Washington County, WI

Land & Water Resource Management Plan

2021-2030

Vision...

"Protected and Improved Land & Water Resources"

LAND & WATER

Vision …

"Protected and Improved Land & Water Resources"

WASHINGTON COUNTY - WISCONSIN

LAND AND WATER RESOURCE MANAGEMENT PLAN 2021-2030

LAND & WATER CONSERVATION GOALS

- Implement local and state laws as a well governed and administered County.
- Provide exceptional customer service through technical and professional expertise.
- Guide agricultural businesses to ensure sustainable and economically viable farmland.
- Provide education and administer programs that help accomplish the proper management of our natural resources (including lakes, rivers, groundwater, wetlands, floodplains and land resources) for an improved quality of life.
- Engage the public through conservation programs that provide for the stewardship of our natural resources.

PREPARED UNDER THE JURISDICTION OF THE WASHINGTON COUNTY LAND USE AND PLANNING COMMITTEE:

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Land &Water Resource Management Plan (2000-2005) – Adopted September 12, 2000
Land &Water Resource Management Plan (1st Rev. 2006-2010) – Adopted December 13, 2005
Land &Water Resource Management Plan (2nd Rev. 2011-2020) – Approved August 3, 2010

Land &Water Resource Management Plan (3rd Revision 2021-2030)
Approved by: Wisconsin Land and Water Conservation Board – August 4, 2020
Approved by: Washington County Board of Supervisors - ???? ??, ???

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The 3rd 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.

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS II
TABLE OF CONTENTS III
LIST OF TABLES VI
LIST OF FIGURES VI
ACRONYMS VIII
EXECUTIVE SUMMARY X

Chapter I: INTRODUCTION 1
Plan Background & Purpose 1
Plan Revision 2
Framework for Implementation 2
County History 3
County Vision & Strategic Goals 5
Aligning LWRM Plan with Strategic Priorities for Washington County 5
Washington County Vision 5
Washington County Mission 5
Goals and Practices 6

Chapter II: DEMOGRAPHICS AND LAND USE 9
Population Trends 9
Household Trends 10
Land Use Trends 12
Existing Farmland 12
Declining Farmland 15
Number and Size of Farms 16
Planned Land Uses 2050 16
Utility Systems 19
Sanitary Sewer Services 19
Private On-Site Wastewater Treatment 21
Water Supply Systems 21

Chapter III: RESOURCE INVENTORY & ASSESSMENT 23
Topography and Geology 23
Watersheds and Subwatersheds 27
Surface Water Resources 31
Lakes and Streams 32
Outstanding and Exceptional Waters 37
Impaired Waters 37
Surface Water Natural Communities Designation 40
Soils 42
Soil Associations 42
Soil Suitable for Agricultural Production 46
Soil Sustainability, Erosion and Sedimentation 47
Non-Metallic Mineral Resources 50

Wetland Resources....51
Groundwater Resources....52
Wellhead Protection Plans and Ordinances....57
Forest Resources....58
Wildlife Habitat....59
Natural Areas....60
Critical Species Habitat and Aquatic Sites....60
Invasive Species....61

Chapter IV: IMPLEMENTATION STRATEGY, PROGRAMS & PRIORITIES....62
Technical and Financial Assistance....62
Water Quality Implementation Strategy....62
Priority Ranking....63
Total Maximum Daily Load Plans....63
Point Source Compliance Options for Phosphorus and TSS....65
Nine Key Element Plans – Section 319 Funding....65
Regional Water Quality Management Plan PR-50 (SEWRPC)....66
State Performance Standards....67
Agricultural Performance Standards....67
Cropland Standards....67
Livestock Standards and Prohibitions....68
Silurian Bedrock Standards....68
Conservation Practices....68
Implementation of the Agricultural Performance Standards & Priority Farm Strategy....69
Non-Agricultural Performance Standards....75
Construction Site Erosion Control....75
Post Construction Stormwater Management - New Development & Redevelopment....75
Stormwater Management – Developed Urban Areas....77
Program Integration....79
Federal Conservation Programs....79
Environmental Quality Incentives Program (EQIP)....79
Regional Conservation Partnership Program (RCPP)....81
Agricultural Conservation Easement Program (ACEP)....82
Conservation Reserve Program (CRP)....82
Conservation Stewardship Program....82
Great Lakes Restoration Initiative (GLRI)....83
State Conservation Assistance Programs....83
Targeted Runoff Management Program....83
Animal Feeding Operation NR 243....84
Farmland Preservation....84
Managed Forest Law....84
Wildlife Damage Abatement and Claims Program....85
Local Conservation Assistance Programs....85
Producer-Led Watershed Protection Groups....85
Lake Districts/Associations....85
County Tree Program and the Stewardship Incentive Program....86

Land and Water Conservation Regulations 87
Animal Waste Storage Ordinance (Chapter 135) 87
Erosion Control & Stormwater Management Ordinance (Chapter 238) 87
Non-Metallic Mining Ordinance (Chapter 265) 88
County and Local Regulations.....88
Comprehensive Planning & Zoning.....88
General Zoning 88
Floodplain Zoning.....89
Shoreland and Shoreland-Wetland Zoning.....88
Subdivision Regulations 89

Chapter V: INFORMATION & EDUCATION ACTIVITIES 91
Benefits of an Education Program 91
Educational Programming 92
One on One Contact with Landowners.....92
Lending Resource Library 92
Website 92
Conservation Newsletter.....92
Staff Presentations and Guest Lectures.....93
Nutrient Management 93
Collaboration with Producer-Led Watershed Group 93
Youth Programs 93
Contractor Workshops 94
Others.....94

Chapter VI: GOALS, OBJECTIVES AND ACTIONS 95
Introduction.....95
Goal: Improve and Implement Planning Strategies and Programs that Protect
and Preserve Land and Water Resources.....96
Goal: Improve and Protect Surface and Groundwater through the Proper
Use of Fertilizers and Pesticides 97
Goal: Reduce the Quantity and Improve the Quality of Stormwater Runoff
from Developed and Developing Areas.....97
Goal: Reduce the Human and Environmental Risks Posed by Animal Waste 98
Goal: Protect and Improve the Quality and Quantity of Groundwater.....98
Goal: Protect and Enhance the Productivity and Sustainability of all Cropland
and Reduce Sediment Delivery into Streams, Lakes and Wetlands 99
Goal: Reduce the Human and Environmental Risks Posed by Hazardous Waste.....99

Chapter VII: IMPLEMENTATION BUDGET.....100
Budget Implementation.....100

Chapter VIII: EVALUATION 103
Administrative Review 103
Quantifying Resource Protection.....103
Planning Strategy.....104

Fertilizer and Pesticide Management 104
Stormwater Management 104
Animal Waste Management 104
Groundwater Protection 104
Soil Sustainability and Sedimentation 104
Waste Management 105
Monitoring Water Resources 105
Modeling vs. Monitoring 106

TABLES & FIGURES

Table 1: Population Trends in Washington County Communities: 1980-2010 9
Table 2: Household Projections for Washington County Under Vision 2050 11
Table 3: Existing Agricultural Lands in Washington County Communities: 2015 13
Table 4: Farm Size in Washington County: 2007, 2012 and 2017 & Wisconsin: 2017 16
Table 5: Planned Land Uses in Washington County 18
Table 6: Surface Water, Wetlands and Floodplains in Washington County Communities 32
Table 7: Major Streams in Washington County 33
Table 8: Lakes within Washington County 34
Table 9: Outstanding and Exceptional Waters Report: Washington County 37
Table 10: Washington County Lakes and Rivers on the Impaired Waters List 38
Table 11: Agricultural Soil Capabilities in Washington County Communities: 2016 46
Table 12: Comparison of Erosion & Tillage Practices:1999, 2009 & 2019 Transect Survey 48
Table 13 Human Activities that can Impact Groundwater Quality 55
Table 14: Municipal Water Systems 58
Table 15: Woodlands and Managed Forest Lands in Washington County Communities 59
Table 16: TMDL Phosphorus and Total Suspended Solids Reduction Goals by Reach 64
Table 17: Conservation Practices used for Agricultural Performance Standards Compliance 69
Table 18: Agricultural Performance Level of Compliance 73
Table 19: Conservation Practices Installed through EQIP from 2015-2019 79
Table 20: Planned Conservation Practices to be Installed through EQIP from 2020-2023 80
Table 21: RCPP Project Goals and Accomplishments 81
Table 22: Ordinance Administration in Washington County related to Natural Resource Issues 90
Table 23: Staff Costs by Source: 2019-2024 101
Table 24: Cost Share Needs by Practice Type 102

Figure 1: Existing Land Use in Washington County: 2015 14
Figure 2: Acres of Land in Farmland Production in Washington County: 1985–2017 15
Figure 3: Washington County Land Use Plan: 2050 17
Figure 4: Historic Urban Growth in Washington County: 1850-2010 20
Figure 5: Areas Served by Public and Private Water Utilities in Washington County 22
Figure 6: Physiographic Features and Generalized Topographic Characteristics in Washington County 25
Figure 7: Slope Analysis for Washington County: 2016 26

Figure 8: 8 and 10 Digit Water Management Units Washington County.....29
Figure 9: Watershed Features in Washington County 30
Figure 10: Surface Waters, Wetland and Floodplains in Washington County: 2015.....36
Figure 11: Riverine and Lake Natural Communities of Washington County 41
Figure 12: General Soil Associations in Washington County 44
Figure 13: Agricultural Soil Capabilities in Washington County: 2016.....45
Figure 14: Washington County Transect Survey Crop and Residue Summary.....49
Figure 15: Depth to Shallow Water Table in Washington County.....53
Figure 16: Soil-Water Balance Recharge Potential Map for Washington County 54
Figure 17: Washington County – Groundwater-Contamination Susceptibility Analysis.....56
Figure 18: Surface Depth to Bedrock 57
Figure 19: Agriculture Performance Standards – Compliance Determinations 74
Figure 20: Stormwater Management Practices Tracked for Long-Term Maintenance 78

APPENDIXES

Appendix A: Public Input 107
Appendix B: Annual Work Plan 113
Appendix C: BMP Achievements 2010-2019 117
Appendix D: Priority Ranking and Factors to Guide Conservation Activities.....119
Appendix E: EVAAL Maps.....127

ACRONYMS

ACS	American Community Survey
AFOs	Animal Feeding Operations
AOA	As opportunity arises
BMPs	Best Management Practices
AC	Advisory Committee
CAFOs	Concentrated Animal Feeding Operations
CO BOARD	Washington County Board of Supervisors
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
DATCP	Department of Agriculture, Trade and Consumer Protection
DOA	Wisconsin Department of Administration
DSPS	Department of Safety and Professional Services
DU	Ducks Unlimited
EM	County Emergency Management Department
EQIP	Environmental Quality Incentives Program
FPP	Farmland Preservation Program
FSA	Farm Services Agency
GIS	Geographic Information Systems
HD	County Health Department
HEL	Highly Erodible Land
HUC	Hydrologic Unit Code
HWY	County Highway Department
IGA	Intergovernmental Agreement
IPAW	Invasive Plants Association of Wisconsin
LCC	Land Conservation Committee of the County Board
LG	Washington County Local Governments
LO	Lakes Organizations
LT	Land Trusts
LUD	Land Use, Division of the County Planning & Parks Department
LUP	Land Use and Planning Committee of the County Board
LWC	Land & Water Conservation, Division of the County Planning and Parks
LWRM Plan	Land & Water Resource Management Plan
MMSD	Milwaukee Metropolitan Sewerage 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
PD	Planning, Division of the County Planning & Parks
POWTS	Private Onsite Wastewater Treatment System
PPD	County Planning & Parks Department
PWP	Priority Watershed Program
RO	River Organizations
SD	Sheriff's Department of Washington County
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	Tolerable Soil Loss
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	Water & Environmental Analysis Lab - University of Wisconsin
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

EXECUTIVE SUMMARY

The Washington County Land and Water Resource Management (LWRM) Plan is a long-range planning document intended to guide the activities of the Land and Water Conservation (LWC) Division in its efforts to protect and improve local land and water resources for the next 10 years. This plan represents the next generation of resource management strategies and is an improved and updated guide that builds upon past work in order to help carry out our overall conservation mission. Also recognized throughout this plan are numerous local and regional plans that likewise focus on natural resources. This plan attempts to incorporate or reference related elements of those plans and serves to support the Washington County Comprehensive Plan and the Washington County Strategic Plan. As a result, this plan is intended to complement and coordinate with existing plans rather than replace them.

The LWRM Plan is mandatory for all counties under s. 92.10 Wisconsin Statutes and describes how Washington County will help state agencies meet federal and state clean water goals while addressing other local natural resource issues. This plan also describes the programs and methodology that will be used to ensure the County is implementing Agricultural and Non-Agricultural Performance Standards and Prohibitions to reduce runoff and protect water quality as defined in NR 151 and will help the County qualify for future grants.

Chapter I – Introduction, provides background on LWRM Plans, the public input process and how the activities of the LWC align with the strategic priorities of Washington County. Chapter II – Demographics and Land Use, describes trends in population and land use specifically looking at agricultural land and urban growth. Chapter III – Resource Inventory and Assessment, provides information on the natural resource base of the County, as well as soil and slope analysis, evaluation of the major watersheds, and details on the County's soil and water resources. Chapter IV – Implementation Strategy, Programs and Priorities, builds off the information presented in this and previous chapters and describes the programs and the work direction opportunities for future conservation efforts. Total Maximum Daily Load plans (TMDL) are introduced in this chapter and they cover 99% of the County; a TMDL is the amount of a pollutant a waterbody can receive and still meet water quality standards. The goals and objectives of the TMDL, along with the goals of other planning efforts and the list of programs highlighted in this chapter are used to group and define objectives and actions for determining measurable work activities in the creation of annual work plans. The overarching goals identified in Chapter VI are listed below:

- Improve and implement planning strategies and programs that protect and preserve land and water resources
- Improve and protect surface and groundwater through the proper use of fertilizers and pesticides
- Reduce the quantity and improve the quality of stormwater runoff from developed and developing areas
- Reduce the human and environmental risks posed by animal waste
- Protect and improve the quality and quantity of groundwater
- Protect and enhance the productivity and sustainability of all cropland and reduce sediment delivery into streams, lakes and wetlands
- Reduce the human and environmental risks posed by hazardous waste

The success of any program relies on an effective information and education program that targets developers, engineers, contractors, municipal staff, farmers, landowners and the general public; the details of these efforts are explained in Chapter V – Information & Education Activities. Chapter VII – Implementation Budget, attempts to capture the current cost of programming and brings to light future shortfalls as well as identifying funding levels to support state mandated cost-sharing requirements to control agricultural pollution. Lastly, Chapter VIII – Evaluation, explains how the LWC will track and monitor the effectiveness of program activities and progress towards improved water quality and natural resource protection efforts.

The Washington County LWRM Plan was written with the assistance of partner agencies, that include staff from: The Wisconsin Department of Agriculture, Trade and Consumer Protection, the Wisconsin Department of Natural Resources, the USDA Natural Resources Conservation Service, County Health Department, Southeastern Wisconsin Regional Planning Commission, Metropolitan Builders Association, Riveredge Nature Center, Cedar Lake Conservation Foundation; and Citizen Representatives which together formed the Advisory Committee. Citizen representatives included farmers, educators, lake residents, and local elected officials. Additional public input included in this plan was generated from an agricultural producer survey and a Public Hearing held by the Land Conservation Committee.

This LWRM Plan does not bring light to any "new" resource management issues or represent any shift in county policy or priorities relating to land and water conservation. Rather, it describes how limited county resources will continue to be focused on meeting water quality standards through a wide array of program methods, including education, technical assistance, cost-sharing grants, GIS technology, low-impact development, partnerships with other agencies and organizations, and regulations. To that end, successful implementation of this plan will be contingent on continued funding from all current sources.

Chapter I

INTRODUCTION

PLAN BACKGROUND & PURPOSE

Conservation professionals throughout Wisconsin proposed the Land and Water Resource Management (LWRM) Plan concept in 1996 in response to the State Legislative call to "redesign" the Nonpoint Pollution Abatement Program. State and federal agencies supported the concept that local governments and residents are best suited to identify and provide solutions for natural resource problems within a county. In the fall of 1997 the Legislature amended Wisconsin Stats. 92.10 establishing a state land and water resource management planning program and requires that each county prepare a land and water management plan. Furthermore, Wisconsin Admin. Code ATCP 50.10(1)(a) requires each land conservation committee to establish a land and water resource management plan and a program to implement that plan.

A land and water resource management plan is a long-term strategic plan that includes an assessment of the resource conditions and needs of a county. The process includes input from local citizens as well as resource professionals and directs conservation efforts. While the plan is a 10-year document, it is used in the development of annual work plans that strike a balance between state priorities and the County's strategic priorities identified later in this chapter. This plan further provides supporting materials for the application for conservation grant funds. The process and plan is a holistic approach to land and water resource management that focuses on partnerships and collaboration. At a minimum, a land and water resource management plan is required to meet WI Stats., Chapter 92.10(6) and describes, in reasonable detail the following:

- Water quality and soil erosion conditions,
- State and local regulations used for implementation including compliance procedures,
- Water quality objectives,
- Key water quality and soil erosion problem areas,
- Conservation practices to address resource concerns,
- Process to identify priority farms,
- Strategies to encourage voluntary implementation of conservation practices,
- Information and education,
- Coordination with partners including local, state and federal agencies,
- Multi-year work plan to implement conservation practices and achieve compliance with performance standards,
- Includes benchmarks for progress and performance towards plan goals and objectives, and
- Estimated costs needed to implement the plan including staffing and cost-share funding.

Washington County's first LWRM plan was approved in 2000, and revised in 2005, 2010 and 2015. Historically plans were updated every five years but recent administrative code changes

extended that to a maximum of ten years. County LWRM Plans are needed to maintain eligibility for state conservation staff funding. This plan, as developed, focuses on the specific requirements and legislative authority provided to the Washington County Land Conservation Committee. This is the third generation of the original plan.

As referenced throughout this plan, there exists numerous local and regional plans that focus on natural resources. This document attempts to incorporate many elements of those plans as well as summarizing various elements of the Washington County Comprehensive Plan, and serves to support the implementation of the Washington County Strategic Plan. As a result, this plan is intended to complement and coordinate with existing plans rather than replace them.

PLAN REVISION

In July of 2019, the LWC 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), Southeastern Wisconsin Regional Planning Commission (SEWRPC), University of Wisconsin-Extension (UWEX), WDNR, NRCS and DATCP. Input from Individuals representing those organizations not only participated as members of the advisory committee discussed below, but helped to ensure that regional and state resource issues and concerns were included in this plan.

The 2019 revision process included a producer survey and two Advisory Committee (AC) meetings which occurred on February 4, 2020 and April 28, 2020. Besides the previously mentioned cooperating agencies, AC participants included farmers, rural and city residents, developer, and elected officials from local governments. The first meeting of the AC, members were provided relevant background information about plan requirement and reviewed the first five chapters that included: demographics, resource inventory and assessment information, implementation strategies, and information and education activities. The second meeting members discussed local resource concerns, provided feedback on plan goals and objects, as well as prioritizing resource concerns. The issues, priorities and focus areas identified in the producer survey, mentioned above, and those identified during the AC meetings (see Appendix A) will be utilized in the formation of annual work plans and help guide activities for future programs. As discussed throughout this plan there are many commonalties between the county, regional, state and national priority issues, allowing for improved integration and coordination of efforts.

A public hearing was held during a Land Conservation Committee meeting on June 25, 2020; information regarding the draft Land & Water Resource Management Plan revision was presented and no public comments were received. The meeting was posted as a legal notice and held at the Washington County Courthouse Building located in West Bend, Wisconsin (see Appendix A).

FRAMEWORK FOR IMPLEMENTATION

During the 2010 revision of the LWRM Plan, the AC members and the Land Conservation Committee established guiding principles for plan development and implementation. The AC overseeing the 2020 LWRM Plan reconfirmed the following guiding principles with minor changes:

- Recognize the potential impacts of mandated conservation practices and seek available funding where substantial costs and management changes are required.
- Emphasize the positive economic and ecological benefits of land and water 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, regional, county and local resource management efforts.
- Enhance collaboration between governmental units, businesses, non-profit entities and the agricultural community.
- Prioritize land and water resource management efforts based upon quality, sensitivity and level of impairment.
- Conduct informational and educational programming to help meet Plan objectives.
- Integrate LWRM Plan objectives with local priorities and initiatives.

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

COUNTY HISTORY[1]

Washington County is within the southeastern quarter of the state, the most populous and urban section of Wisconsin. It contains 432 square miles, 12 townships, (Addison, Barton, Erin, Farmington, Germantown, Hartford, Jackson, Kewaskum, Polk, Trenton, Wayne and West Bend); six villages (Germantown, Jackson, Kewaskum, Newburg, Slinger and Richfield); and two cities (Hartford and West Bend) plus "urban sprawl" from Milwaukee.

The landscape is rolling and varied, showing the effects of the ice sheets which covered this part of Wisconsin. Kames, kettles, eskers, small lakes and gravel bends constitute the "Kettle Moraine" nature of the topography, recognized by the State Department of Natural Resources which extends the Kettle Moraine State Forest a few miles into Washington County near Kewaskum. Fairly extensive stands of native hardwoods still exist in woodlots and on rougher ground. There are several attractive lakes and a number of streams, most of which flow either into the Rock River and its tributaries or Lake Michigan via the Milwaukee River.

The soil, a fairly fertile clay loam, produces good crops of hay and pasture grass, small grains, corn, soybeans, fruits and vegetables. Peas, beets and sweet corn are the major vegetable crops. About one half of the total agricultural income is realized from the sale of animal or animal by-products. Because of the close proximity to metropolitan areas, Washington County's agriculture picture is changing, the marginal lands have become prime land for developing building sites.

The first white men to reach the area were Marquette and Joliet who stopped at the mouth of Sauk Creek in 1673 and may have planted a cross on top of Holy Hill. LaSalle and Hennepin also were at Sauk Creek in 1679, and about 1700 a Jesuit missionary Joseph J. Marest, spent the winter there,

probably the first white man to live here. In 1818, S. A. Storrow, Judge Advocate of the United States Army, passed through as he returned from Green Bay to Ft. Dearborn (Chicago).

But settlement began in the 1830's when British-American mainly from New York, Connecticut, and Pennsylvania, came north along the Milwaukee River and what later became the Green Bay Road. They found friendly Indians thinly scattered because they needed the wildlife of the forests for food and clothing. Winnebagoes (of the Sioux Nation) claimed the Rock River valley but earlier had built the numerous effigy mounds throughout the county, before the memory of the Algonquins, including Potowatomies. Sacs (Sauks and Ozaukis), and Menominees had villages and camps at the sites of Grafton, Cedarburg, Theinsville, Newburg, Waubeka, Saukville, Port Washington, West Bend, Kewaskum, Pike Lake, Little Cedar Lake, Monches. In 1838 the Menominees, who held sway over the county, were removed by United States treaty to land west of the Mississippi River, but many returned and in 1859 Kewaskum was Chief of the Potowatomies and an honored friend of Densmore Maxon of the First Wisconsin Legislature. Waubeka was Chief over about 100 Sauks and Chief Monches ruled the Menomonees here and southwards in Waukesha County.

Washington County was formed from the territory of Milwaukee and Brown, by act of the territorial legislature of Wisconsin, December 7, 1836. As first constituted, it extended eastward to Lake Michigan. The seat of justice was originally established at "Wisconsin City" now Port Washington. The county was attached to Milwaukee, and remained unorganized until 1840. It was duly organized for county purposes, in pursuance of an act of the legislature, dated August 13, 1840.

The county was organized for judicial purposes in pursuance of an act dated February 20, 1845. In March 1853, a bill was passed for the division of the county and the creation of Ozaukee from its eastern portion, fixing the county seat of Washington at West Bend, and providing for the complete organization and establishment of both county organizations, the removal and transcribing of the records and other matters. Although controversial, the law dividing the county was decided by the Wisconsin Supreme Court to be constitutional, thus this ended one of the longest and most hotly contested county-seat wars in the state.

A fortunate combination of local capital and enterprise, efficient labor and competent management, has enabled Washington County to attract a substantial number of important industries. The various industries surrounded by a prosperous farming community has resulted in a well-balanced community.

In addition to the Kettle Moraine State Forest, Lizard Mound State Park, with its five Indian effigy mounds, a number of local parks offer recreation facilities for swimming, skating, picnic areas, camping, athletic fields, pavilions and band stands. Recreational activities include golf, swimming, fishing, hunting and skiing. Holy Hill, site of the church and monastery of the Discalced Carmelite order, is one of Wisconsin's most scenic points of interest, and a major center of Roman Catholic pilgrimage in the U.S. The lakes and forest and varied landscape of Washington County make it most desirable for year-round or summer residence.

[1]*Previously published in the Land Atlas & Plat Book – Washington-Ozaukee County, Wisconsin 1993- 10th Edition*

County Vision and Strategic Goals

Aligning LWRM Plan with Strategic Priorities for Washington County

In 2015 and updated in 2018, the Washington County Board of Supervisors identified a vision, mission, and four strategic goals for County services that are provided directly to citizens along with a set of practices designed to achieve each goal. The County Board also established a goal and related practices for programs that do not provide direct services to citizens, but that support the direct services provided by other County programs.

