private	Golden seal ( <i>Hydrastis canadensis</i> ) (R)
10	Unnamed Wetland (CSH-B)	T12N, R18E, Section 7; Town of Wayne	48	Private	Great egret (T)
11	Gilbert Lake (CSH-B)	T11N, R19E, Sections 17 and 20; Town of West Bend	10 <sup>f</sup>	Private	Black Tern (R) (Colony)
12	Silver Lake (CSH-B)	T11N, R19E, Section 27; Town of West Bend	11	Private	Red-shouldered hawk (T)
13	Silver Lake Swamp (CSH-P)	T11N, R19E, Section 34; Town of West Bend	10	Private	Showy lady's slipper ( <i>Cypripedium reginae</i> ) (R)
Total – 13 Sites		--	356	--	--

<sup>a</sup>Inventory conducted in 1994; ownership information updated in 2007.

<sup>b</sup>CSH-P identifies a critical plant species habitat site; CSH-B identifies a critical bird species habitat site.

<sup>c</sup>"R" refers to species designated as rare or special concern; "T" refers to species designated as threatened.

<sup>d</sup>The Ozaukee Washington Land Trust has a conservation easement over nine acres of this site.

<sup>e</sup>Werner Pond is referred to as an "unnamed wetland" in the regional natural areas report.

<sup>f</sup>The site totals 43 acres. The remaining 33 acres are located within the Gilbert Lake Tamarack Swamp natural area.

Source: Wisconsin Department of Natural Resources, Wisconsin Geological and Natural History Survey, and SEWRPC. Sites were identified as part of the regional natural areas plan, documented in SEWRPC Planning Report No. 42, A Regional Natural Areas and Critical Species Habitat Protection and Management Plan for Southeastern Wisconsin, September 1997.

**Table 19:  
AQUATIC HABITAT AREAS IN WASHINGTON COUNTY: 2005<sup>a</sup>**

Number on Map 17	River, Stream, or Lake	Size <sup>b</sup>	Rank <sup>c</sup>	Description <sup>d</sup> and Comments
14	Bark River upstream from Nagawicka Lake	4.5 miles <sup>e</sup>	AQ-1 (RSH)	Good overall fish population and diversity; important reservoir for critical fish and herptile species
15	Cedar Creek upstream from Little Cedar Lake	1.4 acres	AQ-1 (RSH)	Good water quality; good fish population and diversity; critical fish and herptile species habitat
16	Milwaukee River downstream from Washington-Fond du Lac county line to CTH H	5.4 miles	AQ-1 (RSH)	Excellent Biotic Index Rating; <sup>f</sup> good water quality and fish population and diversity
17	Oconomowoc River downstream from Friess Lake to North Lake	7.8 miles <sup>e</sup>	AQ-1 (RSH)	Contains critical fish, herptile, and mussel species habitat; bisects high-quality Natural Areas
18	Allenton Creek	3.4 miles	AQ-2 (RSH)	Class I trout stream with good fish population and diversity
19	Cedar Creek downstream from Little Cedar Lake to Little Cedar Creek inflow	6.6 miles	AQ-2 (RSH)	Contains critical mussel and fish species habitat
20	East Branch, Milwaukee River downstream from Washington-Fond du Lac county line	5.0 miles	AQ-2 (RSH)	Low sedimentation and few modifications to channel; bisects the Milwaukee River Floodplain Forest State Natural Area
21	Mason Creek	2.7 miles <sup>e</sup>	AQ-2 (RSH)	Class I trout stream; Biotic Index Rating <sup>f</sup> of Good; critical fish species present
22	Milwaukee River downstream from CTH H to Woodford Drive	4.9 miles	AQ-2 (RSH)	Good water quality; critical fish species present
23	Milwaukee River downstream from STH 33 to main stem	5.6 miles <sup>e</sup>	AQ-2 (RSH)	Excellent Biotic Index Rating; <sup>g</sup> critical fish species present; good assemblage of mussel species
24	North Branch, Milwaukee River	7.7 miles <sup>e</sup>	AQ-2 (RSH)	Good overall fish population and diversity, including critical fish species; Biotic Index Rating; <sup>f</sup> of Good to Excellent
25	Wallace Creek	8.6 miles	AQ-2 (RSH)	Good overall fish population and diversity, including critical fish species
26	Ashippun River upstream from Druid Lake	4.3 miles	AQ-3 (RSH)	Critical fish species present
27	Ashippun River downstream from Druid Lake to Washington-Dodge county line	5.2 miles	AQ-3 (RSH)	Critical herptile species habitat
28	Cedar Creek downstream from Little Cedar Creek inflow to CTH M	9.3 miles <sup>e</sup>	AQ-3	Good fish population and diversity; bisects Jackson Swamp, an identified Natural Area
29	Cedar Creek downstream from CTH M to STH 60	0.7 mile <sup>e</sup>	AQ-3	Good fish population and diversity; good mussel species assemblage
30	East Branch Rock River downstream from CTH D	4.4 miles	AQ-3 (RSH)	Critical fish species present
31	East Branch Rock River upstream from CTH D	14.3 miles	AQ-3 (RSH)	Critical fish species present
32	Friedens Creek	3.2 miles	AQ-3 (RSH)	Biotic Index Rating <sup>g</sup> of Very Good
33	Kewaskum Creek	8.1 miles	AQ-3	Good fish population and diversity
34	Kohlsville River	1.9 miles	AQ-3	A cold-water stream
35	Limestone Creek	5.8 miles	AQ-3 (RSH)	Good fish population and diversity, including critical species records
36	Little Oconomowoc River	2.7 miles <sup>e</sup>	AQ-3 (RSH)	Biotic Index Rating <sup>f</sup> of Excellent; upper reaches bisect a high-quality Natural Area, Murphy Lake-McConville Lake Wetland Complex

**Table 19: (continued)**

Number on Map 17	River, Stream, or Lake	Size <sup>b</sup>	Rank <sup>c</sup>	Description <sup>d</sup> and Comments
37	Menomonee River downstream from STH 145 to CTH Q	3.8 miles	AQ-3	Bisects identified Natural Areas
38	Milwaukee River downstream from Woodford Drive to STH 33	13.6 miles	AQ-3 (RSH)	Critical fish species present
39	North Branch, Cedar Creek	7.3 miles	AQ-3 (RSH)	Critical fish species; bisects an identified Natural Area, Reinartz Cedar Swamp
40	North Branch, Menomonee River upstream from STH 145	9.2 miles <sup>e</sup>	AQ-3	Bisects identified Natural Areas
41	Oconomowoc River upstream from Friess Lake	2.8 miles	AQ-3 (RSH)	Critical herptile species habitat
42	Quaas Creek	4.9 miles	AQ-3 (RSH)	Good fish population and diversity
43	Rubicon River downstream from Pike Lake	6.7 miles	AQ-3 (RSH)	Critical fish species present
44	Rubicon River upstream from Pike Lake	2.8 miles	AQ-3 (RSH)	Critical herptile species habitat
45	Silver Creek	5.9 miles	AQ-3 (RSH)	Critical fish species present; Biotic Index Rating <sup>f</sup> of Good
46	Stony Creek	11.7 miles	AQ-3 (RSH)	Critical fish species present; Class II trout stream
47	Wayne Creek	3.5 miles	AQ-3	Good fish population and diversity
48	West Branch, Menomonee River	4.2 miles	AQ-3	Good fish population and diversity; good Biotic Index Rating <sup>f</sup>
--	Subtotal (35 river and stream reaches)	187.9 miles	--	--
49	Big Cedar Lake	957 acres	AQ-1 (RSH)	A deep spring-drainage lake at the headwaters of Cedar Creek; critical fish and herptile species present; good water quality
50	Gilbert Lake	45 acres	AQ-1 (RSH)	An undeveloped spring lake surrounded by tamarack swamp, bog, sedge meadow, and marsh at the headwaters of Cedar Creek; critical fish and herptile species present
51	Loew's Lake	26 acres	AQ-1 (RSH)	An undeveloped drainage lake located in the heart of the valuable upper Oconomowoc River environmental corridor
52	Beck Lake	12 acres	AQ-2 (RSH)	An undeveloped seepage lake encompassed by a high-quality Natural Area, Murphy Lake-McConville Lake Wetland Complex
53	Little Cedar Lake	266 acres	AQ-2 (RSH)	A drainage lake with adjacent wetlands which support good habitat for critical herptile species such as the bullfrog
54	Lucas Lake	69 acres	AQ-2 (RSH)	A largely undeveloped drainage lake with good water quality and critical fish species present
55	McConville Lake	12 acres	AQ-2 (RSH)	An undeveloped seepage lake encompasses by a high-quality Natural Area, Murphy Lake-McConville Lake Wetland Complex
56	Murphy Lake	18 acres	AQ-2 (RSH)	An undeveloped seepage lake encompassed by a high-quality Natural Area, Murphy Lake-McConville Lake Wetland Complex
57	Pike Lake	469 acres	AQ-2 (RSH)	A drainage lake with critical fish and herptile species present; important spawning area for game fish
58	Silver Lake	125 acres	AQ-2 (RSH)	A drainage lake with critical fish species present; wetland to west offers diversity of wildlife and plant communities
59	Smith Lake	86 acres	AQ-2 (RSH)	A shallow seepage lake with adjacent high-quality wetlands; an identified Natural Area
60	Unnamed Lake	18 acres	AQ-2 (RSH)	A drainage lake; a component of the Oconomowoc River corridor
61	Amy Bell Lake	29 acres	AQ-3 (RSH)	A seepage lake encompassed by a Natural Area, Amy Bell Lake and Lowlands

**Table 19: (continued)**

Number on Map 17	River, Stream, or Lake	Size <sup>b</sup>	Rank <sup>c</sup>	Description <sup>d</sup> and Comments
62	Bark Lake	65 acres	AQ-3 (RSH)	A spring-drainage lake located at the headwaters of the Bark River
63	Druid Lake	127 acres	AQ-3	A drainage lake within the Ashippun River watershed
64	Friess Lake	120 acres	AQ-3 (RSH)	A drainage lake in the Oconomowoc River corridor; important for waterfowl
65	Green Lake	71 acres	AQ-3 (RSH)	A seepage lake with critical fish species present; extensive wetlands adjacent to Lake
66	Hasmer Lake	15 acres	AQ-3 (RSH)	A drainage lake with critical fish species present
67	Lake Five	103 acres <sup>e</sup>	AQ-3	A seepage lake with good water quality; adjacent Natural Area, Lake Five Woods
68	Lake Twelve	46 acres	AQ-3	A spring lake with a mostly undisturbed shoreline; good wildlife habitat
69	Mud Lake	16 acres	AQ-3	An undeveloped seepage lake encompasses by a Natural Area, Mud Lake Meadow
70	Mueller Lake	14 acres	AQ-3 (RSH)	A spring lake with an adjacent Natural Area, Big Cedar Lake Bog; critical herptile habitat
71	Radtke Lake	10 acres	AQ-3	An undeveloped seepage lake within an identified Natural Area, Camp Wowitan Wetlands
72	Tilly Lake	14 acres	AQ-3 (RSH)	A spring lake with critical fish species present
73	Unnamed Lake	16 acres	AQ-3 (RSH)	Suitable habitat for Blanding's turtle, a threatened species
--	Subtotal (25 lakes)	2,749 acres	--	--

<sup>a</sup>Inventory conducted in 1994; ownership information updated in 2005.

<sup>b</sup>Size is listed as stream miles for rivers and streams and lake surface area (in acres) for lakes.

<sup>c</sup>AQ-1 identifies Aquatic Area sites of statewide or greater significance.

AQ-2 identifies Aquatic Area sites of countywide or regional significance.

AQ-3 identifies Aquatic Area sites of local significance.

RSH, or Rare Species Habitat, identifies those aquatic areas which support rare, endangered, threatened, or "special concern" species officially designated by the Wisconsin Department of Natural Resources.

<sup>d</sup>"Seepage lakes" are lakes which have no inlet or outlet and whose main source of water is direct precipitation and runoff supplemented by groundwater. "Spring lakes" are lakes which have no inlet but do have an outlet and whose main source of water is groundwater flowing directly into the basin and from the immediate drainage area. "Drainage lakes" are lakes that have both an inlet and an outlet and whose main water source is a river or stream.

<sup>e</sup>Lake or stream is located partially within Washington County. Number refers to stream miles or acreage located within the County.

<sup>f</sup>Based upon the Index of Biotic Integrity (IBI) discussed in U.S. Department of Agriculture, Forest Service, General Technical Report No. 149, Using the Index of Biotic Integrity (IBI) to Measure Environmental Quality in Warmwater Streams of Wisconsin, April 1992.

<sup>g</sup>Based upon the Hilsenhoff Biotic Index (HBI) discussed in Wisconsin Department of Natural Resources Technical Bulletin No. 132, Using a Biotic Index to Evaluate Water Quality in Streams, 1982.

Source: Wisconsin Department of Natural Resources, Wisconsin Geological and Natural History Survey, and SEWRPC. Sites were identified as part of the regional natural areas plan, documented in SEWRPC Planning Report No. 42, A Regional Natural Areas and Critical Species Habitat Protection and Management Plan for Southeastern Wisconsin, September 1997.



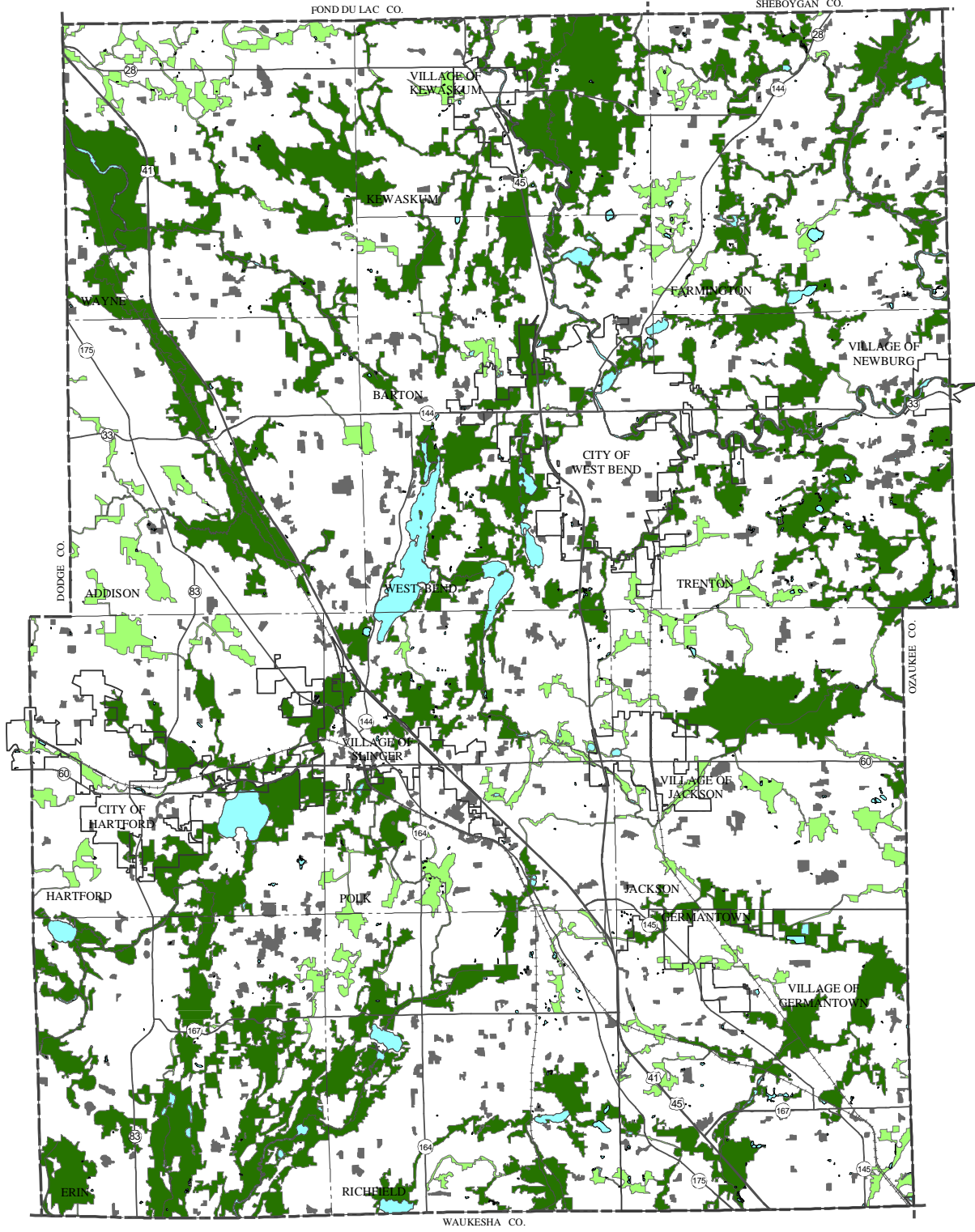
## **ENVIRONMENTAL CORRIDORS AND ISOLATED NATURAL RESOURCE AREAS**

One of the most important tasks completed under the regional planning program for Southeastern Wisconsin has been the identification and delineation of those areas in which concentrations of the best remaining elements of the natural resource base occur. It has been recognized that preservation of these areas is essential to both the maintenance of the overall environmental quality of the Region and to the continued provision of the amenities required to maintain a high quality of life for residents.

Seven elements of the natural resource base are considered essential to the maintenance of the ecological balance and the overall quality of life in the Region, and served as the basis for identifying the environmental corridor network. These seven elements are: 1) lakes, rivers, and streams and associated shorelands and floodplains; 2) wetlands; 3) woodlands; 4) prairies; 5) wildlife habitat areas; 6) wet, poorly-drained, and organic soils; and 7) rugged terrain and high relief topography. In addition, there are certain other features which, although not a part of the natural resource base, are closely related to the natural resource base and were used to identify areas with recreational, aesthetic, ecological, and natural value. These features include existing park and open space sites, potential park and open space sites, historic sites, scenic areas and vistas, and natural areas.

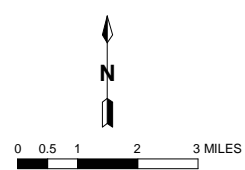
The mapping of these 12 natural resource and resource-related elements results in a concentration of such elements in an essentially linear pattern of relatively narrow, elongated areas that have been termed “environmental corridors” by SEWRPC. Primary environmental corridors include a wide variety of the most important natural resources and are at least 400 acres in size, two miles long, and 200 feet wide. Secondary environmental corridors serve to link primary environmental corridors, or encompass areas containing concentrations of natural resources between 100 and 400 acres in size. Where secondary environmental corridors serve to link primary corridors, no minimum area or length criteria apply. Secondary environmental corridors that do not connect primary corridors must be at least 100 acres in size and one mile long. An isolated concentration of natural resource features, encompassing at least five acres but not large enough to meet the size or length criteria for primary or secondary environmental corridors, is referred to as an isolated natural resource area. Environmental corridors and isolated natural resource areas in Washington County in 2000 are shown on Map 18.

**Map 18**  
**ENVIRONMENTAL CORRIDORS AND**  
**ISOLATED NATURAL RESOURCE AREAS IN WASHINGTON COUNTY: 2000**



- PRIMARY ENVIRONMENTAL CORRIDORS
- SECONDARY ENVIRONMENTAL CORRIDORS
- ISOLATED NATURAL RESOURCE AREAS
- SURFACE WATER

Source: SEWRPC.



The preservation of environmental corridors and isolated natural resource areas in essentially natural, open uses can help reduce flood flows, reduce noise pollution, and maintain air and water quality. Corridor preservation is important to the movement of wildlife and for the movement and dispersal of seeds for a variety of plant species. In addition, because of the many interacting relationships between living organisms and their environment, the destruction and deterioration of any one element of the natural resource base may lead to a chain reaction of deterioration and destruction. For example, the destruction of woodland cover may result in soil erosion and stream siltation, more rapid stormwater runoff and attendant increased flood flows and stages, as well as destruction of wildlife habitat. Although the effects of any single environmental change may not be overwhelming, the combined effects will eventually create serious environmental and developmental problems. These problems include flooding, water pollution, deterioration and destruction of wildlife habitat, reduction in groundwater recharge, as well as a decline in the scenic beauty of the County. The importance of maintaining the integrity of the remaining environmental corridors and isolated natural resource areas thus becomes apparent.

As shown on Map 18, the primary environmental corridors in Washington County are located along the Milwaukee River and other major streams, around the major lakes, in large wetland areas such as the Jackson and Theresa Marshes, and in the Kettle Moraine. In 2000, about 60,300 acres, comprising about 22 percent of the County, were encompassed within primary environmental corridors. Secondary environmental corridors are located chiefly along the smaller perennial streams and intermittent streams in the County. About 9,800 acres, comprising about 3 percent of the County, were encompassed within secondary environmental corridors in 2000. Isolated natural resource areas within the County include a geographically well-distributed variety of isolated wetlands, woodlands, and wildlife habitat. These areas encompassed about 6,450 acres, or about 2 percent of the County, in 2000.

## **INVASIVE SPECIES**

Invasive species are non-native plants and animals whose introduction cause or are likely to cause economic or environmental harm or harm to human health. Invasive species can alter ecological relationships among native species and can affect ecosystem function and structure, economic value of ecosystems, and human health. Invasive species out-compete native plants, and may degrade fish and wildlife habitat, reduce agricultural yields, and hinder recreational opportunities. The first step towards controlling invasive species in Washington County is to inventory species present in the County.

There are many non-native plants and animals that are invasive in Washington County forests, grasslands, wetlands, farmlands, lakes and rivers. Land practices have created conditions where these species can aggressively invade and dominate natural areas, agricultural lands and waterways by:

- 1) Introducing exotic species (from other regions or countries) which lack natural competitors and predators to keep them in check.

- 2) Disrupting the delicate balance of native ecosystems by changing environmental conditions (e.g., stream sedimentation, ditching, building roads) or by restricting or eliminating natural processes (e.g., fire). In such instances, even some native plants and animals can become invasive.
- 3) Spreading invasive species through various methods (e.g., moving watercrafts from waterbody to waterbody without removing invasive plants and animals, roadside mowing, and importing firewood).

The net result is a loss of diversity of our native plants and animals as invasive species rapidly multiply and colonize. Nearly half of the species on the federal Threatened or Endangered species lists are at risk primarily because of invasive species. Chapter NR 40, Wisconsin's Invasive Species Identification, Classification and Control Rule helps citizens learn to identify and minimize the spread of plants, animals and diseases that can invade our lands and waters and cause significant damage.

## Chapter IV

# CURRENT SOIL AND WATER RESOURCE CONDITIONS

## SOIL RESOURCES

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Determinations of how well soil resources are being adequately protected and preserved, particularly cropland topsoil, are based on calculated rates of erosion. The rate that a given soil can erode yet remain productive indefinitely is referred to as the “tolerable” soil loss rate, or “T”, and is measured in tons/acre/year. In Washington County, the average maximum rate at which cropland soil can erode yet still remain productive is 4 tons, and ranges anywhere from 2 to 5 tons, depending on soil type.

In 1999, the Land and Water Conservation Division (LWCD) began conducting a yearly Transect Survey, which is a method to determine the average rate of cropland erosion throughout the County. The county has conducted the survey in the years of 1999-2002, 2005 and 2007-2009. In 1999, 89% and in 2005, 94% of all cropland was eroding at or below tolerable soil loss rates. In 2009, the Transect Survey indicated that 91% of all cropland was eroding at or below tolerable soil loss rates. Although not indicated in the table below, there was an increased amount of aggressive tillage that occurred in 2009 due to excessive precipitation during the summer of 2008. The aggressive tillage was performed to smooth areas of field that were scoured by the 2008 storms. The data suggests that past local, state and federal conservation program efforts have been successful in helping farmers manage soil erosion rates, however, the data reveals continued need for conservation programs that control soil movement from the fields to wetlands and surface waters based on the total soil loss from croplands category. The total tonnage listed is not a true loss, but rather, a movement of soil across the landscape. The actual deposition of the soil loss is highly dependent on down-slope conditions. A more detailed summary of the results of the Transect Survey is given in Table 20 below.

**Table 20:  
COMPARISON OF SOIL EROSION AND TILLAGE PRACTICES –  
1999, 2005, AND 2009 TRANSECT SURVEYS**

<b>Factor</b>	<b>1999 Value</b>	<b>2005 Value</b>	<b>2009 Value</b>
Average countywide soil erosion rate (tons/acre/year)	1.6 tons/acre/year	1.4 tons/acre/year	1.7 tons/acre/year
Cropland w/soil erosion at/or below tolerable soil loss rate (“T”)	89% (92,075 ac.)	94% (94,400 ac.)	91% (88,200 ac.)
Cropland with soil erosion above “T”	11% (10,925 ac.)	6% (5,750 ac.)	9% (8,500 ac.)
Total soil loss from croplands eroding at or below “T”	98,480 tons	113,290 tons	105,840 tons
Total soil loss from croplands eroding above “T”	62,400 tons	30,410 tons	53,730 tons
Conventional tillage (crops planted in <30% residue cover)	53% (54,955 ac.)	47% (47,550 ac.)	42% (40,915 ac.)

**Table 20: (continued)**

<b>Factor</b>	<b>1999 Value</b>	<b>2005 Value</b>	<b>2009 Value</b>
Conservation tillage (crops planted in 30-50% residue cover)	5% (4,845 ac.)	6% (5,750 ac.)	6% (5,315 ac.)
No-Till (crops planted in greater than 50% residue cover)	4% (4,220 ac.)	19% (19,160 ac.)	29% (27,985 ac.)
Cropland in hayland production	32% (33,100 ac.)	26% (26,475 ac.)	22% (21,430 ac.)

*Note: In 2008 the Transect Survey Program was updated from the Universal Soil Loss Equation (USLE) to the RUSLE2 model to calculate soil erosion rates. The data from 1999 and 2005 was processed using this new model which could attribute to the slight variations in the data from previous printed versions of this table.*

*Source: Washington County LWCD*

The Wisconsin Department of Administration (DOA) estimates that the County population grew by just over 11 percent, from 117,496 to 131,066 residents between 2000 and 2009<sup>10</sup>, ranking Washington County among the six fastest growing counties in Wisconsin by percent change in population growth. Construction site soil erosion presents a ten-fold higher erosion rate than that of cropland soil erosion on a per acre basis. The issue of construction site erosion control has been a long-standing concern of the LWCD.

In 2008, the Erosion Control & Stormwater Management Ordinance was updated for the first time since 1997, and now requires more stringent review of plans and monitoring of construction sites during development. This County ordinance or general renditions thereof, is in the process of being adopted by the municipalities of Washington County. Although enforcement of the ordinance has not been uniform across all municipal lines, efforts continue to improve uniform coverage. This is done by conducting joint contractor meetings and explaining the similarities and differences between State, County and Municipal rules. The message of proper containment of job site soil erosion is clearly explained during these meetings.

## **WATER RESOURCES**

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There are two major drainage systems within Washington County, and several minor drainage systems, based upon the direction of surface water flow as shown on Map 11 in Chapter III. Of the major drainage systems, the Milwaukee River and its tributaries (the East and West Branches of the Milwaukee River, the North Branch of the Milwaukee River, and Cedar Creek) drains the central and eastern portions of the County to the southeast; ultimately discharging into Lake Michigan and the Laurentian drainage system. The other major drainage system is formed by the headwater streams of the Rock River drainage system, including the Oconomowoc River, which drains the western portions of the County to the southwest; ultimately discharging into the Mississippi River system. In addition, a small portion of the south central area of the County

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<sup>10</sup> Wisconsin Department of Administration Population Estimates

drains to the Mississippi River drainage basin through the Illinois Fox River drainage system and a portion of the southeastern area of the County drains to Lake Michigan via the Menomonee River. These waterways and watershed areas form the basis for management actions undertaken and was supported by the Regional Water Quality Management Planning Program and the Wisconsin Department of Natural Resources (WDNR) Nonpoint Source Pollution Abatement, Priority Watershed Programs.<sup>11</sup>

### **FOX RIVER WATERSHED**

As noted above, a portion of the Fox River watershed is located in the south central portion of Washington County. However, the main stem of the Fox River originates to the south of the southern boundary of Washington County as shown on Map 11 in Chapter III, and flows southward from Washington County through Waukesha County. The portion of the watershed within Washington County does not include the main stem of the Fox River. The watershed encompasses approximately one and one-half square miles, or about 1 percent of the total land area of the County. This portion of the Fox River watershed represents only about 1 percent of the entire 151-square-mile watershed area. For this reason, the Washington County portion of the Fox River watershed was not considered within the context of the Upper Fox River Priority Watershed Project.<sup>12</sup> Given the similarities of this portion of the Fox River watershed to neighboring portions of the Rock and Menomonee River watersheds, the recommendations set forth below for those watersheds may be considered applicable to the portion of the Fox River basin within the context of this plan. That is, that the pollutant reduction levels recommended within the adopted regional water quality management plan to meet the established water use objectives for this watershed are an approximately 25 percent reduction in pollutant runoff within urban areas and an approximately 25 percent reduction in pollutant runoff within rural areas of the watershed.

### **MENOMONEE RIVER WATERSHED**

The portion of the Menomonee River watershed in Washington County is located in the southeastern part of the County. The Menomonee River extends southward from CTH E, and proceeds in a generally southeasterly direction to its confluence with the Milwaukee River within the City of Milwaukee in Milwaukee County, as shown on Map 11 in Chapter III. The headwaters of the Menomonee River are located along its two main branches: 1) Upper Menomonee River located in southeastern Washington County; and 2) the Little Menomonee River which originates in Ozaukee County, which joins the main stem of the Menomonee River in the west central part of Milwaukee County. The watershed encompasses approximately 32 square miles, or about 10

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<sup>11</sup>Wisconsin Department of Natural Resources, Nonpoint Source Pollution Control Plans - Publication Nos. WR-194-86 (1986), WR-255-90 (1989), WR-253-90 (1989), WR-245-91 (1991), WR-244-92 (1992), WR-336-93 (1993) and WR-320-93 (1993), *op. cit.* for the Oconomowoc River, East and West Branches of the Milwaukee River, North Branch Milwaukee, Milwaukee River South, Menomonee River, Cedar Creek, and Upper Fox River, respectively.

<sup>12</sup>Wisconsin Department of Natural Resources Publication No. WR-320-93, *op. cit.*



percent of the total land area of Washington County, which represents about 24 percent of the entire 135-square-mile watershed area. The Menomonee River watershed is characterized by rolling ground moraine, with generally few areas of the watershed being internally drained.

Land use in the Menomonee River watershed is mixed. Since the Washington County portion of the Menomonee River watershed is entirely located within the Village of Germantown and the extreme eastern portion of the Town of Richfield, about one-third of the watershed is urban land uses or urbanizing. About one-half of the watershed remains in agricultural and rural land uses. Wetlands comprise about 16 percent of the watershed area, and woodland comprise about 5 percent of the land uses.

The Menomonee River within Washington County is designated as having to meet the standards for fish and aquatic life and recreational uses<sup>13</sup>, as shown on Map 19. The Menomonee River has experienced low to moderate levels of sedimentation and few physical modifications that limit the achievable water quality of the stream. The River has been characterized as having fair to good water quality. Nevertheless, fecal coliform concentrations have been reported to exceed the standards, and the River has experienced a toxic chemical spill within the Village of Germantown. Water quality data for the portion of the Menomonee River in Washington County has been nonexistent in the past but the LWCD is currently collecting data for this section of the river.<sup>14</sup> Pollutant reduction levels found to be needed to meet the water use objectives for this watershed were established within the adopted regional water quality management plan as refined by the recommended measures set forth in the Menomonee River Priority Watershed plan. These measures are consistent with the applicable performance standards as set forth in Chapter ATCP 50 and Chapter NR 151 of the *Wisconsin Administrative Code*. The adopted regional water quality management plan<sup>15</sup> recommended an approximately 25 percent reduction in pollutant runoff within urban areas and an approximately 25 percent reduction in pollutant runoff within rural areas of the watershed. These reductions were refined in the nonpoint source pollution abatement plan for the Menomonee River watershed to recommend a 50 percent reduction in sediment loads and a 50 to 75 percent reduction in phosphorus loads from both urban and rural areas of the watershed.<sup>16</sup> Full implementation of the recommendations set forth in these plans would address the issues of fertilizer and pesticide, stormwater, animal waste, and soil sustainability and sedimentation management, as identified in this plan. It would also address the issues of

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<sup>13</sup>Wisconsin Department of Natural Resources Administrative Code NR 104.

<sup>14</sup>State of Wisconsin Department of Natural Resources, *Environmental Impact Statement for the Stream Channel Modifications to the Pike River System*, September 1995.

<sup>15</sup>SEWRPC Planning Report No. 30, *A Regional Water Quality Management Plan for Southeastern Wisconsin—2000*, Volume Three, *Recommended Plan*, June 1979, as refined in SEWRPC Memorandum Report No. 93, *A Regional Water Quality Management Plan for Southeastern Wisconsin: An Update and Status Report*, March 1995.

<sup>16</sup>Wisconsin Department of Natural Resources, Publication No. WR-244-92, *op. cit.*

development and groundwater management, identified in this plan and set forth in the adopted regional land use plan and the regional groundwater resource inventory and analysis.<sup>17</sup>

### **MILWAUKEE RIVER WATERSHED**

The Milwaukee River watershed in Washington County comprises the eastern portion of the County. The watershed is comprised of three major subbasins within the County; namely, the East and West Branches of the Milwaukee River, the North Branch of the Milwaukee River, and Cedar Creek. All three subbasins were included within Priority Watershed Planning Project areas.<sup>18</sup> The East and West Branches of the Milwaukee River, originating in Sheboygan and Fond du Lac Counties, enter the County from the north, flowing southerly then easterly within Washington County. The North Branch of the Milwaukee River, originating in Sheboygan County, flows in a generally southerly direction within Washington County. These branches converge immediately east of Washington County within Ozaukee County. Cedar Creek originates in the central portions of Washington County and flows in a generally easterly direction to its confluence with the Milwaukee River in the central part of Ozaukee County. The East and West Branches of the watershed, originating in Sheboygan County, extends southward, encompassing approximately 93 square miles, or about 20 percent of the total land area of the County, and this area represents about 35 percent of the entire 265-square-mile watershed area. The North Branch of the watershed encompass approximately 39 square miles, or about 10 percent of the total land area of the County, and this area represents about 26 percent of the entire 149-square-mile watershed area. The Cedar Creek portion of the watershed encompasses approximately 91 square miles, or about 20 percent of the total land area of the County, and this area represents about 72 percent of the entire 126-square-mile watershed area. The Milwaukee River watershed is characterized by undulating and abruptly irregular moraines, punctuated by shallow and deep depressions or kettles that give the Kettle Moraine State Forest its appellation. Floodplains and outwash plains form areas of uniform slope within the watershed.

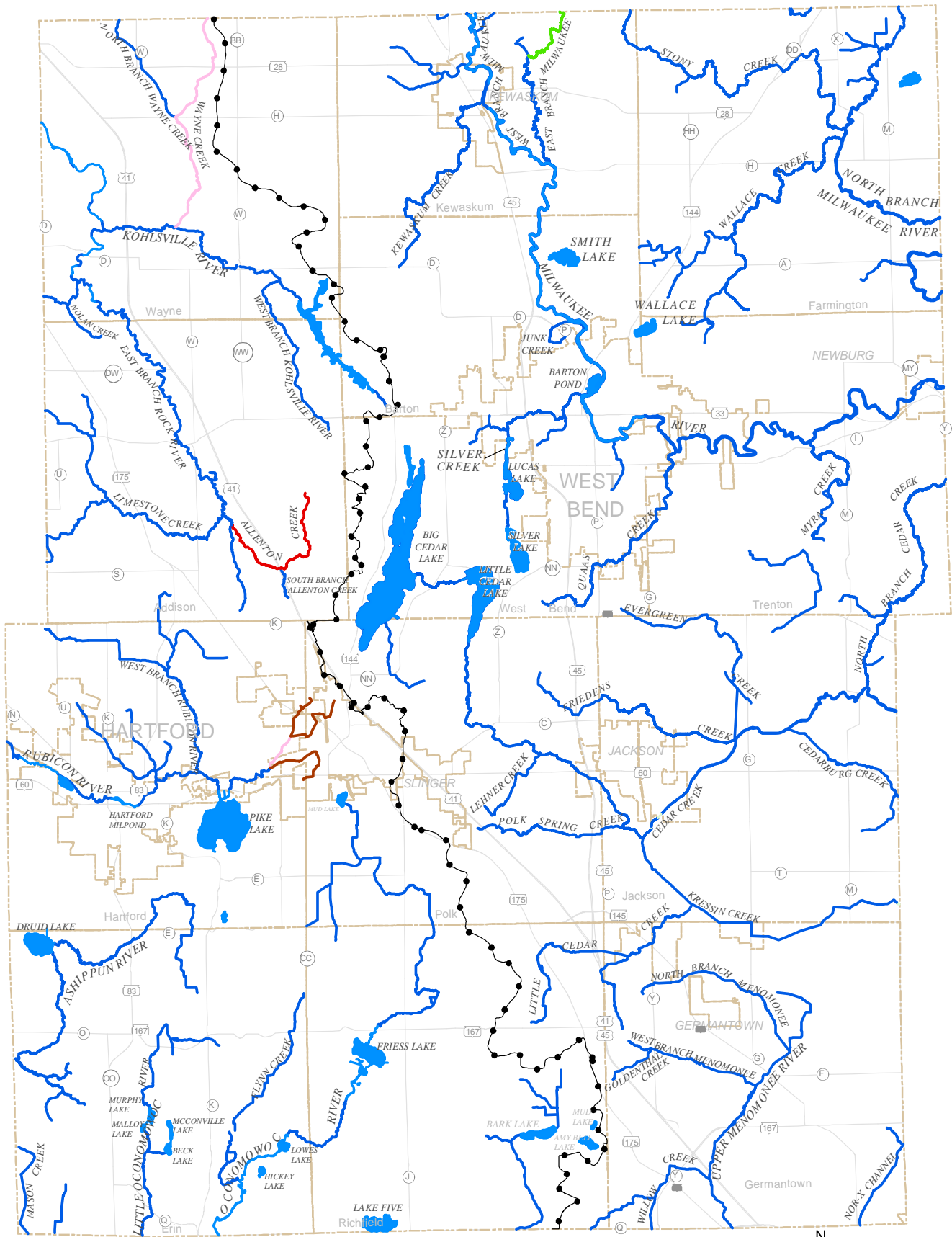
Land use in the Milwaukee River watershed is mixed, with about 15 percent of the watershed in urban land use or urbanizing. About 60 percent of the watershed is in agricultural use. Wetlands comprise about 15 percent of the land area, and woodlands comprise about 10 percent of the land area. The Jackson Marsh Wildlife Area is located in the lower reaches of the Milwaukee River system within the Cedar Creek drainage basin in Washington County.

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<sup>17</sup>SEWRPC Planning Report No. 45, *A Regional Land Use Plan for Southeastern Wisconsin: 2020*, December 1997; SEWRPC Technical Report No. 37, draft, *Groundwater Resources of Southeastern Wisconsin*, April 2000.