Washington County Vision

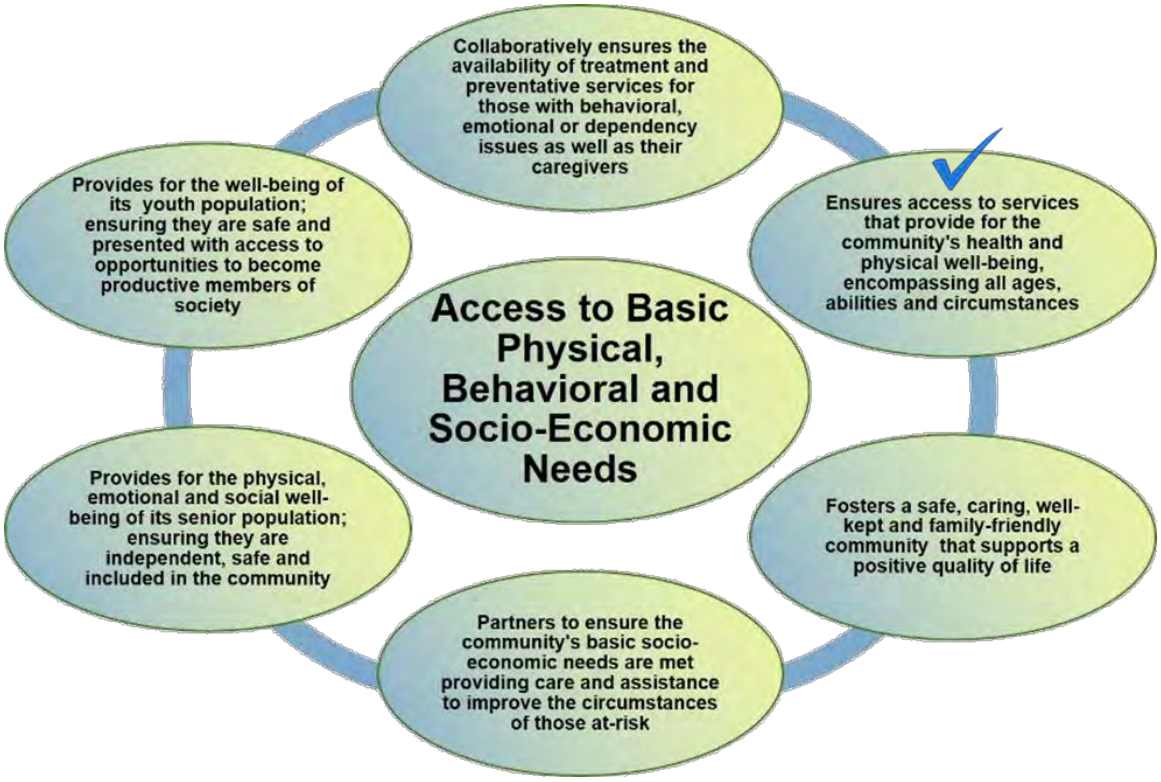
Washington County strives to cultivate its rich heritage, vibrant economy and attractive communities through the distinct values that define us.

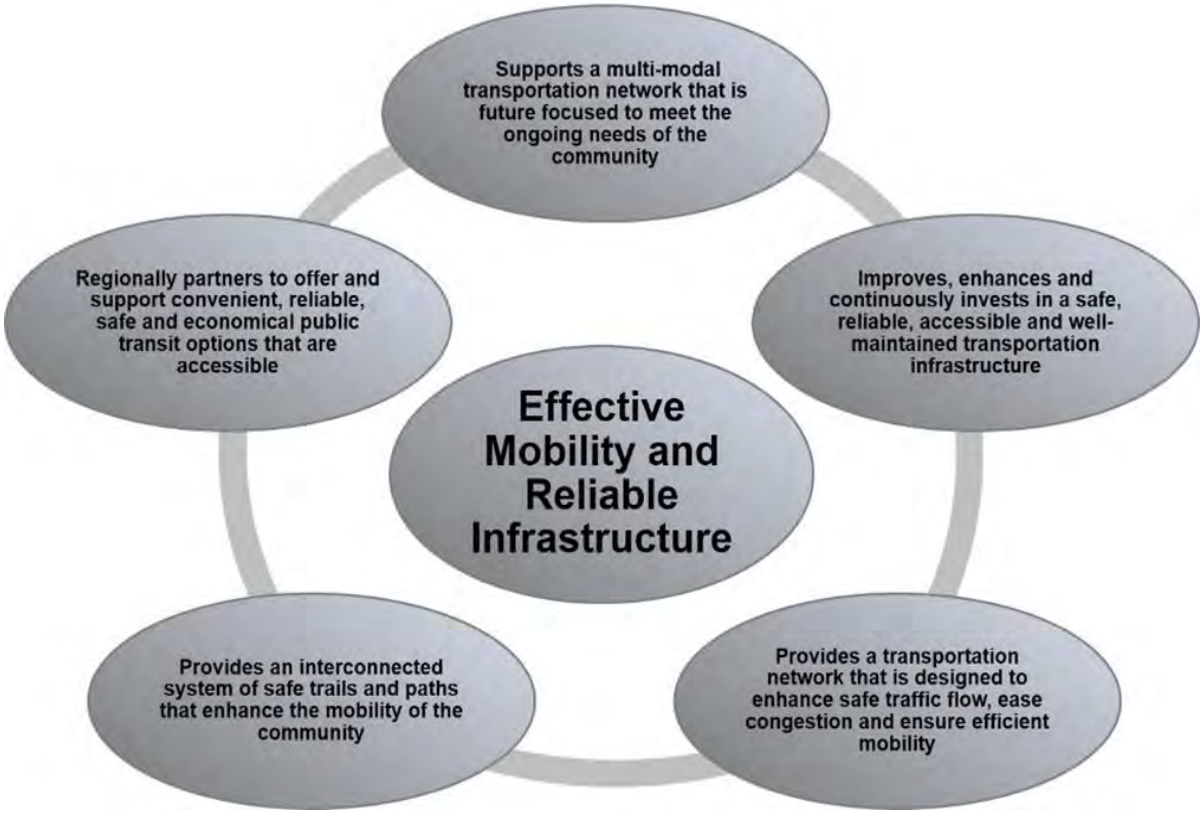
Washington County Mission

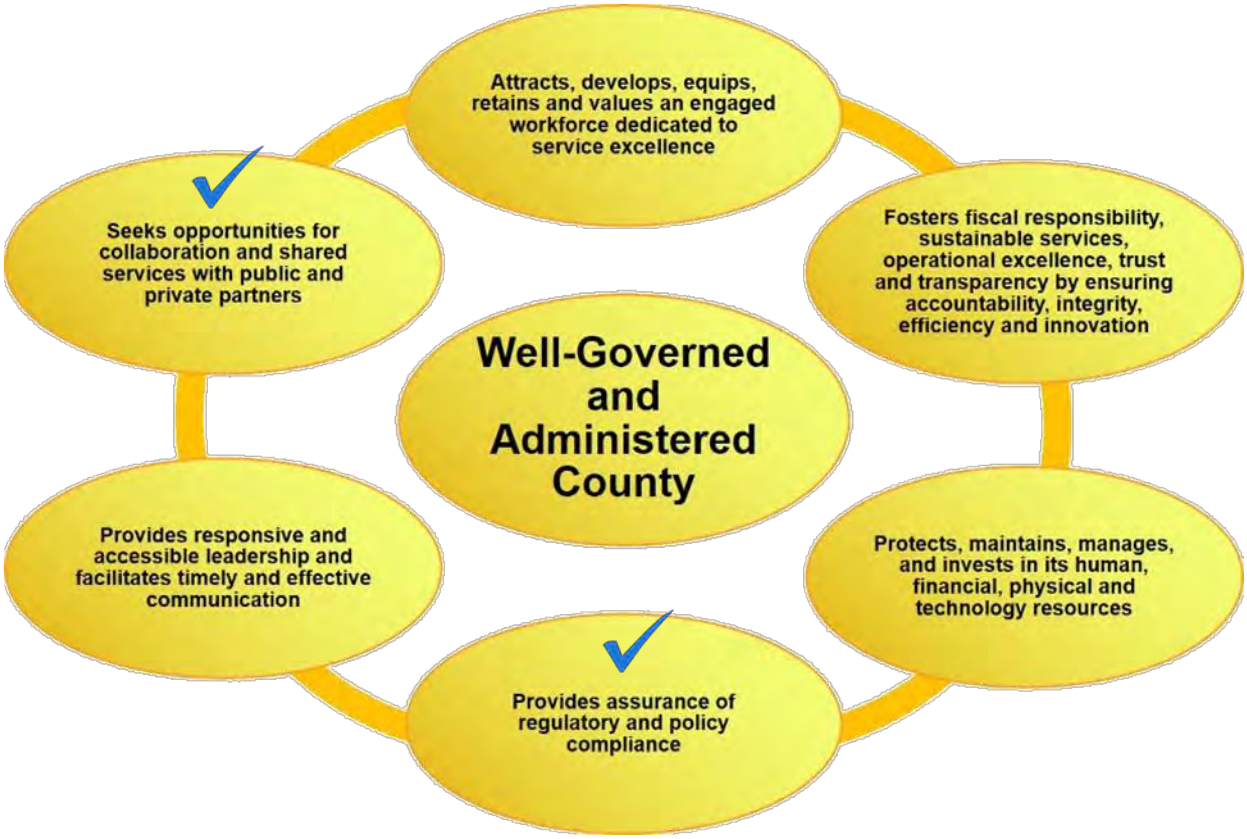
We create an environment for residents and businesses to enjoy our authentic quality of life through a well-governed and administered county dedicated to safe and secure communities; economic growth and vitality; effective mobility and reliable infrastructure; and access to basic needs.

GOALS AND PRACTICES

The goals and practices for County services are shown below. Practices that align with the LWRM Plan are marked with checkmarks.


Access to Basic Physical, Behavioral and Socio-Economic Needs
Collaboratively ensures the availability of treatment and preventative services for those with behavioral, emotional or dependency issues as well as their caregivers
Ensures access to services that provide for the community's health and physical well-being, encompassing all ages, abilities and circumstances
Fosters a safe, caring, well-kept and family-friendly community that supports a positive quality of life
Partners to ensure the community's basic socio-economic needs are met providing care and assistance to improve the circumstances of those at-risk
Provides for the physical, emotional and social well-being of its senior population; ensuring they are independent, safe and included in the community
Provides for the well-being of its youth population; ensuring they are safe and presented with access to opportunities to become productive members of society


Effective Mobility and Reliable Infrastructure
Supports a multi-modal transportation network that is future focused to meet the ongoing needs of the community
Improves, enhances and continuously invests in a safe, reliable, accessible and well-maintained transportation infrastructure
Provides a transportation network that is designed to enhance safe traffic flow, ease congestion and ensure efficient mobility
Provides an interconnected system of safe trails and paths that enhance the mobility of the community
Regionally partners to offer and support convenient, reliable, safe and economical public transit options that are accessible


Attracts, develops, equips, retains and values an engaged workforce dedicated to service excellence
Fosters fiscal responsibility, sustainable services, operational excellence, trust and transparency by ensuring accountability, integrity, efficiency and innovation
Protects, maintains, manages, and invests in its human, financial, physical and technology resources
Provides assurance of regulatory and policy compliance
Provides responsive and accessible leadership and facilitates timely and effective communication
Seeks opportunities for collaboration and shared services with public and private partners
Well-Governed and Administered County

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. Much of the inventory data in this chapter is from *A Multi-Jurisdictional Comprehensive Plan for Washington County: 2050* which was adopted by the Washington County Board of Supervisors on April 10, 2019.

POPULATION

POPULATION TRENDS

The Wisconsin Department of Administration (DOA) estimates the population of Washington County in 2015 was 133,486 residents. Washington County has 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 County's population grew by an additional 36,559 people between 1990 and 2010, a 38 percent increase to 131,887. Then from 2010 to 2015 the population increased by only 1% to the 2015 estimate.

Between 2000 and 2010, the Village of Jackson had the highest percent increase in population of almost 37 percent, followed by the City of Hartford with an increase of approximately 30 percent. From the year 2000 to 2010, most of the communities in Washington County experienced an increase in population with the exception of the Town of Hartford, which decreased by 10.5%, the Town of Germantown (-8.6%), the Town of Kewaskum (-5.9%), and the Town of West Bend (-1.2%). The change in population by community is displayed in *Table 1*.

Table 1

Population Trends in Washington County Communities: 1980-2010

	Year				Change: 2000-2010	
Community	1980	1990	2000	2010	Number	Percent
Cities						
Hartford[a]	7,159	8,188	10,905	14,223	3,318	30.4
West Bend	21,484	24,470	28,152	31,078	2,926	10.4
Villages						
Germantown	10,729	13,658	18,260	19,749	1,489	8.2
Jackson	1,817	2,486	4,938	6,753	1,815	36.8
Kewaskum	2,381	2,514	3,277	4,004	727	22.2
Newburg[b]	783	958	1,119	1,254	135	12.1

Richfield[c]	8,390	8,993	10,373	11,300	927	8.9
Slinger	1,612	2,340	3,901	5,068	1,167	29.9
Towns						
Addison	2,834	3,051	3,341	3,495	154	4.6
Barton	2,493	2,586	2,546	2,637	91	3.6
Erin	2,455	2,817	3,664	3,747	83	2.3
Farmington	2,386	2,523	3,239	4,014	775	23.9
Germantown	267	258	278	254	-24	-8.6
Hartford	3,269	3,243	4,031	3,609	-422	-10.5
Jackson	3,180	3,172	3,516	4,134	618	17.6
Kewaskum	1,243	1,139	1,119	1,053	-66	-5.9
Polk	3,486	3,540	3,938	3,937	-1	0.0
Trenton	3,914	3,967	4,440	4,732	292	6.6
Wayne	1,471	1,374	1,727	2,169	442	25.6
West Bend	3,588	4,165	4,834	4,774	-60	-1.2
Washington County[d]	84,848	95,328	117,496	131,887	14,391	12.2

[a] *Includes that portion of the City of Hartford located in Dodge County. There were nine City of Hartford residents in Dodge County in 1990 and 10 in 2000; however, there were no Hartford residents in Dodge County in 2010.*

[b] *Includes that portion of the Village of Newburg located in Ozaukee County. There were 105 Village of Newburg residents in Ozaukee County in 1990, 92 in 2000, and 97 in 2010.*

[c] *In 2008, the Town of Richfield incorporated as the Village of Richfield. Population data shown for 1980 through 2000 are for the former Town of Richfield.*

[d] *Includes Washington County only.*

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

HOUSEHOLDS

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. There were 51,605 households in Washington County in 2010, taking the assumptions from the SEWRPC VISION 2050 Plan into consideration, the projected number of households for Washington County in 2050 is expected to be 74,300. This is a projected increase of 22,695 households, or about 44 percent. 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 2*.

Table 2:
Household Projections for Washington County Under Vision 2050

Sub-Area	Existing Households: 2010			Projected Households: 2050			Change: 2010–2050	
	Sewered	Unsewered	Total	Sewered	Unsewered	Total	Number	Percent
Urban Service Areas								
Allenton	339	54	393	816	--	816	423	107.6
Germantown	6,574	384	6,958	12,014	--	12,014	5,056	72.7
Hartford	6,100	325	6,425	8,598	--	8,598	2,173	33.8
Jackson	3,063	153	3,216	4,962	--	4,962	1,746	54.3
Kewaskum	1,591	43	1,634	2,608	--	2,608	974	59.6
Newburg[a]	490	195	685	920	--	920	235	34.3
Slinger	2,204	167	2,371	4,055	--	4,055	1,684	71.0
West Bend[b]	13,752	579	14,331	22,911	--	22,911	8,580	59.9
Subtotal	34,113	1,900	36,013	56,884	--	56,884	20,871	58.0
Unsewered Areas[c]								
Addison	--	918	918	--	964	964	46	5.0
Barton	--	659	659	--	733	733	74	11.2
Erin	--	1,405	1,405	--	1,658	1,658	253	18.0
Farmington	--	1,462	1,462	--	1,601	1,601	139	9.5
Germantown	--	899	899	--	1,036	1,036	137	15.2
Hartford	--	375	375	--	393	393	18	4.8
Jackson	--	1,192	1,192	--	1,348	1,348	156	13.1
Kewaskum	--	348	348	--	410	410	62	17.8
Polk	--	1,323	1,323	--	1,571	1,571	248	18.7
Richfield	--	4,170	4,170	--	4,620	4,620	450	10.8
Trenton	--	941	941	--	1,000	1,000	59	6.3
Wayne	--	768	768	--	931	931	163	21.2
West Bend	--	1,206	1,206	--	1,299	1,299	93	7.7
Subtotal	--	15,666	15,666	--	17,564	17,564	1,898	12.1
Washington County	34,113	17,566	51,679	56,884	17,564	74,448	22,769	44.1

[a] *Includes the portion of the Village of Newburg urban service area in Ozaukee County. The Ozaukee County portion of the Village of Newburg urban service area in 2010 includes 52 sewered households, 22 unsewered households, and 148 projected 2050 households.*

[b] *The West Bend sewer service area serves portions of the Big Cedar Lake area.*

[c] *Areas located outside planned urban service areas.*

Source: SEWRPC

LAND USE

LAND USE TRENDS

Between 1990 and 2015, the amount of land used for urban uses, including residential, commercial, industrial, and transportation uses, increased by about 20,321 acres, from about 38,000 acres to almost 60,000 acres, a 54.7 percent increase.

The percentage of land classified as "nonurban" decreased by about 8 percent between 1990 and 2015. Much of the land developed for urban uses between 1990 and 2015 was converted from agricultural to urban use. The amount of land used for agriculture decreased by about 39,400 acres, or by about 25 percent. The number of acres in the "open lands" category, that is, lands that are vacant and apparently unused, increased by about 8,600 acres during the 1990 to 2015 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 between 1990 and 2015.

Based on the 2015 inventory, 59,338 acres, or about 21 percent of the County, were in urban uses. About 28 percent or 78,062 acres, were encompassed in natural resource areas (woodlands, wetlands, and surface waters). About 43 percent or 119,134 acres, were in agricultural use.

Rapid and poorly planned development threaten the natural resource base of any community. Sedimentation from construction site erosion, stormwater runoff and concentrated uses of fertilizers and pesticides have negative impacts to water quality. Over the years, development has led to the loss of wetlands contributing to a host of problems including decreased flood storage area, reduced filtering of runoff water 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. 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.

EXISTING FARMLAND

Agricultural lands in 2015 were identified by 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 119,134 acres, or about 186 square miles, representing almost 43 percent of the County, were in agricultural use in 2015. 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 3*

sets forth the number of acres occupied by farmland in each local government and the County in 2015. *Figure 1* illustrates these existing areas throughout Washington County.

Table 3 and *Figure 1* show the area devoted to farmland use in 2015, 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 2.
- 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 84 percent of agricultural land in the County in 2015.

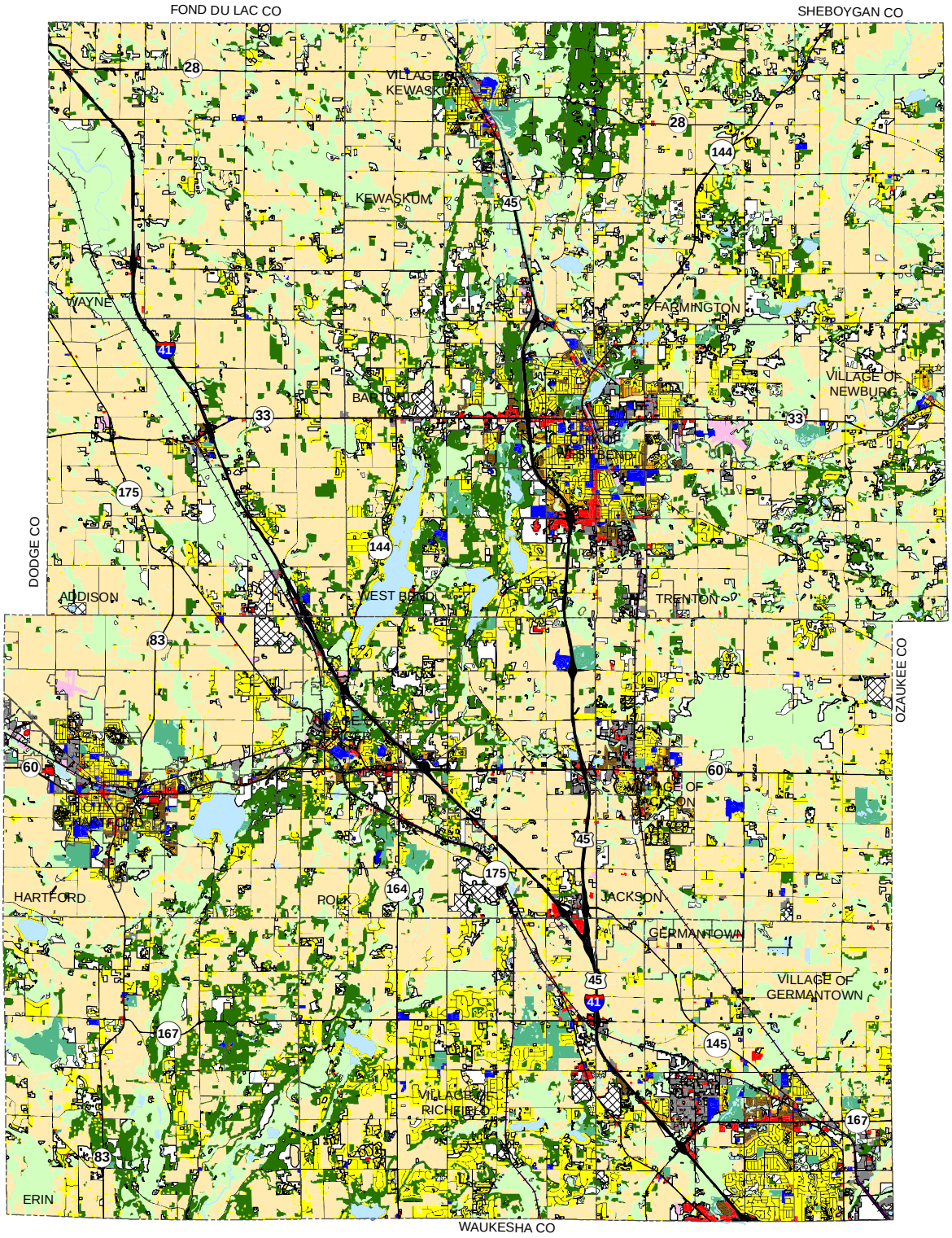
Table 3
Existing Agricultural Lands in Washington County Communities: 2015

Area	Cultivated Lands		Pasture and Unused Agricultural Lands		Orchards, Nurseries, and Specialty Crops		Farm Buildings		Total (acres)
	Acres	Percent of Total	Acres	Percent of Total	Acres	Percent of Total	Acres	Percent of Total	
Town of Addison	13,077	93.4	612	4.4	--	--	312	2.2	14,001
Town of Barton	4,657	88.1	472	9.0	28	0.5	129	2.4	5,286
Town of Erin	5,088	59.5	3,279	38.3	41	0.5	147	1.7	8,555
T. of Farmington	10,796	88.5	1,013	8.3	59	0.5	331	2.7	12,199
T. of Germantown	523	82.5	100	15.7	--	--	11	1.8	634
Town of Hartford	9,600	92.4	542	5.2	33	0.3	216	2.1	10,391
Town of Jackson	8,859	79.1	1,550	13.8	489	4.4	302	2.7	11,200
T. of Kewaskum	5,521	88.4	574	9.2	10	0.2	139	2.2	6,244
Town of Polk	7,430	84.5	1,030	11.7	124	1.4	213	2.4	8,797
Town of Trenton	8,002	83.5	1,293	13.5	49	0.5	239	2.5	9,583
Town of Wayne	11,006	90.4	905	7.4	2	--	262	2.2	12,175
T. of West Bend	1,829	79.2	416	18.0	13	0.6	51	2.2	2,309
City of Hartford	331	92.8	20	5.7	--	--	5	1.5	356
City of West Bend	661	86.0	101	13.1	--	--	7	0.9	769
V. of Germantown	6,103	73.4	1,495	18.0	524	6.3	189	2.3	8,311
Village of Jackson	197	95.3	3	1.4	--	--	7	3.3	207
V. of Kewaskum	93	76.3	28	23.1	--	--	1	0.6	122
Village of Newburg	83	84.3	10	10.2	--	--	6	5.5	99
Village of Richfield	5,290	71.3	1,858	25.0	134	1.9	136	1.8	7,418
Village of Slinger	401	83.9	66	13.9	1	0.0	10	2.2	478
Washington County	99,547	83.6	15,367	12.9	1,507	1.2	2,713	2.3	119,134

Source: SEWRPC

Figure 1

EXISTING LAND USES IN WASHINGTON COUNTY: 2015



Single - Family Residential	Railroads	Surface Water
Two - Family Residential	Communications, Utilities and Other Transportation	Agricultural
Multi - Family Residential and Mobile Homes	Governmental and Institutional	Extractive
Commercial	Recreational	Unused Urban Lands
Industrial	Woodlands	Unused and Other Open Lands (Nonurban)
Streets and Highways	Wetlands	

N W E S

0 0.5 1 2 3 Miles

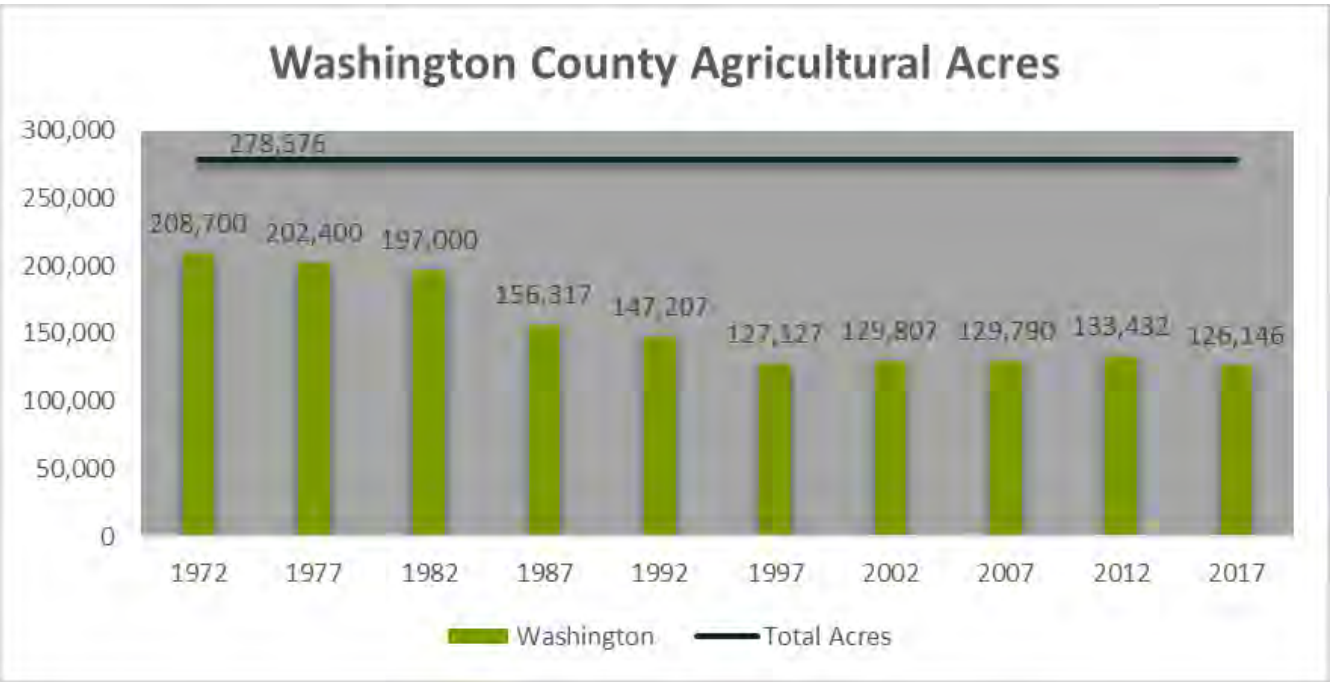
Source: SEWRPC

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 17 percent decline in the number of acres of land in farmland production between 1982 and 2017. Washington County saw about a 40 percent decline in the number of acres of land in farmland production between 1972 and 2017. *Chart 1* illustrates the decline in the number of acres of land in farmland production in Washington County.

Agriculture is the largest single land use in the County, compromising about 129,920 acres, or about 47 percent of the area in the County in 2010.

Figure 2
Acres of Land in Farmland Production in Washington County: 1982 – 2017



Source: Wisconsin Agricultural Statistical Service

Number and Size of Farms

According to the 2017 Census of Agriculture, Washington County had a 28% increase in the number of cattle and calves from 2007 and is now home to 45,180 cattle and calves and 165 hogs and pigs. These animals produce as much waste as a city of approximately 960,000 people. This manure is a valuable and economical source of fertilizer, however if improperly managed, it can adversely impact water quality and aquatic life.

In 2017, there were 578 farms in the County, and the average farm size was 218 acres; the largest percentage of farms in the County, about 31 percent, were between 50 and 179 acres. An additional 26.9 percent of farms were between 10 and 49 acres. Only about 10 percent of farms were more than 500 acres in size.

In the time period from 2012 to 2017, the number of farms in Washington County declined by 19 percent and the number of cattle and calves increased by 6 percent while the acreage of farmlands remained nearly the same. *Table 4* and *Table 5* sets forth the number of farms by size category in Washington County and Wisconsin. There were 831 farms in the County in 2007, with an average farm size of 156 acres compared to 194 acres for farms in the State.

***Table 4*:**
Farm Size in Washington County: 2007, 2012 and 2017 & Wisconsin: 2017

	2007		2012		2017		State of Wisconsin: 2017	
Size (Acres)	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Less than 10 acres	78	9.3	82	11.5	81	14.0	5,923	9.1
10 to 49 acres	282	33.9	226	31.7	155	26.9	16,919	26.1
50 to 179 acres	279	33.6	223	31.3	180	31.1	21,254	32.8
180 to 499 acres	134	16.1	120	16.8	100	17.3	14,177	21.8
500 to 999 acres	41	4.9	40	5.6	42	7.3	4,180	6.5
1,000 acres or more	17	2.0	21	2.9	20	3.4	2,340	3.6
Total:	831	100.0	712	100.0	578	100.0	64,793	100.0

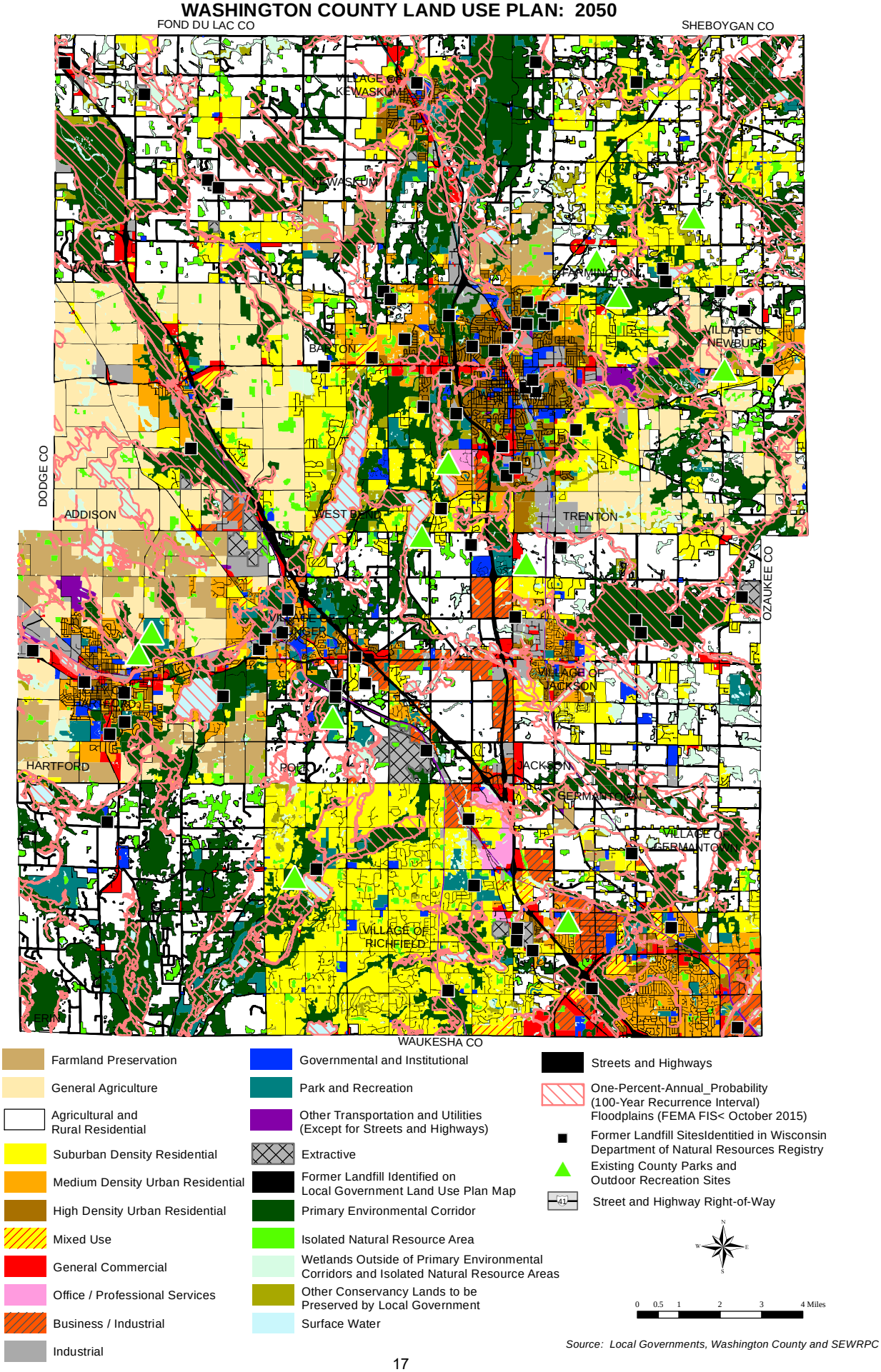
Source: Wisconsin Agricultural Statistical Service

Planned Land Uses 2050

The land use plan for Washington County for the year 2050 is presented on *Figure 3*. *Table 5* 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, current as of January 24, 2019, 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 2050, however, uses a "phased plan" approach to land use planning.

Figure 3

WASHINGTON COUNTY LAND USE PLAN: 2050



Source: Local Governments, Washington County and SEWRPC

Table 5
Planned Land Uses in Washington County: 2050

Land Use Category	Acres	Percent of Subtotal (Urban or Nonurban)	Percent of Total
Urban			
Suburban-Density Residential[a]	35,262	38.0	12.6
Medium-Density Urban Residential[b]	10,176	11.0	3.7
High-Density Urban Residential[c]	5,157	5.6	1.9
Residential Subtotal	50,595	54.6	18.2
Mixed-Use	1,539	1.7	0.6
General Commercial	4,476	4.8	1.6
Office/Professional Services	707	0.8	0.3
Business/Industrial	4,475	4.8	1.6
Industrial	4,256	4.6	1.5
Governmental and Institutional	2,861	3.1	1.0
Park and Recreation	6,243	6.6	2.2
Street and Highway Rights-of-Way	16,085	17.4	5.8
Other Transportation and Utilities	1,464	1.6	0.5
Urban Subtotal	92,701	100.0	33.3
Nonurban			
Farmland Preservation[d]	7,811	4.2	2.8
General Agricultural	22,423	12.1	8.0
Agricultural and Rural Residential[e]	73,375	39.4	26.3
Extractive	1,778	1.0	0.6
Former Landfill Identified on Local Government Land Use Plan Map	31	--[f]	--[f]
Primary Environmental Corridor	56,795	30.5	20.4
Isolated Natural Resource Area	6,320	3.4	2.3
Wetlands Outside Primary Environmental Corridors and Isolated Natural Resource Areas	8,763	4.7	3.1
Other Conservancy Lands to be Preserved by Local Government[g]	3,909	2.1	1.4
Surface Water	4,851	2.6	1.8
Nonurban Subtotal	186,056	100.0	66.7
Total	278,757	--	100.0

[a] *Average density equating to one home per 1 to 4.9 acres.*

[b] *Average density equating to one home per 10,000 to 43,559 square feet.*

[c] *Average density of less than 10,000 square feet per home.*

[d] *Includes portions of parcels within the farmland preservation areas (FPAs) shown on Map T-25 of the Washington County farmland preservation plan that are outside primary environmental corridors, isolated natural resource areas, and wetlands. Land uses on parcels included in FPAs on Map T-25 must comply with the requirements of Chapter 91 of the* Wisconsin Statutes. *Primary environmental corridors, isolated natural resource areas, and wetlands within FPAs are shown on Figure 3 for informational purposes.*

[e] *Allows agricultural uses and residential uses with an average density of one home per 5 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.*

[f] *Less than 0.05 percent.*

[g] *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 environmental corridors, isolated natural resource areas, and wetlands.*

[h] *Boundaries of the one-percent-annual-probability floodplains are based on floodplains identified by the Federal Emergency Management Agency (FEMA). Documentation for FEMA study reaches are summarized in the Washington County Digital Flood Insurance Rate Map and in the Flood Insurance Study, October 16, 2015. About 15 percent of the County is located in the 100-year floodplain.*

[i] *Includes 78 closed landfills encompassing 396 acres (acreage data was unavailable for 13 sites). See Table 6.4 in Chapter 6 of the Multi-Jurisdictional Comprehensive Plan for Washington County: 2050 for a list of closed landfills listed on the WDNR registry of waste disposal sites.*

Source: SEWRPC

UTILITIES

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.

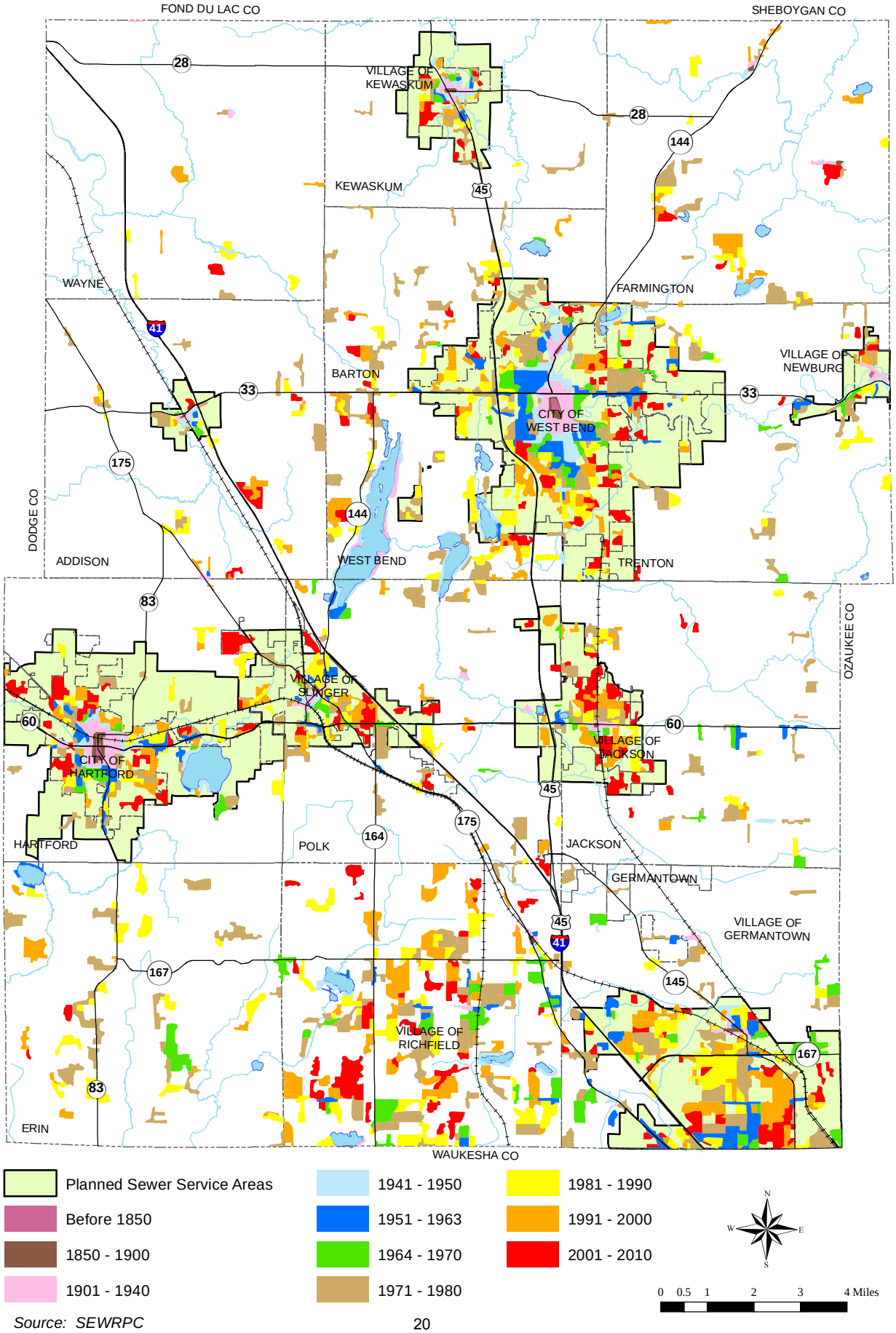
SANITARY SEWER SERVICES

About 49,784 acres, or 18 percent of the County, were within existing sanitary sewer service areas in 2015. *Figure 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. About 18,594 acres, or about 7 percent of the County, were served by public sanitary sewers in 2010; an estimated 84,500 residents, or about 64 percent of Washington County residents.

Figure 4

HISTORICAL URBAN GROWTH IN WASHINGTON COUNTY: 1850 - 2010



Source: SEWRPC

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. *Figure 4 and Figure 5* shows the urban development, prior to 2010, 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 sewage system or a POWTS. 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 14,592 POWTS in Washington County between 1980 and 2018.

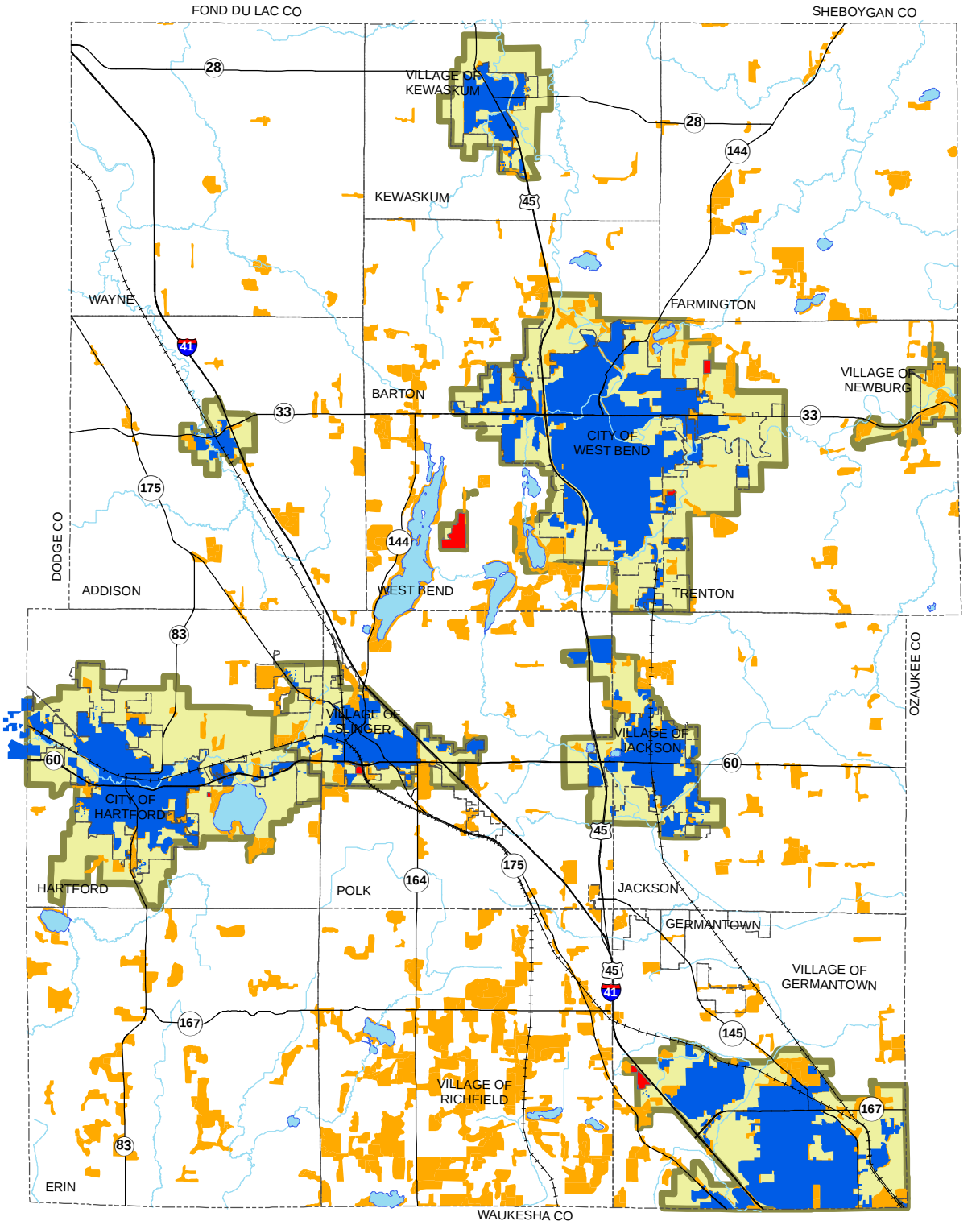
Water Supply Systems

In 2010, the total estimated use of water in Washington County was 12.86 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 5.87 mgd. Other water uses included 1.35 mgd by industrial, 1.49 mgd by commercial, 0.74 mgd by agricultural, 0.77 mgd for irrigation, and 2.64 mgd by governmental or institutional land and water lost to the system.

Figure 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 17,300 acres, or about 6 percent of the County, in 2010. An estimated 80,100 County residents, or about 61 percent of the County population, were served by public water utilities in 2010. 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. The total water use demand per day is expected to increase from 6.2 mgd to 11.7 mgd in 2035. These pumpage estimates include water use base based on sales, water used for production and system maintenance, and unaccounted-for water. About 50 percent of this projected increase in water use throughout Washington County is due to existing development not currently served, but within the planned 2035 service areas.

Figure 5

Areas Served by Public and Private Water Utilities in Washington County: 2010



Areas Served by Private Water Utilities

Areas Served by Public Water Utilities

Urban Development as Identified in the Regional Planning Commission Historic Urban Growth Ring Analysis

Planned Sewer Service Areas

Surface Water

N W E S

0 0.5 1 2 3 4 Miles

Source: Washington County and SEWRPC

Chapter III

RESOURCE INVENTORY & ASSESSMENT

The conservation and wise use of natural resources are fundamental to achieving strong and stable physical and economic development as well as maintaining community identity. Recognizing that each natural resource is limited and difficult or impossible to replace if damaged or destroyed is important. 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 the County that the management and use of our natural resources be carefully tailored to the capacity of the underlying resource.

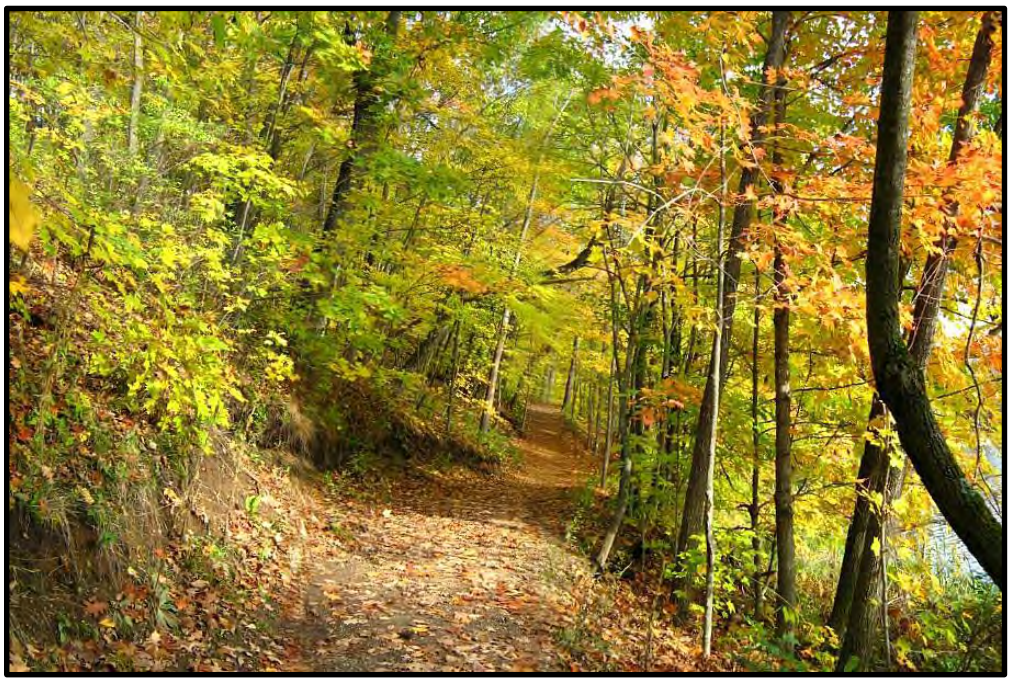
This chapter provides inventory information on existing natural resources in Washington County. Information regarding topography, water resources, soil types, nonmetallic mining resources, woodland resources, natural areas, critical species habitats and environmental corridors is included in this chapter. Much of the inventory data in this chapter is from *A Multi-Jurisdictional Comprehensive Plan for Washington County: 2050* which was adopted by the Washington County Board of Supervisors on April 10, 2019.

NATURAL RESOURCES

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 separated from the ice mass and melted to form depressions; eskers, or long, narrow ridges of drift deposited in tunnels of ice; and abandoned drainage ways. 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, the entire County is covered with glacial deposits ranging from large boulders to fine clays.

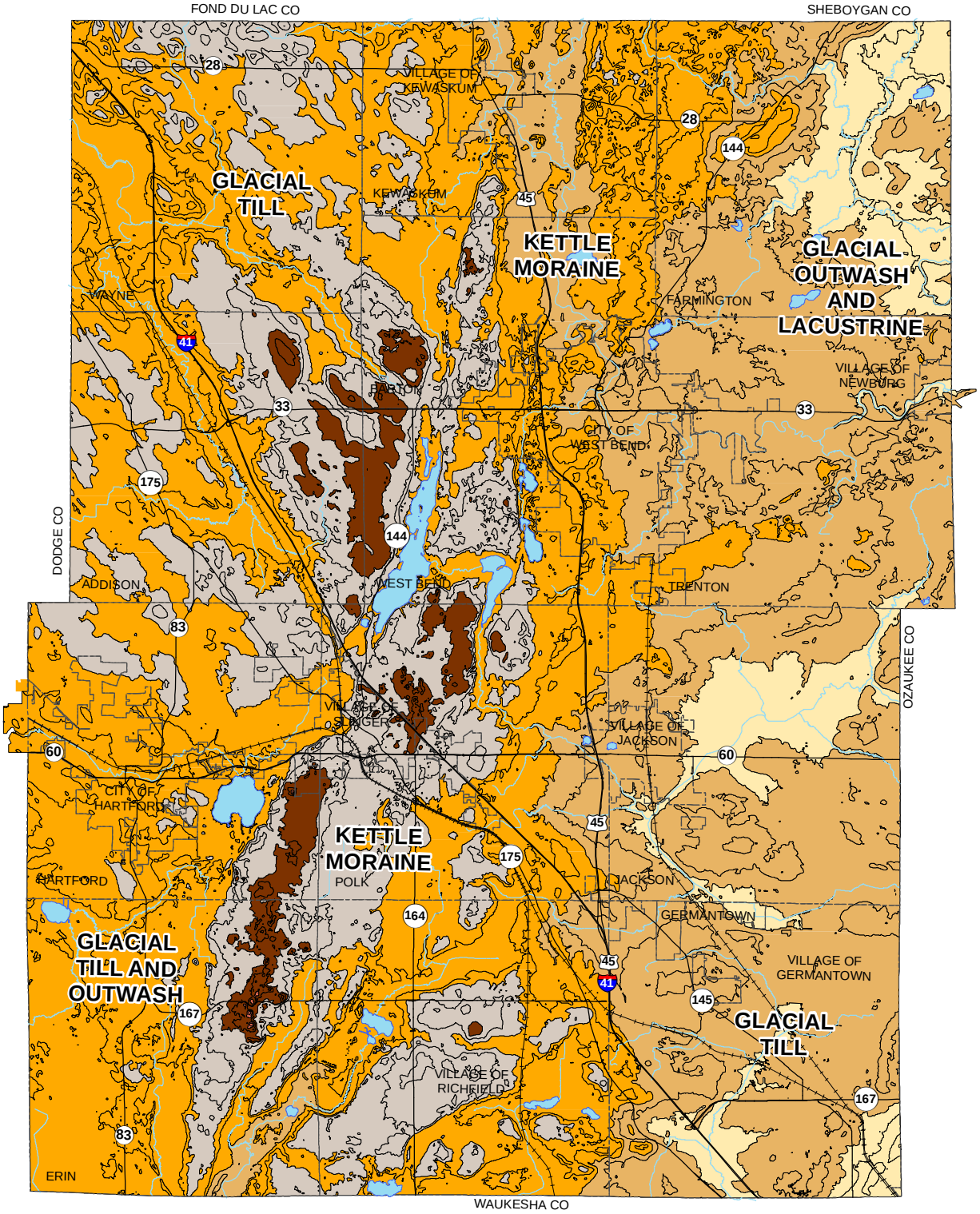


Generalized landforms and topographic characteristics in about 100-foot interval contours are shown on *Figure 6.* Surface elevations range from a low of about 755 feet above sea level in the southeast portion of the Village of Germantown at the Ozaukee-Washington County line to a high of 1,332 feet 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.