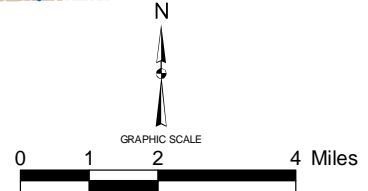
<sup>18</sup>Wisconsin Department of Natural Resources Publication No. WR-255-90, *op. cit.*; Wisconsin Department of Natural Resources Publication No. WR-253-90, *op. cit.*; Wisconsin Department of Natural Resources Publication No. WR-336-93, *op. cit.*

Map 19: REGULATORY WATER USE OBJECTIVES FOR WASHINGTON COUNTY 2005



- FISH AND AQUATIC LIFE
- FISH AND AQUATIC LIFE EXCEPTIONAL RESOURCE WATER
- LIMITED AQUATIC LIFE
- LIMITED FORAGE FISH
- COLD WATER BIOLOGICAL COMMUNITY

—●— SUBCONTINENTAL DIVIDE



Source: SEWRPC

The Milwaukee River within Washington County is designated as having to meet the standards for fish and aquatic life and recreational uses<sup>19</sup>, as shown on Map 19. The East Branch of the Milwaukee River, upstream of STH 28 in Washington County, is classified as an Exceptional Resource Water of the State, pursuant to Section NR 102.22(1)(d)(39) of the Wisconsin Administrative Code. The Milwaukee River system has suffered from moderate levels of sedimentation and from levels of physical modification that range from low to severe, especially along Cedar Creek and Little Cedar Creek.

These modifications limit the achievable water quality of the stream. The Milwaukee River system has been characterized as having generally fair to very good water quality, although the stream reaches suffering from major physical modifications typically have waters of diminished quality. Some fecal coliform and total phosphorus concentrations were reported to exceed the standards, while portions of the Cedar Creek subwatershed have had reported dissolved oxygen problems. Current water quality data, available from the WDNR for portions of the Milwaukee River system in Washington County, indicate that the River continues to be characterized by fair to very good water quality.

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<sup>19</sup> Wisconsin Department of Natural Resources Administrative Code NR 104.

Pollutant reduction levels found to be needed to meet the water use objectives for this watershed were established within the adopted regional water quality management plan as refined by the recommended measures set forth in the Milwaukee River Priority Watershed plans. These measures are consistent with the applicable performance standards as set forth in Chapter ATCP 50 and Chapter NR 151 of the *Wisconsin Administrative Code*. The adopted regional water quality management plan<sup>20</sup> recommended an approximate 25 percent reduction in pollutant runoff within urban areas and an approximate 25 percent reduction in pollutant runoff within rural areas of the watershed, except in the vicinity of Lake Twelve where an approximate 75 percent reduction in pollutant runoff was recommended within rural areas draining to the Lake. These reductions were refined in the nonpoint source pollution abatement plans for the Milwaukee River watershed to recommend an overall 25 percent reduction in sediment and phosphorus loads from both urban and rural areas of the watershed.<sup>21</sup> Varying levels of pollutant load reduction (ranging from a 10 to 40 percent reduction in sediment loads, and a 25 to 70 percent reduction in phosphorus loads) were recommended for specific subbasins within these watersheds. In addition, a 75 to 90 percent reduction in sediment loads from construction activities, and a 50 to 80 percent reduction in toxic substance and heavy metals loads in urban stormwater, were recommended in urban areas of the Cedar Creek watershed. Full implementation of the recommendations set forth in these plans would address the issues of fertilizer and pesticide, stormwater, animal waste, and soil sustainability and sedimentation management as identified in this plan. It would also address the issues of development and groundwater management, identified in this plan, and set forth in the adopted regional land use plan and the regional groundwater resource inventory and analysis.<sup>22</sup>

## **ROCK RIVER WATERSHED**

The Rock River watershed is located in the western portions of Washington County. The East Branch of the Rock River extends northward from CTH K, just north of the City of Hartford, and proceeds in a generally northwesterly direction into Dodge County. The Rubicon and Ashippun Rivers flow in a generally westerly and southwesterly direction, respectively, to their confluences with the Rock River in Dodge County. The Oconomowoc and Bark Rivers drain the southwestern portions of Washington County in a generally southerly direction into Waukesha County, as shown on Map 11 in Chapter III. The watershed encompasses approximately 178 square miles, or

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<sup>20</sup>SEWRPC Planning Report No. 30, *A Regional Water Quality Management Plan for Southeastern Wisconsin—2000*, Volume Three, *Recommended Plan*, June 1979, as refined in SEWRPC Memorandum Report No. 93, *A Regional Water Quality Management Plan for Southeastern Wisconsin: An Update and Status Report*, March 1995.

<sup>21</sup>Wisconsin Department of Natural Resources Publication No. WR-255-90, *op. cit.*; Wisconsin Department of Natural Resources Publication No. WR-253-90, *op. cit.*; Wisconsin Department of Natural Resources Publication No. WR-336-93, *op. cit.*

<sup>22</sup>SEWRPC Planning Report No. 45, *A Regional Land Use Plan for Southeastern Wisconsin: 2020*, December 1997; SEWRPC Technical Report No. 37, draft, *Groundwater Resources of Southeastern Wisconsin*, April 2000.

about 40 percent of the total land area of the County, and this area represents about 10 percent of the entire 1,920-square-mile watershed area of the Upper Rock River Basin. Only the Oconomowoc River basin has been included within a Priority Watershed Project planning program.<sup>23</sup> The Rock River watershed is characterized by rolling ground moraines.

Land use in the Rock River watershed is mixed, with about 15 percent of the watershed in urban land uses or urbanizing. About 60 percent of the watershed is in agricultural land use. Wetlands comprise about 15 percent of the land area, and woodlands comprise about 10 percent of the land area. The Allenton Marsh Wildlife Area is situated within the East Branch of the Rock River subbasin, in the northwestern portion of the County.

The Rock River within Washington County is required to meet the standards for fish and aquatic life and recreational uses<sup>24</sup>, as shown on Map 19, although portions of the Rubicon River in the vicinity of the Village of Slinger and Wayne Creek are classified for a limited forage fish use objective. The reach of the Rubicon River in the vicinity of the Village of Slinger sewage treatment facility is classified for a limited aquatic life use objective. As a result of the abandonment of the private sewage treatment facility draining to Wayne Creek and the upgrading of the Village of Slinger sewage treatment facility (as recommended in the adopted regional water quality management plan<sup>25</sup>) all of the various water use objectives are recommended to be upgraded. Wayne Creek is recommended to be reclassified to a coldwater fish use objective, while the Rubicon River is recommended to be reclassified to a warmwater sportfish or forage fish use objective, except in the immediate vicinity of the Village of Slinger sewage treatment facility, which is recommended to be reclassified for a limited forage fish use objective. The Rock River watershed has suffered from low to moderate levels of sedimentation within the County and major physical modifications that limit the achievable water quality of the stream have been restricted to portions of the Rubicon River and the Coney Creek portion of the Oconomowoc River. The Rock River has been characterized as having fair water quality, however, fecal coliform concentrations and dissolved oxygen concentrations have failed to meet standards in portions of the East Branch of the Rock River. Current water quality data, available from the WDNR for portions of the Rock River system in Washington County, indicate that the River continues to be characterized by fair to very good water quality.

Pollutant reduction levels necessary to meet the water use objectives for this watershed were established within the adopted regional water quality management plan as refined by the recommended measures set forth in the Oconomowoc River Priority Watershed plan and Upper Rock River Basin water quality management plan. These measures are consistent with the

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<sup>23</sup>Wisconsin Department of Natural Resources Publication No. WR-194-86, *op. cit.*

<sup>24</sup> Wisconsin Department of Natural Resources Administrative Code NR 104.

<sup>25</sup>SEWRPC Memorandum Report No. 93, *A Regional Water Quality Management Plan for Southeastern Wisconsin: An Update and Status Report*, March 1995.

applicable performance standards as set forth in Chapter ATCP 50 and Chapter NR 151 of the *Wisconsin Administrative Code*. Varying levels of pollutant load reduction were recommended for specific subbasins within this watershed. In addition, implementation of management measures consistent with the reduction in nonpoint source pollutant loads from urban and rural sources was recommended in the Rock River basin plan.<sup>26</sup> Full implementation of the recommendations set forth in these plans would address the issues of fertilizer and pesticide, stormwater, animal waste, and soil sustainability and sedimentation management, identified in this plan. It would also address the issues of development and groundwater management, identified in this plan, and set forth in the adopted regional land use plan and the regional groundwater resource inventory and analysis.<sup>27</sup>

## **GROUNDWATER**

Like surface water, groundwater is susceptible to depletion in quantity and to deterioration in quality as a result of urban and rural development. Consequently, land use planning must appropriately consider the potential impacts of urban and rural development on this important resource and take into account, as appropriate, natural conditions that may limit the use of groundwater as a source of water supply, including the relatively high levels of naturally occurring radium that may occur in groundwater in the deep sandstone aquifer. The vulnerability of groundwater to contamination is a combination of several factors; however, two of the most important elements are surface and subsurface soil characteristics and depth to groundwater levels. Since much of the County is covered by highly permeable glacial soils, and given that the depth to groundwater is between zero and 25 feet throughout much of the County, the potential for contamination is a concern.

The principal human activities contributing to potential groundwater contamination were identified in an inventory and analysis of the groundwater resources of the Southeast Region conducted by SEWRPC and the Wisconsin Geological and Natural History Survey. These potential sources of groundwater contamination are listed in Table 21.

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<sup>26</sup>Wisconsin Department of Natural Resources, Publication No. WR-190-95 REV, *Upper Rock River Basin Water Quality Management Plan*, December 1995.

<sup>27</sup>SEWRPC Planning Report No. 45, *A Regional Land Use Plan for Southeastern Wisconsin: 2020*, December 1997; SEWRPC Technical Report No. 37, draft, *Groundwater Resources of Southeastern Wisconsin*, April 2000.



**Table 21:  
HUMAN ACTIVITIES THAT CAN IMPACT GROUNDWATER QUALITY**

Originating On the Land	Originating Below Land Surface
Above-ground storage tanks	<b>Above Water Table</b>
Accidental spills	Animal waste storage facilities
Agricultural activities:	Landfills
- Animal feedlots	Leakage:
- Fertilizer and pesticide storage, mixing, and loading	- Underground storage tanks
- Fertilizer and pesticide application	- Underground pipelines
- Irrigation return flow	- Sewers
- Silage and crop residue piles	Septic tanks
Highway deicing	Surface wastewater impoundment's
Liquid waste spreading or spraying (sewage, sludge, septage, whey)	Sumps, dry wells
Stockpiles (chemicals, salt), dumps	Waste disposal in dry excavations
Infiltration of contaminated surface water or precipitation	<b>Below Water Table</b>
	Groundwater development:
	- Abandoned wells and holes
	- Improper well construction
	- Overpumping
	Illegal drainage or disposal wells
	Waste disposal in wet excavations

*Source: Wisconsin Geological and Natural History Survey and SEWRPC.*

Groundwater used for drinking in the County is generally of good quality. However, there are localized areas of concern where clean drinking water standards are exceeded, particularly in areas of shallow bedrock and areas that have become contaminated from improperly abandoned wells, leaking underground storage tanks and facilities, and waste disposal sites. The most common contaminants include nitrates, petroleum ingredients and volatile organic compounds (VOCs) and synthetic organic compounds such as fertilizers and pesticides.

## **SURFACE WATERS: LAKES**

Water quality is affected by plant nutrients, such as nitrogen and phosphorus, sediments from the land surface, and various natural and synthetic chemicals. As nutrient enrichment of the water resource increases, water quality declines. This nutrient enrichment process, known as eutrophication, leads to increased algal and aquatic plant growth, decreased oxygen levels, reduced water clarity, and changes in the fish fauna of the aquatic systems, even, in extreme cases can lead to fish kills.

The trophic status of most of the lakes in Washington County is set forth in Table 22. Trophic status is an indicator of overall water quality. It is commonly quantified using an index that takes into consideration water clarity, phosphorus and chlorophyll-*a* concentrations, and regional location within Wisconsin. While based upon a trophic continuum, there are essentially three commonly differentiated trophic levels. An oligotrophic lake has few nutrients and is characterized by clear water and low amounts of plant and algal growth. There are no oligotrophic lakes in Washington County. Mesotrophic lakes are characterized by moderate concentrations of nutrients, and have somewhat reduced water clarity and increased numbers of aquatic plants. There is usually a healthy fisheries community, including those fishes prized as angling gamefish species, while swimming and boating can be enjoyed without restrictions. Given the underlying geological conditions within Washington County, most of the lakes may be expected to be mesotrophic in nature.

In contrast, eutrophic lakes are characterized by high nutrient levels, high levels of plant and algal growth, and reduced water clarity. Fisheries in eutrophic lakes are generally dominated by a few species including large numbers of rough fish or species not generally considered desirable for angling purposes. Further, because of the accumulation of plant residues and the resulting decomposition that occurs, these lakes are often not as desirable for swimming and other water contact sports. As of 1993, four of the major lakes for which data were available were classified as eutrophic, five lakes as meso-eutrophic and nine as mesotrophic in the Regional Water Quality Management Plan Update.<sup>28</sup>

## **SURFACE WATERS: MAJOR STREAMS**

As shown in Tables 15 & 23, of the 244 stream miles for which data were available, about 38 miles (15%) were reported to be of poor quality, and about 22 miles (10%) were reported to be of fair quality. These conclusions are based upon calculated biotic indices and/or the best professional judgment of WDNR staff who conducted the assessments. No water quality data were available for the remaining 110 miles of stream courses within Washington County.

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<sup>28</sup>SEWRPC Memorandum Report No. 93, *A Regional Water Quality Management Plan for Southeastern Wisconsin: An Update and Status Report*, March 1995.

**Table 22:  
TROPIC STATUS OF WASHINGTON COUNTY LAKES**

Lake	Surface Area (acres)	Trophic Status*
Allis	9	--
Amy Bell	26	Mesotrophic
Bark	62	Meso-eutrophic
Barton Pond	67	--
Beck	16	--
Big Cedar	932	Mesotrophic
Boltonville Millpond	10	--
Brickyard	1	--
Druid	120	Eutrophic
Ehne	18	--
Erler	37	Mesotrophic
Five	102	Mesotrophic
Friess	117	Meso-eutrophic
Gilbert	44	Meso-eutrophic
Green	71	Mesotrophic
Hartford Millpond	11	--
Hasmer	15	--
Hawthorn	8	--
Hickey	10	--
Keowns Pond	1	--
Kewaskum Millpond	5	--
Kohlsville Millpond	6	--
Lehner	3	--
Lent	8	--
Lenwood	15	--
Little Cedar	246	Mesotrophic

Lake	Surface Area (acres)	Trophic Status <sup>a</sup>
Little Drickens	9	--
Little Friess	15	--
Lohr Pond	7	--
Lowe	23	Eutrophic
Lucas	78	Mesotrophic
Malloy	5	--
Mayfield Pond	8	--
McConville	14	--
Miller	3	--
Mud T10N R19E S19	23	--
Mud T9N R19E S24	5	Eutrophic
Mueller	14	--
Murphy	16	--
Newburg Pond	7	--
Paradise Valley	9	--
Pike	522	Eutrophic
Proschinger	6	--
Quaas	7	--
Radtke	10	--
Rockfield Quarry Pond	3	--
Silver	118	Mesotrophic
Smith	86	Meso-eutrophic
Tilly	13	--
Twelve	53	Meso-eutrophic
Wallace	52	Mesotrophic
<b>Total</b>	<b>3,066</b>	

\*Trophic status as determined by the SEWRPC based upon water chemistry data reported by WDNR, and/or the U.S. Geological Survey.

Source: Wisconsin Department of Natural Resources and SEWRPC.

**Table 23:  
WATER QUALITY CHARACTERISTICS OF STREAMS WITHIN WASHINGTON COUNTY**

Watershed and Stream	Biotic Index Rating <sup>b</sup>	Record Fish Kill	Water Quality Problems <sup>a</sup>					Other Known Impairments <sup>c</sup>
			D.O.	NH <sub>3</sub>	Nutrients	Fecal Coliform	Toxics	
<b>Menomonee R. Watershed</b>								
Goldendale Creek (West Branch of Menomonee River)	Good	No	No	No	--	Yes	Yes	Streambed sedimentation; loss of aquatic habitat; <sup>d</sup> channel modification <sup>d</sup>
North Branch of Menomonee River (upstream STH 145)	--	No	No	No	--	Yes	Yes <sup>d</sup>	Moderate streambed sedimentation; <sup>d</sup> hydraulic scour
Menomonee River (downstream STH 145 to CTH Q)	Fair	No	No	Yes	--	Yes	Yes	--
Little Menomonee River	Fair-poor <sup>g</sup>	No	No	No	--	Yes	Yes <sup>d</sup>	--
Nor-X-Way Channel	Fair-poor <sup>g</sup>	Yes <sup>h</sup>	No	No	--	Yes	--	Streambed sedimentation; moderate channel modification <sup>d</sup>
Willow Creek	Fair	No	No	No	--	Yes	--	Streambed sedimentation; loss of aquatic habitat
<b>Milwaukee River Watershed</b>								
Cedar Creek (to CTH M)	Good-fair	--	Yes	No	No	Yes	--	Sediment/trampling or grazing
Cedar Creek North Branch	Very good-fair	--	--	--	--	--	--	Moderate streambed sedimentation; <sup>d</sup> stream habitat loss
Kewaskum Creek	--	--	No	No	No	Yes	Yes <sup>k</sup>	Moderate streambed sedimentation; <sup>d</sup> stream habitat loss
Lehner Creek <sup>P</sup>	Very good-good	--	--	--	--	--	--	Excessive aquatic plants; elevated temperature; loss of riparian vegetation
Little Cedar Creek	--	--	--	--	--	--	--	Sediment/trampling or grazing; channelization/ wetland drainage
Milwaukee River	Poor-excellent <sup>g</sup>	Yes <sup>o</sup>	No	No	No	No	--	Sediment/trampling or grazing; stream habitat loss
Milwaukee River East Branch	--	--	--	--	--	--	--	Sediment/trampling or grazing; stream habitat loss
Milwaukee River Watershed (continued)								
Milwaukee River North Branch	Excellent-good	--	No	No	No	Yes	--	Sediment/trampling or grazing; stream habitat loss
Milwaukee River West Branch	Good	--	No	No	Yes	No	--	Sediment/trampling or grazing
Quaas Creek	Very good-fair	--	--	--	--	--	Yes <sup>k</sup>	Stream habitat loss
Silver Creek	Good	--	No	No	No	Yes	--	Sediment/trampling or grazing
Stony Creek	--	--	--	--	--	--	--	Sediment/trampling or grazing
Wallace Creek	--	--	--	--	--	--	--	Sediment/trampling or grazing
<b>Rock River Watershed</b>								
Allenton Creek	--	--	No	No	--	--	--	Moderate streambed sedimentation; stream habitat loss
Ashippun River	--	No	--	--	--	--	--	Streambed sedimentation; stream habitat loss
Bark River	Good	No	No	--	No	No	--	--
Coney Creek	--	--	No	No	--	--	Yes <sup>n</sup>	Major channel modification; streambed sedimentation <sup>d</sup>
Kohlsville Creek <sup>P</sup>	--	No	Yes	--	--	--	--	Channel modification; streambed sedimentation <sup>d</sup>
Limestone Creek	Good	No	Yes	--	--	Yes	Yes <sup>n</sup>	Streambed sedimentation <sup>d</sup>
Little Oconomowoc River	Excellent	--	No	No	--	--	--	--
Mason Creek	Very good-good	--	--	--	--	--	Yes	Streambed sedimentation <sup>d</sup>
Oconomowoc River	Good	No	No	No	--	--	--	Moderate channel modification; streambed sedimentation <sup>d</sup>
Rock River East Branch	--	No	Yes	No	--	--	--	Streambed sedimentation <sup>d</sup>

**Table 23: (continued)**

Watershed and Stream	Biotic Index Rating <sup>b</sup>	Record Fish Kill	Water Quality Problems <sup>a</sup>					Other Known Impairments <sup>c</sup>
			D.O.	NH <sub>3</sub>	Nutrients	Fecal Coliform	Toxics	
Rubicon River	--	No	Yes	Yes	No	No	Yes	Major channel modification; streambed sedimentation <sup>d</sup>
Wayne Creek <sup>P</sup>	--	No	--	--	--	--	--	Low streambed sedimentation; moderate channel modification <sup>d</sup>

<sup>a</sup>SEWRPC Memorandum Report No. 93, A Regional Water Quality Management Plan for Southeastern Wisconsin: An Update and Status Report, March 1995.