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. *Figure 7* 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.

Figure 6

Physiographic Features and Generalized Topographic Characteristics in Washington County



Elevation in Feet Above Mean Sea Level

1250 - 1335	950 - 1049	Surface Water
1150 - 1249	850 - 949	
1050 - 1149	750 - 849	

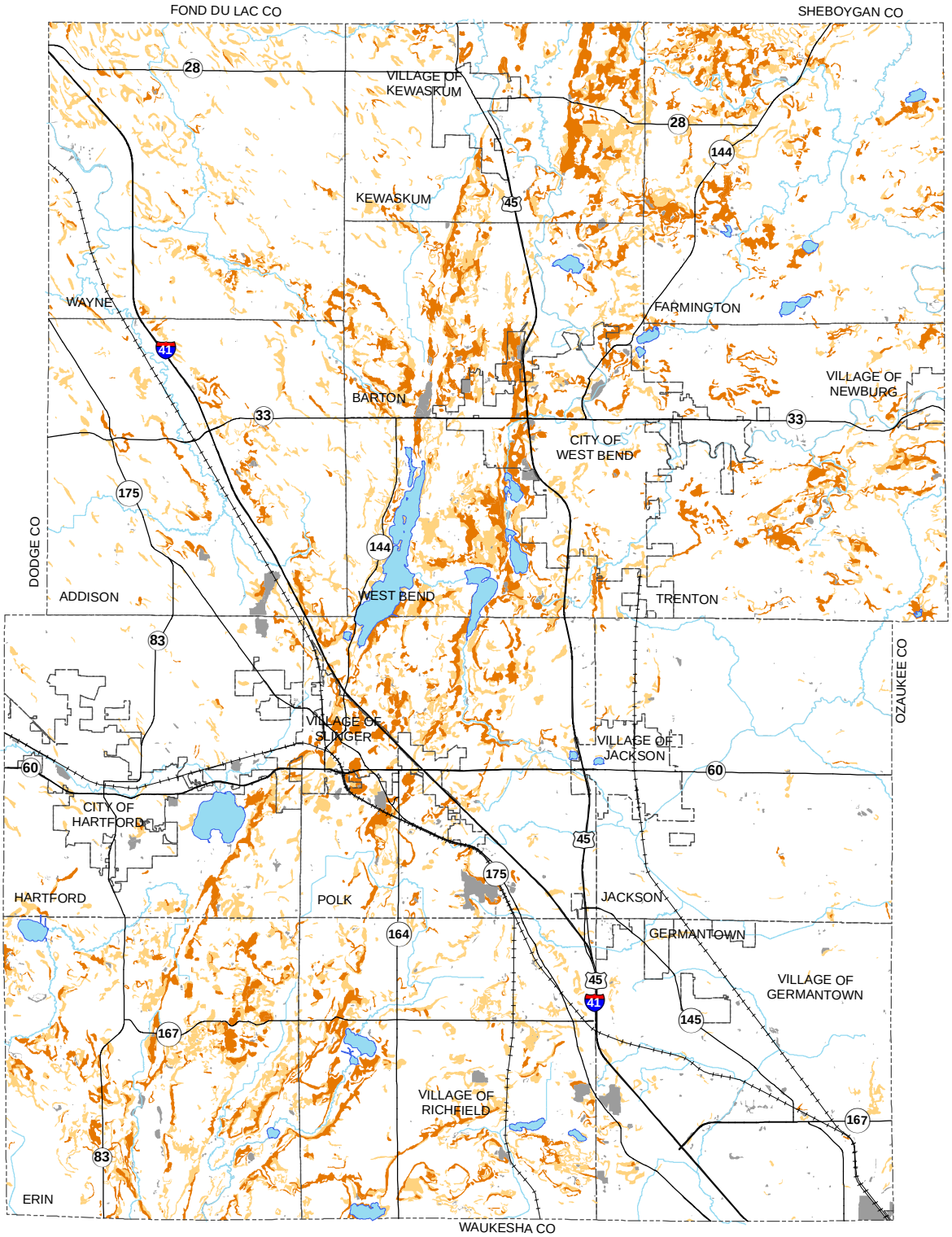
N W E S

0 0.5 1 2 3 4 Miles

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

Figure 7

Slope Analysis for Washington County: 2016



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

N W E S

0 0.5 1 2 3 4 Miles

Source: USDA-Natural Resources Conservation Service and SEWRPC

WATERSHEDS AND SUBWATERSHEDS

Watersheds are often used in natural resource management and conservation because land use practices within the watershed can impact the water quality of the stream or lake. Adoption and implementation of conservation practices within a watershed should improve the water quality of the lake or stream that it drains to. Through the years, many implementation programs have required targeting watersheds to focus implementation efforts, often referred to as Hydrologic Unit Codes (HUC) or areas which is a sequence of numbers, the more numbers the smaller the watershed. With the onset of Wisconsin's phosphorus rules, new projects and programs identifying targeted priority areas are explained in Chapter IV. *Figure 8* depicts the four main drainage systems that make up Washington County and forms the basis for management actions undertaken and supported by the Regional Water Quality Management Planning Program and the WDNR.

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 Village of Richfield on the south, as shown on *Figure 9*. 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 - Illinois watershed, which encompasses less than one-tenth of 1 percent of the County.

FOX RIVER - ILLINOIS WATERSHED

As noted above, a portion of the Fox River - Illinois watershed is located in the south central portion of Washington County. However, the main stem of the Fox River - Illinois originates to the south of the southern boundary of Washington County 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 about one-half square miles, or about 0.1 percent of the total land area of the County. This portion of the Upper Fox River - Illinois watershed represents less than one 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.[1]

[1]Wisconsin Department of Natural Resources Publication No. WR-320-93, *op. cit.*

Given the similarities of this portion of the Fox River - Illinois watershed to neighboring portions of the Rock and Menomonee River watersheds the recommendations for those watersheds may be considered applicable to the portion of the Fox River basin within the context of this plan.

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 northwesterly direction into Dodge County. The Rubicon and Ashippun Rivers flow in a 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 southerly direction into Waukesha County. The watershed encompasses approximately 178 square miles, or 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.[2] The Rock River watershed is characterized by rolling ground moraines.

Land use in the Rock River watershed is mixed, with about 20 percent of the watershed in urban land uses or urbanizing. About 51 percent of the watershed is in agricultural land use. Wetlands and surface waters comprise about 19 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 sub basin, in the northwestern portion of the County.

MENOMONEE RIVER WATERSHED

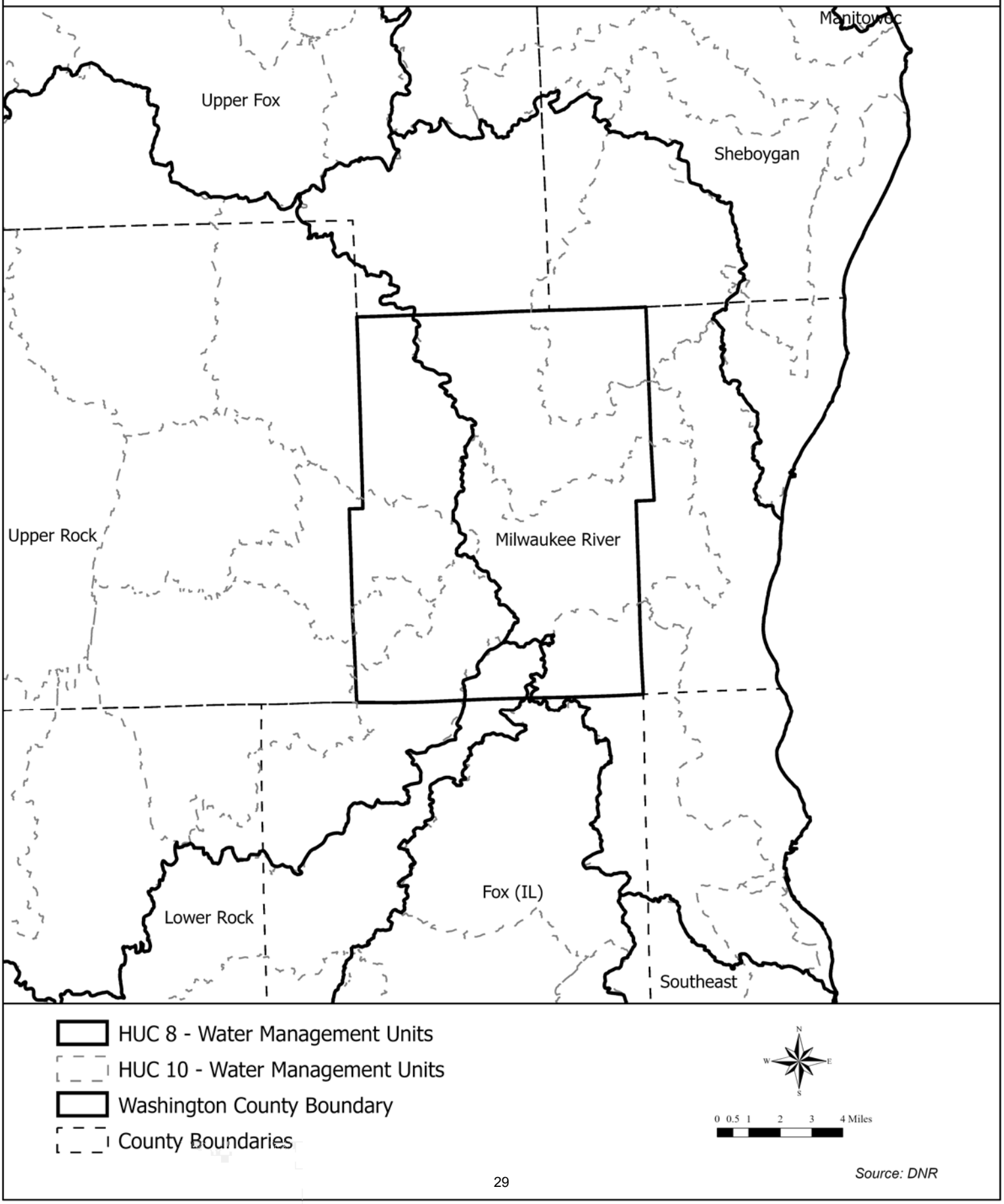
The portion of the Menomonee River watershed in Washington County is located in the southeastern part of the County. The Menomonee River extends southward and proceeds in a southeasterly direction to its confluence with the Milwaukee River within the City of Milwaukee in Milwaukee County, as shown on *Figure 9*. 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 7 percent of the total land area of Washington County and 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 Village of Richfield, about 40 percent of the watershed is urban land uses or urbanizing. Approximately 38 percent of the watershed remains in agricultural and rural land uses. Wetlands and surface waters comprise about 18 percent of the watershed area, and woodland comprise about 4 percent of the land uses.

[2]Wisconsin Department of Natural Resources Publication No. WR-194-86, *op. cit*.

Figure 8

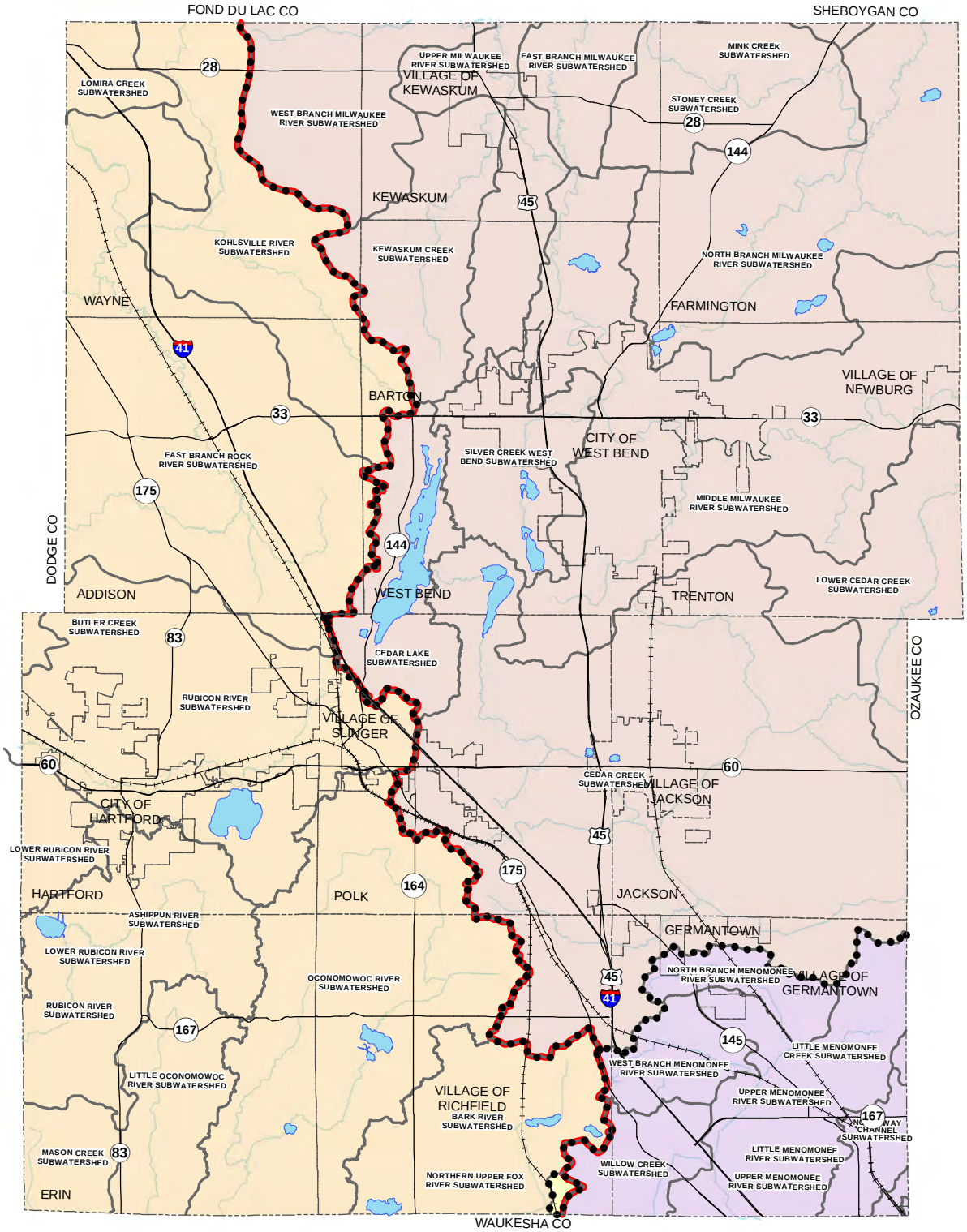
8 and 10 Digit Water Management Units
Washington County



Source: DNR

Figure 9

Watershed Features in Washington County



Source: SEWRPC

MILWAUKEE RIVER WATERSHED

The Milwaukee River watershed in Washington County comprises the eastern portion of the County. The watershed contains 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.[3] 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 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 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 usage in the Milwaukee River watershed is mixed, with about 21 percent of the watershed in urban land use or urbanizing. About 51 percent of the watershed is in agricultural use. Wetlands and surface waters comprise about 18 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.

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 6*.

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

[3]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*.

groundwater resources constitute the major source of supply for domestic, municipal, and industrial water users in Washington County.

Table 6
Surface Water, Wetlands and Floodplains in Washington County Communities

Area	Surface Water (acres)	Floodplains (acres)[b]	Wetlands (acres)
Partnering Governments			
Village of Jackson	33	207	135
Village of Kewaskum	38	286	152
Town of Addison	53	3,316	3,794
Town of Barton	268	1,543	1,736
Town of Erin	377	2,560	4,360
Town of Farmington	402	4,115	3,914
Town of Germantown	7	369	237
Town of Hartford	521	2,386	2,875
Town of Jackson	119	4,882	4,903
Town of Kewaskum	104	2,883	2,652
Town of Polk	286	1,988	1,960
Town of Trenton	347	3,016	4,155
Town of Wayne	142	5,579	6,027
Non-Partnering Governments			
City of Hartford	74	525	769
City of West Bend	193	922	913
Village of Germantown	295	3,505	3,821
Village of Newburg	18	70	42
Village of Richfield	464	2,327	2,644
Village of Slinger	34	321	436
Town of West Bend	1,379	2,017	1,115
Washington County[c]	5,158	42,817	46,640

[a] *The area within surface water and wetlands is based on the 2015 SEWRPC land use inventory and city and village limits as of January 1, 2017.*
[b] *The area within floodplains is based on the Washington County Flood Insurance Study.*
[c] *Includes four acres of the City of Milwaukee lying in the extreme southeastern corner of Washington County.*
Source: Federal Emergency Management Agency and 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 approximately 220 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 *Figure 9*. The lengths and water quality characteristics of the streams are listed in *Table 7*.

There are 13 major lakes of 50 or more acres located entirely within Washington County, which are listed in *Table 8*. 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. 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 7
Major Streams in Washington County

Watershed and Stream	Stream Length (miles)	Mean Width (feet)	Mean Depth (feet)	Drainage Area (acres)	Percent of Land Area
Menomonee River Watershed					
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
Milwaukee River Watershed					
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
Rock River Watershed					
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
Total	**244.0**	**- -**	**- -**	**278,566.2**	**100.00**

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

Table 8
Lakes within Washington County

Lake	Surface Area (acres)	Volume (acre-feet)	Maximum Depth (ft.)	Mean Depth (ft.)
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

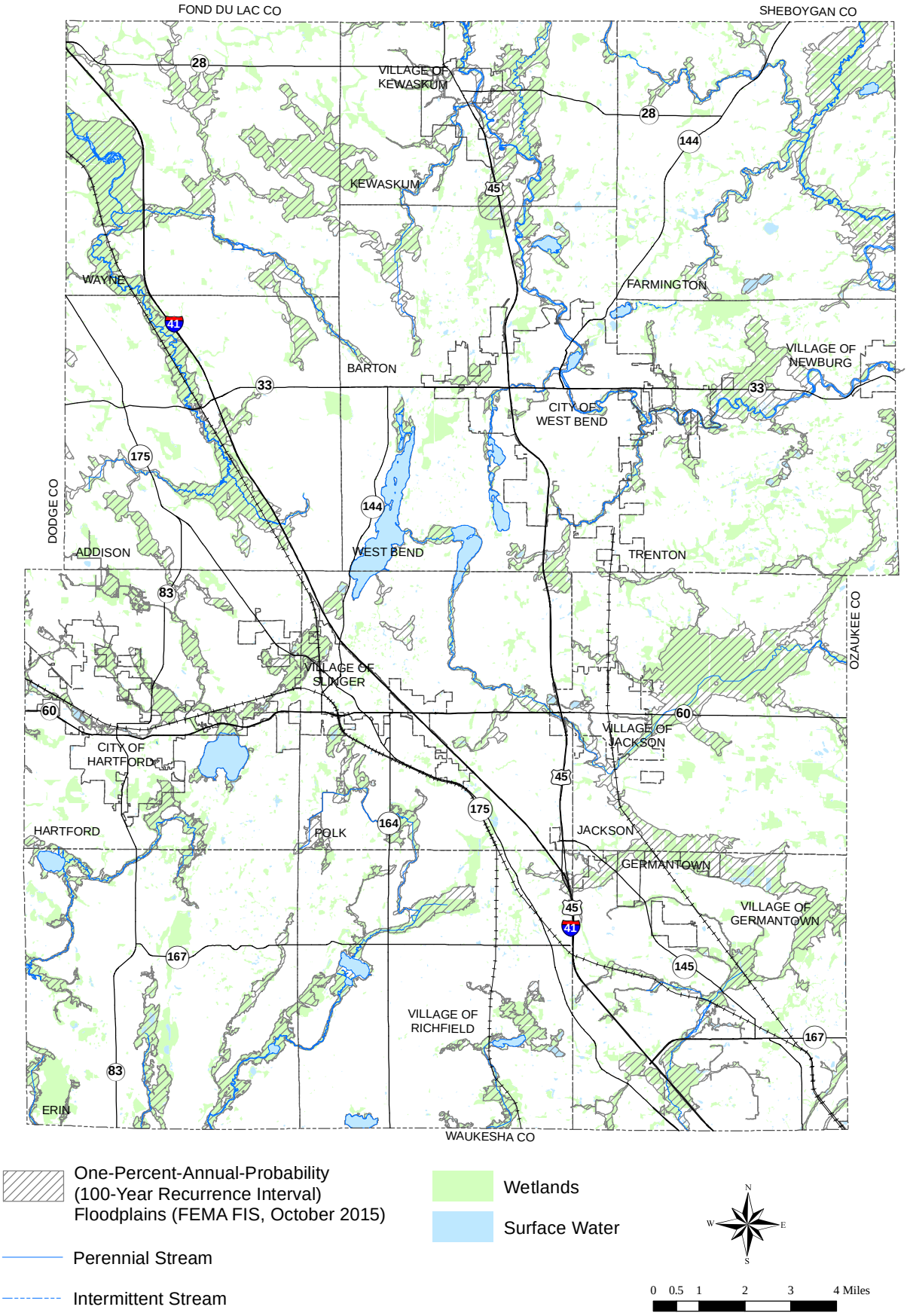
Lake	Surface Area (acres)	Volume (acre-feet)	Maximum Depth (ft.)	Mean Depth (ft.)
Lohr Pond	7	- -	8	- -
Lowe	23	253	23	11
Lucas	78	468	15	6
Malloy	5	- -	24	- -
Mayfield Pond	8	- -	4	- -
McConville	14	- -	37	- -
Miller	3	- -	16	- -
Mud T10N R19E S19	23	- -	10	- -
Mud T9N R19E S24	5	15	5	3
Mueller	14	210	33	15
Murphy	16	- -	37	- -
Newburg Pond	7	- -	8	- -
Paradise Valley	9	- -	35	- -
Pike	522	- -	45	- -
Proschinger	6	- -	23	- -
Quaas	7	- -	12	- -
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	- -
Total	**3,075**	**50,292**	**- -**	**- -**

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.

Figure 10

Surface Waters, Wetlands and Floodplains in Washington County: 2015



Source: Federal Emergency Management Agency and SEWRPC

Outstanding and Exceptional Waters

Wisconsin has designated many of the state's highest quality waters as **Outstanding Resource Waters** (ORWs) or **Exceptional Resource Waters** (ERWs). Waters designated as ORW or ERW are surface waters which provide outstanding recreational opportunities, support valuable fisheries and wildlife habitat, have good water quality, and are not significantly impacted by human activities.

Outstanding Resource Waters do not have any point sources discharging pollutants directly to the water, though they may receive runoff from nonpoint sources. *Exceptional Resource Waters* may have a point source discharger, however, dischargers to ERW waters are required to maintain background water quality levels.

Table 9
Outstanding and Exceptional Waters Report:
Washington County

WADRS ID	Official Waterbody Name	Local Waterbody Name	WBIC	ORW/ ERW	ORW/ ERW ID	Start Mile	End Mile	Mileage	Code Reference	Counties	Watersheds
10102	East Branch Milwaukee River	East Branch Milwaukee River	36900	ERW	1187	2.55	18.35	15.8	102.11(1)(d) 39	Washington and Fon du Lac	MI06

Source: Wisconsin Department of Natural Resources

Impaired Waters

Every two years, Section 303(d) of the Clean Water Act requires states to publish a list of all waters that do not meet water quality standards. The list, also known as the Impaired Waters List, is updated to reflect waters that are newly added or removed based on new information or changes in water quality status. *Table 10* lists the lakes and rivers in Washington County that are on the Impaired Waters List, as of July 2019. Impaired Waters in Washington County are also shown on Map 5 in Appendix D.

Section 303(d) of the Clean Water Act requires the State to prepare a list of impaired waterbodies that will remain so even after the application of technology-based standards typically applied to point sources of pollution. The State is to identify the pollutants causing the problem, identify the sources of that pollution and develop a Total Maximum Daily Load (TMDL) of that pollution that a water body can receive and still meet water quality standards. The State is then required to set priorities for implementing strategies to meet the TMDL.

Table 10
Washington County Lakes and Rivers on the Impaired Waters List

Official Name	Local Name	Start Mile	End Mile	WBIC	Water Type	County	Pollutant	Impairment	Status	Priority
Ashippun River	Ashippun River	0	33.17	853800	River	Dodge Jefferson Washington Waukesha	Total Phosphorus	Impairment Unknown	303d Listed	Low
Cedar Creek	Cedar Creek	5.01	32.71	21300	River	Ozaukee Washington	Total Phosphorus	Impairment Unknown	TMDL Development	High
Cedar Creek	Cedar Creek	5.01	32.71	21300	River	Ozaukee Washington	PCBs	Contaminated Fish Tissue	Water Delisted	Delisted 2010
Druid Lake	Druid Lake			855200	Lake	Washington	Unknown Pollutant	Excess Algal Growth	Proposed to Delist	N/A
Evergreen Creek	Evergreen Creek	0	5.21	23000	River	Washington	Sediment/ Total Suspended Solids	Degraded Habitat	TMDL Development	High
Flynn Creek	Flynn Creek	0	5.92	852800	River	Washington	Sediment/ Total Suspended Solids	Degraded Habitat	TMDL Approved	N/A
Friess Lake	Friess Lake			853200	Lake	Washington	Total Phosphorus	Excess Algal Growth	303d Listed	Low
Friess Lake	Friess Lake			853200	Lake	Washington	Unknown Pollutant	Excess Algal Growth	Pollutant Removed	Delisted 2016
Goldendale Creek	Goldenthal Creek	0	3.5	18900	River	Washington	Fecal Coliform	Recreational Restrictions-Pathogens	TMDL Development	High
Kohlsville River	Kohlsville River	0	8.33	865400	River	Washington	Total Phosphorus	Water Quality Use Restrictions	TMDL Approved	N/A
Kohlsville River	Kohlsville River	0	8.33	865400	River	Washington	Sediment/ Total Suspended Solids	Degraded Habitat	TMDL Approved	N/A
Lehner Creek	Lehner Creek	0	2.12	24400	River	Washington	Sediment/ Total Suspended Solids	Elevated Water Temperature, Degraded Habitat	TMDL Development	High
Limestone Creek	Limestone Creek	0	1.67	866800	River	Washington	Sediment/ Total Suspended Solids	Degraded Habitat	TMDL Approved	N/A
Mason Creek	Mason Creek	4.11	6.14	851100	River	Washington	Sediment/ Total Suspended Solids	Low DO, Elevated Water Temperature	TMDL Approved	N/A
Mason Creek	Mason Creek	4.11	6.14	851100	River	Washington	Total Phosphorus	Low DO	TMDL Approved	N/A

Table 10 Continued

Official Name	Local Name	Start Mile	End Mile	WBIC	Water Type	County	Pollutant	Impairment	Status	Priority
Menomonee River	Menomonee River	6.27	24.81	16000	River	Milwaukee Washington Waukesha	Total Phosphorus	Impairment Unknown	TMDL Development	High
Menomonee River	Menomonee River	24.81	30.14	16000	River	Washington	Total Phosphorus	Impairment Unknown	Delist	N/A
Menomonee River	Menomonee River	6.27	24.81	16000	River	Milwaukee Washington Waukesha	Chloride	Chronic Aquatic Toxicity, Acute Aquatic Toxicity	Addition	Low
Milwaukee River	Milwaukee River	68.5	103.3	15000	River	Fond du Lac Washington	PCBs	Contaminated Sediment	Water Delisted	Delisted 2006
Milwaukee River	Milwaukee River	29.33	68.5	15000	River	Ozaukee Washington	Total Phosphorus	Impairment Unknown	TMDL Development	High
Milwaukee River	Milwaukee River	29.33	68.5	15000	River	Ozaukee Washington	PCBs	Contaminated Sediment	Water Delisted	Delisted 2006
Milwaukee River	Milwaukee River	29.33	68.5	15000	River	Ozaukee Washington	Unknown Pollutant	Elevated Water Temperature	303d Listed	Low
Milwaukee River	Milwaukee River	68.5	103.3	15000	River	Fond du Lac Washington	Unknown Pollutant	Elevated Water Temperature	303d Listed	Low
North Branch Milwaukee River	Milwaukee River North Branch	0	23.5	27100	River	Ozaukee Sheboygan Washington	Total Phosphorus	Degraded Biological Community	TMDL Development	High
Pike Lake	Pike Lake			858300	Lake	Washington	Mercury	Contaminated Fish Tissue	303d Listed	Low
Rubicon River	Rubicon River	11.43	29	856500	River	Dodge Washington	Total Phosphorus	Water Quality Use Restrictions	303d Listed	Low
Unnamed	Nor-X-Way Channel	0	4.9	18450	River	Ozaukee Washington Waukesha	Total Phosphorus	Water Quality Use Restrictions	TMDL Development	High
Unnamed	Jackson Creek	0	1.25	23900	River	Washington	Sediment/ Total Suspended Solids	Degraded Habitat	TMDL Development	High
Unnamed	Nor-X-Way Channel	0	4.9	18450	River	Ozaukee Washington Waukesha	Fecal Coliform	Recreational Restrictions-Pathogens	TMDL Development	High
Unnamed	Unnamed Trib to Unnamed Creek	0	1.83	5030146	River	Washington	Total Phosphorus	Impairment Unknown	Proposed for List	Medium

Table 10 Continued

Official Name	Local Name	Start Mile	End Mile	WBIC	Water Type	County	Pollutant	Impairment	Status	Priority
Unnamed	West Br. Menomonee	0	2.45	5033615	River	Washington	Fecal Coliform	Recreational Restrictions-Pathogens	TMDL Development	High
Wayne Creek	Wayne Creek	0	3.1	865500	River	Washington	Total Phosphorus	Water Quality Use Restrictions	303d Listed	Low
Wayne Creek	Wayne Creek	3.08	4.14	865500	River	Washington	Sediment/ Total Suspended Solids	Degraded Habitat	TMDL Approved	N/A
Wayne Creek	North Branch Wayne Creek	4.14	4.8	865500	River	Washington	Sediment/ Total Suspended Solids	Degraded Habitat	TMDL Approved	N/A
West Branch Milwaukee River	West Branch Milwaukee River	0	20.6	40400	River	Dodge Fond du Lac Washington	Total Phosphorus	Impairment Unknown	303d Listed	Medium
Willow Creek	Willow Creek	0	2.8	18800	River	Washington Waukesha	Fecal Coliform	Recreational Restrictions-Pathogens	TMDL Development	High

Source: Wisconsin DNR Impaired Waters Search – Water Condition Viewer July 2019

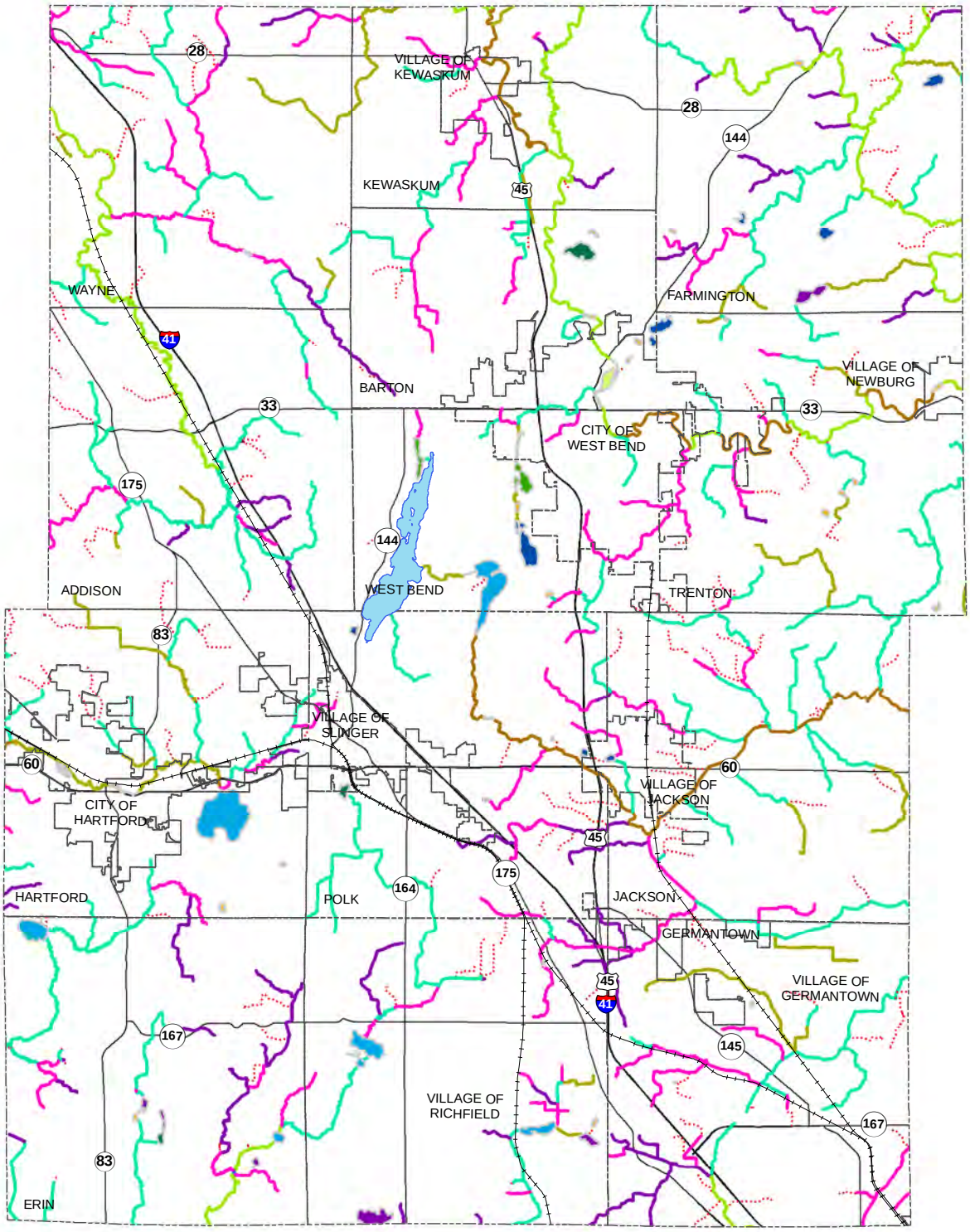
SURFACE WATER NATURAL COMMUNITIES DESIGNATIONS

Protecting and preserving riverine and lake natural communities are important to the environment and economy. New scientific findings have identified distinct "natural communities" into which different types of streams, rivers and lakes can be grouped. These groupings help us manage the resources more effectively.

Wisconsin's Riverine and Lake Natural Communities represent analyzed products from a USGS/DNR Bureau of Science Services model created based on predicted flow and temperatures. Ranges of flow and temperature for rivers are associated with specific aquatic life communities (fish, macroinvertebrates). Lakes natural communities are based on lake surface area, stratification status, hydrology and watershed size, which are stored in the Register of Waterbodies (ROW) database. To find out more about how the communities were assigned refer to the Wisconsin Department of Natural Resources, Wisconsin's riverine and lake natural communities webpage at: https://dnr.wi.gov/topic/Rivers/naturalcommunities.html#lakes

Figure 11

Riverine and Lake Natural Communities of Washington County



No Classification
Deep Headwater
Deep Lowland
Deep Seepage
Impounded Flowing Water
Reservoir
Shallow Headwater
Shallow Lowland
Shallow Seepage
Small
Coldwater
Cool-Cold Headwater
Cool-Cold Mainstem
Cool-Warm Headwater
Cool-Warm Mainstem
Large River
Macroinvertebrate
No Classification
Warm Headwater
Warm Mainstem
Big Cedar Lake Designation: Two-Story - Stratified (Based also on historically supporting a native cold water fishery)

N W E S

0 0.5 1 2 3 4 Miles

Source: Department of Natural Resources

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.[4] 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. *Figure 12* 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 outwash

[4] *Documented in the Soil Survey, Washington County, Wisconsin, USDA Soil Conservation Service, June 1971.*

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

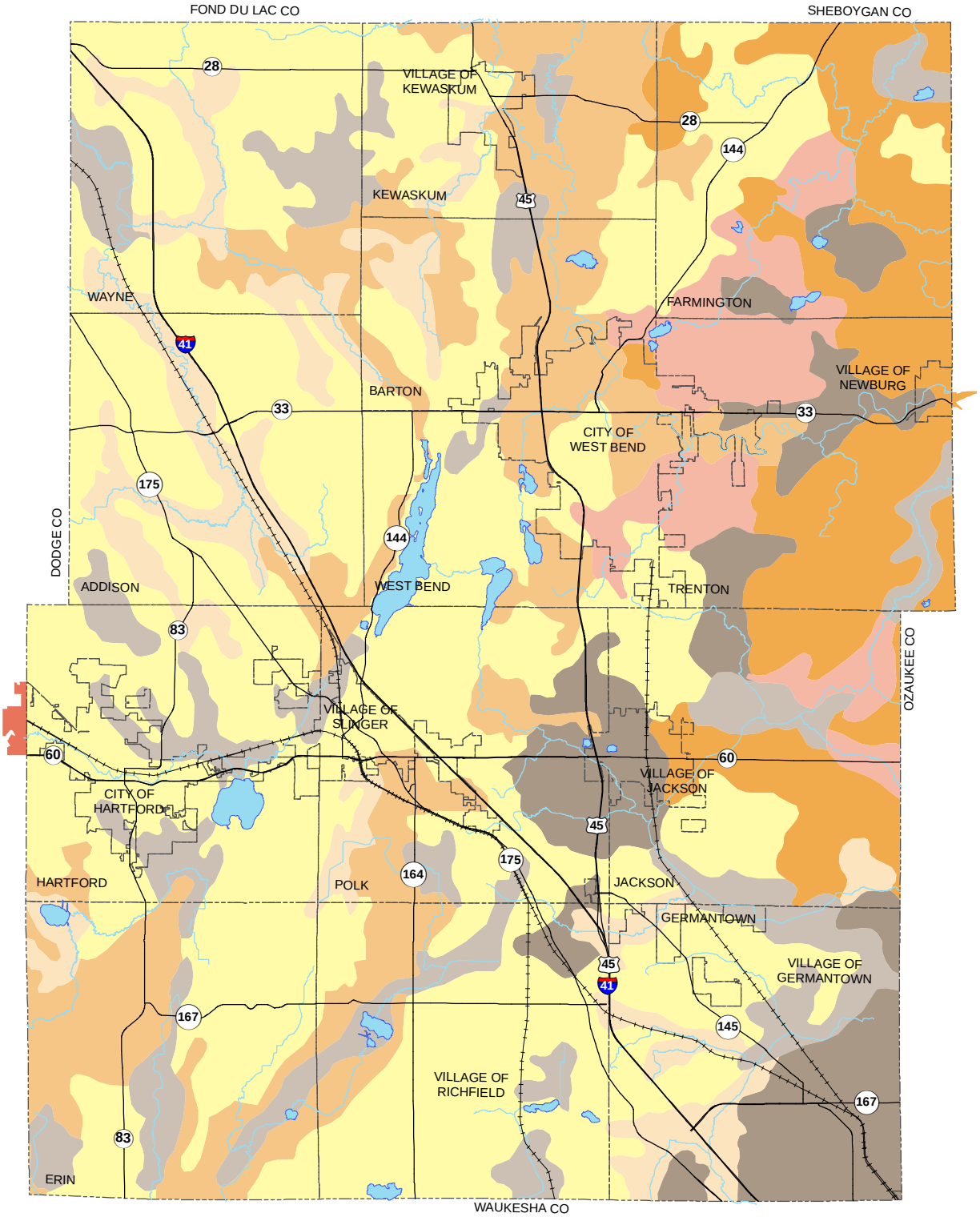
The ***Hochheim-Theresa Association*** contains well-drained soils that have a subsoil of clay loam, formed in loess with underlying sandy loam to loam glacial till on uplands. This is the predominant soil association, encompassing about 44 percent of the County. Much of the central and western parts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

The ***Houghton-Palms-Adrian Association*** contains very poorly drained organic soils along drainage ways, 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.

Figure 12

General Soil Associations in Washington County



Brookston-Pella-Lamartine Association
Casco-Fox-Rodman Association
Casco-Hochheim-Sisson Association
Colwood-Boyer-Sission Association
Theresa-Lamartine-Hochheim Association
Hochheim-Theresa Association
Houghton-Palms-Adrian Association
Ozaukee-Martinton-Saylesville Association
Surface Water

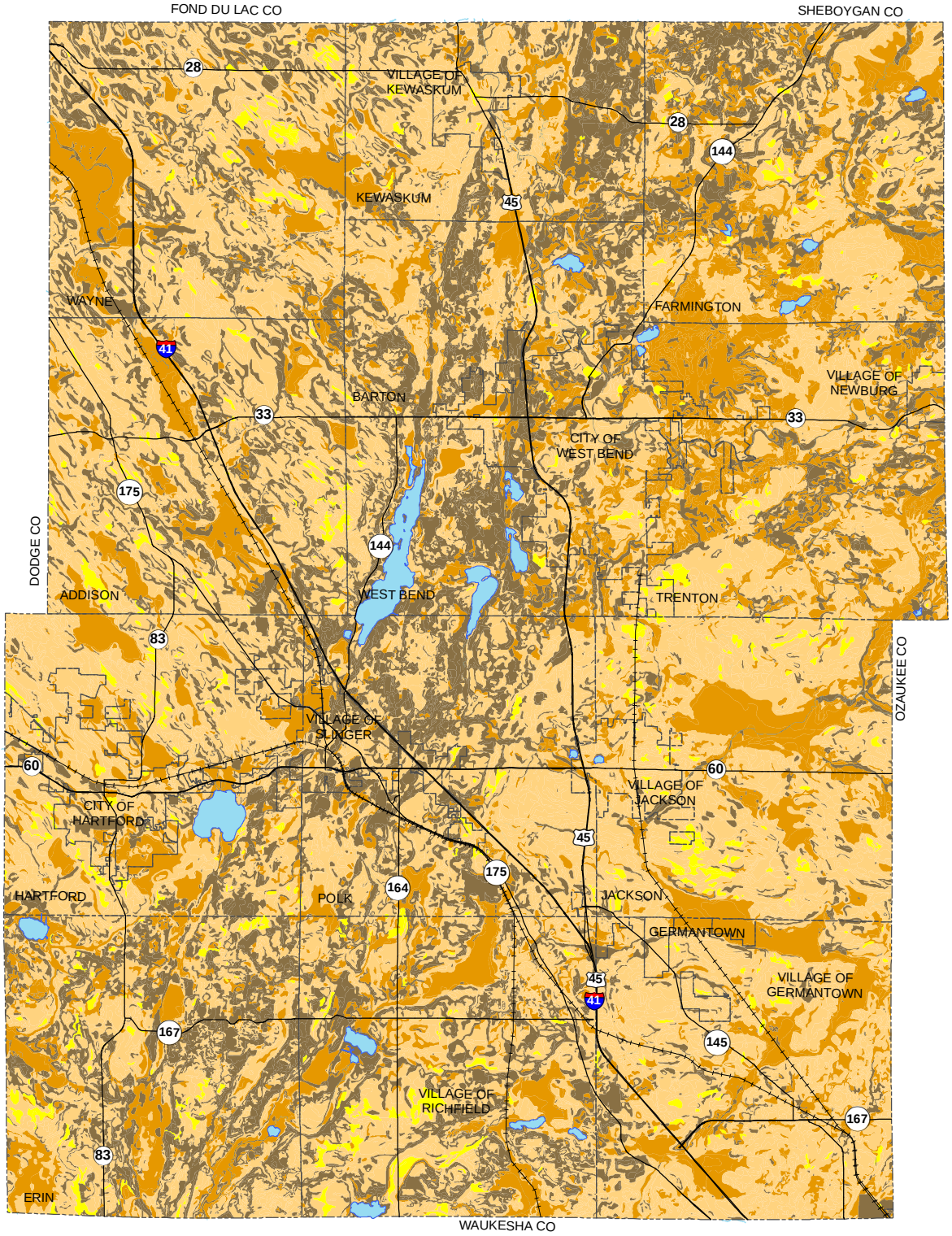
N W E S

0 0.5 1 2 3 4 Miles

Source: USDA-Natural Resources Conservation Service and SEWRPC

Figure 13

Agricultural Soil Capability in Washington County: 2016



Class I

Class II

Class III

Class IV, V, VI, VII and VIII

Surface Water

N W E S

0 0.5 1 2 3 4 Miles

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 *Figure 13*, and the acreage for each soil class in each area of the County from 2016 is outlined in *Table 11*.

Table 11
Agricultural Soil Capability in Washington County Communities: 2016

Area	Class I Soils (acres)	Class II Soils (acres)	Class III Soils (acres)	Class IV, V, VI, VII, and VIII Soils and Unclassified Areas (acres)	Surface Water (acres)	Total (acres)
Partnering Governments						
Village of Jackson	51	1,581	216	135	20	2,003
Village of Kewaskum	36	1,027	96	283	23	1,465
Town of Addison	700	13,317	3,589	5,419	36	23,061
Town of Barton	56	5,383	2,079	4,628	229	12,375
Town of Erin	690	9,647	4,547	7,883	365	23,132
Town of Farmington	376	10,358	6,580	5,876	352	23,542
Town of Germantown	3	742	304	112	4	1,165
Town of Hartford	548	10,884	3,065	2,938	504	17,939
Town of Jackson	933	13,831	5,266	1,496	83	21,609
Town of Kewaskum	133	6,791	2,030	5,063	99	14,116
Town of Polk	160	10,741	1,958	6,956	279	20,094
Town of Trenton	375	9,307	7,726	3,318	258	20,984
Town of Wayne	545	11,933	4,275	6,048	103	22,904

Area	Class I Soils (acres)	Class II Soils (acres)	Class III Soils (acres)	Class IV, V, VI, VII, and VIII Soils and Unclassified Areas (acres)	Surface Water (acres)	Total (acres)
Non-Partnering Governments						
City of Hartford[a]	95	3,034	1,018	690	54	4,891
City of West Bend	164	4,160	2,490	2,792	161	9,767
Village of Germantown	331	14,440	5,078	2,026	140	22,015
Village of Newburg[b]	18	231	155	98	20	522
Village of Richfield	909	10,937	4,126	6,933	419	23,324
Village of Slinger	42	1,502	459	1,340	2	3,367
Town of West Bend	69	3,434	1,325	4,288	1,352	10,468
Washington County[c]	6,234	143,282	56,385	68,327	4,529	278,757
Percent of Total Lands	2.3	51.4	20.2	24.5	1.6	100.0

[a] *Excludes the 338 acres of the City of Hartford lying within Dodge County.*

[b] *Excludes the 53 acres of the Village of Newburg lying within Ozaukee County.*

[c] *Includes the 14 acres of the City of Milwaukee lying in the extreme southeastern corner of Washington County.*

Source: Natural Resources Conservation Service and SEWRPC

Soil Sustainability, Erosion and Sedimentation

Soil sustainability refers to maintaining the health and productivity of cropland for future generations. 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 typical 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.

Soil erosion is a natural process. However, it is accelerated when land use practices, such as farming and construction, leave the soil surface bare and unprotected. Raindrops striking bare soil surfaces detach soil particles and a thin layer of runoff carries the particles downhill. The soil particles are deposited as sediment on adjacent land or may enter surface waters. This type of erosion is called sheet and rill erosion. When runoff concentrates in the natural drainage ways of the land, soil erosion is more dramatic and is called gully erosion.

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 maximum rate at which cropland soil can erode yet remain productive ranges from 2 to 5 tons, depending on soil type.

In 1999, the LWCD began conducting a yearly Cropland Transect Survey. The Survey method was originally developed by Purdue University to collect conservation tillage and crop residue information. It was later expanded to obtain county and watershed data on tillage, crop residue,

and soil loss. Survey results have shown that the transect survey can provide 90 percent or more confidence in the accuracy of the results. The County has conducted the survey nearly every year since 1999. In 1999, 89% of all cropland was eroding at or below tolerable soil loss rates, followed by 91% in 2009 and then a drop to 82% in 2019.

The data from the 2019 Transect Survey indicates a slight increase in the average soil loss, but more noticeable is the increase in the total amount of cropland eroding over tolerable soil loss, an increase from 9% to 18%. This increase can be mostly attributed to changes in the K-factor and "T" rates on over 74% of the counties cropland in 2015. These changes help explain the slight increase in soil erosion rate mainly due to the K-factor changes, however the changes to the T-factor are more telling of the acres now eroding over tolerable. This change continues to present challenges throughout may counties as producers are trying to meet tighter soil loss limits.

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 also indicates the need for continued 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 12* below.