<sup>b</sup>Biotic Index ratings were determined by the Wisconsin Department of Natural Resources staff based upon either the Hilsenhoff Biotic Index (HBI) and/or the Index of Biotic Integrity (IBI).

<sup>c</sup>Other Known Impairments are defined by the Wisconsin Department of Natural Resources in the following reports specific to that watershed unless otherwise indicated.

<sup>d</sup>As defined in SEWRPC Memorandum Report No. 93, low channel modification occurs when up to 25 percent of the stream channel has been structurally altered, deepened, and/or straightened; moderate stream modification occurs when 25 to 50 percent of the channel has been modified; high channel modification occurs when 50 percent or more of the channel has been modified.

<sup>e</sup>Wisconsin Department of Natural Resources, A Nonpoint Source Control Plan for the Menomonee River Priority Watershed Project, March 1992.

<sup>f</sup>Lengths include areas outside Washington County.

<sup>g</sup>The Little Menomonee River and Nor-X-Way Channel have had low to moderate modifications to their channels, and have had reported water quality problems associated with high fecal coliform concentrations. The Little Menomonee River has also had reported water quality problems associated with toxic contaminants as a result of spillages downstream of the Washington county line.

<sup>h</sup>Reported to be due to a discharge of ammonia.

<sup>i</sup>The Milwaukee River has had moderate modifications to its channel and has had reported water quality problems associated with high fecal coliform concentrations.

<sup>j</sup>Wisconsin Department of Natural Resources, Nonpoint Source Control Plan for the Cedar Creek Priority Watershed Project, August 1993.

<sup>k</sup>Wisconsin Department of Natural Resources, A Nonpoint Source Control Plan for the East and West Branches of the Milwaukee River Priority Watershed Project, February 1992.

<sup>l</sup>Wisconsin Department of Natural Resources, Nonpoint Source Control Plan for the North Branch Milwaukee River Priority Watershed Project, July, 1989.

<sup>m</sup>Wisconsin Department of Natural Resources, A Nonpoint Source Control Plan for the Oconomowoc River Priority Watershed Project, 1986.

<sup>n</sup>Wisconsin Department of Natural Resources, Upper Root River Basin Water Quality Management Plan, December 1995.

<sup>o</sup>Undetermined cause.

<sup>P</sup>Wisconsin Department of Natural Resources 303(d) listed waters within Washington County.

Source: Wisconsin Department of Natural Resources and SEWRPC.

## WATER USE OBJECTIVES

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With the exception of those waters identified in Section NR 104.06 of the *Wisconsin Administrative Code*, the waters of the County are expected to meet the standards for warmwater sport fish, and be fully compliant with the fishable and swimmable goals established by the federal Clean Water Act. Map 19 shows the regulatory water use objectives established for the waters of Washington County.

As of 1999, the proposed modifications, set forth in Table 24 would be applied to stream reaches where a new local wastewater treatment facilities has been constructed, as recommended pursuant to the adopted regional water quality management plan. As a consequence of these proposed revisions, only the unnamed tributary to the Rubicon River draining the Village of Slinger sewage treatment facility would fail to meet the federal Clean Water Act guidelines.

Based upon data the Regional Water Quality Management Plan update<sup>30</sup>, four lakes (Druid Lake, Lucas Lake, Lake Twelve, and Lake Five) and portions of two streams (the Bark River and Milwaukee River) were determined to meet the water use objectives established for those surface waters as of 1993. Portions of the Rock River, North Branch of the Milwaukee River, Cedar Creek, and the Menomonee River were determined to partially meet their recommended water use objectives. Eight of the major lakes in Washington County (Green Lake, Smith Lake, Wallace Lake, Silver Lake, Little Cedar Lake, Big Cedar Lake, Pike Lake, and Friess Lake) and portions of the upper reaches of the Menomonee River were determined not to be meeting their recommended water use objectives as of 1993.

In general, data upon which to base an assessment of the ability of the major lakes and streams and tributaries to meet the recommended water use objectives are scarce. Since 1976, only six major lakes and portions of the Menomonee and Milwaukee Rivers have been included in water quality monitoring programs. Of these monitoring programs, only the monitoring programs involving four lakes and the portion of the Menomonee River were considered to be comprehensive water quality monitoring programs.

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<sup>30</sup> SEWRPC, Regional Water Quality Management Plan For Greater Milwaukee Watersheds

**Table 24:  
 PROPOSED REVISIONS TO WATER USE OBJECTIVES SET FORTH IN  
 CHAPTERS NR 102 AND NR 104 OF THE WISCONSIN ADMINISTRATIVE CODE  
 AS PROPOSED BY THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES**

Stream Reach	Water Use Objective	Proposed Water Use Objective	Notes
Unnamed Tributary to Rubicon River in the T10N R18E Section 13 NW of the NE	Limited Aquatic Life	Tolerant Fish & Aquatic Life - TF	Slinger Waste Water Treatment Plant

*Source: Wisconsin Department of Natural Resources.*



## CHAPTER V

# STATEWIDE NONPOINT SOURCE POLLUTION PERFORMANCE STANDARDS - PRIORITY FARMS - LAND USE REGULATIONS - WATER QUALITY STANDARDS

## MINIMUM STATE PERFORMANCE STANDARDS ---

Wisconsin Act 27 (1997-1999 Budget Bill) created significant changes to the Wisconsin Department of Natural Resources (WDNR) Nonpoint Source Water Pollution Abatement Program and to the Department of Agriculture, Trade and Consumer Protection's (DATCP) Soil and Water Resources Management Program. It required the WDNR to develop performance standards for agricultural and nonagricultural nonpoint sources of pollution.<sup>31</sup> These standards have been codified into Chapter NR 151 of the *Wisconsin Administrative Code*.

In parallel to the promulgation of NR 151, the DATCP revised its soil and water resource management programs in Chapter ATCP 50. ATCP 50 developed statewide nutrient management requirements and prescribed conservation practices to address the WDNR's performance standards. Appendix A shows achievements of Soil and Water Conservation Practices beginning in 1985 with the first Nonpoint Source Watershed Pollution Abatement Program in Washington County through 2009.

## AGRICULTURAL PERFORMANCE STANDARDS ---

The agricultural performance standards cover four areas: cropland soil erosion control, sediment delivery from riparian lands, manure management, and nutrient management. The requirement to comply with these standards for existing livestock facilities and cropland practices is contingent upon the landowner or operator receiving an offer of cost sharing. Existing facilities and practices are typically those created on or before October 1, 2002. New facilities and practices, including

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<sup>31</sup> Under the provisions of Section 92.15 *Wisconsin Statutes*, a local unit of government may enact livestock operation regulations that exceed the State performance standards, prohibitions, conservation practices and technical standards only if the local unit of government demonstrates to the satisfaction of the Department of Agriculture, Trade and Consumer Protection, or the Wisconsin Department of Natural Resources that the regulations are necessary to achieve water quality standards.

those created after October 1, 2002 must comply regardless of cost sharing. Once a livestock facility or cropland is brought into compliance with a standard, the landowner or operator is required to maintain compliance in perpetuity regardless of future cost-share availability.

### **CROPLAND SOIL EROSION CONTROL**

Soil erosion is not only a source of sediment in rivers and lakes, but also a source of nutrient contamination to water resources. Nutrients and other pollutants are attached to individual soil particles, and when erosion occurs, transport of various chemical and nutrients takes place. One of the most essential plant nutrients is phosphorus, and soil erosion is the primary method by which this nutrient enters lakes and rivers. This phenomenon has been long recognized, and over the years, a number of programs to reduce erosion have been developed.

The current soil erosion standard applies only to crop producers and requires that all farmland must be cropped in such a way as to reduce sheet flow, wind, and rill erosion to “tolerable” soil loss rates, also known as “T”. The tolerable soil loss rates for the soils in Washington County are typically between two and five tons/acre/year depending on the soil type. Controlling agricultural soil erosion can be accomplished through a variety of methods known as best management practices (BMPs). Some of the most effective BMPs include conservation tillage, contour strip-cropping, field buffers and conservation crop rotations.

### **ANIMAL WASTE STORAGE FACILITIES**

On many farms, storage is the preferred manure-handling option. It eliminates the inconvenience of daily hauling, and allows manure to be conveniently stockpiled in a single facility until conditions are environmentally safe and agronomically correct for field application. However, proper construction, routine maintenance and/or proper abandonment are essential in preventing surface or groundwater pollution, or the human health hazards that these facilities can pose. This standard requires new or substantially altered facilities meet technical requirements at the time of construction. A facility is considered significantly altered if the owner initiates a change that results in the relocation of a structure or facility or significant changes to the size, depth or configuration of a facility. This includes replacing the liner or increasing the structure’s capacity or area by 20% or more. State law also requires repair or upgrade to any failing or leaking structures that pose an imminent health threat to public health, fish and aquatic life or causes a violation of groundwater standards. Furthermore, existing manure storage facilities require proper abandonment if manure has not been added for a period of 24 months, unless certain conditions are met.

### **CLEAN WATER DIVERSION**

Wherever manure is concentrated and exposed to the elements, rain and melting snow can wash nutrients, bacteria and organic matter into nearby drainageways, and ultimately to streams and lakes. Polluted runoff is often associated with barnyards and exercise areas. Diversions shall be installed that prevent clean water from coming into contact with manure in concentrated animal feedlots, barnyards or manure storage areas that are located within a water quality management area. A water quality management area means the area within 1,000 feet from the ordinary high water mark of a lake or pond or the area within 300 feet from the ordinary high water mark of a

river or stream. Additionally, clean water diversion shall also be installed around feedlots, barnyards or manure storage areas that are highly susceptible to groundwater contamination.

**NUTRIENT MANAGEMENT**

Wise nutrient management practices not only benefit the environment in terms of limiting nutrient concentrations in runoff to streams and lakes, but also have positive economic impacts for the farmer. This standard requires all producers applying nutrients to agricultural fields to do so in accordance with NRCS Standard 590. This technical standard sets forth limits on the volume, form, placement and timing of application of plant nutrients upon agricultural fields, including nutrients from organic wastes, commercial fertilizers, cover crops, and crop residues. These limits are based on a number of factors including, but not limited to, crop needs (based on routine soil tests), soil type, and proximity of environmentally sensitive areas and resources.

**ANIMAL WASTE MANAGEMENT**

Manure management performance standards, or “prohibitions” include:

- No overflows from manure storage facilities.
- No unconfined manure stacking or stockpiling within water quality management areas.
- No direct runoff from a feedlot or stored manure to waters of the State.
- No unlimited access by livestock to state waters at a location where the high concentration of animals could prevent maintenance of adequate sod cover or self-sustaining vegetative cover.

**CONSERVATION PRACTICES**

Federal, state and local conservation agencies have identified four cost-effective BMPs, including conservation tillage, nutrient management, integrated pest management and shoreline buffers. These practices have shown to offer the greatest benefit to water quality and soil resource protection and improvement per dollar spent. The Land and Water Conservation Division (LCWD) will give priority to promoting countywide the adoption of these practices and limit the promotion of other, more costly BMPs to the Priority Farm Strategy listed below. All ATCP 50 approved conservation practices are listed in Table 25.

**Table 25:  
ATCP 50 CONSERVATION PRACTICES**

ATCP 50 # (if applicable)	Practice / Activity
50.62	Manure Storage Facilities
50.63	Manure storage Abandonment
50.64	Barnyard runoff control system
50.65	Access Roads or cattle crossing
50.66	Animal trails and walkways

**Table 25: (continued)**

ATCP 50 #	Practice / Activity
50.67	Contour Farming
50.68	Cover and Green Manure crop
50.69	Critical Area Stabilization
50.70	Diversions
50.71	Field Windbreak (tree planting)
50.72	Filter Strips
50.73	Grade Stabilization Structures
50.74	Heavy Use Area Protection
50.75	Fencing
50.76	Livestock watering facilities
50.77	Milkhouse Waste Control
50.78	Nutrient Management
50.79	Pesticide Management
50.80	Prescribed grazing
50.81	Relocating or abandoning animal feeding operations
50.82	Residue Management
50.83	Riparian Buffers (non-CREP)
50.84	Roofs
50.85	Roof Runoff
50.86	Water and Sediment Control Structures
50.87	Sinkhole Treatment
50.88	Streambank Protection
50.89	Stripcropping
50.90	Subsurface drains
50.91	Terraces
50.92	Underground outlet
50.93	Waste Transfer system
50.94	Wastewater treatment strips
50.95	Water and sediment control basins
50.96	Grassed Waterways
50.97	Well Abandonment
50.98	Wetland Restoration

Source: DATCP

### **IMPLEMENTATION OF THE AGRICULTURAL PERFORMANCE STANDARDS**

Regulations on crop production and manure management are relatively new. Hastily enforced performance standards could pose undo economic hardship on family farms. Washington County recognizes that the line between resource protection and a healthy farm community must be carefully drawn, and will follow prudent policies and procedures to guide this process.

In 2006 a Memorandum of Understanding (MOU) was developed and signed between the WDNR and the LWCD outlining roles and responsibilities for implementing the State's Agriculture Performance Standards within Washington County. The following is a summary of that process.

#### **Inventory and Evaluation of Agricultural Nonpoint Sources:**

It is important to have current and accurate inventory records of farmstead and cropland conditions. An accurate inventory provides the county and state agencies a clear picture of total

workload, priority sites and potential costs. Current LWCD records are incomplete and inadequate for programs that include a regulatory component. For this reason the LWCD has decided to conduct on-site inventories of each farm in order to evaluate compliance with the state performance standards and prohibitions. This on-site inventory will also provide an opportunity for LWCD staff to share information with farmers and landowners about new performance standards and possible impacts on their operations.

Landowners who voluntarily seek program or technical assistance from the LWCD will be given first priority for inventory and evaluation of compliance status. Second priority will be with farms that participated in past conservation programs such as the Farmland Preservation or the Priority Watershed Program. Third in priority will be a county wide systematic selection of farms base on the following watershed order:

1. Rock River
2. North Branch Milwaukee River
3. East West Branch Milwaukee River
4. Cedar Creek Milwaukee River
5. Rubicon River
6. Menomonee River
7. Oconomowoc River
8. Ashippun River
9. Bark River
10. Upper Fox River

During farm inventories, the LWCD will collect new or update inventory data, this inventory will include evaluations of all animal feeding operations, nutrient management activities and cropland erosion rates. Once this inventory has been completed, all records will be updated in a computerized database using GIS technology. For these reasons, modernizing inventory data is identified several times in the work plan as an important action item.

#### Determinations of Compliance and Notification:

The county will assume the authority to make determinations on whether a site is in or out of compliance with a performance standard. The LWCD will make compliance determinations and notify landowners of their status in a systematic manner. The county will notify landowners and operators of their compliance status as inventories are completed. Whenever possible, written notifications will be delivered in person. If a landowner does not agree with the status of compliance, appeals must be made to the Land Conservation Committee (LCC) within 30 days at no cost to the landowner.

#### Schedule for Implementing Performance Standards:

The primary role of the LWCD will be to gain voluntary acceptance and compliance with performance standards through education, financial and technical assistance.

LWCD staff will concentrate first on gaining compliance with the most critical sites and with large or expanding operations within the county based on the Priority Farm Strategy listed below. Since cost share funds are limited, landowners or managers who fall under these conditions and who are committed to cooperating voluntarily will be given first priority for the available dollars. Second priority will be given to landowners who want to cooperate on a voluntary basis

regardless of location or priority rating. It is hopeful that this approach will inspire hesitant producers to cooperate voluntarily.

Priority Farms Strategy:

The Washington County priority farms strategy aims to target implementation of the performance standards and provide cost-sharing and technical assistance in areas of greatest environmental need or threat to public health. The Washington County LWCD may evaluate any property within the county to determine compliance status if there is sufficient evidence that the NR 151 Agricultural Nonpoint Performance Standards and Prohibitions are not being met and there is reason to believe that there is a significant environmental impact or a threat to public health and safety. Priority farms will be identified through the following means:

- 1) Reports of environmental incidents, including well-contamination and/or fish kills.
- 2) Public complaints.
- 3) Volunteer landowners that identify soil and water conservation issues on their farms and request LWCD assistance.

LWCD staff will use the above criteria to prioritize farms for LWCD assistance and limited cost-sharing. In the event that the number of priority farms exceeds the assistance available, the highest priority farms will be those that have caused documented environmental incidents or are in sensitive environmental areas, such as those with shallow depth to groundwater, water quality management areas, or areas draining to 303(d) streams. Even when cost-sharing and technical assistance limits the number of priority farms that can be served each year, the information and education program will target all identified priority farms. Farms may be re-prioritized at the discretion of the LWCD staff and the LCC.

Enforcement:

In cases where a site is considered by the LWCD and WDNR staff to be a high priority and cost sharing is available, yet voluntary compliance does not occur within a reasonable time frame, the LWCD and WDNR will issue an official Notification of Noncompliance (NON), along with a formal offer of cost sharing and technical assistance based on availability through the LWCD. The NON and formal offer will establish deadlines consistent with state administrative rules in which the responsible individual must comply with a performance standard or be subject to enforcement under provisions of state administrative rules. Although there are prescribed circumstances when an offer of cost sharing must be extended to the farmer before the standards & prohibitions can be enforced, the farmer is never obligated to accept a cost share offer. He or she may fix the problem using their own funds. The sole basis for enforcement is continued failure to meet standards and prohibitions. If a landowner refuses to meet the standards and prohibitions through a NON and a formal offer of cost-sharing, the case will be referred to the appropriate basin team leader at the WDNR's Southeastern Regional Office. These cases may lead to circumstances where compliance can be enforced without cost sharing and civil forfeiture penalties can be issued. All landowners and producers will be made aware of this policy and available appeals procedures through education materials, notification letters, and on-farm visits.

# NON-AGRICULTURAL PERFORMANCE STANDARDS ---

The nonagricultural performance standards for construction, post-construction, and developed urban area runoff are contained in Subchapters II and III, NR 151 of the *Wisconsin Administrative Code*. Subchapter III of NR 151 of the *Wisconsin Administrative Code* also contains the nonagricultural performance standards to transportation facility runoff, which include all roads and associated structures, as they apply to state, local, and private facility owners. The nonagricultural or urban performance standards encompass two major types of land management. The first type includes performance standards developed for areas of new development and redevelopment. This is further subdivided to include the construction phase and the post-construction (stormwater management) phase. The second type includes performance standards for developed urban areas. The LWCD, other county and municipal departments, and private developers and businesses are responsible for implementing the non-agricultural performance standards. The LWCD will provide regulatory and technical assistance as described in this section and in the related work plan goals and objectives.

## CONSTRUCTION SITE EROSION CONTROL

Research shows that, on a per-acre basis, erosion and sediment delivery from construction sites is significantly higher than from cropland. The construction site erosion control standards apply to construction sites where land disturbing activities affect one or more acres of land. This threshold is consistent with the timing and applicability of federal Phase 2 Storm Water Regulations. The standard does not apply to transportation facility sites.