Table 12
Comparison of Erosion and Tillage Practices – 1999, 2009 & 2019 Transect Survey

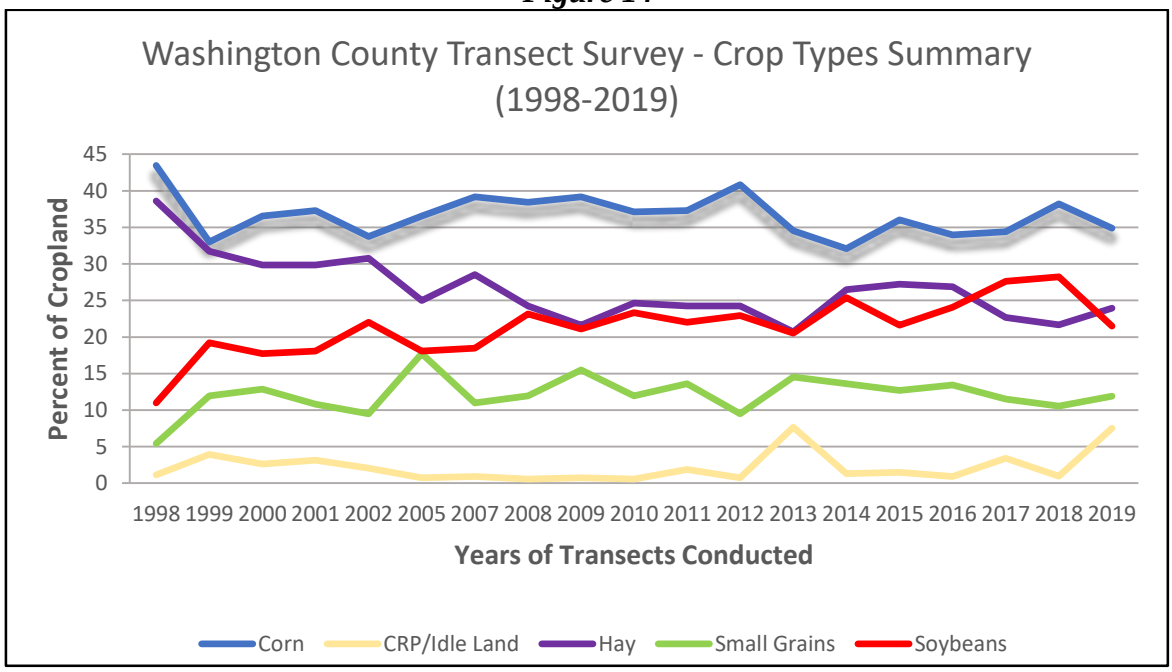
Factor	1999 Value	2009 Value	2019 Value
Average countywide soil erosion rate (tons/acre/year)	1.6 tons/acre/year	1.7 tons/acre/year	1.8 tons/acre/year
Cropland with soil erosion at/or below tolerable soil loss rate ("T")	89% (92,075 ac.)	91% (88,200 ac.)	82% (82,008 ac.)
Cropland with soil erosion above "T"	11% (10,925 ac.)	9% (8,500 ac.)	18% (18,002 ac.)
Total soil loss from croplands eroding at or below "T"	98,480 tons	105,840 tons	106,666 tons
Total soil loss from croplands eroding above "T"	62,400 tons	53,730 tons	78,124 tons
Conventional tillage (crops planted in <30% residue cover)	53% (54,955 ac.)	42% (40,915 ac.)	32% (32,003 ac.)
Conservation tillage (crops planted in 30-50% residue)	5% (4,845 ac.)	6% (5,315 ac.)	14% (14,001 ac.)
No-Till (crops planted in greater than 50% residue)	4% (4,220 ac.)	29% (27,985 ac.)	23% (23,002 ac.)
Cropland in hayland production	32% (33,100 ac.)	22% (21,430 ac.)	24% (24,002 ac.)

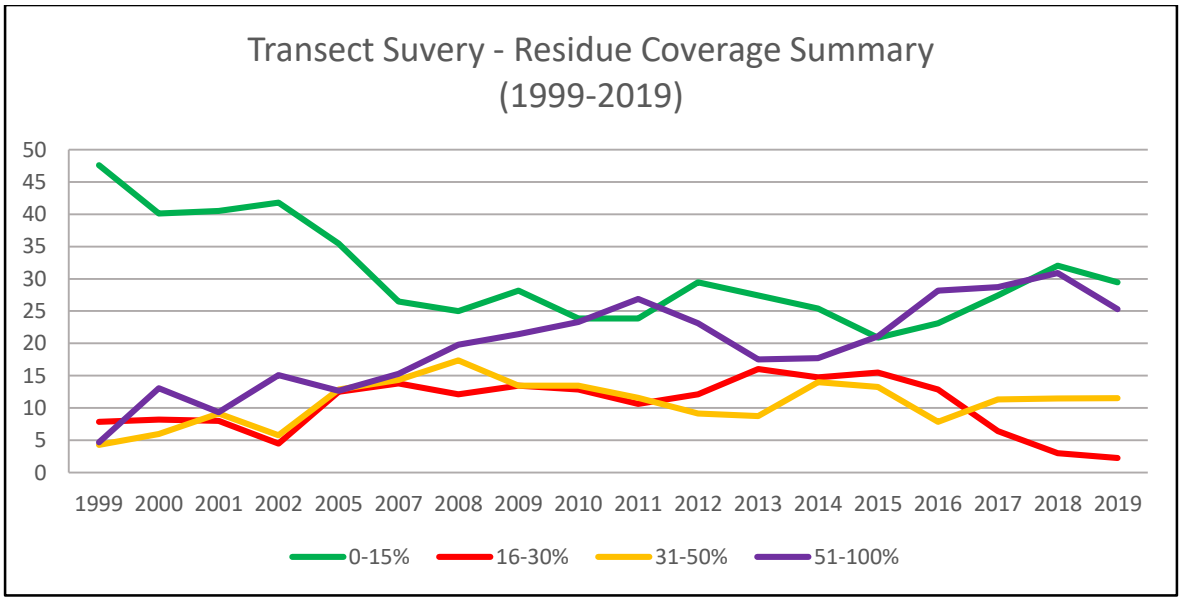
Source: Washington County LWCD

The following graphs provide trend data from the Cropland Transect Survey for crop types grown and the amount of residue cover left on the soil surface after planting. As indicated, there has been a reduction in hay, due in large part to the reduction in dairy farms in the southern half of the County. The dairy farmers were replaced with cash grain operations, now producing corn and soybeans to meet domestic and international market demand. The good news is that there has been

a steady decline in conventional, clean tilled fields and a steady increase in no-till planting, this is representative of the 51-100% residue cover. In the last couple years however, fields have experienced more tillage as farmers worked the land to help dry the soil surface from the last three years' wet springs and to smooth areas of a field scoured by the increased occurrence of heavy summer rains.

Figure 14





The second part of the soil sustainability issue deals with soil quality, including such aspects as organic matter, 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 uses 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.

Mentioned previously, construction site soil erosion presents a ten times 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 1997 the County adopted its first Erosion Control & Stormwater Management Ordinance requiring review of plans and monitoring of construction sites during development. The ordinance requires an 80% reduction in sediment during construction and post construction. The construction site allowable discharge is 5 tons/acre which mimics the tolerable agricultural sediment loss numbers. The post construction reduction numbers are in the tens of pounds/acre realm which is significantly less than the tolerable agricultural sediment loss numbers.

Overall reduction in sediment delivery from changes in land use of agricultural to residential/commercial have not been calculated. As mentioned above, the construction site ordinance requires limiting the construction sites to agricultural goals. Construction/development sites that implement permanent stormwater practices reduce the sediment loading to less than 1% of the current agricultural goals.

NON-METALLIC 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.

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.[5]

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 lake levels and stream flows; 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 46,640 acres, or 17 percent of the County, in 2015. Wetlands, which are shown on *Figure 10*, are based on the Wisconsin Wetlands Inventory completed in 2010, updated to the year 2015 as part of the regional land use inventory. It should be noted that, in addition to the wetlands shown on *Figure 10*, certain other areas have been identified by the NRCS as farmed wetlands, which are subject to Federal wetland regulations.

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 stream flows
- 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

[5] *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 DNR. Under the DNR 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 DNR 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.*

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. *Figure 15* 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; 2) the shallow Silurian dolomite strata in the underlying bedrock; and, 3) the deeper sandstone, dolomite, siltstone, and shale strata. 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.

Understanding recharge and its distribution is key to making informed land use decisions so that the groundwater needs of society and the environment can continue to be met. A groundwater recharge potential map derived from a soil-water balance recharge model was developed under the SEWRPC water supply planning program for the Southeastern Wisconsin Region. Groundwater recharge potential in the County is shown on *Figure 16*. The map can be used for identifying and protecting recharge areas that contribute most to the baseflow of the ponds, streams, springs, and wetlands amongst watersheds throughout the County.

Groundwater recharge potential in the County was divided into four main categories defined as: low, moderate, high, and very high. Areas that are not determined were placed into a fifth category as undefined. These undefined areas are most often associated with groundwater discharge, which is why they tend to be located adjacent to streams. Groundwater recharge potential among the County contains 3 percent very high, 28 percent high, 49 percent moderate, 2 percent low, and 17 percent undefined.

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. These areas can become contaminated from improperly abandoned wells, leaking underground storage tanks, wastewater treatment facilities, and improper management of animal waste. The most common contaminants include nitrates, fecal coliform bacteria, petroleum volatile organic compounds and synthetic organic compounds such as fertilizers and pesticides.

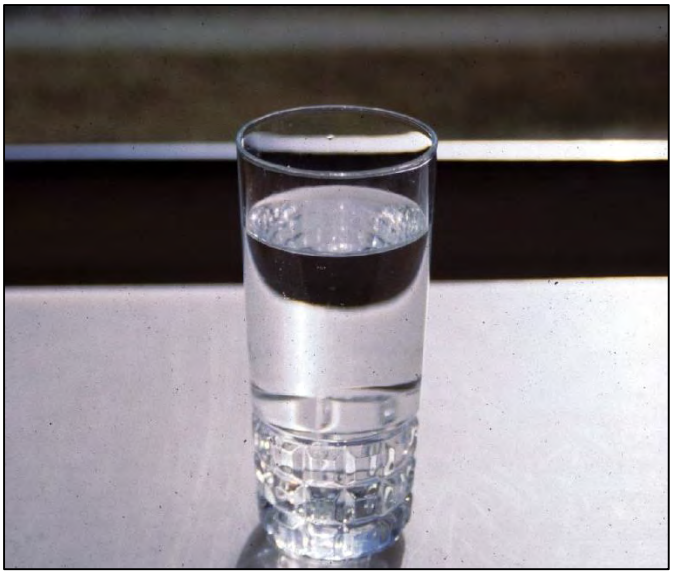
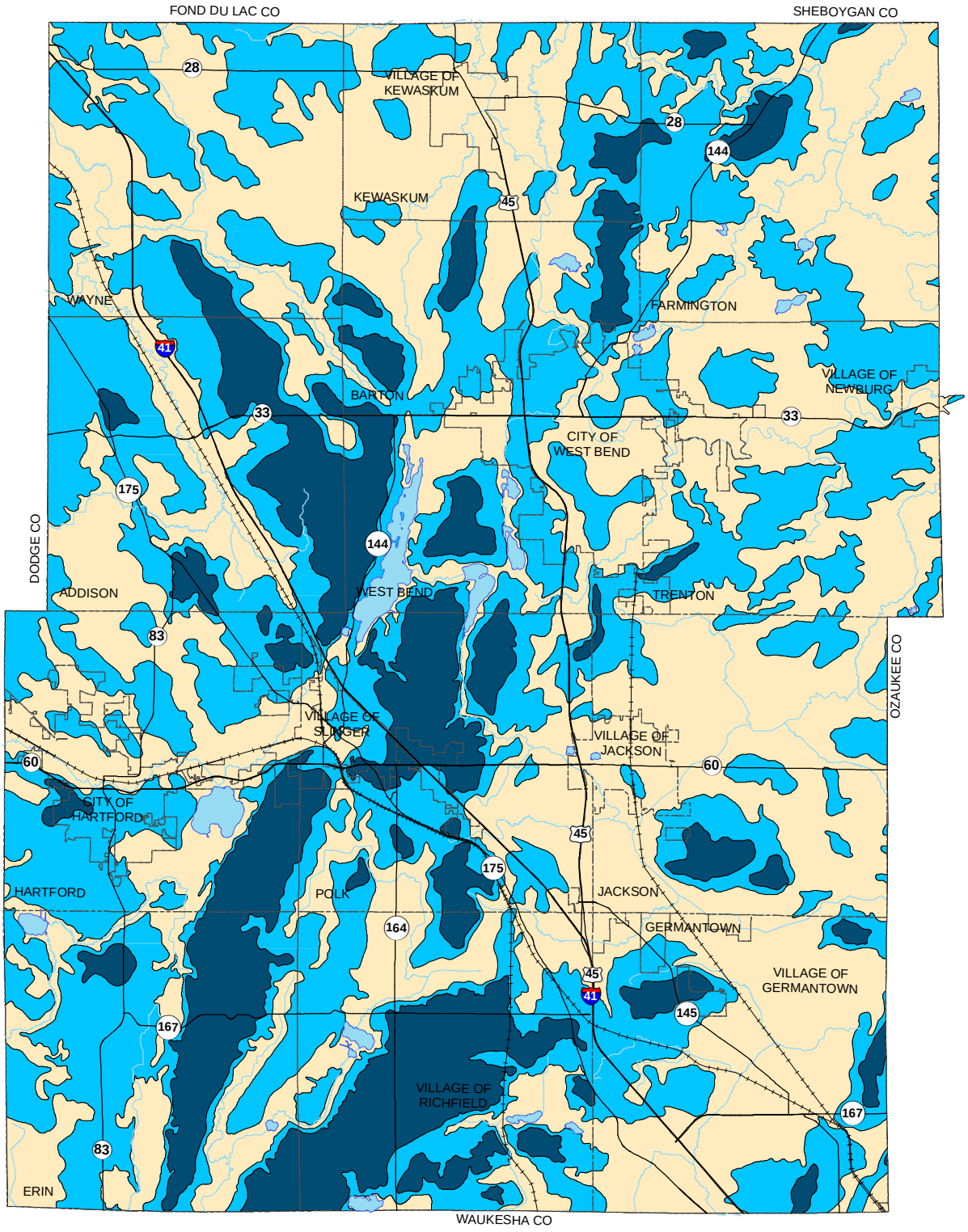


Figure 15

Depth to Shallow Water Tabel in Washington County



0-25 Feet

25-50 Feet

Greater Than 50 Feet

Surface Water

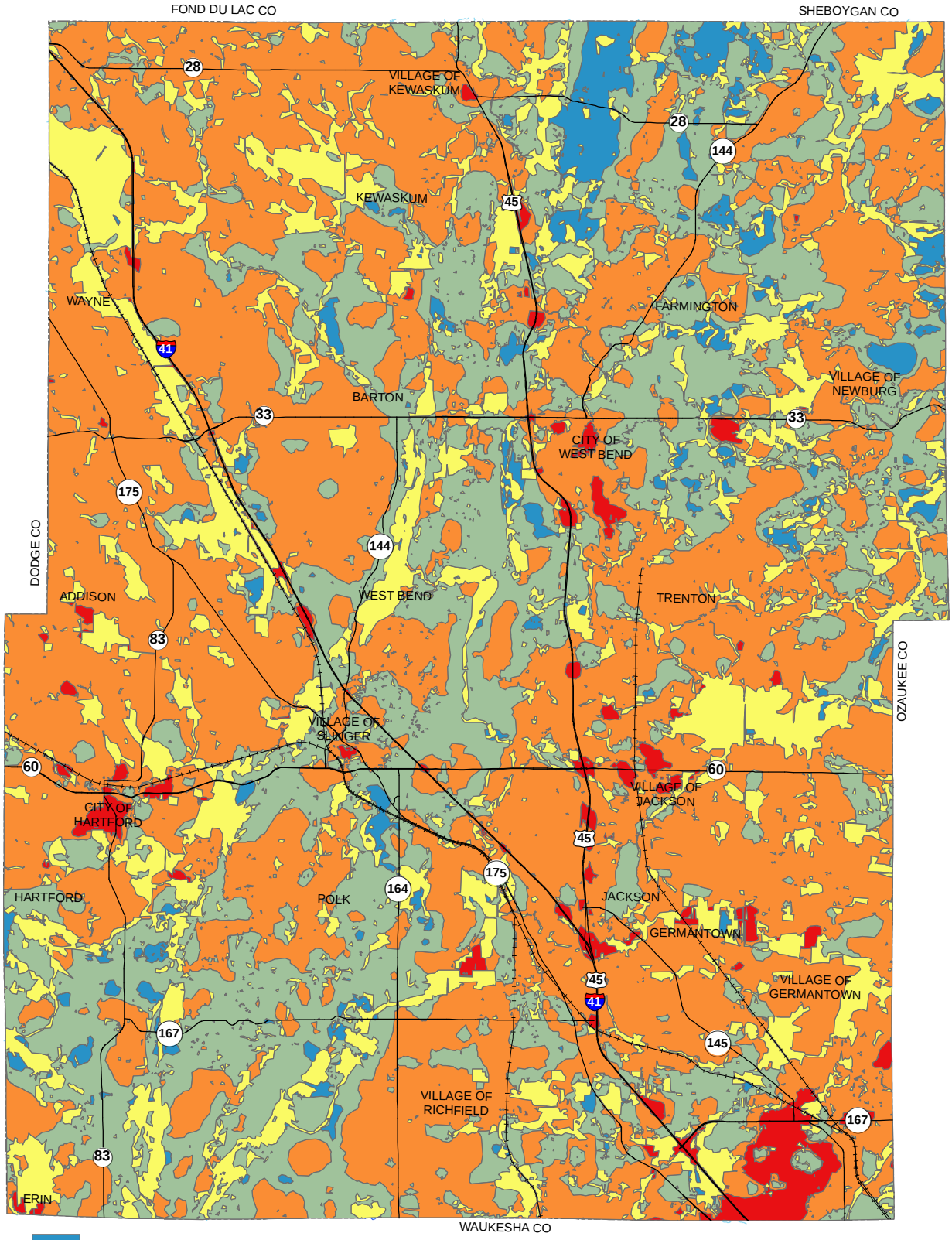
N
W
E
S

0 0.5 1 2 3 4 Miles

Source: Wisconsin Geological and Natural History Survey and SEWRPC

Figure 16

SOIL-WATER BALANCE RECHARGE POTENTIAL MAP FOR WASHINGTON COUNTY



Source: SEWRPC

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, as shown in *Figure 17*, 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.

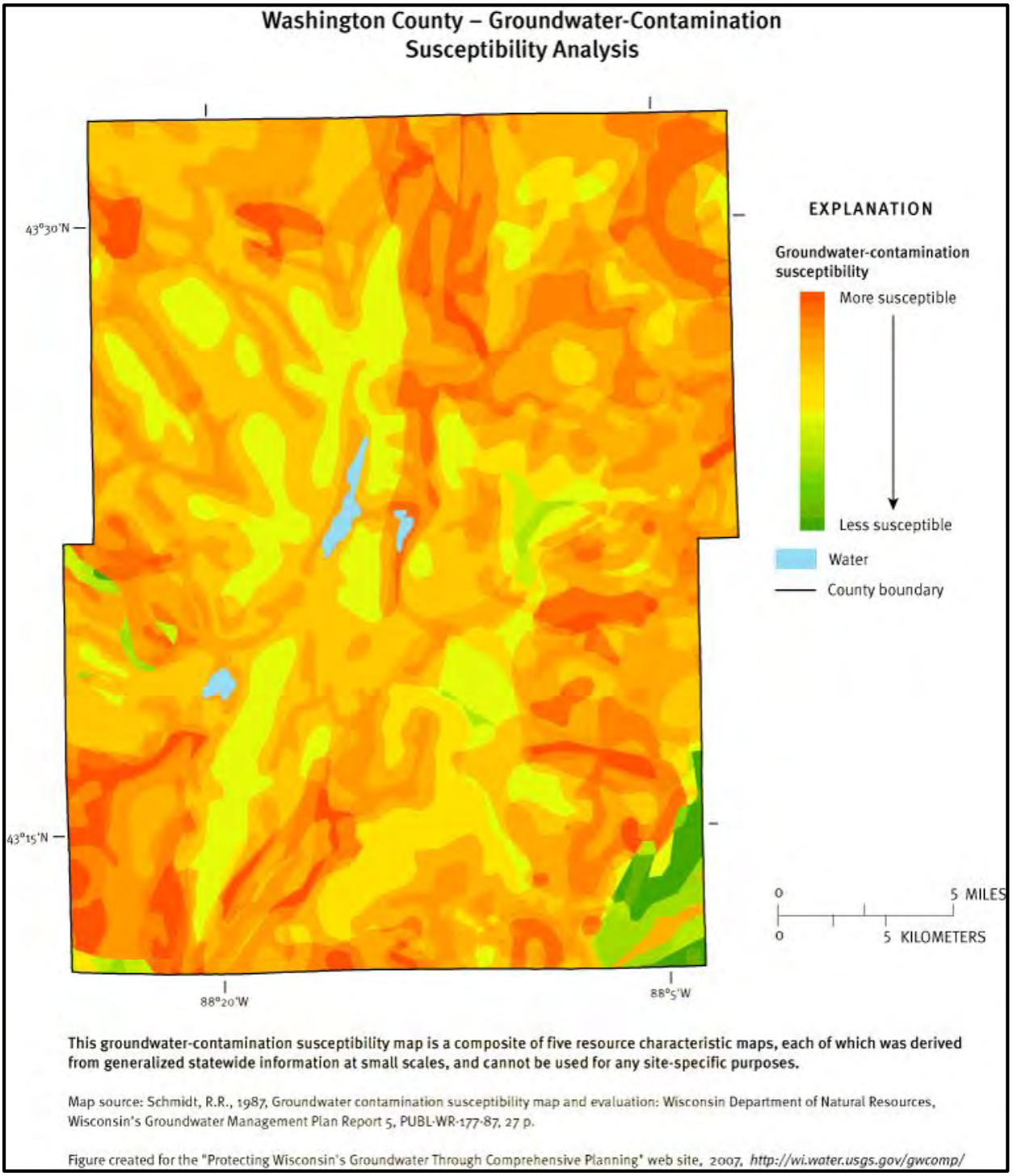
The principal human activities contributing to potential groundwater contamination were identified in an inventory and analysis of the groundwater resources of the Southeast Region conducted by SEWRPC and the Wisconsin Geologic and Natural History Survey. These potential sources of groundwater contamination are listed in *Table 13*.

Table 13:
Human Activities that Can Impact Groundwater Quality

Originating On the Land	Originating Below Land Surface
Above-ground storage tanks	**Above Water Table**
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	Sumps, dry wells
(sewage, sludge, septage, whey)	Waste disposal in dry excavations
Stockpiles (chemicals, salt), dumps	
Infiltration of contaminated surface water or precipitation	**Below Water Table**
	Ground water 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.

Figure 17

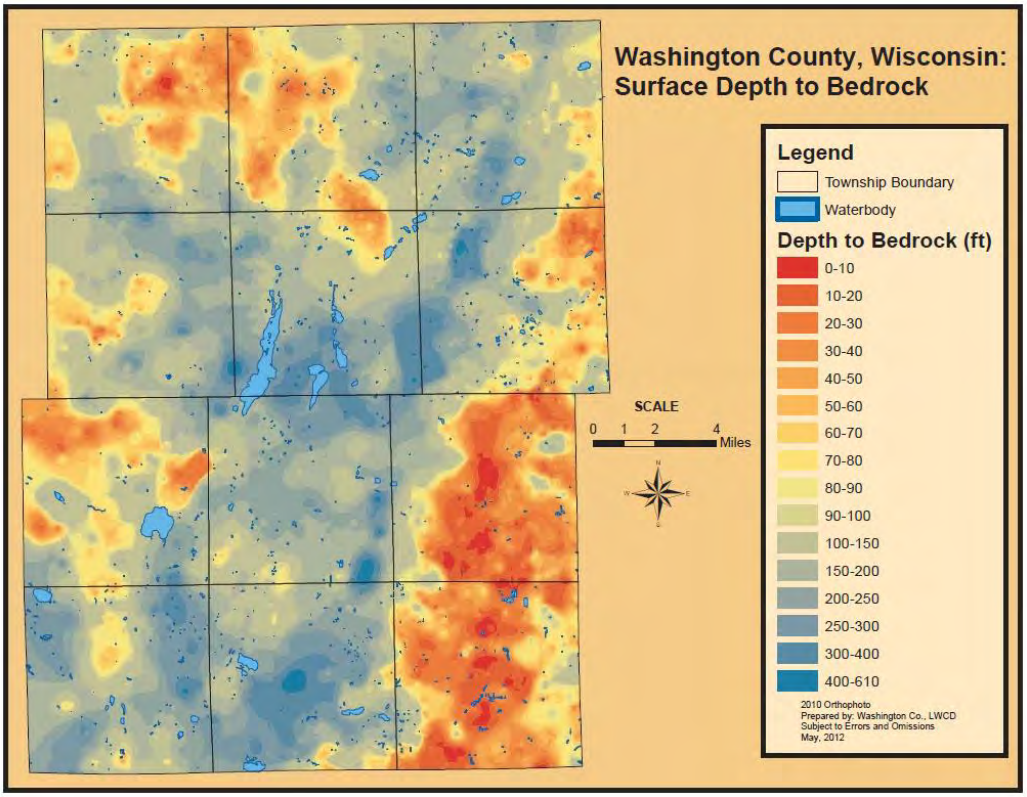


Source: U.S. Geological Survey

Surface depth to bedrock is another important aspect when trying to figure out if a groundwater is susceptible to contamination. Areas with shallow bedrock, shown in red, orange, and yellow on *Figure 18* are more susceptible because they have less of the soil and surficial deposits that treat and filter the contaminants in groundwater. Dolomite, commonly referred to as limestone, is the first layer of bedrock encountered throughout most of Washington County and has a tendency to be fractured which can allow surface water to infiltrate very quickly into groundwater

Washington County has created a database of well construction log information in the County. This dataset was used to develop a more detailed depth to bedrock map. Well construction reports provide us important information that can be used as a tool to plan and protect groundwater.

Figure 18
Surface Depth to Bedrock



Another alternative to protect the quantity of groundwater is communities could consider developing a groundwater protection ordinance within the County to integrate analysis of groundwater and surface water impacts when considering future development. One such example was developed by the Village of Richfield is there Groundwater Protection Program. The Village of Richfield maintains a groundwater monitoring network to help track and monitor water level changes.

WELLHEAD PROTECTION PLANS AND ORDINANCES

Wellhead protection plans are developed to achieve groundwater pollution prevention measures within public water supply wellhead areas. In some areas of the state, sophisticated groundwater

flow modeling techniques were used to delineate source water areas for municipal wells. A wellhead protection plan uses public involvement to delineate the wellhead protection area, inventory potential groundwater contamination sources, and manage the wellhead protection area. All new municipal wells are required to have a wellhead protection plan. A wellhead protection ordinance is a zoning ordinance that implements the wellhead protection plan by controlling land uses in the wellhead protection area.

Of those municipal water systems that have Wellhead Protection (WHP) plans, some have a WHP plan for all of their wells, while others only have a plan for one or some of their wells. Similarly, of those municipal water systems that have WHP ordinances, some ordinances apply to all of their wells and others just one or some of their wells.