The performance standard requires the installation of best management practices designed to limit sediments and other pollutants from runoff entering waters of the State or separate storm sewers connecting to waters of the State, including:

- Controlling sediment carried in runoff to reduce the annual average sediment load by 80 percent, as compared to no sediment controls,<sup>32</sup> unless a lower level of control is justified in certain instances.
- Minimize tracking of sediment from the construction site onto roads and other paved surfaces.
- Ensure proper use, storage and disposal of chemicals, cement and other compounds used on the site.
- Minimize the discharge of sediment as part of construction site de-watering.
- Sediment cleanup
- Storm sewer inlet protection

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<sup>32</sup> Achieving this standard is estimated by the Wisconsin Department of Natural Resources to result in an average phosphorus load reduction of 60 percent.

The standard also provides for incorporating the findings of detailed stormwater management plans, which may indicate the need for additional levels of control.

### **STORMWATER MANAGEMENT – DEVELOPED AND REDEVELOPED AREAS**

Once construction is complete, controlling runoff from these developed areas remains an issue. Conventional pollutants, as well as heavy metals such as zinc, cadmium, chromium, and copper are contained in the stormwater runoff from urban areas. These pollutants are often found in combination with particulates such as sediment. Additionally, oils, grease, and other hydrocarbons are contained in stormwater from urban areas. Unlike the construction phase, the best management practices for stormwater management are permanent measures, with some exemptions for sites with low levels of imperviousness or no exposed roads or parking areas. These proposed site standards may be set aside where regional facilities are in place to manage stormwater from a larger-area within the context of an approved subwatershed-level stormwater management plan.

The performance standards require that best management practices be installed or applied and maintained in accordance with a stormwater management plan to control total suspended solids and other pollutants carried in runoff from new development and redevelopment to the maximum extent practicable, including:

- Reducing the average annual sediment load by 80 percent for a given area or development, compared to a site that had no stormwater management practices. This is intended to have the effect of reducing phosphorus and heavy metals by approximately 50 percent.
- Maintaining or lowering the existing pre-development peak runoff rates for the two-year, 24-hour storm event.
- Infiltrating a portion of runoff from a rainfall event, taking into account land use (residential or commercial) and geologic conditions (soil type and depth to groundwater).

Additional provisions are also required in riparian areas and at gas stations and vehicle maintenance facilities. In riparian areas, sufficient vegetative cover must be maintained to provide bank stability, filtering of pollutants from upslope overland flow areas, and protecting habitat for fish and wildlife. However, this provision does not apply to redevelopment sites, boat landings, bridges, and other transportation related structures. Gas stations and vehicle maintenance facilities must control petroleum products in runoff using an oil and grease separator or an equivalent practice.

### **STORMWATER MANAGEMENT - DEVELOPED URBAN AREAS**

The performance standard for developed urban areas requires permitted municipalities to develop a stormwater management plan, including any necessary ordinance adoption and administration to control contaminants. This standard is divided up into two stages. Stage one, which was to be implemented by March 10, 2008, included the following:



- Educating the public and municipal management regarding leaf management and collection.
- Educating the public on the proper use of lawn and garden fertilizers, pesticides, and herbicides, managing pet wastes, and the ramifications associated with dumping oil and chemicals into storm sewers.
- Following a consistent program for municipal street sweeping, annual catch basin clean out, and also managing the amount of deicer applied to streets and parking areas.
- Ensuring proper use of fertilizers, herbicides, and pesticides on municipal lawn areas based on soil test results.
- Detecting illicit wastewater discharge to streams and storm sewer systems and elimination of that discharge.

If this stage is effectively accomplished, it is expected that this could reduce the average amount of sediment by about 20 percent, and phosphorus and heavy metals by approximately 10 percent.

The second stage, to be implemented by March 10, 2013, involves the progressive use of a combination of high-efficiency street sweeping and/or structural best management practice retrofitted to serve existing areas. This would be expected to reduce the sediment by about 40 percent and the phosphorus and heavy metals by about 20 percent.

## **EXISTING PROGRAMS USED TO HELP IMPLEMENT THE PERFORMANCE STANDARDS**

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Following is a discussion of existing programs, regulations and proposed performance standards and how they will be used to address urban and rural resource management concerns. While the LWCD remains committed to using all applicable federal, state, and local voluntary and incentive-based conservation programs, future efforts will also involve state and local regulations.

Although specific roles vary depending on the program, getting conservation "on the land" has always been a cooperative effort between the LWCD, NRCS and other federal, state, and local agency staff. Lead administrative responsibilities are generally assigned to the LWCD for programs with state or local origins and to NRCS staff for federal programs. A cooperative agreement exists between the local NRCS office and the LWCD, which helps to ensure that federal programs are used to achieve local priorities to the maximum extent possible.

The following describes each of these programs and explains how, over the next several years, they can be used to implement LWRM plan objectives.

### **CONSERVATION RESERVE PROGRAM - CRP (FEDERAL)**

During a general sign up, this program removes environmentally sensitive land from agricultural production for a 10-15 year period and in return producers are compensated with cost sharing to establish a perennial vegetation cover on the land in addition to receiving an annual rental payment. Producers are required to follow annual maintenance practices to maintain the eligible cover for the full length of the contract period. The Farm Service Agency (FSA) administers the

program and NRCS assists with eligibility determinations and conservation plan development. A continuous sign up is also available specifically for riparian buffers and grassed waterways.

#### **ENVIRONMENTAL QUALITY INCENTIVE PROGRAM - EQIP (FEDERAL)**

This cost share program replaced the former Annual Conservation Program/Long Term Agreement in 1997. These funds are available for Conservation Practices similar to those listed previously under ATCP 50. LWCD and NRCS staff will continue to provide technical assistance based on local priority efforts explained earlier.

#### **USDA CONSERVATION CROSS COMPLIANCE (FEDERAL)**

In order to maintain eligibility for all USDA program benefits, all producers who participate in such programs are required to follow a conservation plan on all Highly Erodible Land (HEL). Producers visit the FSA for initial paperwork to make necessary referrals for determinations and plan development with the NRCS office. NRCS/LWCD staff determines what land is HEL and then develops a conservation plan. The FSA maintains the records and ultimately determines compliance. Failure by a producer to follow a conservation plan may result in payment reductions and or ineligibility for all USDA program benefits. Five percent of these plans are spot checked annually.

#### **USDA WETLAND RESERVE PROGRAM - WRP (FEDERAL)**

The Wetlands Reserve Program helps landowners restore wetlands on their property. Through WRP, landowners may sell a permanent or 30-year easement or enter into a restoration cost share agreement lasting 10 years. USDA pays 100% restoration costs for permanent easements and 75% for 30-year easements and 10-year restoration agreements.

#### **FARMLAND PRESERVATION PROGRAM -FPP (STATE)**

This program provides tax credits to landowners who are willing to keep their land in agricultural uses and are willing to meet soil and water conservation standards that mirror the agricultural performance standards. LWCD staff provides technical assistance for conservation plan development and is required to spot check 20% of the participants each year to monitor compliance. There are currently 160 participants covering 20,126 acres in this program.

This program has been recently reformed as the Working Lands Initiative (WLI) which will require the County to develop and adopt a new Farmland Preservation Plan.

#### **SOIL AND WATER RESOURCE MANAGEMENT PROGRAM (STATE)**

The Wisconsin Department of Agriculture, Trade and Consumer Protection administers the Soil and Water Resource Management (SWRM) grant program that supports locally-led conservation efforts. DATCP awards annual grants primarily to counties to pay for conservation staff and provide landowner cost-sharing to implement the goals of Land and Water Resource Management Plan. ATCP 50 specifies how the SWRM grant funds be administered by DATCP and utilized by Washington County LWCD.

### **TARGETED RESOURCE MANAGEMENT PROGRAM (STATE)**

The Priority Watershed Program (PWP) has been replaced with the Targeted Resource Management (TRM) program. TRM grants focus on small areas, perhaps even individual problem sites, are short in duration (1 to 4 years) and only provide cost sharing dollars. The costs for administration will be covered primarily by County funds and to a lesser degree, by annual grants from the DATCP. The LWCD will use TRM grants as a means of accelerating performance standard implementation. These projects will be coordinated with regional WDNR staff and whenever possible, with neighboring counties sharing the same watershed.

### **COUNTY TREE PROGRAM (LOCAL)**

Since 1993, the LWCD has sponsored an annual tree sale, in cooperation with the County Park staff. The purpose of the program is to encourage area residents to plant native trees, shrubs and prairies by offering an inexpensive source of planting stock. The tree program is used as a vehicle to promote conservation by offering such additional items as private well and lawn testing kits, no/low phosphorus fertilizer information, bird, bat, and butterfly houses, compost bins and rain barrels.

### **LAKE DISTRICTS/ASSOCIATIONS (LOCAL)**

The LCC has developed “Working Agreements” with several lake districts in the county. Through these agreements, the LWCD offers program planning guidance and technical assistance aimed to control nonpoint sources of water pollution in the watersheds of those lakes. Some lake districts also budget funds to help pay for conservation practices. These close-working relationships will continue.

### **STEWARDSHIP INCENTIVE PROGRAM (LOCAL)**

The Stewardship Incentive Program (SIP) was created by the LCC in 2002 whereas the funding is provided through the proceeds of the annual LWCD Native Tree Sale Program. The purpose of the SIP is to improve land and water resources in Washington County by offering financial support to local landowners, units of government and non-profit organizations which will encourage and enable them to implement soil erosion control and runoff management practices.

# LAND USE REGULATIONS

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The comprehensive zoning ordinance<sup>33</sup> represents one of the most important and significant tools available to local units of government in directing the proper use of lands. Local zoning regulations include general, or comprehensive, zoning regulations and special-purpose regulations governing floodplain and shoreland areas. General zoning regulations may be adopted as a single ordinance or as separate ordinances; they may or may not be contained within a single document. Any analysis of locally proposed land use must take into consideration the provision of both general and special-purpose zoning. In Washington County, general zoning is administered at the municipal level. County zoning oversight is limited to shoreland, wetland and floodplain districts. The ordinances that are administered by the local units of government in Washington County are summarized in Table 26, and described further below.

## **GENERAL ZONING**

In Washington County, general zoning is in effect in the unincorporated areas of the County, which includes all of the Towns in the County. Each city, town and village in Washington County has adopted and enforces its own zoning ordinance. In towns, town zoning applies in all areas of the town except the shoreland area. The County enforces shoreland and floodplain zoning regulations in shoreland areas in the towns. The Washington County land division ordinance regulates land divisions in towns that initially or by subsequent divisions create five or more lots of five acres each or less in area within a five-year period. In addition, the Washington County shoreland and floodplain zoning ordinance includes land division regulations for areas located in the shoreland district. Washington County also has authority under Section 236.10 of the *Statutes* to review and approve all subdivisions located in unincorporated portions of the County. All cities and villages in the County have adopted a land division ordinance, and all of the towns except the Town of Germantown have adopted a land division ordinance.

## **FLOODPLAIN ZONING**

Section 87.30 of the *Wisconsin Statutes* requires that cities, villages, and counties, with respect to their unincorporated areas, adopt floodplain zoning to preserve the floodwater conveyance and storage capacity of the floodplain areas and to prevent the location of new flood damage-prone development in flood hazard areas.

The required regulations govern filling and development within the 100-year floodway and flood fringe. The floodway is that portion of the floodplain required to convey the 100-year recurrence peak flood flow, whereas the flood fringe is that portion of the floodplain located outside of the floodway that would be covered by floodwater during the 100-year recurrence flood.

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<sup>33</sup> Ordinance information is found at <http://www.co.washington.wi.us>

The County Shoreland and Floodplain Zoning Ordinance applies in all of the unincorporated areas of the Towns in Washington County. The incorporated Cities and Villages have all adopted floodplain zoning ordinances.

### **SHORELAND AND SHORELAND-WETLAND ZONING**

Under Section 59.971 of the *Wisconsin Statutes*, counties in Wisconsin are required to adopt zoning regulations within shoreland areas (lands that are within 1,000 feet of a navigable lake, pond, or flowage, or 300 feet of a navigable stream) within their unincorporated areas. Counties must also place all wetlands five acres or larger and within the statutory shoreland zoning jurisdiction area into a wetland conservancy zoning district to ensure their preservation after completion of appropriate wetland inventories by the WDNR.

In 1982, the State Legislature extended shoreland-wetland zoning requirements to cities and villages in Wisconsin. County shoreland-wetland zoning ordinances are in effect in all unincorporated areas of Washington County. The incorporated Villages of Kewaskum and Germantown, and City of West Bend, have adopted their own shoreland-wetland zoning ordinances.

### **SUBDIVISION REGULATIONS**

Chapter 236 of the *Wisconsin Statutes* requires the preparation of a subdivision plat whenever five or more lots of 1.5 acres or less in area are created either at one time or by successive divisions within a period of five years. The *Statutes* set forth requirements for surveying lots and streets, for plat review and approval by State and local agencies, and for recording approved plats. Each of the incorporated communities in Washington County has adopted its own subdivision control ordinance.

### **CONSTRUCTION SITE EROSION CONTROL**

Section 62.23 of the *Wisconsin Statutes* grants authority to cities and villages in Wisconsin to adopt ordinances for the prevention of erosion from construction sites and the management of stormwater runoff from lands within their jurisdiction. During 1997, Washington County prepared a model stormwater and construction erosion control ordinance for adoption by the Towns. A construction site erosion control and stormwater management ordinance is in effect for all of the unincorporated areas, and has been adopted and is in effect for all incorporated municipalities within the County. The County maintains oversight of land development activities, including stormwater management and construction site erosion control, in all unincorporated areas of the County where a similar ordinance has not been adopted.

**Table 26:  
LAND USE REGULATIONS RELATED TO NATURAL RESOURCE ISSUES**

Community	Type of Ordinance				
	Zoning/ Ordinance	County Floodplain Zoning	County Shoreland or Shoreland/ Wetland Zoning	Subdivision Control	Construction Site Erosion Control
<b>Cities</b>					
Hartford (portion)	Own	Own	None	Own	Own
West Bend	Own	Own	Own	Own	Own
<b>Villages</b>					
Germantown	Own	Own	Own	Own	Own
Jackson	Own	Own	NA <sup>a</sup>	Own	Own
Kewaskum (portion)	Own	Own	Own	Own	Own
Newburg (portion)	Own	Own	NA <sup>a</sup>	Own	Own
Richfield	Own	Own	Own	Own	Own
Slinger	Own	Own	None	Own	Own <sup>b</sup>
<b>Township</b>					
Addison	Own	County	County	County	Own
Barton	Own	County	County	County	County
Erin	Own	County	County	County	County
Farmington	Own	County	County	County	Own <sup>c</sup>
Germantown	Own	County	County	County	County
Hartford	Own	County	County	County	County
Jackson	Own	County	County	County	Own
Kewaskum	Own	County	County	County	Own
Polk	Own	County	County	County	Own <sup>c</sup>
Trenton	Own	County	County	County	Own <sup>c</sup>
Wayne	Own	County	County	County	Own
West Bend	Own	County	County	County	Own
<b>Washington County</b>	None	County	County	County	County

<sup>a</sup>Information is not available at this time.

<sup>b</sup>Provisions included within the Water Quality Protection performance standards.

<sup>c</sup>Washington County administers ordinance for the Community

Source: SEWRPC and Washington County

## STATE AND LOCAL REGULATIONS

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The LWCD will enforce local ordinances<sup>34</sup> and assist the WDNR in seeking compliance with State regulations. The County will revise ordinances in order to keep current with technical standards and new state laws. Below is a description of current regulations involving the LWCD.

### **WDNR ANIMAL WASTE RULE NR-243**

The WDNR must investigate complaints and determine if an operation is causing a “significant” water quality problem. If so, the WDNR issues a Notice of Discharge (NOD) which requires landowners to adopt animal waste management practices. At the landowner’s request, the LWCD recommends solutions to the problem and will design and supervise the installation of practices. Cost sharing will be administered by WDNR.

Interim Southeast Region WDNR policy is to conduct investigations in a more proactive and systematic manner, focusing primarily on the four manure management prohibitions. WDNR staff prioritizes their efforts according to the following:

1. Incidents that imminently threaten human and/or aquatic health.
2. New or expanding confined animal operations of 1,000 animal units or greater are to be issued Wisconsin Pollutant Discharge Elimination System (WPDES) permits.
3. Targeted facilities violating one or more of the four prohibitions in the vicinity of 303(d) waters or exceptional and outstanding resources are to be issued Notices of Discharge.
4. Public complaint response.

Washington County will continue to cooperate with the WDNR on implementing clean-up measures for NOD sites. A cooperative agreement with Southeast Region WDNR (informal at the present) establishes the guidelines to be used for NR 243 as the backup enforcement tool to address operations falling under the third scenario if/when county efforts have failed to gain cooperation.

### **FARMLAND PRESERVATION PROGRAM (FPP) CONSERVATION COMPLIANCE (CHAPTER 15)**

Originally adopted by the County Board on August 12, 1986, Chapter 15 of the County Code states that all landowners receiving a tax credit through this program must maintain certain soil and water conservation standards. Those standards require that:

- Sheet and rill erosion on all participating croplands shall be controlled to “T” value;
- Gully erosion shall be controlled on all participating lands; and,

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<sup>34</sup> Ordinances are found at <http://www.co.washington.wi.us/lcd>

- Conservation practices used to meet soil erosion control standards shall be consistent with the standards found in the *Natural Resources Conservation Service Field Office Technical Guide*;
- Farms participating in the FPP program are subject to Agricultural Performance Standards and Prohibitions.

#### **ANIMAL WASTE STORAGE ORDINANCE (CHAPTER 16)**

This county ordinance became effective on January 1, 1991. It is designed to prevent water pollution by requiring all new or substantially altered manure storage facilities be designed and built to technical standards and specification. A producer is required to obtain a permit for construction and allow LWCD inspection. A 2006 revision of this county ordinance required permits for the proper abandonment of manure storage facilities that are no longer intended to be utilized.

#### **EROSION CONTROL & STORMWATER MANAGEMENT ORDINANCE (CHAPTER 17)**

This code became effective January 1, 1998. It requires development activities to meet stormwater management and erosion control standards. Chapter 17 replaced similar provisions that existed in the County Land Division Ordinance (Chapter 24) since 1978. By meeting the requirements of Chapter 17, the non-agricultural performance standards would also be met.

Washington County amended the ordinance in 2008 to include additional infiltration requirements of initial runoff from developed sites. Local municipalities will be requested to amend their ordinance to match the county model for consistent code language throughout the county.

#### **NONMETALLIC MINING ORDINANCE (CHAPTER 18)**

The Nonmetallic Mining Reclamation Ordinance, (Chapter 18), was adopted by the Washington County Board of Supervisors in June of 2001. Washington County amended the ordinance in 2007 to include removal of “start up” language, changes to the annual reporting/fee collection, and a few definition additions/modifications. The LWCD is the permitting agent for the county. The ordinance requires that all nonmetallic mining operations have a permit. The permit requires submittal and approval of a reclamation plan, and also requires a financial assurance be placed for the reclamation in the event of closure.



## *Chapter VI*

# **INFORMATION & EDUCATION STRATEGY**

One of the guiding principles in developing this Land and Water Resource Management Plan was that education and outreach must be a component of each objective. As one of the fastest growing counties in the state, it is important that Washington County residents understand land and water resources, how they are managed in the County, and the issues affecting them. An educated populace is clearly a key to the future management of our resources, and therefore, education must remain a priority.

## **BENEFITS OF AN EDUCATION PROGRAM** ---

The overall goal of the education program is to develop knowledgeable citizens who can participate in public discussion and debate about environmental issues. With a basic understanding of natural resources, residents can respond intelligently to issues such as the need for nutrient management and storm water facilities, the dangers associated with leaking contaminants, and the benefits of invasive species management and habitat restoration. Education improves the public's ability to examine and evaluate practices. Non-regulatory approaches require that the populace identify appropriate actions to take, and those actions will be taken when they are understood and supported. Through education, individuals can form their own opinions based on factual data and information, and rely less on emotion or rhetoric.