Table 14:
Municipal Water Systems

Municipal Water System	Wellhead Protection Plan	Wellhead Protection Ordinance
Allentown Sanitary District	No	No
Germantown Water Utility	Yes	No
Hartford Waterworks	Yes	Yes
Jackson Waterworks	Yes	Yes
Kewaskum Waterworks	Yes	No
Slinger Water Utility	Yes	Yes
West Bend Waterworks	No	No

Additional groundwater information for the County can be found in the 2007 USGS report: https://wi.water.usgs.gov/gwcomp/find/washington/index_full.html

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 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 2015, woodlands encompassed over 26,000 acres, or about 9 percent of the County. *Table 15* lists the number of acres of woodlands, by local government, in the County.

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 should be maintained

for their beautiful scenic views, wildlife habitat, open space, education and recreational opportunities, and timber products.

Table 15:
Woodlands and Managed Forest Lands in Washington County Communities

Local Government	Woodlands: 2015 (acres)	Managed Forest Lands: 2018 (acres)		
		Open to the Public	Closed to the Public	Total
Partnering Governments				
Village of Jackson	21	--	--	--
Village of Kewaskum	114	--	--	--
Town of Addison	1,195	--	460	460
Town of Barton	1,443	--	579	579
Town of Erin	4,425	--	1,826	1,826
Town of Farmington	2,194	--	632	632
Town of Germantown	27	--	--	--
Town of Hartford	1,012	--	137	137
Town of Jackson	675	--	300	300
Town of Kewaskum	2,770	41	408	449
Town of Polk	2,423	--	334	334
Town of Trenton	2,058	--	861	861
Town of Wayne	1,120	207	1,014	1,221
Non-Partnering Governments				
City of Hartford	199	--	--	--
City of West Bend	745	--	--	--
Village of Germantown	784	28	283	311
Village of Newburg	17	--	--	--
Village of Richfield	2,695	--	695	695
Village of Slinger	338	--	--	--
Town of West Bend	2,009	--	855	855
Washington County	26,264	276	8,384	8,660

Source: Wisconsin Department of Natural Resources and SEWRPC

WILDLIFE HABITAT

Wildlife habitat provides opportunities for recreational, educational, and scientific activities. The Regional Planning Commission identified high-value natural resource elements and resource-oriented features that serve as the foundation for identifying environmental corridors and isolated natural resource areas. Preserving primary 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. Primary environmental corridors are important to the movement of wildlife and for the movement and dispersal of seeds for a variety of plant species.

The primary environmental corridors in Washington County are mainly 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 2015, about 62,691 acres, comprising about 22 percent of the County, were encompassed within primary environmental corridors. Isolated natural resource areas within the County include a geographically well-distributed variety of isolated wetlands, woodlands, and wildlife habitat. These areas encompassed about 7,262 acres, or about 3 percent of the County. Primary environmental corridors and isolated

natural areas are shown on *Map 5.23* in the *Multi-Jurisdictional Comprehensive Plan for Washington County: 2050*.

NATURAL AREAS

A comprehensive inventory of natural resources and important plant and animal habitats was conducted by SEWRPC in 1994 and updated in 2010 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 2016.

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 95 natural areas, encompassing about 16,906 acres, or about 6 percent of the County, have been identified. Of the 95 identified sites, eight are classified as NA-1 sites and encompass about 3,267 acres, 28 are classified as NA-2 sites and encompass about 5,533 acres, and 59 are classified as NA-3 sites and encompass about 8,106 acres. Natural areas are shown on *Map 5.21* in the *Multi-Jurisdictional Comprehensive Plan for Washington County: 2050*

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. A total of 21 sites supporting rare or threatened plant and animal species have been identified in Washington County as of 2016. These sites encompass an area of 1,035 acres, or less than 1 percent of the County.

There are also 60 aquatic habitat sites supporting threatened or rare fish, herptile, or mussel species in the County, including about 200 miles of rivers and streams and 2,749 acres of lake waters. Aquatic habitat sites are shown on *Map 5.22* in the *Multi-Jurisdictional Comprehensive Plan for Washington County: 2050*

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 in three ways:

1) Introducing exotic species (from other regions or countries) who 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, 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 take over. 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.

Aquatic invasive species (AIS) have long been recognized as a serious problem in Wisconsin and Washington County. In 2013, the Washington County Aquatic Invasive Species Strategic Plan was developed and updated in 2020, both plans were approved by the County Board and DNR. The Plan provides an overview of Washington County water bodies, describes how AIS can be detrimental to aquatic ecosystems, and pin-points where AIS have been identified in the County. The Plan also recommends goals and strategies for combating AIS and engaging in AIS education and outreach, as well as identifying entities responsible for Plan implementation. Plan implementation involves the county working together with stakeholder groups, surrounding counties, and the state to prevent the introduction and transport of aquatic invasive species into Washington County waters. Refer to the AIS Strategic Plan for additional details about partnerships, program prioritization, goals and implementation strategies.

Chapter IV

IMPLEMENTATION STRATEGY, PROGRAMS AND PRIORITIES

TECHNICAL AND FINANCIAL ASSISTANCE

The Land and Water Conservation (LWC) provides 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 LWC is to ensure that, through ongoing training and professional development, LWC staff continues to provide sound, professional services based on the best available technology, information, and research.

The LWC also administers available cost share programs 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 to offset operational risks associated with changes to land management practices and water quality improvements. 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. However, as mentioned in Chapter 1, the level of implementation of state and regional programs and priorities discussed in this chapter are fully dependent on the combination of the fiscal resource provided by the state and those that align with the priorities of the County.

The State of Wisconsin has enacted and is implementing runoff management regulation for agricultural and urban land uses to help achieve state water quality goals. Counties are local delivery system in their implementation through their local land and water conservation programming. The role of the Washington County LWC is to provide technical assistance to landowners in planning, designing, installing, and approving management plans and practices to meet state water quality standards. This goal will be accomplished through utilizing existing programs and ordinances. The following summarizes various state regulation, programs, partnerships and describes past, current and future implementation efforts.

WATER QUALITY IMPLEMENTATION STRATEGY

The Land and Water Resource Management Plan is meant to direct the work of the Washington County Land and Water Conservation through the development of goals, objectives, and activities for a ten-year timeframe. Many organizations have plans with goals, objectives, and activities which are related to or align with those of the Washington County Land and Water Resource Management Plan. This plan recognizes many of the goals and objectives of water quality plans

and will use those plans to guide future implementation of conservation practices by the LWC. Furthermore, the LWC relies on numerous tools and resources to accomplish the goals, objectives and actions of the management plan. Focusing on building capacity within the community through education, partnerships, and inclusion is an important method for addressing resource concerns and building awareness of the importance of the soil and water resources throughout the County.

PRIORITY RANKING

A number of criteria will be used to determine priority focus areas for directing conservation activity. As mentioned in Chapter III, watersheds are often used in natural resource management and conservation priorities because land use practices impact the water quality of the stream or lake in the watershed. That said, for this plan, prioritizing and directing workload of the Land and Water Conservation will focus at the 12 Digit HUC level. Additionally, the factors listed below will be used to help guide and rank areas of greatest need, as well as, identify potential areas that will provide the greatest response to water quality initiatives and conservation improvements. Example of how this prioritization could be utilized can be found in Appendix D.

Prioritization factors:

- Phosphorus & TSS loading based on TMDLs
- Impaired waters
- Nine-Key Element Plan areas
- Water Quality Initiatives (RCPP, Adaptive Management, WQT, MDV)
- Outstanding resource waters/exceptional resource waters
- Stream Order & Natural Community Designations
- Highly erodible soils & modeling results (EVAAL, STEPL)
- Percent agriculture land cover using the Normalized Difference Tillage Index (NDTI)
- Water Quality Monitoring Data
- Number of livestock operations
- Groundwater contamination susceptibility & Depth the Bedrock
- Lake development & MS4 Urbanized Area designations
- Active partners (producer groups, lake organizations)

TOTAL MAXIMUM DAILY LOAD PLANS

Impaired waters in Wisconsin are now largely addressed through an analysis, known as a Total Maximum Daily Load (TMDL). A TMDL is the amount of a pollutant a waterbody can receive and still meet water quality standards. To define the TMDL for a water body, modeling is used to determine the current pollutant loads, their sources, and the amount of reduction needed from each source to reach the water quality goal. Water quality goals for Wisconsin surface waters are set in Wisconsin Administrative Code NR 102: Water Quality Standards for Wisconsin Surface Waters.

A TMDL considers both Waste Load Allocation (WLA, point sources) and Load Allocation (LA, nonpoint sources). The WLAs determined in the TMDL for point sources, such as wastewater treatment plants or factories, are addressed through Wisconsin Pollutant Discharge Elimination System (WPDES) permits. Nonpoint source LAs, on the other hand, are more complex and require

collaboration by many partners and stakeholders to effectively use available multi-agency programs, education, regulations, and financial and technical resources.

A TMDL for the Rock River Basin was approved in July 2011 and a TMDL for the Milwaukee River Basin was approved in March 2018. Elevated phosphorus, sediment, and bacteria levels in the Milwaukee River Basin and the Rock River Basin have led to low dissolved oxygen concentrations, degraded habitat, excessive algal growth, turbidity, and recreational impairments. These impairments adversely affect fish and other aquatic life, water quality, recreation, and navigation. The table below summarizes the various pollutant reductions needed from each pollutant source to meet water quality goals in each TMDL sub-basin.

Table 16
TMDL Phosphorus and Total Suspended Solids Reduction Goals by Sub-Basin

TMDL Sub-Basin*	TMDL Percent Phosphorus Reduction From AG	TMDL Percent Phosphorus Reduction From Non-Permitted Urban	TMDL Percent Phosphorus Reduction for MS4s	TMDL Percent TSS Reduction From AG	TMDL Percent TSS Reduction From Non-Permitted Urban	TMDL Percent TSS Reduction for MS4s
5	47%	47%	-	52%	52%	-
6	32%	32%	-	36%	36%	-
7	32%	32%	-	36%	36%	-
8	24%	24%	-	24%	24%	-
9	30%	30%	-	20%	20%	-
10	27%	27%	-	24%	24%	-
20	27%	27%	37%	23%	23%	40%
21	27%	27%	34%	19%	19%	40%
22	30%	30%	-	36%	36%	-
23	29%	29%	36%	33%	33%	47%
24	39%	39%	35%	43%	43%	47%
55	54%	54%	77%	39%	39%	66%
MI-2	49%	70%	68%	62%	68%	67%
MI-3	37%	44%	42%	70%	73%	72%
MI-4	38%	52%	50%	68%	72%	71%
MI-5	35%	47%	45%	63%	68%	67%
MI-6	62%	85%	85%	54%	68%	67%
MI-7	45%	64%	63%	68%	75%	74%
MI-10	29%	39%	-	64%	65%	-
MI-18	40%	69%	68%	63%	72%	71%
MI-19	40%	57%	56%	68%	73%	72%
MI-20	49%	76%	75%	68%	76%	76%
MI-21	51%	76%	75%	70%	76%	76%
MI-22	37%	50%	49%	68%	72%	71%

MI-23	38%	49%	47%	72%	75%	74%
MI-24	52%	78%	77%	60%	68%	67%
MN-1	46%	60%	59%	46%	59%	58%
MN-2	30%	43%	41%	45%	55%	54%
MN-3	38%	-	55%	42%	-	57%
MN-4	30%	-	45%	43%	-	55%
MN-5	58%	-	69%	51%	-	63%
MN-6	45%	-	65%	42%	-	67%
MN-9	49%	-	60%	51%	-	63%

** TMDL sub-basins with numbers are from Rock River TMDL report. Sub-basins with numbers and letters are from Milwaukee River TMDL report.*

Point Source Compliance Options for Phosphorus and TSS

A number of the Wisconsin Pollutant Discharge Elimination System (WPDES) permitted communities in Washington County are exploring alternative phosphorous compliance options for their discharges including water quality trading and adaptive management. These options allow the point source to offset or reduce their pollution load by reducing sources of phosphorous within specified watersheds. Currently, the County has entered into a Memorandum of Understanding with the City of Oconomowoc for their Adaptive Management Program. The MOU recognizes a partnership to mutually work together towards similar goals: agriculture soil health, soil conservation, nonpoint source water pollution abatement and the installation of BMPs. LWC staff have also met with a number of local municipalities who are exploring adaptive management or water quality trading as a compliance option.

In addition, the County has also applied to participate in Wisconsin's Multi-Discharger Variance (MDV) program for the first time starting in 2020. The MDV for phosphorus extends the timeline for point sources to comply with low-level phosphorus limits. In exchange, point sources commit to step-wise reductions of phosphorus within their effluent as well as help to reduce nonpoint sources of phosphorus from farm fields, cities or natural areas via specific projects designed to improve water quality. Over time, some of the MDV projects may be converted to Water Quality Trades.

The following WDNR webpage provides more information on the three options described above: https://dnr.wi.gov/topic/wastewater/Phosphorus/

Nine Key Element Plans – Section 319 Funding

The United States Environmental Protection Agency (EPA) has identified nine key elements that are critical for achieving improvements in water quality. The EPA requires that these nine elements be addressed in watershed plans funded with incremental Clean Water Act section 319 funds. Plans must address the nine elements (see below) if they are developed in support of a section 319-funded project.

Summary of the Nine Minimum Elements:

1. Identify the causes and sources
2. Estimate pollutant loading into the watershed and the expected load reductions
3. Describe management measures that will achieve load reductions and targeted critical areas
4. Estimate the amounts of technical and financial assistance and the relevant authorities needed to implement the plan
5. Develop an information/education component
6. Develop a project schedule
7. Develop the interim, measurable milestones
8. Identify indicators to measure progress and make adjustments
9. Develop a monitoring component

Washington County Land & Water Conservation provided assistance in the development of Nine Key Element watershed plans for multiple subwatersheds in the Milwaukee River Basin. The HUC 10-Cedar Creek Watershed Plan received DNR/EPA approval in June 2020. The HUC-12 North Branch-Milwaukee River, HUC-12 Village of Newburg-Milwaukee River and the HUC-12 Town of Fredonia-Milwaukee River (Ozaukee County) Watershed Plan is under DNR review and may be approved in Fall 2020.

REGIONAL WATER QUALITY MANAGEMENT PLAN PR-50 (SEWRPC)

A joint planning effort designated as the "Water Quality Initiative" included the cooperative development of the MMSD facilities planning program and the SEWRPC Regional Water Quality Management Plan (RWQMP) updating program by WDNR, MMSD, and SEWRPC. In 2007 (and an amendment in 2013), an update of the RWQMP was completed to integrate previous regional water quality management efforts completed by SEWRPC and MMSD's 2020 Facilities Plan. The plan update was for the design year 2020 and represented a major amendment to the RWQMP for southeastern Wisconsin.

The goal of the RWQMP was to produce a scientifically defensible and implementable plan to improve water quality within the greater Milwaukee watersheds. The RWQMP was developed as a framework for the management of surface water for the greater Milwaukee watersheds that would abate existing water quality issues and allow for flexibility to address future concerns. The success of the RWQMP is dependent on local implementation efforts including, but not limited to: refinement and detailing of sanitary sewer service areas; the development of stormwater management plans and sewerage system facilities plans; and the integration of the plan recommendations into county land and water resource planning as a means for implementing the rural land management recommendations.

The RWQMP includes planning objectives for land use development, water quality management, outdoor recreation and open space preservation, water control facility development, plan structure and monitoring, educational and informational programming, and objectives for water use classifications and standards. Screening alternatives were developed to address upgrades to the MMSD sewerage system, and BMP implementation for nonpoint source pollution reduction. The recommended plan was comprised of elements to address plans for the following:

- Land Use – recommendations under the land use plan element of the RWQMP include the preservation of environmentally significant lands to maintain an integrated system of open space lands throughout the study area and the preservation of the area's most productive farmland.
- Surface Water – elements of this plan include point and nonpoint source pollution reductions. Recommendations include, but are not limited to, upgrades to sanitary sewer services throughout the study area, maintenance of adequate sewage collection system capacity, and a wet weather control plan for sewer overflows. Nonpoint source control recommendations include, but are not limited to, reduction of soil erosion from cropland, manure and nutrient management, and the installation of riparian buffers.

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. It required the WDNR to develop performance standards for agricultural and nonagricultural nonpoint sources of pollution; these are codified in Chapter NR 151 of the *Wisconsin Administrative Code* with a goal of reducing nonpoint sources of polluted runoff to waters of the state. The first state-wide minimum performance standards and prohibitions became effective in 2002 and were updated in 2011 and again in 2018.

Parallel to the promulgation of NR 151, the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) revised its soil and water resource management programs in Chapter ATCP 50. Administrative code ATCP 50 prescribes conservation practices to address the DNR's performance standards.

AGRICULTURAL PERFORMANCE STANDARDS

The agricultural standards and prohibitions were developed to control polluted runoff from all cropland and livestock operations while protecting Wisconsin's water resources. These nonpoint standards address soil erosion and nutrient runoff from cropland as well as barnyard runoff and manure handling practices for livestock operations; details on these standards are provided below. State administrative rules also prescribe specific cost-sharing requirements that must be met before a landowner can be required to comply with the state standards. The minimum cost-share rate is generally 70%, except in cases of economic hardship, whereby 90% cost-sharing is required. The cost-sharing requirement does not apply to landowners who receive the state Farmland Preservation income tax credit.

CROPLAND STANDARDS

- Sheet, rill and wind erosion: All cropped fields shall meet the tolerable (T) soil erosion rate established for that soil.

- Tillage setback: No tillage operations may be conducted within 5 feet of the top of the channel of surface waters.
- Phosphorus index: Croplands, pastures, and winter grazing areas shall average a phosphorus index of 6 or less over the accounting period and may not exceed a phosphorus index of 12 in any individual year within the accounting period.
- Nutrient management: Agricultural operations applying nutrients to agricultural fields shall do so according to a nutrient management plan.

Livestock Standards and Prohibitions

- Manure storage facilities: All new, substantially altered, or abandoned manure storage facilities shall be constructed, maintained or abandoned in accordance with accepted standards. Failing and leaking existing facilities posing an imminent threat to public health or fish and aquatic life or violate groundwater standards shall be upgraded or replaced.
- Process wastewater handling: There may be no significant discharge of process wastewater to waters of the state.
- Clean water diversions: Runoff from agricultural buildings and fields shall be diverted away from contacting feedlots, manure storage areas and barnyards located within water quality management areas (300 feet from a stream or 1,000 feet from a lake or areas susceptible to groundwater contamination).
- No overflow of manure storage facilities.
- No unconfined manure piles in a water quality management area.
- No direct runoff from feedlots or stored manure into state waters.
- No unlimited livestock access to waters of the state in locations where high concentrations of animals prevent the maintenance of adequate or self–sustaining vegetative cover.

Silurian Bedrock Standard

All crop producers and livestock producers that mechanically apply manure directly or through contract, or other agreement, to cropland or pasture may not cause the fecal contamination of water in a well or apply to soils that have 24 inches or less of separation between the ground surface and apparent water table. Manure must be applied in conformance with a nutrient management plan that meets the requirements of NR 151.075 (4) through (16). *Figure 18* in Chapter III depicts the areas of the County where bedrock is assumed to be less than 20 feet from the surface and areas with less than two-feet.

Conservation Practices

Federal, State and local conservation agencies have identified four cost-effective Best Management Practices (BMPs), including conservation tillage or no-till, cover crops, nutrient 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 LWC will give priority to promoting countywide the adoption of these practices and limit the promotion of other, costlier BMPs to the Priority Farm Strategy listed below. All ATCP 50 approved conservation practices are listed below:

Table 17
Conservation Practices used for Agricultural Performance Standards Compliance

ATCP 50 Code	Cost-Shared Practices
50.62	Manure Storage Systems
50.63	Manure Storage System Closure
50.64	Barnyard Runoff Control Systems
50.65	Access Road
50.66	Trails and Walkways
50.67	Contour Farming
50.68	Cover Crop
50.69	Critical Area Stabilization
50.70	Diversions
50.705	Feed Storage Runoff Control Systems
50.71	Field Windbreak
50.72	Filter Strips
50.73	Grade Stabilization Structures
50.75	Livestock Fencing
50.76	Livestock Watering Facilities
50.77	Milking Center Waste Control Systems
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
50.84	Roofs
50.85	Roof Runoff Systems
50.86	Sediment Basins
50.87	Sinkhole Treatment
50.88	Streambank or Shoreline Protection
50.885	Stream Crossing
50.89	Stripcropping
50.90	Subsurface Drains
50.91	Terrace Systems
50.92	Underground Outlets
50.93	Waste Transfer Systems
50.94	Wastewater Treatment Strips
50.95	Water and Sediment Control Basins
50.96	Waterway Systems
50.97	Well Decommissioning
50.98	Wetland Development or Restoration

Source: DATCP-Chapter ATCP 50 (January 2018)

Implementation of the Agricultural Performance Standards and Priority Farm Strategy

County Land and Water Resource Management Plans are the local mechanism to implement the NR151 Runoff Management standards. Farms, like all major industries, must meet environmental

standards to control runoff from fields, pastures and livestock facilities to protect water quality. However, hastily enforced performance standards could pose undue 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 outlined in ATCP 50 to guide this process. The County's preference is that agricultural landowners and operators comply with the state and local performance standards and prohibitions voluntarily. The main tools of choice to accomplish voluntary compliance include: education; conservation practices; incentives; and targeting of resources, programs, and partnerships.

In 2006 a Memorandum of Understanding (MOU) was developed and signed between the DNR and the LWC outlining roles and responsibilities for implementing the State's Agriculture Performance Standards within Washington County. The following is a summary of the current process. Updating the MOU with the DNR will be a priority in 2020 and 2021 to align the goals and objectives with this plan, priorities of the County and conservation programs mentioned herein, and workload.

INVENTORY AND EVALUATION OF AGRICULTURAL NONPOINT SOURCES

It is important to have current and accurate information about farmstead and cropland conditions. Accurate and up-to-date information provides the county and state agencies a clearer picture of workload, priority sites and potential costs. Current LWC records are inadequate as farms expand, go out of business, modify operations, and equally notable, as the state continues to refine and add performance standards, as mentioned above. For this reason, the LWC has decided to conduct on-site inventories of each farm in the County in order to evaluate compliance with the states performance standards and prohibitions. This on-site inventory will also provide an opportunity for LWC staff to share information with farmers and landowners about new performance standards and possible impacts on their operations.

The first priority for which farms are selected for inventory and evaluation for compliance status will be with landowners that voluntarily seek program or technical assistant from the LWC. Second priority will be with farms that participated in past conservation programs like 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, however target areas may be re-prioritized at the discretion of the LWC:

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 LWC will collect 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 make determinations on whether a farm operation is in or out of compliance with a NR 151 Agricultural Nonpoint Performance Standards and Prohibitions. The LWC will make compliance determinations in accordance with NR 151.090 and 151.095 and will notify landowners of their status in a systematic manner 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 within 30 days at no cost to the landowner. DNR staff may be requested to help/assist with selected NR 151 compliance determinations.

SCHEDULE FOR IMPLEMENTING PERFORMANCE STANDARDS

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

LWC 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 have 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 is 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 LWC 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 a significant environmental impact or a threat to public health and safety. Priority farms will be identified through using the following criteria:

1) Reports of environmental incidents, including well-contamination, fish kills and/or manure spills/overflow events.
2) Public complaints.
3) Volunteer landowners that identify soil and water conservation issues on their farms and request LWC assistance.
4) Watersheds with impaired waters, approved TMDLs, nine element watershed-based plans or areas with high susceptibility for groundwater contamination.

LWC staff will use the above criteria to prioritize farms for LWC 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) impaired 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 LWC staff and the LCC.

A Targeted Runoff Management Grant provided the incentive to move this heifer raising operation from this location to the home farm site and abandon the feedlot and pasture area.

A restrictive covenant is in-pace preventing future livestock operations at this site.

ENFORCEMENT

In cases where a site is considered by the LWC and DNR staff to be a high priority and cost sharing is available, yet voluntary compliance does not occur within a reasonable time frame, the LWC and DNR will issue an official Notification of Noncompliance (NON). A formal offer of cost sharing and technical assistance will also be made when the LWC has them available. The NON and formal offer will establish deadlines consistent with state administrative rules (i.e., NR 151.090 and 151.095) in which the responsible individual must comply with a performance standard or be subject to enforcement under provisions of state administrative rules. If a landowner refuses an offer of cost-sharing, the case will be referred to the appropriate nonpoint source staff member at the DNR's South Eastern 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.