For these reasons, there is a need for a comprehensive education and public involvement program that supports each component of the Washington County Land and Water Resource Management Plan. A wide array of educational methods and products will be utilized, as some residents and some issues are best approached from one set of choices, while with a different need, another approach may be more successful. Education is most effective when the information is provided consistently and continually.

Given the inter-relatedness of the resource programs (nutrient planning, development, runoff pollution, etc.) it is advantageous to coordinate education with public involvement. This will provide for efficiencies in education development and delivery.

# **CURRENT PROGRAMMING**

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## **INFORMATION & EDUCATION**

The Land and Water Conservation Division (LWCD) is committed to providing natural resource education to the public as well as assisting the environmental education efforts of youth educators and other organizations throughout the county. Numerous public relations opportunities, both formal and informal, are provided to the county community each year.

## **LENDING RESOURCE LIBRARY**

An environmental resource library has been established and is stocked with curriculum material for all age levels. Materials are updated and expanded as needed and include videos, models, interactive electronic compact discs, traveling trunks, stenciling kits, etc. The library is open during regular office hours or by appointment and all material is available for check out. This resource has proven invaluable to youth leaders and community members.

## **WEBSITE**

In 2002, a website was developed for the LWCD providing increased public accessibility to our programs. Program details and updates are easily viewed and our printed outreach material encourages public use of the website resource. We continue to develop our electronic mail (email) database to provide pertinent and current information to target audiences.

## **CONSERVATION NEWSLETTER**

In 2006, the *Conservation News* was merged with the *Planning & Parks Department Newsletter* which is published bi-annually and covers a wide range of topics. With a targeted mailing audience of 3,550, the newsletter has been well received and offers landowners, civic leaders, teachers, etc. a consolidated platform for current environmental issues and upcoming events. Past issues have featured successful environmental practices involving individuals and groups. Our newsletter is also available electronically on our website in an effort to reach a larger audience as well as to accommodate the current trend to reduce paper documents. We do not currently have the capability to track the number of individuals who view our electronic newsletter.

## **STAFF PRESENTATIONS AND GUEST LECTURES**

LWCD staff members routinely receive requests to speak on a variety of natural resource conservation issues. A portfolio of presentations has been developed and updated regularly to provide the public with the most current information. Presentations continue to be developed as new natural resource concerns and issues arise.

In 2009 the LWCD partnered with Riveredge Nature Center and Lac Lawrann Conservancy to host an adult environmental lecture series. The lectures are held in the Public Agency Center and a minimum of eight lectures are offered annually to the public concerning various natural resource protection topics.

### **NUTRIENT MANAGEMENT**

Wisconsin nutrient management rules require producers to follow a certified nutrient management plan. The LWCD initiated an active role in nutrient management planning in 2003 and the educational approach involved hosting an annual *Nutrient Management Farmer Education Program Curriculum* developed by the University of Wisconsin and UW-Madison College of Agricultural and Life Sciences.

The curriculum focuses on soil testing, soil nutrients and manure management. It is designed to enable and encourage producers to write customized management plans. This program has been expanded to include the opportunity for producers who wish to update, revise or develop their nutrient management plans through an annual nutrient management workshop.

### **YOUTH PROGRAMS**

LWCD staff assists with several programs designed for youth education including the Conservation Poster Contest, Conservation Summer Camp, Rural Conservation Tour, Storm Drain Stenciling, and Agricultural Day on the Farm.

### **OTHER**

In addition to the routine education components, we will continue to use target mailings, cable television, local newspaper, radio, workshops, field days, tours, demonstration projects, the County Fair, and presence at community events as education and outreach tools. New technology such as online video and electronic mail list-serves are currently being developed as educational outreach resources.

Educational efforts will need to focus on a number of areas to meet Plan objectives.

These include:

- Comprehensive planning and preservation practices
- Alternative agricultural practices
- Proper fertilizer and pesticide use
- Stormwater management
- Animal waste management
- Groundwater quality and quantity
- Soil sustainability and sedimentation
- Invasive species management
- Natural landscaping

- Hazardous waste reduction
- Natural Area Preservation
- Farmland Preservation

As in the past, these educational efforts will be developed collaboratively with other County Departments and cooperating agencies (i.e., nature centers, land trusts, lake organizations, Natural Resources Conservation Service, University of Wisconsin Extension, Wisconsin Department of Natural Resources, Southeastern Wisconsin Invasive Species Consortium, etc.).

## *Chapter VII*

# **ISSUES, GOALS and ACTIONS**

## **INTRODUCTION**

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As discussed in Chapter I, the Land Conservation Committee and the Citizen's Advisory Committee adopted a comprehensive approach for local citizens and officials to identify issues, goals and objectives related to County land and water resources. This process led to the identification of eight priority issues: Development, Fertilizer and Pesticides, Stormwater, Animal Waste, Groundwater, Soil Sustainability and Sedimentation, Nonmetallic Mining and Waste Management.

A discussion of these issues as they relate to the County's natural resources is followed by a work plan. The work plan sets forth the objectives and actions that will be carried out in order to achieve the goals associated with each issue.

A key element of the work plan is the identification of the party or organization responsible for carrying out the listed action steps. Although the Land and Water Conservation Division (LWCD) is the primary entity responsible for the County Land and Water Resource Management (LWRM) plan, its overall success relies heavily on continued cooperation with many local, state and federal agency partners. The adoption of this plan by the County Board and approval by the Wisconsin Land and Water Conservation Board (WLWCB) shall serve as a directive for continued cooperation and for each to fulfill their respective roles and responsibilities as defined in this chapter.

## DEVELOPMENT

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Between 1970 and 2009, the County population doubled from 63,839 to 131,066 residents. The land devoted to urban uses increased 98.8 percent, from 24,611 acres<sup>35</sup> in 1970 to 48,936 acres<sup>36</sup> in 2000. Based on a generalized 2006 inventory, 71,463 acres, or about 26 percent of the County, were in urban uses. Rapid and poorly planned development was identified as the leading threat to the natural resource base. Sedimentation from construction site erosion, stormwater runoff and concentrated uses of fertilizers and pesticides are examples of direct impacts to water quality.

Development has also led to the loss of wetlands, contributing to a host of problems including decreased flood storage area, reduced filtering of runoff and loss of habitat for native plants and animals. Ecological services such as groundwater discharge and recharge areas have also diminished as draining and filling has destroyed over half of our local wetland plant communities. New regulations have prevented or slowed the loss of wetlands, however, consistent enforcement is not exercised.

Indirect consequences of development also negatively affect the agricultural community. Urban sprawl and rural subdivision have led to increased property taxes, nuisance complaints by non-farm neighbors, and loss of farmland. Magnified by the current economic struggles facing farmers, these circumstances make it increasingly difficult for farmers to commit time and money to merely continue farming, much less to adopt needed conservation practices.

Sustainable population and development patterns and practices, balanced with private property rights, are vitally important considerations that must be addressed to protect Washington County's natural resources. Key to successful implementation will be creating a positive and cooperative partnership between Washington County and all county local governments.

***Goal: Improve and implement planning strategies that protect and preserve land and water resources***

<sup>35</sup> SEWRPC 1992, *A Regional Land Use Plan for Southeastern Wisconsin 2010*. Urban lands include residential; commercial; industrial; transportation, communication and utility; governmental and institutional; and recreational land uses and unused urban lands.

<sup>36</sup> SEWRPC 2006, *A Regional Land Use Plan for Southeastern Wisconsin 2035*. As part of the regional land use inventory for the year 2000, the delineation of existing land use was referenced to real property boundary information not available for prior inventories. This change increases the precision of the land use inventory and makes it more useable to public agencies and private interests throughout the Region. As a result of the change, however, year 2000 land use inventory data are not strictly comparable with data from the 1990 and prior inventories.

## FERTILIZERS AND PESTICIDES

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Fertilizers and pesticides have proven to increase crop production and aid in landscape maintenance. However, overuse or misapplication can lead to serious water quality problems. These substances can contaminate streams and lakes, alter the aesthetic beauty and interfere with recreational use. Nearly half of the county is actively farmed and runoff containing agricultural fertilizer remains a concern, however, on a per acre basis, the overuse of fertilizer in urban areas is more of a potential detriment to water quality.

In an effort to remove urban source phosphorus from the runoff flowing into our waters, Wisconsin Legislature established a ban on the use of phosphorus compounds in lawn fertilizer effective April 1, 2010, and the use of phosphorus in dishwasher soaps is expected to be banned by July 2010. Nutrients such as phosphorus are degrading 90% of Wisconsin's inland lakes, causing algae blooms, fish kills, and declining water quality. This process is known as eutrophication and, as indicated in Table 22; many County lakes have experienced eutrophication as a result of excessive phosphorus runoff.

Nitrogen may lead to decreased oxygen in certain waterbodies, and in high concentration in its ammonia form, is toxic to aquatic life. Nitrogen is also a concern as a groundwater pollutant. Another consequence of excessive nitrogen in surface water is a phenomenon known as hypoxia.

Monitoring efforts have revealed the presence of nutrients and pesticides in both urban and rural runoff. Remediation is costly and difficult, if not impossible. Proper fertilizer and pesticide use, in conjunction with preventing runoff, is one of the goals necessary to protect our growing County's water resources.

***Goal: Improve and protect surface and groundwater through the proper use of fertilizers and pesticides***

## STORMWATER

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Stormwater runoff can have significant impacts on land and water resources. Due to increased impervious surfaces such as roads, parking lots and rooftops, the volume and intensity of stormwater runoff has the potential to increase downstream erosion and flooding.

Thermal pollution is another concern regarding urban development which is often overlooked. Thermal pollution results when stormwater flows over heated impervious surfaces before entering into a stream. As a result, water temperatures rise and oxygen is depleted because warm water cannot hold as much oxygen as cold water. Any increase in the level of thermal and oxygen stress, can lead to decreased growth, reproduction, or death of the aquatic organisms.

Additionally, urban areas generate a variety of nonpoint pollutants including sediment, heavy metals, lawn pesticides, and organic waste (lawn clippings, leaves, and waste from pets and urban wildlife). Toxic particulates from industrial and automotive exhaust are also problematic. Cumulatively, these pollutants pose serious threats to water quality and, in turn, to human and animal health as certain toxic pollutants work their way through the food chain.

By promoting infiltration standards and properly designed and engineered stormwater facilities that minimize the release of discharge, the negative consequences of stormwater runoff can be minimized. Furthermore, utilization of innovative technologies can maximize improvement of post-development groundwater recharge.

The costs associated with managing stormwater and clean up of urban nonpoint pollution are considerable. However, the potential benefits from these investments are high in terms of preventing future remediation costs and providing cleaner, more livable neighborhoods and waterways. Proper planning, management and design can reduce erosion and flooding, and protect water quality in Washington County.

***Goal: Reduce the quantity and improve the quality of stormwater runoff from developed and developing areas***



## ANIMAL WASTE

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According to the 2008 Census of Agriculture, Washington County was home to 35,500 cattle and calves and 1,500 hogs and pigs. These animals produce as much waste as a city of approximately 650,000 people. This manure can be a valuable and economical source of fertilizer, however, if improperly managed, it can adversely impact water quality and aquatic life.

Significantly lowered oxygen levels occur as a direct result of the decomposition of animal wastes in streams and lakes. Furthermore, animal waste contains high concentrations of phosphorus and nitrogen. When added to the ecosystem, they create conditions favorable for the occurrence of eutrophication, thereby inducing similar problems are caused by commercial fertilizer runoff. Bacteria (e.g. fecal coliform) and ammonia (a toxic form of nitrogen) are also associated with raw waste. Both are harmful, and in extreme cases, fatal, to both animals and humans.

The major sources of manure runoff in the county are from Animal Feeding Operations (AFOs), improper storage and field spreading practices, and stream pasturing. The Wisconsin Priority Watershed Program has been highly successful in certain areas of the county, but manure management practices must be implemented by all livestock farms in the county.

**Goal:** *Reduce the human and environmental risks posed by animal waste*

## GROUNDWATER

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All Washington County residents rely on groundwater as their source for drinking water. Although local groundwater quality is generally good, isolated problems do exist. Improper application of fertilizers, animal wastes, and poorly maintained private sewage systems can cause groundwater contamination. Leaking underground storage tanks and spills can cause volatile organic compounds and other chemicals to show up in drinking water supplies. As shown on Map 13, the vulnerability of groundwater to contamination is a concern throughout the County.

The lakes in Washington County are, in part, spring or seepage fed, meaning they rely on mineral-rich groundwater to maintain their base levels. In addition, many of the surface streams in the County, particularly coldwater streams, occur as a result of overflow from groundwater-fed kettles or are dependent upon groundwater recharge to retain base flow and quality characteristics. The maintenance of groundwater quality and quantity is an important consideration for our surface water health.

Groundwater flows are seriously threatened in areas where high-density residential and commercial developments have vastly diminished groundwater recharge. Since it is impossible to eliminate a pollutant once it has come in contact with groundwater, or to reverse development, education, planning and prevention are vitally important. Public awareness of potential threats as well as preventative measures is critical for groundwater protection and improvement.

***Goal: Protect and improve the quality and quantity of groundwater***

## SOIL SUSTAINABILITY AND SEDIMENTATION ---

Soil sustainability refers to maintaining the health and productivity of cropland for future generations. In Washington County, the maximum rate at which soil may erode, yet still remain productive, ranges from 2 to 5 tons/acre/year, depending on soil type. This is referred to as the tolerable soil loss rate, or “T”. Sedimentation is pollution resulting from the deposition of solid particles into surface water. Sediment is the major pollutant in local streams and lakes. While suspended, sediment causes water to be turbid, or cloudy, making it difficult for fish and other aquatic life to feed and breathe. As sediment settles in lake and stream bottoms, it blankets habitat and spawning beds required by fish and other aquatic species. It also creates undesirable conditions for leisure activities such as wading and swimming.

Due to the vast number of acres, cropland is the single largest source of sediment. However, acre for acre, construction sites can erode up to ten times greater and typically have a much more efficient delivery system to a water body. Therefore, controlling erosion from both agricultural and construction site sources is equally important for water resource management planning.

Transect survey results indicate that 91% of all cropland within the County is eroding at or below tolerable soil loss rates. This suggests that past local, state, and federal conservation program efforts have been successful in helping farmers manage soil erosion. Efforts will need to continue to control erosion on the remaining 9%. This has become increasingly difficult as landowners are growing more cash crops and less hay. Since cash crops are prone to greater erosion, an increase in education and the application of Best Management Practices (BMPs) such as conservation tillage and contour farming will be needed.

The second part of the soil sustainability issue deals with soil quality, including such aspects as organic matter content, compaction, and balanced nutrient content. There are a number of benefits that result from healthy soils:

- Better soil structure, which leads to greater water infiltration, moisture retention, and less erosion
- More efficient cycling of nutrients, higher organic matter, and increased microbial activity
- Lower pesticide use due to lack of weed pressure
- Healthier and more nutritionally balanced crops

These characteristics of healthy soil not only lead to better crop production, but also to better water quality and management.

*Goal: Protect and enhance the productivity and sustainability of all cropland and reduce sediment delivery into streams, lakes and wetlands*

## NONMETALLIC MINING

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Since June 2001, Washington County has implemented a Nonmetallic Mining Reclamation Ordinance; Chapter 18 of the Washington County Code. This policy is intended to achieve approved post-mining land uses, resulting in environmental protection, stable non-eroding sites, productive end land uses and potentially enhance habitat and increase land values and tax revenues.

The ordinance requires a permit for all nonmetallic mining operations. The permit entails submittal and approval of a reclamation plan, and also requires a financial assurance be placed with the county for the reclamation in the event of closure. Lands, once reclaimed, must conform to local land use plans and local zoning.

*Goal: Assure reclamation of mines when operations are terminated*

## WASTE MANAGEMENT

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Waste materials, including pharmaceuticals, hazardous substances, tires, and electronic goods are potential sources of pollutants to the land and water resources of Washington County. Improper disposal of these wastes into landfills, roadside ditches and waterbodies is a concern of our generation as well as future generations.

Working with our partners, the LWCD organizes and hosts county-wide “Clean Sweep” waste collections. The program facilitates safe and convenient disposal of acceptable waste products through licensed, state-approved organizations.

*Goal: Reduce the human and environmental risks posed by hazardous waste*

# LAND & WATER RESOURCE MANAGEMENT WORK PLAN (2011–2015)

*Notes: All goals are of equal priority. Objectives under each goal were assigned a rank of High or Medium by the Citizen’s Advisory Committee. Status of planned actions are listed as ongoing, as the opportunity arises (AOA), or scheduled for completion during a specific year. The leadership role is assumed to be the LWCD for each action step, unless another entity is indicated first as providing the lead role. Agency acronyms listed on page i.*

## **DEVELOPMENT ISSUES & PLANNED ACTIONS**

*GOAL: Improve and implement planning strategies that protect and preserve land and water resources*

WORK PLAN OBJECTIVES	PLANNED ACTION & OUTCOMES	STATUS OF PLANNED ACTIONS	AGENCY
1. Preserve and restore stream corridor, lake shoreland, wetland and floodplain areas. <i>Rank = High</i>	Assist and advise the Planning Division with amendments to the Comprehensive Plan regarding the management and preservation of wetland and floodplain areas.	ONGOING	PD, LWCD
	Assist with the identification of stream corridor and floodplain areas to be preserved and/or restored.	AOA	PD, LWCD, SEWRPC, RO, SWWT
	Develop and maintain a Wetland Restoration Inventory (inventory development completed by 12/2011). Annually assess a minimum of 2 sites to determine landscape functions.	ONGOING	LWCD, UFSWS, WDNR, NRCS, DU
	Work with partners interested in providing identification of watershed and wetland boundaries.	AOA	LWCD, LO, LT
	Promote BMP programs and conservation easements through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	ONGOING	LWCD, NRCS, WDNR, LT, MMSD, RO, SWWT
2. Protect and maintain woodlands, environmental corridors, exceptional water resources, unique geological areas resulting in the protection of threatened and endangered species. <i>Rank = High</i>	Continue to assist with amendments to the Comprehensive Plan. Specify primary and secondary environmental corridors.	ONGOING	PD, LWCD, SEWRPC
	Assist with identification, mapping, and maintenance of these areas.	ONGOING	LWCD, PD, SEWRPC, MMSD

2. <i>Continued.</i>	Identify efforts that have been successful within Washington County and throughout the region and promote those efforts through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	ONGOING	LWCD, PD, UWEX, SEWRPC, WDNR, LT, MMSD
	Participate with development and execution of a minimum of 1 regional or local field tour annually featuring environmental protection efforts and needs.	AOA	LWCD, UWEX, WDNR, LT, MMSD, SEWRPC
	Encourage municipalities and individual landowners to follow the Natural Areas and Critical Species Habitat Protection and Management Plan as well as future updates to the Plan through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	AOA	LWCD, PD, SEWRPC
	Encourage local governments to follow the Washington County Park and Open Space Plan through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	AOA	PD, LWCD
	Promote the use of state and federal set-aside and preservation programs through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	ONGOING	WDNR, LWCD, DATCP, NRCS, FSA
	Partner with organizations to monitor and improve water quality and wildlife habitat resources in our county waterbodies.	AOA	WDNR, NC, UW, UWEX, USGS, LO, LT
	Encourage residents to follow the National Wildlife Federation and US Fish & Wildlife guidelines for creating "Backyard Wildlife Habitats" through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	AOA	LWCD, NWF, USFWS
	Provide information concerning sensitive areas to landowners, land trusts and other organizations through a minimum of 1 method annually (e.g., event displays, presentations, website and newsletters, etc).	ONGOING	LWCD, PD, LUD
	3. Encourage development that can be served by established urban infrastructure and services. <i>Rank = High</i>	Encourage development within areas planned for, or currently served by, sewer systems through a minimum of 1 method annually (e.g. event displays, presentations, website, brochures, newsletters, etc.).	AOA
4. Increase the use of conservation-minded development practices. <i>Rank = High</i>	Develop and distribute informational materials through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	ONGOING	LWCD, UWEX

4. <i>Continued.</i>	Identify and promote projects that successfully implement conservation-minded practices.	AOA	LWCD, UWEX
	Promote successful practices with developers, local officials and other agencies through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	ONGOING	LWCD, PD, LUD, UWEX, MMSD, WDNR, NRCS
	Promote opportunities provided through the state Working Lands Initiative through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	ONGOING	PD, DATCP, LWCD
	Continue to work with interested developers in the planning and design phase of new developments.	AOA	LWCD, PD, LUD
5. Promote uniform adoption of wetland regulations. <i>Rank = High</i>	Maintain a dialogue for the implementation of a shared set of rules for environmental protection between incorporated and unincorporated areas.	AOA	PCPC, CO BOARD, LG, WDNR, USACE, NRCS, USFWS
	Work with and encourage municipalities to implement wetland regulations through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	AOA	LUD, LWCD, WDNR, LG, USACE
6. Preserve sufficient farmland to support a viable agricultural community, future food production needs and environmentally safe application of human and animal wastes. <i>Rank = High</i>	Assist and advise the Planning Division with amendments to the Comprehensive Plan regarding farmland preservation.	ONGOING	PD, LWCD
	Assist towns with information regarding agricultural land preservation through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	AOA	PD, LWCD, LT, DATCP, NRCS
	Continue to encourage local governments to follow the Washington County Park and Open Space Plan.	AOA	PD, LWCD
	Explore opportunities to participate in the state Working Lands Initiative including, but not limited to, Preservation of Agricultural Conservation Easement programs and Agricultural Enterprise Areas.	AOA	PD, LWCD, DATCP

6. <i>Continued.</i>	Continue to cooperate with local land trusts to seek federal and state grants to purchase easements and seek donated easements on high quality agricultural land identified in the County LESA analysis.	AOA	LWCD, LT
	Promote information on sustainable and alternative agricultural practices through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	ONGOING	TCRC&D, LWCD, UWEX, DATCP
7. Reduce overland water flow and increase infiltration from developed land. <i>Rank = High</i>	Promote increased use of infiltration basins, rain gardens, rain barrels, and other water infiltration methods through a minimum of 1 method annually (e.g., event displays, presentations, website, newsletters, etc.).	AOA	LWCD, UWEX, WDNR, MMSD, SEWRPC
	Distribute information related to successful infiltration practices through a minimum of 1 method annually (e.g., event displays, presentations, website, newsletters, etc.).	ONGOING	LWCD, UWEX, SEWRPC
8. Promote identification, control and management of invasive plant and animal species. <i>Rank = High</i>	Assist with the development and efforts of the Southeastern Wisconsin Invasive Species Consortium.	ONGOING	SEWISC, LT, LWCD, WDNR, IPAW, LO, TCRC&D
	Work with and encourage County and Municipal Departments to identify, control and manage invasive species in parks and roadways.	ONGOING	SEWISC, PD, LWCD, LO, HWY, WDNR, IPAW
	Distribute information to the public related to invasive species identification, control, and management through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	ONGOING	SEWISC, LT, LWCD, WDNR, IPAW, LO, TCRC&D
	Assist lakes organizations regarding Aquatic Invasive Species (AIS) issues.	ONGOING	LO, WDNR, LWCD, SEWISC
	Promote native species plantings by offering native tree, shrubs, and prairie plants through the annual LWCD tree and native plant sale program.	ONGOING	LWCD
	Continue participation in the WDNR Gypsy Moth Suppression Program.	ONGOING	WDNR, LWCD
9. Continue to encourage intergovernmental cooperation with urban, rural, and county representatives. <i>Rank = Medium</i>	Promote intergovernmental discussion, cooperation, and agreement regarding development issues.	ONGOING	PD, LWCD, UWEX

***Estimated 20% of Annual Division Budget***



## **FERTILIZER & PESTICIDE ISSUES & PLANNED ACTIONS** —————

*GOAL: Improve and protect surface and groundwater through the proper use of fertilizers and pesticides*

WORK PLAN OBJECTIVES	PLANNED ACTIONS & OUTCOMES	STATUS OF PLANNED ACTIONS	AGENCY
1. Assist farmers and private consultants with the development and implementation of nutrient management plans on cropland and sod farms. <i>Rank = High</i>	Host 1 certification training program annually and 1 update/revision course bi-annually.	ONGOING	LWCD, UWEX, WDNR
	Develop and implement a nutrient management database and monitoring procedure (development completed by 12/2010).	ONGOING	LWCD, WDNR
	Monitor compliance on 5% of planned acres annually.	ONGOING	LWCD, WDNR
	Provide support to private agronomists.	ONGOING	LWCD, WDNR
	Provide information and educational opportunities through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	ONGOING	LWCD, UWEX, NRCS, WDNR
2. Increase awareness of the proper use of fertilizer, pesticide and de-icers and promote natural landscaping (non-agricultural). <i>Rank = High</i>	Promote and assist with training / educational events for residential, departmental, utilities, public and private property owners and managers through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	ONGOING	LWCD, LUD, UWEX, LO
	Provide information through a minimum of 1 method annually (e.g., event displays, presentations, website, newsletters, etc.).	ONGOING	LWCD, LUD, UWEX
	Provide information regarding State phosphorus ban in fertilizer and proper lawn care through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	ONGOING	LWCD, UWEX, LUD
	Promote natural landscaping and proper use of lawn products through a minimum of 1 method annually (e.g., event displays, presentations, website, newsletters, etc.).	ONGOING	LWCD, LUD, UWEX
	Tie non-agricultural pesticide and fertilizer education to existing programs.	ONGOING	LWCD, UWEX
3. Monitor quantities and locations of sludge and septic applications. <i>Rank = Medium</i>	Continue to maintain working relationship with WDNR to obtain reports regarding location, content and amount of materials being applied in the County.	ONGOING	WDNR, LWCD

3. <i>Continued.</i>	Pending availability of funds, conduct limited soil testing for heavy metal build-up.	AOA	LWCD, WDNR
	Informally monitor sludge and septage application and look for mismanagement.	ONGOING	LWCD, WDNR

*Estimated 20% of Annual Division Budget*

## ***STORMWATER ISSUES & PLANNED ACTIONS***

*GOAL: Reduce the quantity and improve the quality of stormwater runoff from developed and developing areas*

<b>WORK PLAN OBJECTIVES</b>	<b>PLANNED ACTIONS &amp; OUTCOMES</b>	<b>STATUS OF PLANNED ACTIONS</b>	<b>AGENCY</b>
1. Expand the adoption and implementation of the county's erosion control and stormwater management ordinance or equivalent for new developments. <i>Rank = High</i>	Continue updates to Chapter 17 of the County Code to include new State and Federal standards.	AOA	LWCD
	Collaborate with all town officials regarding status of ordinance update and administration.	ONGOING	LWCD
	Meet with village and city officials to promote consistent Erosion and Stormwater Control Ordinances.	ONGOING	LWCD
	Continue to update and develop related policy and procedure forms.	AOA	LWCD
	Review development projects in which LWCD has jurisdiction for compliance, including offsite impacts to cropland. Promote more esthetically pleasing stormwater facilities through a minimum of 1 method annually (e.g., event displays, presentations, website, newsletters, etc.).	ONGOING	LWCD, LUD
	Monitor and track county-wide development to improve design and maintenance of properly engineered stormwater facilities.	ONGOING	LWCD, LUD
	Increase awareness about impacts and proper management of stormwater runoff (contractors/developers workshop every 2 years, annual environmental lectures, brochures, newsletters, etc.).	ONGOING	WDNR, LWCD, LUD, UWEX

<p>2. Ensure the long-term function and maintenance of stormwater facilities. <i>Rank = High</i></p>	Map stormwater facilities in unincorporated areas in the county GIS.	ONGOING	LWCD
	Continue routine inspection procedure whereby 20% of all facilities are checked annually. Take follow-up action as needed.	ONGOING	LWCD
	Work with local governments to develop best alternatives strategies for long term maintenance.	AOA	LWCD, LG
	Develop a Maintenance Guide for Stormwater Facilities and create a distributions system for the guide.	2013	LWCD, UWEX, WDNR
<p>3. Encourage the use of regional stormwater practices (RSP's). <i>Rank = Medium</i></p>	Promote benefits, design and maintenance of RSP's through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	AOA	LG, LWCD, LUD, WDNR
	Advise and assist the Lake Districts on plans and projects related to water quality protection and regional stormwater management, including implementation.	AOA	LWCD, LUD, SEWRPC, WDNR
	Work with local governments to identify long-term development plans and match potential sites with funding opportunities.	AOA	LWCD, LUD
<p>4. Assist local governments with the adoption of the developed urban areas performance standards. <i>Rank = Medium</i></p>	Advise and assist local governments with implementation and annual reporting of the public education components (storm drain casting, leaf litter disposal, fertilizer, pesticide and de-icer use, etc.). Promote and update "Cleanways for Waterways" Program materials.	ONGOING	LWCD, UWEX, LG, WDNR
	Continue to seek available grants that would allow the County to implement Best Management Practice demonstration projects on publically-owned lands and facilities.	AOA	LWCD, LG

***Estimated 15% of Annual Division Budget***

## ***ANIMAL WASTE ISSUES & PLANNED ACTIONS***

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*GOAL: Reduce the human and environmental risks posed by animal waste*

<b>WORK PLAN OBJECTIVES</b>	<b>PLANNED ACTIONS &amp; OUTCOMES</b>	<b>STATUS OF PLANNED ACTIONS</b>	<b>AGENCY</b>
<p>1. Continue application of the County's Manure Storage Ordinance (Chapter 16). <i>Rank = High</i></p>	Continue to provide high quality technical review and planning assistance.	AOA	LWCD
	Continue updates to Chapter 16 of the County Code to include new State and Federal standards.	AOA	LWCD, PCPC
	Continue to develop an inspection procedure and inspection schedule for manure storage facilities.	2012	LWCD
	Inspect 10% of facilities annually based on procedure; take follow-up action as needed.	ONGOING	LWCD
	Educate producers, town officials, agricultural lenders and contractors regarding ordinance requirements through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	AOA	LWCD, UWEX
<p>2. Ensure that all livestock operations have no: overflowing manure storage facilities, unconfined manure stacks within Water Quality Management Areas, direct runoff from feedlots or stored manure to water resource, and/or animals in streams where degradation of the streambank has or will likely occur. <i>Rank = High</i></p>	Continue to map existing livestock operations.	ONGOING	LWCD
	Continue to conduct on-site inventory of existing operations to determine compliance.	ONGOING	LWCD, WDNR
	Continue to develop and revise producer farm resource conservation plans which address these objectives.	ONGOING	LWCD, NRCS
	Educate producers, town officials, agricultural lenders and contractors regarding these objectives through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	AOA	LWCD, UWEX, NRCS
	Assist a minimum of 5 producers annually to implement corrective measures.	ONGOING	LWCD
	Develop a monitoring and inspection procedure that encompasses State Performance Standards.	2015	LWCD

2. <i>Continued.</i>	Promote waste-spreading BMPs that prevent runoff to water resources through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	ONGOING	LWCD, UWEX, NRCS
	Inspect 10% of operations annually and take follow-up action as needed.	2015	LWCD, WDNR
3. Assist with the planning and development of livestock expansions. <i>Rank = High</i>	Continue to provide technical assistance for expansion projects.	AOA	LWCD, NRCS

*Estimated 15% of Annual Division Budget*

## **GROUNDWATER ISSUES & PLANNED ACTIONS**

*GOAL: Protect and improve the quality and quantity of groundwater*

<b>WORK PLAN OBJECTIVES</b>	<b>PLANNED ACTIONS &amp; OUTCOMES</b>	<b>STATUS OF PLANNED ACTIONS</b>	<b>AGENCY</b>
1. Ensure a safe drinking water supply. <i>Rank = High</i>	Continue to assist with the location of sensitive (e.g., high bedrock, sandy soils) recharge areas using existing maps and groundwater hydrology models.	AOA	SEWRPC, WDNR, LWCD, GISD
	Continue to identify unused wells through farmstead inventories, subdivision reviews, and historic septic system project.	ONGOING	LWCD, GISD, LUD, WDNR, LG
	Continue to promote and provide assistance for proper well abandonment.	AOA	LWCD, HD, WDNR, LG
	Continue to promote well water testing through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.). Maintain test results in a GIS database that will be used to compose a county-wide groundwater quality report.	ONGOING	LWCD, WEAL, UWEX, HD, LUD, WDNR
	Continue to develop and revise producer whole farm resource conservation plans that include these objectives.	ONGOING	LWCD, NRCS
	Raise awareness about levels of nitrates, volatile organic compounds (VOCs) and other well contaminates through a minimum of 1 method annually (e.g., event displays, presentations, website, newsletters, etc.).	ONGOING	LWCD, WDNR, HD, UWEX, LUD

1. <i>Continued.</i>	Assist local communities in developing Wellhead Protection Plans.	2015	SEWRPC, HD, LWCD, WDNR, UWEX, LUD, LG
	Increase awareness and promote action for proper groundwater protection practices (fertilizer and pesticide use, well abandonment, etc.) through a minimum of 1 method annually (e.g., event displays, presentations, website, newsletters, etc).	ONGOING	LWCD, WDNR, HD, UWEX, LUD, LG
2. Protect and preserve groundwater recharge areas, springs and other discharge points that feed cold water streams. <i>Rank = High</i>	Continue to assist with the identification and mapping of springs, cold water streams and their recharge areas.	ONGOING	WDNR, SEWRPC, LWCD, LUD, GISD
	Assist and advise the Planning Division in the Comprehensive Planning update processes regarding groundwater protection.	AOA	PD, LWCD, SEWRPC
	Continue to assist with Quaas Creek Watershed Protection Project and Watershed Protection Plan implementation. Make Plan information available on the LWCD website.	ONGOING	City of West Bend, WDNR, SEWRPC, LWCD, LUD
	Assist with watershed protection planning efforts for all cold water streams.	AOA	LG, WDNR, LWCD, SEWRPC
	Work with partners to protect and preserve groundwater recharge areas, springs and other discharge points that feed streams and lakes through fee simple purchase or conservation easements.	AOA	LT, LG, MMSD, LWCD
	Identify and encourage protection of recharge areas for groundwater through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	ONGOING	SEWRPC, MMSD, WDNR, LWCD
3. Promote adequate maintenance of private sewerage treatment systems. <i>Rank = High</i>	Increase awareness and promote action for proper groundwater protection through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	ONGOING	LUD, UWEX, LWCD, LG

4. Identify practices and educate homeowners on conservation measures they can use to decrease water consumption within households. <i>Rank = Medium</i>	Raise awareness about groundwater levels, water infiltration, and aquifer recharge through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	ONGOING	SEWRPC, LWCD, UWM, UWEX
	Continue outreach program to increase water conservation efforts through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	ONGOING	LWCD, UWEX
	Provide current information via the LWCD web site and link with other sites of similar content.	ONGOING	LWCD

*Estimated 5% of Annual Division Budget*

## ***SOIL SUSTAINABILITY/SEDIMENTATION ISSUES & PLANNED ACTIONS***

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*GOAL: Protect and enhance the productivity and sustainability of all cropland and reduce sediment delivery into streams, lakes and wetlands*

<b>WORK PLAN OBJECTIVES</b>	<b>PLANNED ACTIONS &amp; OUTCOMES</b>	<b>STATUS OF PLANNED ACTIONS</b>	<b>AGENCY</b>
1. Achieve an erosion rate at or below "T" for cropland fields. <i>Rank = High</i>	Identify croplands that do not currently have a conservation plan.	ONGOING	LWCD, NRCS
	Develop and revise 15 producer whole farm resource conservation plans annually that include this objective.	ONGOING	LWCD, NRCS
	Actively promote applicable conservation programs through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	AOA	LWCD, NRCS, FSA, UWEX, USFWS, LT
	Research and distribute information about alternatives for marketing hay.	ONGOING	UWEX, LWCD, TCRC&D
	Increase education and use of BMP that reduce erosion through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	ONGOING	LWCD, NRCS, UWEX
	Develop a routine spot-check procedure whereby 5% of plans are checked annually.	2015	LWCD, NRCS
	Perform spot-checks according to the procedure; take follow-up action as needed.	2015	LWCD, NRCS
2. Develop a targeted buffer program to effectively augment existing programs. Work with local organizations and the	Identify target areas and map to GIS database.	ONGOING	LWCD, GISD, LUD, LT, SEWRPC

<p>2. <i>Continued.</i></p> <p>Ozaukee Washington Land Trust.</p> <p><i>Rank = High</i></p>	Actively promote buffer programs by providing technical information and educational materials through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	ONGOING	LWCD, NRCS, LUD, UWEX, FSA
	Administer a monitoring and maintenance program.	ONGOING	LWCD, NRCS
	Continue to work with local organizations and land trusts to leverage resources.	ONGOING	LWCD, NRCS, UWEX, LT, MMSD
<p>3. Establish and maintain permanent vegetation in concentrated flow channels or other areas where runoff would otherwise cause erosion or sediment delivery to surface waters.</p> <p><i>Rank = High</i></p>	Implement countywide education effort to promote conservation practices through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.).	ONGOING	LWCD, NRCS, WDNR
	Promote native vegetation plantings by offering native tree, shrubs, and prairie plants through 1 annual LWCD tree and native plant sale program.	ONGOING	LWCD
	Develop/revise producer whole farm resource conservation plan to include these objectives.	ONGOING	LWCD, NRCS
	Maintain GIS cropland, hydrography and BMP layers.	ONGOING	LWCD
	Develop an inspection and monitoring procedure and implement follow-up action.	2015	LWCD
<p>4. Promote agricultural BMP's that improve soil health.</p> <p><i>Rank = High</i></p>	Increase education about and use of Best Management Practices (BMP's) such as conservation tillage, and cover crops (e.g. reduced till and no-till) through a minimum of 1 method annually (e.g., event displays, workshops, website, brochures, newsletters, etc).	ONGOING	LWCD, NRCS, UWEX
	Include principles of balanced pH and micronutrient content of soils in nutrient management planning efforts.	ONGOING	LWCD, NRCS, UWEX
	Promote testing for compaction and other soil quality indicators through a minimum of 1 method annually (e.g. event displays, workshops, website, newsletters, etc).	ONGOING	LWCD, NRCS, UWEX
	Raise producer awareness (field days, fact sheets, etc.). Participate with a minimum of 1 public event annually.	ONGOING	LWCD, NRCS, UWEX
	Distribute information developed by others (e.g., Soil Quality Institute).	ONGOING	LWCD, NRCS, UWEX

***Estimated 15% of Annual Division Budget***



## **NONMETALLIC MINING ISSUES AND PLANNED ACTIONS**

*GOAL: Assure reclamation of mines when operations are terminated*

WORK PLAN OBJECTIVES	PLANNED ACTIONS & OUTCOMES	STATUS OF PLANNED ACTIONS	AGENCY
1. Monitor sites for compliance. <i>Rank = Medium</i>	Continue to approve and permit sites and reclamation plans annually.	AOA	LWCD
	Continue to inspect sites via remote sensing and ground-truthing techniques to ensure plan compliance and update financial assurances.	ONGOING	LWCD

*Estimated 5% of Annual Division Budget*

## **WASTE MANAGEMENT ISSUES AND PLANNED ACTIONS**

*GOAL: Reduce the human and environmental risks posed by hazardous waste*

WORK PLAN OBJECTIVES	PLANNED ACTIONS & OUTCOMES	STATUS OF PLANNED ACTIONS	AGENCY
1. Provide convenient and cost effective methods for county residents to dispose of unused hazardous waste, thereby protecting county natural resources. <i>Rank = High</i>	Establish permanent annual funding for the full-service Clean Sweep program.	ONGOING	LWCD
	Continue to promote partnerships with local governments, health care facilities and the business community involving program initiatives.	ONGOING	LWCD, HD, UWEX, LG, SD, EM, DATCP
	Continue to promote and conduct annual County-wide full-service Clean Sweep Collections incorporating pharmaceutical, electronic goods, tires, hazardous waste, etc. through a minimum of 4 methods annually (e.g., event displays, presentations, website, brochures, newsletters, press releases, etc.).	ONGOING	LWCD, HD, SD, EM, LG, DATCP, UWEX
2. Increase awareness on the hazards of dioxins and other toxins/carcinogens emitted by open burning. <i>Rank = Medium</i>	Provide educational materials to residents through a minimum of 1 method annually (e.g., event displays, presentations, website, brochures, newsletters, etc.). Provide information to producers as part of farm assessments.	AOA	LWCD, HD

*Estimated 5% of Annual Division Budget*

## Chapter VIII

# IMPLEMENTATION BUDGET

## BUDGET IMPLEMENTATION ---

Adequate funding will be essential to successfully implement the County’s Land and Water Resource Management (LWRM) Plan. It is suggested that current staffing and administrative funding are not adequate to fulfill the objectives outlined in this plan. Currently, there are 6 full-time employees working in the Land and Water Conservation Division (LWCD).

The projected staff costs (not including support and office costs) for implementing this plan over the next five years is outlined below in Table 27. As the estimates indicate, it is anticipated that the level of state support for local administration of land and water resource management activities will hold steady over the next five-years. Consequently, the County will need to pursue one of three possible courses of action. The first option would be for the County to gradually increase its portion of costs to maintain a staffing level of 7 employees. The second option is to scale back the implementation of the LWRM Plan to a level that is suited to the number of staff currently supported by county plus anticipated state funds. The third option is a combination of the first two options whereby the County would make increased commitment to local staff support along with scaling back implementation. The table below shows the estimated costs given the third option.

**Table 27:  
STAFF COST BY SOURCE: 2010-2015<sup>a</sup>**

Funding Source	2010		2011		2012 <sup>c</sup>		2013		2014		2015	
	COST	FTE <sup>b</sup>	COST	FTE	COST	FTE	COST	FTE	COST	FTE	COST	FTE
County	\$336,208	4.7	\$391,768	4.7	\$490,512	5.8	\$525,593	5.8	\$558,989	5.9	\$594,247	5.9
State	\$129,000	1.3	\$100,000	1.3	\$100,000	1.2	\$100,000	1.2	\$100,000	1.1	\$100,000	1.1
<b>Total</b>	<b>\$465,208</b>	<b>6.0</b>	<b>\$491,768</b>	<b>6.0</b>	<b>\$590,512</b>	<b>7.0</b>	<b>\$625,593</b>	<b>7.0</b>	<b>\$658,989</b>	<b>7.0</b>	<b>\$694,247</b>	<b>7.0</b>
<b>5-YEAR TOTAL (2011-2015)</b>												
<b>County:</b>	<b>\$2,561,109</b>											
<b>State</b>	<b>\$500,000</b>											

<sup>a</sup> Figures include 5% annual cost increases for salary and benefits; based on historic trends over the last 5 years.

<sup>b</sup> Full Time Equivalent

<sup>c</sup> Projected increase due to need for additional staff

Source: Washington County

The second budget consideration involves financial assistance to landowners. This type of funding, referred to as cost sharing, is administered through the LWCD to help offset the price of installing best management practices (BMPs). To qualify for assistance, the landowner must meet program eligibility criteria, enter into a binding cost-share contract with the County and commit to a long-term maintenance plan.

The projected cost share needs of installing best management practices over the next 5 years are listed in Table 28. Due to limited inventory, the variability between farm operations, uncertain funding levels and the farm economy, the amounts shown below are only rough estimates.

Currently, all cost share dollars are acquired through grants from the State and Federal government. While the County will continue to apply for grants, it will need to look into different funding opportunities, ranging from alternative grants to creating a county cost share program to supplement state and federal funds.

**Table 28:  
COST SHARE NEEDS BY PRACTICE TYPE<sup>a</sup>**

<b>Category</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>Total</b>
Development & Groundwater	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$25,000
Fertilizer & Pesticide Mgt.	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$250,000
Animal Waste Mgt.	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$1,000,000
Sedimentation & Cropland Sustainability	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$100,000
<b>Totals</b>	<b>\$275,000</b>	<b>\$275,000</b>	<b>\$275,000</b>	<b>\$275,000</b>	<b>\$275,000</b>	<b>\$1,375,000</b>

<sup>a</sup> Does not include the portion paid by the landowners.

Source: Washington County LWCD

## *Chapter IX*

# **EVALUATION**

The Land and Water Conservation Division (LWCD) will evaluate achievement of goals and objectives outlined in this plan by 1) Administrative reviews; 2) Quantifying resource protection; and 3) Monitoring water resources. Results from each of three components will be included in annual reports to the Wisconsin Department of Natural Resources (WDNR) and Department of Agriculture, Trade and Consumer Protection (DATCP).

### **ADMINISTRATIVE REVIEW**

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Administrative review will consist of tracking and reporting the accomplishments and amount of staff time involved in carrying out the year-to-year activities outlined in the work plan, including but not limited to:

- Completed Information and Education activities
- Landowners contacts and advising
- Design and installation of best management practices
- Development of conservation and nutrient management plans
- Development of cost share agreements and other documentation
- Stormwater and erosion control plan reviews and site inspections
- Manure storage permits issued
- Compliance monitoring and follow-up
- Maintenance of computer database records
- Program planning, promotion, etc.

Most of these administrative activities do not result in direct, measurable outcomes. Therefore, evaluating their effectiveness is often a subjective exercise. Decisions to modify activities will be an internal determination based on LWCD and Land Conservation Committee (LCC) determinations.

Administrative reports will also document the amount of funding committed to program implementation and funds distributed for cost sharing.

## **QUANTIFYING RESOURCE PROTECTION**

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The second component of the annual evaluation involves quantifying resource protection, including resource preservation and pollution reduction, which occurs as a result of installing best management practices or modifying landowner behavior. Appendix A shows achievements of Soil and Water Conservation Practices in Washington County from 1985 through 2009. Methods to document measurable effects are listed below.

### **DEVELOPMENT**

Using Geographic Information System (GIS) software, track where and how development is occurring. The results will be compared to current land use information to determine where farmland, wetlands, shoreland and other environmentally sensitive areas are not adequately protected. Trends in the use of conservation (versus conventional) subdivisions, zoning restrictions, boundary agreements, etc. will also be documented. Invasive species populations will continue to be mapped in the county and land managers will be advised on management techniques.

### **FERTILIZER AND PESTICIDE MANAGEMENT**

The LWCD will track the number of, and acreage included in nutrient and pest management plans and monitor subsequent changes in fertilizer management practices (quantity, placement, timing, etc.) of local producers. Changes in management by non-farm residents and managers of public areas cannot be easily assessed; however, the county will monitor behavior and attitude changes over time by routinely conducting a random survey of landscaping and turf management operations.

### **STORMWATER MANAGEMENT**

Stormwater quality and quantity improvements will be evaluated by using standard book values or computer modeling to estimate reductions in pollutants and stormwater discharge. The increased adoption of stormwater ordinances and installation of stormwater practices will be monitored along with systematic inspection of existing facilities.

### **ANIMAL WASTE MANAGEMENT**

Reductions in phosphorus and other pollutants from feedlot runoff management practices will be documented using current accepted computer models. The installation and proper maintenance of manure storage facilities will also be documented as a function of the permitting process.

## **GROUNDWATER PROTECTION**

There is no feasible way to directly measure the effects that isolated land use changes have on improving or protecting ground water quality. Based on scientific research, the county will presume that groundwater quality improves as a result of documented implementation of sound nutrient and pest management practices, proper maintenance of private septic systems and proper well abandonment. Data received through our new residential well water testing program will be stored in a geodatabase and analyzed to reveal possible problem areas.

## **SOIL SUSTAINABILITY AND SEDIMENTATION**

Data from the annual soil erosion Transect Survey and farm conservation plan updates will be used to track trends in soil erosion rates. Improvements in soil health, including such factors as compaction, organic matter and balanced micronutrients, will be monitored using standard soil quality testing methods.

Reductions in sediment delivery to water bodies and wetlands will be quantified using either book values or computer models which reveal “before and after” effects of best management practices (vegetative buffer strips, conservation tillage, etc.). Reports will document the number of acres upon which practices were applied in addition to the resulting reduction in sediment. Construction site sediment control will be monitored as a function of the number of erosion control plans reviewed by the Land and Water Conservation Division and the Land Use Division.

## **NONMETALLIC MINING**

Reclamation of nonmetallic mining sites is encouraged by providing financial incentives in the form of reduced financial guarantees, which in turn expedites site reclamation following the extraction of materials. Annual reports will be generated depicting areas that have been intermittently or permanently reclaimed.

## **WASTE MANAGEMENT**

Efforts to promote proper disposal of hazardous waste through the Clean Sweep program can be quantified by the number of participants and volume of waste collected annually. The County program may be adjusted based upon feedback from the county residents.

## **MONITORING WATER RESOURCES** ---

The best evaluation of whether or not water quality goals are being met is by directly monitoring the resource. In addition, monitoring data shows where, why and to what degree water resources are suffering from nonpoint pollution. This type of evidence is the best way to encourage behavioral modifications. Farmers and other residents are willing to make appropriate changes in

order to be better stewards, particularly if data can be presented that links their actions and water quality problems downstream. It is also essential to justify the amount of staff and money being spent for environmental protection efforts.

Despite its importance, water quality data is far too sparse as demonstrated by the large amounts of missing data in Tables 22 and 23. Furthermore, the ground and surface water monitoring data that has been collected in the past has not typically been well coordinated or easily accessible. Therefore, the LWCD will continue to assemble ground and surface water quality data and appraisals from various sources including the U.S. Geological Survey (USGS), Wisconsin Department of Natural Resources (WDNR), Southeastern Wisconsin Regional Planning Commission (SEWRPC), University of Wisconsin Extension (UWEX), Center for Watershed Science and Education, and University of Milwaukee. The LWCD will also seek to increase the amount of monitoring activity until current ground and surface water quality data is available throughout the county; and furthermore, to have that data in an accessible and comprehensible format. This will be done by:

- Encouraging the WDNR and USGS to step up their monitoring activities;
- Expanding LWCD, citizen monitoring, and school monitoring efforts; and
- Building cooperative partnerships between volunteer and professional monitoring efforts

Upon receiving an adequate number of residential well water tests results, a report will be composed and distributed in partnership with UWEX and the Center for Watershed Science and Education to summarize overall groundwater quality in the county.

## Appendix A:

### SOIL AND WATER CONSERVATION PRACTICE ACHIEVEMENTS (1985-2009)

Best Management Practices	Number of BMP's Installed through the Priority Watershed Milw./Ocon. River	Number of BMP's Installed by other Programs outside the Priority Watersheds Same Time Era	Number of BMP's Installed since the close of the Priority Watershed Projects (SWRM & EQIP)
Closure of Waste Impoundments	3		6
Grade Stabilization Structures	1	1	
Heavy Use Area Protection*	8		1
Manure Transfer	17	4	9
Roof Runoff Structure*	4		5
Sediment Basin*	35	7	8
Stream Crossing	4		
Waste Storage	25	10	18
Waste Treatment Strip	36	6	9
Water and Sediment Control Basin	20	1	
Well Decommissioning	1		4
Animal Trails/Walkways	4		2
Diversions	4	2	3
Fencing Systems – Grazing	4		1
Grassed Waterways	19	2	7
Streambank Protection	2		
Terraces	5		
Underground Outlets*			3
Contour Buffer Strips		3	
Critical Area Plantings	3		
Riparian Buffers	9		37
Use Exclusion – Animals	4		5
Wetland Enhancements	10		
<b>Total</b>	<b>218</b>	<b>35</b>	<b>118</b>

*\* Specific BMP's are typically components of a Barnyard Runoff Control System*

### PERMITS ISSUED THROUGH THE LAND AND WATER CONSERVATION DIVISION - LAST FIVE YEARS

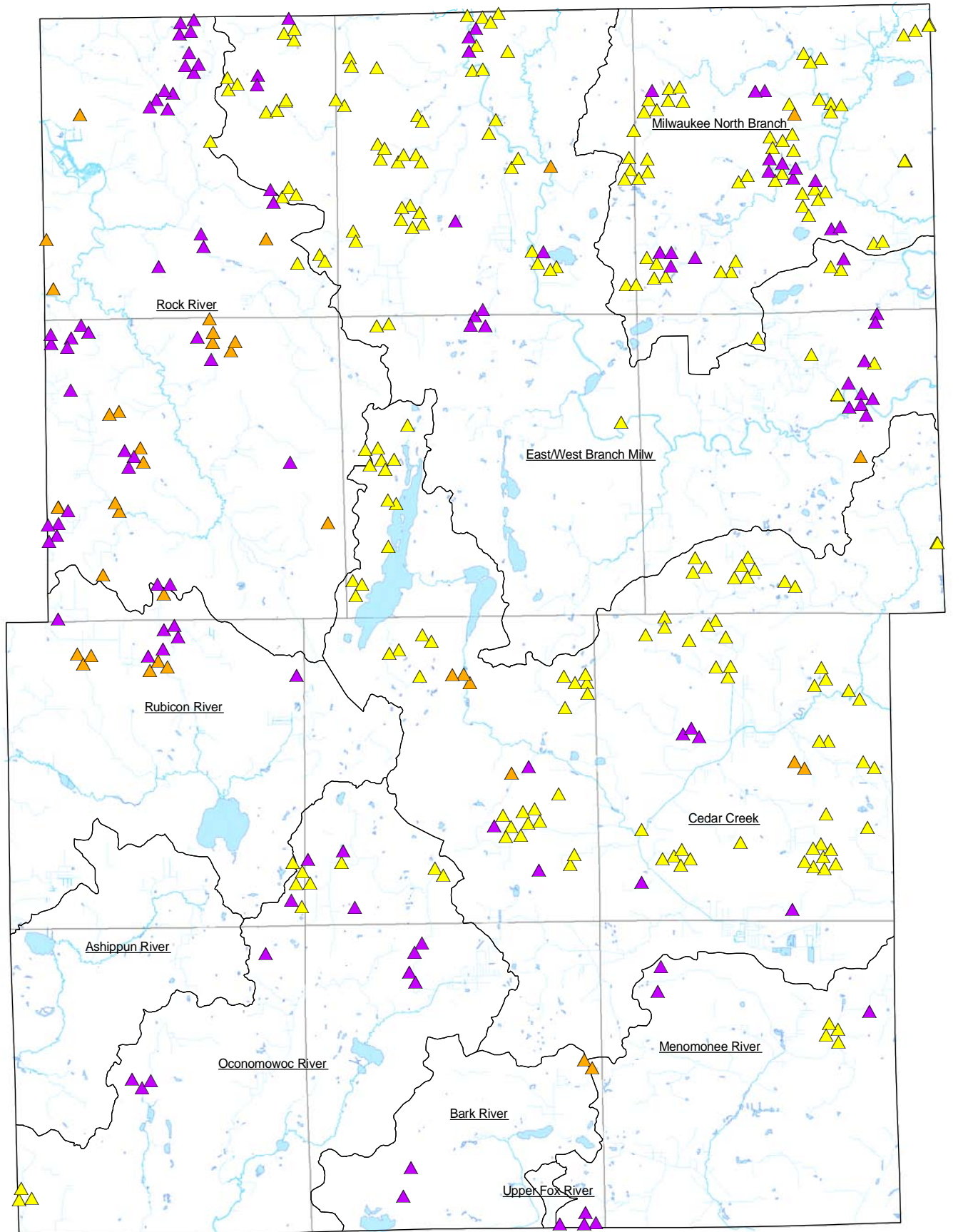
Washington County Ordinances	2005	2006	2007	2008	2009
Chapter 16 – Animal Waste Storage Facility	8	0	4	6	2
Chapter 17 – Erosion Control and Stormwater Management	21	15	15	12	12
Chapter 18 – Nonmetallic Mining Reclamation	13	14	12	12	14

*1985 – Marked the start of the Nonpoint Source Priority Watershed Programs in Washington County.*

*Source: Washington County LWCD*



# Appendix A: Soil and Water Conservation Practice Achievements (1985-2009)



- ▲ BMP's Installed since the close of the Priority Watershed (118)
- ▲ BMP's Installed through the Priority Watershed Program (218)
- ▲ BMP's Installed by other programs outside the Priority Watershed - Same Years (35)



Source: Washington County LWCD



# Washington County Planning and Parks Department Land and Water Conservation Division

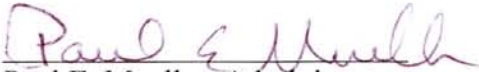
**TO BE PUBLISHED AS A LEGAL NOTICE IN THE WEST BEND NEWS ON  
JUNE 15, 2010 & JUNE 22, 2010**

Notice is hereby given that at a public hearing to be held at a meeting of the Washington County Land Conservation Committee in Room 112 at Washington County Fair Park, 3000 County Highway PV, West Bend, Wisconsin on Tuesday, June 29, 2010 at 5:00 P.M., there will be heard and considered:

The Public Hearing for public comment on the Final Draft of the Washington County Land & Water Resource Management Plan (2nd Revision 2011-2020). A presentation of the Plan will begin at 4:30 P.M., in Room 112 at Washington County Fair Park.

Copies of the Final Draft Plan are available for review at the Washington County Planning and Parks Department, 333 E. Washington Street, Suites 2300 and 3200, West Bend, WI, during the hours of 8:00 am to 4:30 pm Monday- Friday and on-line on the Washington County website ([www.co.washington.wi.us/lcd](http://www.co.washington.wi.us/lcd)). Written comments will be accepted until 1:00 pm on June 29, 2010. Written comments will be read at the public hearing and given the same weight as oral testimony. Written comments may be submitted to the Washington County Land & Water Conservation Division, Attn: Dr. Jill Hapner, 333 E. Washington St., Ste 3200, West Bend, WI 53095-2003.

The purpose of this hearing is to hear public opinion on the Final Draft of the Washington County Land & Water Resource Management Plan (2nd Revision 2011-2020) regarding the Division's work plan as stated by State Statutes, s. 92.14 (3) basic allocations to counties.

  
Paul E. Mueller, Administrator  
Planning & Parks Dept.

Dated this June 9, 2010  
Published on June 15 & June 22, 2010

Individual County Board Supervisors may attend the above meeting. It is possible that such attendance may constitute a meeting of the county board or any of its committees pursuant to State ex rel. Badke v. Greendale Village Board, 173 Wis. 2d 553, 494 N.W. 2d 408 (1993). This notice does not authorize attendance at either the above meeting or the Badke meeting, but is given solely to comply with the notice requirements of the open meeting law.

**AFFIDAVIT OF POSTING**

This agenda was posted in the office of the County Clerk on June 9, 2010. Notice was sent to the West Bend News, WBKV/WBWI Radio, WTKM Radio, My Community NOW, Hartford Times Press, Kewaskum Statesman, Milwaukee Journal-Sentinel, and Express News. Individuals with disabilities requiring special accommodations for attendance at the meeting should contact the County Clerk at (262) 335-4301 at least 48 hours prior to the meeting.

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