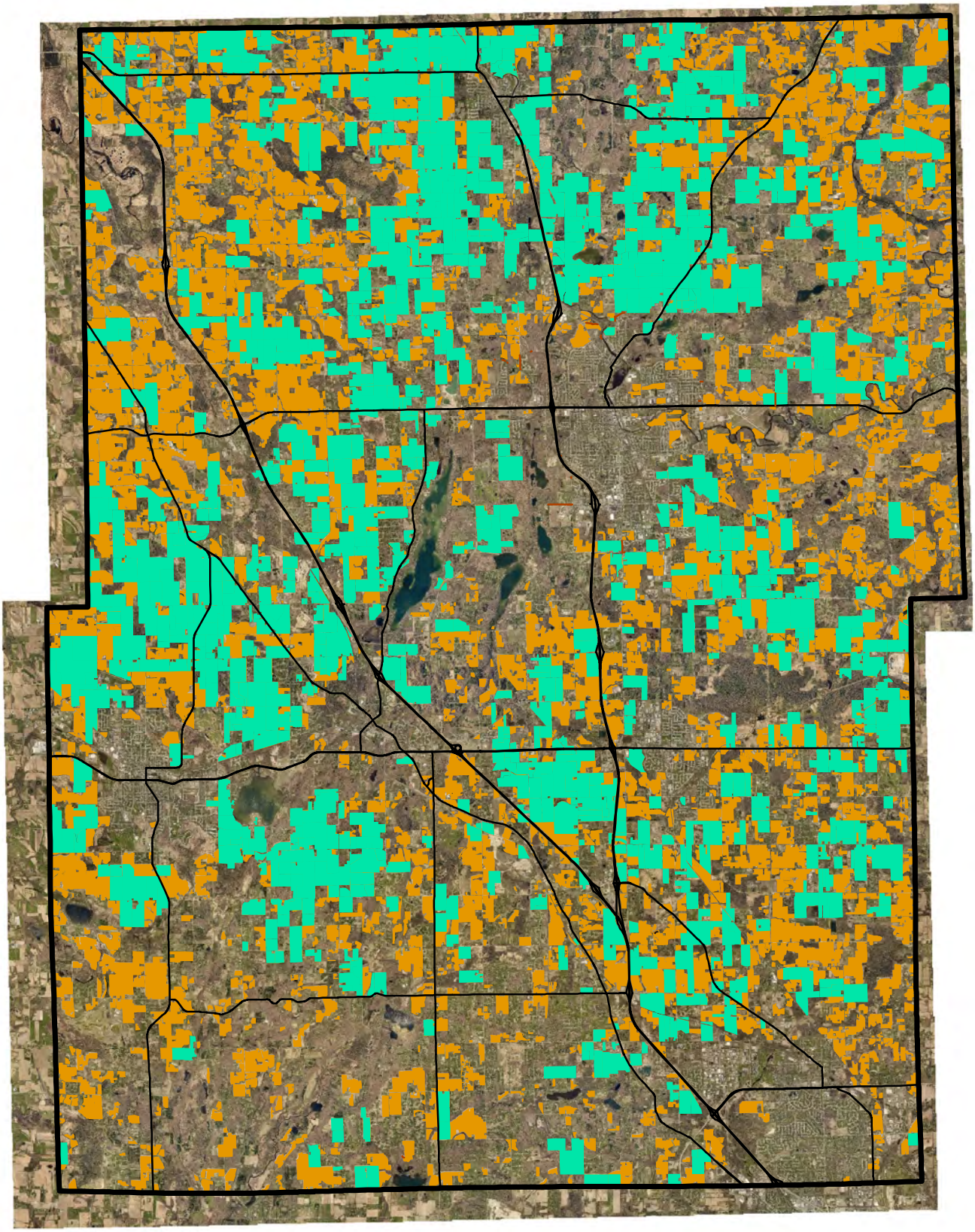
Through 2019, NR151 evaluations have been conducted on over 35% of the agricultural lands in Washington County as shown in *Figure 19*. The table below highlights the level of compliance currently being achieved; however, the level of compliance can be somewhat misleading. Compliance evaluations, conservation planning efforts and conservation practice installations have been tracked since the adoption of the Runoff Rules (NR151) in 2002. Since then, there have been changes to soil loss factors, mentioned previously, as well as the adoption of additional performance standards and significant changes to the engineering requirements for many conservation practice standards. Ownership of agricultural land and operations has also changed since 2002 within the county. LWC staff work to maintain open communication and a working relationship with farms operations to achieve and maintain compliance with the NR 151 performance standards and prohibitions irregardless of changes mentioned above.

Table 18
Agriculture Performance Level of Compliance

Ag Performance Standard	**Non-Compliant Operations**	**Full Compliant Operations**
Compliance Level	86	225
	Non-Compliant Reason	
Tolerable Soil Loss "T"	12	
Waste Storage Facility	1	
WQMA	15	
Nutrient Management	66	
Direct Discharge	25	
Pit Overflow	0	
Unconfined Piles	2	
Unlimited Access	2	

Figure 19

Agriculture Performance Standards - Compliance Determinations



NR 151 Compliance Determinations Conducted

Remaining Agricultural Lands

N W E S

0 0.5 1 2 3 4 Miles

Source: WASHINGTON COUNTY

NON-AGRICULTURAL PERFORMANCE STANDARDS

The nonagricultural performance standards for construction, post-construction, and developed urban area runoff are contained in Subchapters III and IV, 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 LWC, other county and municipal departments, and private developers and businesses are responsible for implementing the non-agricultural performance standards. The LWC 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 State's 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:

- Reduce the sediment load by 80 percent, as compared to no sediment controls.
- Prevent tracking of sediment from the construction site onto public or private roadways.
- Minimize the discharge of sediment as part of construction site de-watering.
- Control erosion from soil stockpiles.
- Storm sewer inlet protection.
- Ensure proper use, storage and disposal of chemicals, cement and other compounds used on the site.

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

POST CONSTRUCTION STORMWATER MANAGEMENT

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 state's 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 (TSS) and other pollutants carried in runoff from new development and redevelopment to the maximum extent practicable, including:

- Reduce the post-construction (TSS) by 80 percent for new development and 40 percent for redevelopments.
- Maintain pre-development peak runoff rates for the one-year and two-year, 24-hour storm events for new developments.
- Infiltrate 90%, 75% or 60% of pre-development runoff volumes for new development with low, moderate or high imperviousness respectively.
- Maintain protective areas (10-75 feet) between new impervious surfaces and lakes, streams, and wetlands.
- Control petroleum runoff (visible sheen) from fueling and vehicle maintenance areas.

Washington County Erosion Control and Stormwater Management Ordinance

Since January 1, 1998 Washington County has enforced an Erosion Control and Stormwater Management Ordinance. Washington County amended its ordinance in 2008 and again in 2016 to stay consistent with state requirements and changes to NR151 Administrative Code and to comply with the Uniform Statewide Standards under s. 281.33, Stats. With each ordinance update the County pulled together representative from local municipalities and created a model ordinance for local adoption and consistency across municipal boundaries. Within the unincorporated areas of the County, through Intergovernmental Agreements (IGAs), the LWC is the Administering Authority in 8 of its 11 townships. The County's ECSM Code replaced similar provisions that existed in the County Land Division Ordinance since 1978.

The County Code ensures that new developments meet sediment reduction limits and also incorporates TMDL reductions limits for redevelopments. In some TMDL reachsheds new development may be required to reach even higher sediment reductions in order to meet targeted goals. The County maintains a database of permanent stormwater practices and conducts follow-up site inspections to address long-term maintenance needs. It is recognized that proper maintenance will help minimize structure failure and possible damages, and ensure that the facilities continue to serve their designed function. Developing a process to ensure the proper long term maintenance of stormwater management facilities will be a focus of the LWC over the next couple years. The IGAs identifies the County, as administering authority will do the following:

- Create and maintain a computerized map and database of all stormwater management facilities;
- Conduct routine on-site inspections of stormwater management facilities based on facility age and surrounding land use and produce a written report concerning the current condition of each facility inspected;

- If maintenance action is recommended, discuss needs and jointly establish deadlines with the local government for the work to be completed by the responsible party; and,
- Jointly enforce maintenance requirements outlined in the inspection report. The Town will use their special assessment authority to recover all County or Town costs incurred if necessary.

As of 2019, the stormwater management GIS database contains records for over 310 installed stormwater BMPs, as shown in *Figure 20*.

STORMWATER MANAGEMENT – DEVELOPED URBAN AREAS

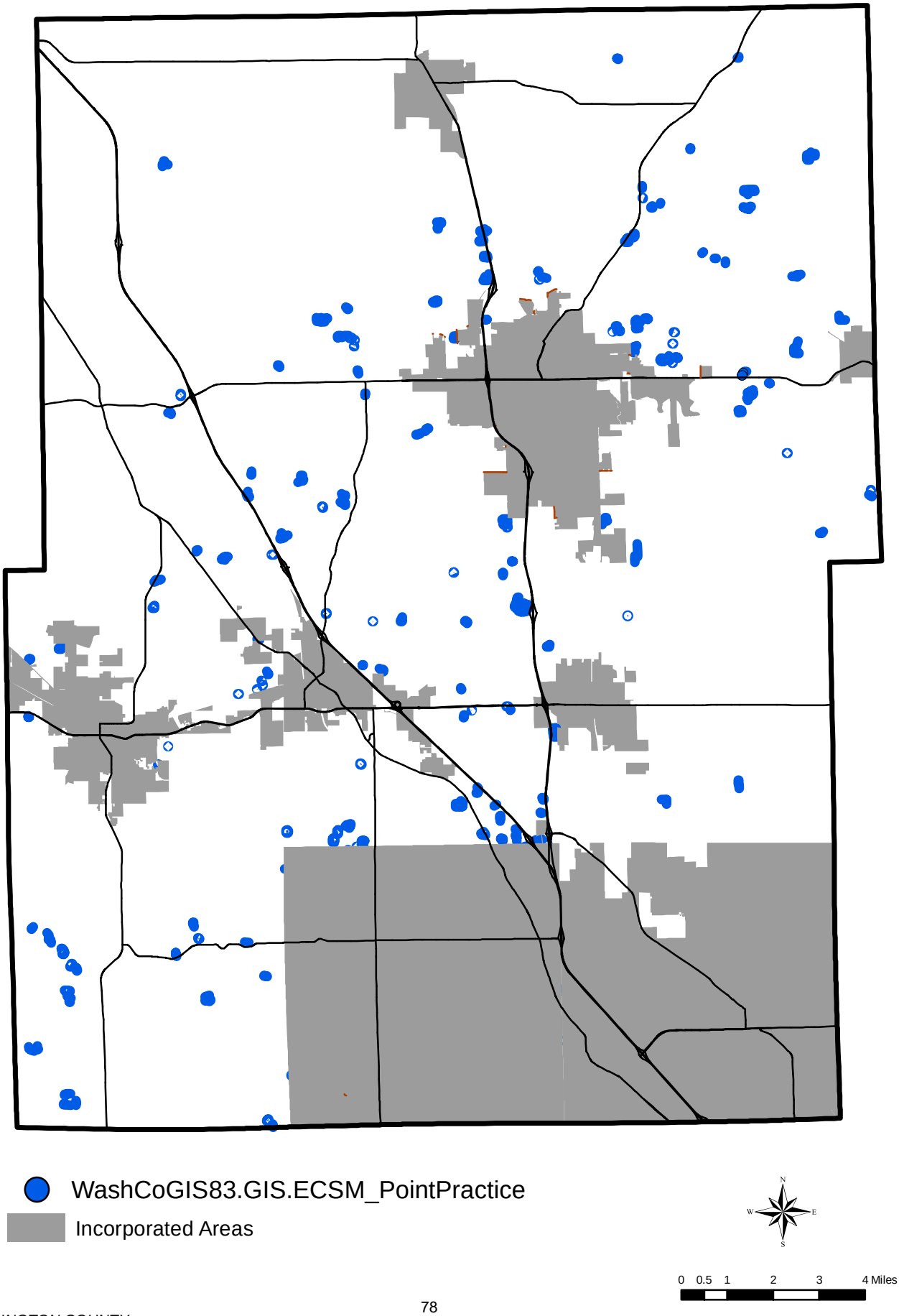
Chapter NR 216 Wisconsin Administrative Code requires discharge permits for community storm sewer systems, which collect runoff from existing urban development in the community. The DNR issues general Municipal Separate Storm Sewer System (MS4) permits and requires communities to apply for coverage. In general, these permits apply to all communities with a contiguous population density of 1000 people per square mile. In 2000, Phase 1 of this permit was first applied to communities with population of over 100,000, then in 2004, Phase II implementation, five communities in Washington County were required to apply for coverage – the cities of Hartford and West Bend, the Village of Germantown and Richfield and Washington County. At that time Washington County through a successful appeal was provided an exemption. Then, in 2014 Washington County and the Villages of Jackson, Kewaskum, Slinger, and Richfield along with the Townships of Hartford and West Bend received notice for permit coverage. As a result, the County along with the other communities obtained a Wisconsin Pollutant Discharge Elimination System (WPDES) permit. There are six WPDES permit requirements for an MS4 to meet;

- Public education and outreach
- Public involvement and participation
- Illicit discharge detection and elimination
- Construction site pollutant control
- Post-construction site storm water management
- Pollution Prevention/Good housekeeping

The LWC serves as the MS4 permit contact and plays the lead role in the development and implementation for Washington County.

Figure 20

Stormwater Management Practices Tracked for Long-Term Maintenance



Source: WASHINGTON COUNTY

PROGRAM INTEGRATION

The goals of this Plan can be achieved through implementation of Federal, State, and County Soil and Water Conservation Programs. The following are brief descriptions of each of the applicable programs.

FEDERAL CONSERVATION PROGRAMS

There are several federal programs available to landowners and farm operations, as well as partner agencies staff like the Natural Resource Conservation Service that help get conservation on the ground. This Plan identifies the primary programs utilized by LWC staff that help landowners address water quality and land management improvements.

Environmental Quality Incentives Program (EQIP)

Provides financial assistance to agricultural producers and agricultural landowners to address natural resource concerns and deliver environmental benefits, such as improved water and air quality, conserved ground and surface water, reduced soil erosion and sedimentation, and improved or created wildlife habitat. Funding is available for Conservation Practices similar to those listed previously under ATCP 50. LWC and NRCS staff work collaboratively through an Operational Agreement to provide technical assistance based on local priority efforts explained earlier.

EQIP uses a local workgroup of Federal, State and County Employees to determine priorities in order to distribute federal funds to help cost share conservation practices. It is a voluntary program designed to meet local resource concerns. The Land and Water Conservation Department works very closely with NRCS through the EQIP. The LWC oftentimes provides technical assistance to landowners who install practices through EQIP.

Table 19
Conservation Practices Installed through EQIP from 2015 – 2019

		Year Practice was Installed				
Practice Name	**Units**	**2015**	**2016**	**2017**	**2018**	**2019**
Brush Management	ac	4.4			4.1	7.1
Composting Facility	no		1			
Conservation Cover	ac	41.5	17.6	7.4	710.5	
Cover Crop	ac	48.9		427.5		816.5
Critical Area Planting	ac	0.8				
Diversion	ft				501.0	
Fence	ft	5,035.0	2,999.0			
Filter Strip	ac		1.5		0.9	
Forage and Biomass Planting	ac	8.1	12.4	0.9		15.8
Forest Management Plan - Written	no					6
Grassed Waterway	ac			0.6	9.0	

Heavy Use Area Protection	sq ft			252.0		
High Tunnel System	sq ft			2,160.0	2,700.0	2,160.0
Livestock Pipeline	ft		4,295.0			
Mulching	ac			0.6	0.3	
Nutrient Management	ac	398.1	406.4			
Pond Sealing or Lining - Concrete	sq ft					53,789.0
Prescribed Grazing	ac	13.9	20.0	31.9	17.7	12.4
Pumping Plant	no	1		2		1
Roof Runoff Structure	no	3				
Spoil Spreading	ac	0.8				
Stream Crossing	no			1		
Structures for Wildlife	no			2		
Subsurface Drain	ft			900.0	1,401.0	
Tree & Shrub Establishment	ac	11.5	2.0			2.7
Tree & Shrub Site Preparation	ac	16.5	0.6			2.7
Underground Outlet	ft	175.0				
Waste Separation Facility	no			1		
Waste Storage Facility	no		2	2		2
Waste Transfer	no	1		1		2
Water Well	no					1
Watering Facility	no		5			
Well Decommissioning	no				2	
Wetland Restoration	ac	0.7				

Table 20

Planned Conservation Practices to be installed through EQIP from 2020 – 2023

		Year Practice is Planned			
Practice Name	**Units**	**2020**	**2021**	**2022**	**2023**
Clearing and Snagging	ft	1,080.0			
Conservation Cover	ac	3.9			
Cover Crop	ac	4,162.8	4,446.5	400.0	301.1
Critical Area Planting	ac	1.0			
Fence	ft	12,240.0			
Filter Strip	ac	0.8			
Forage and Biomass Planting	Ac	5.8			
Forest Management Plan - Written	no	2.0			
Grade Stabilization Structure	no	3.0			
Grassed Waterway	ac	4.8			
Heavy Use Area Protection	sq ft	3,351.0			
High Tunnel System	sq ft	2,160.0			
Lined Waterway or Outlet	ft	70.0			

Livestock Pipeline	ft	7,990.0			
Mulching	ac	3.8			
Nutrient Management	ac	3,516.3	3,516.3		
Obstruction Removal	ac	1.1			
Pond Sealing or Lining - Concrete	sq ft	27,113.0			
Prescribed Grazing	ac	16.5	30.9	30.9	14.4
Pumping Plant	no	3.0			
Residue and Tillage Management, No Till	ac	400.0	400.0	400.0	
Spoil Spreading	ac	5.7			
Stream Crossing	no	3.0			
Streambank and Shoreline Protection	ft	850.0			
Subsurface Drain	ft	1,520.0			
Underground Outlet	ft	460.0			
Waste Transfer	no	5.0			
Waste Treatment	no	1.0			
Watering Facility	no	3.0			
Wetland Restoration	ac	1.4			

Regional Conservation Partnership Program (RCPP)

Promotes coordination between NRCS and its partners to deliver conservation assistance to producers and landowners. Under partnership agreements, NRCS and its partners leverage and target their respective resources to deliver conservation assistance to producers and landowners to address priority natural resource concerns. Programs primarily utilized through RCPP include Agricultural Conservation Easement Program, Environmental Quality Incentives Program and the Conservation Stewardship Program.

In 2016, a coalition between Washington County, Ozaukee County and the Milwaukee Metropolitan Sewerage District successfully applied for a RCPP Grant for the Cedar Creek Watershed (see *Figure 9* in Chapter III) and the Ulao Creek Watershed (Ozaukee County) through 2020. The Milwaukee River Watershed Conservation Partnership RCPP Grant supplied $800,000 of funding while the MMSD match ACEP funding for a total dollar grant of $1.5 million. The following chart summarizes the accomplishments through 2019.

Table 21
RCPP Project Goals and Accomplishments

Project Goal	*Target Quantity	Unit of Measure	Goal Progress (Cumulative Total)	% Complete
Producer Participation (i.e. Contacts, Outreach, Education)	382	no.	400	105%
RCPP-EQIP contract acreage	888	ac.	1564	176%
Hayland/ or Field Border (386)	12.5	ac.	13.9	111%

Pasture Planting	25	ac.	25.3	101%
Residue and Tillage Management - No Till/Strip Till/Direct Seed (329)	500	ac.	0	0%
Contour Buffer Strips (332)	2	ac.	0.9	45%
Cover Crop (412)	500	ac.	789	158%
"Buffer" Filter Strip (393)	25	ac.	5.9	24%
Grassed Waterway (412)	10,560	ft.	3096	29%
Nutrient Management (590)	500	ac.	435	87%
Fencing for Grazing	8,695	ft.	8695	100%
ACEP-ALE easement acquisitions	8	no.	3	38%
ACEP-ALE easement acquisitions	818	ac.	195	24%
Establish Farmer-led Watershed Council	1	no.	2	200%
Agronomist Meetings	5	no.	2	40%
Field Trips	4	no.	4	100%
Field Days	3	no.	4	133%

Agricultural Conservation Easement Program (ACEP)

Helps landowners, land trusts, and other entities protect, restore, and enhance wetlands, grasslands, and working farms and ranches through conservation easements that restricts the use of the land. Land Easements protect the long-term viability of the nation's food supply by preventing conversion of productive working lands to non-agricultural uses or by providing habitat for fish and wildlife, including threatened and endangered species, improve water quality by filtering sediments and chemicals, reduce flooding, recharge groundwater, protect biological diversity and provide opportunities for educational, scientific and limited recreational activities. Depending on the land use and easement type NRCS may contribute between 50 to 100 percent of the fair market value of the easement.

Conservation Reserve Program (CRP)

Protects soil, water quality, and habitat by removing highly erodible or environmentally sensitive land from agricultural production through long-term rental agreements by providing annual rental payments to landowners based on the productivity of the site's soils. The CRP was developed to assist landowners in voluntarily converting highly erodible and environmentally sensitive cropland from the production of annual crops to permanent grass, forbs, wildlife cover or trees. CRP normally has a 10 or 15-year lease payment.

Conservation Stewardship Program (CSP)

Helps agricultural producers maintain and improve their existing conservation systems while adopting additional conservation activities to address priority natural resource concerns.

Participants earn CSP payments for conservation performance—the higher the performance, the higher the payment.

GREAT LAKES RESTORATION INITIATIVE (GLRI)

The Great Lakes Restoration Initiative was launched in 2010 to accelerate efforts to protect and restore the Great Lakes and preventing the introduction of new invasive species. The EPA awards GLRI grants to state and local agencies working to improve and restore the Great Lakes. To date, Washington County has not received funding directly from the GLRI, but is aware of funding that has been provided through other programs like EQIP, and the DNR's Aquatic Invasive Species Education and Prevention Program.

STATE CONSERVATION ASSISTANCE PROGRAMS

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 LWC remains committed to using all available 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 ground" has always been a cooperative effort between the LWC, NRCS and other federal, state, and local agency staff. Lead administrative responsibilities are generally assigned to the LWC 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 LWC, 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 they have been and can be utilized to implement LWRM plan objectives.

TARGETED RUNOFF MANAGEMENT PROGRAM (TRM)

The Priority Watershed Program has been replaced with the Targeted Runoff Management program. Small scale 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. Large scale TRM grants focus upon watershed and are more comprehensive. The costs for administration will be covered primarily by County funds and to a lesser degree, by annual grants from the DATCP. The LWC will use TRM grants as a means of accelerating implementations of the NR 151 agricultural performance standard and prohibitions. These projects will be coordinated with regional DNR staff and whenever possible, with neighboring counties sharing the same watershed.

Washington County has averaged one TRM grant application every other year, since 2010 the program has funded five (5) water quality improvement projects totaling over $608,0000 in grant funds. Those projects consisted of rebuilding two existing manure storage facilities that were failing and leaking to groundwater, two barnyard runoff control systems and one streambank stabilization project.

Animal Feeding Operations and NR 243 (AFO)

Chapter NR 243, Wis. Adm. Code, is administered by DNR through authority from chs. 281 and 283, Wis. Stats. This code primarily outlines the Wisconsin Discharge Pollution Elimination System (WPDES) permitting and compliance requirements for large, over 1,000 animal units, concentrated animal feeding operations (CAFOs) as well as identifies the compliance requirements for small and medium animal feeding operations. For small and medium animal feeding operations, the DNR investigates complaints and determines if an operation is causing a "significant" water quality problem. If so, the DNR often issues a Notice of Discharge (NOD) which requires landowners to adopt animal waste management or other practices to reduce pollution of state waters. At the landowner's request, the LWC recommends solutions to the problem and will design and supervise the installation of practices.

The Washington County LWC has utilized the notice of discharge grant program; a grant was received in 2011 to address water quality problems associated with a groundwater contamination occurrence. As of 2019 there were five permitted CAFOs operating in Washington County; three dairy operations, one heifer raising facility and a poultry operation. There are an additional three operations in the County that are considering expanding and will most likely be permitted by the year 2025.

Farmland Preservation (FP)

In 2009 Wisconsin Act 28, often referred to as the Working Lands Initiative, repealed and recreated Wisconsin's farmland preservation law under Chapter 91 of the Wisconsin Statutes and related tax credits under subchapter IX of Chapter 71 of the Statutes. It also created a new program, under Section 93.73 of the Statutes, for the purchase of agricultural conservation easements. The new law also required counties to update their FP Plans. In response to state law, Washington County's Farmland Preservation Plan was updated and approved by the County Board on December 10, 2013.

The goals of the FP Program are to preserve farmland through local planning and zoning, promote soil and water conservation, and provide tax relief to participating farmers. To be eligible under the new Working Lands Initiative, all cropland and facilities associated with the farm must be in compliance with the Agricultural Performance Standards and meet certain zoning requirements.

The updated FP Plan identified specific Farmland Preservation Area (FPA) to be preserved for agricultural uses. However only three towns in the County agreed to incorporate the FPAs as an overlay map amendment to their comprehensive plans, those being the Towns of Barton, Germantown, and Hartford. None of the townships in the County pursued updates to their zoning code which would have made landowners eligible for the Farmland Preservation tax credit. As of now the only options landowners would have to participate in the program is to seek designation as an Agricultural Enterprise Area.

Managed Forest Law (MFL)

The goal of the MLF program is to encourage long-term sound forest management. MFL is a tax incentive program for industrial and non-industrial private woodland owners who manage their

woodlands for forest products while also managing for water quality protection, wildlife habitat and public recreation. In return the property owner is provided a reduction in property taxes on woodlands for following management plans. The plans are currently written by private consulting foresters and reviewed and approved by DNR foresters. DNR and private foresters provide most of the necessary informational, technical, and management services on trees and woodlands to County residents. The LWC and NRCS assist residents in signing up for federal and state programs to plant and maintain woodlands. The LWC also helps residents obtain trees to plant by administering an annual tree and shrub sale program and by distributing order forms for annual DNR trees sales.

Wildlife Damage Abatement and Claims Program (WDACP)

The WDACP provides abatement and claim assistance to landowners receiving wildlife damage. The damage must be caused by deer, bear, geese, sandhill cranes or wild turkeys to commercial seedlings, orchard trees, agricultural crops, nursery stock, apiaries, or livestock. Landowners are eligible for abatement practices such as fencing, shooting permits, scare devices, etc. Landowners may also receive reimbursement for crop losses up to a maximum cap. The USDA Animal and Plant Health Inspection Service (APHIS) administers the WDACP for Washington County.

Local Conservation Assistance Programs

Producer-Led Watershed Protection Program

The Producer-led Watershed Protection program focuses on ways to prevent and reduce runoff from farm fields and works to increase farm participation in voluntary efforts by fostering locally-led decision making by producers. Washington County's current active Producer-Led Group is the Cedar Creek Farmers, this group focuses on educating farmers within the Cedar Creek Watershed about soil health principles as well as providing funding to area farmers for experimenting with practices like No-till and cover crops. Grant funding available through DATCP along with matching dollars from organizations like the Fund for Lake Michigan help farmers address the unique soil and water quality challenges of their local landscapes with innovative and collaborative approaches.

Lake Districts/Associations

The LWC has developed close working relationships with several lake districts in the County. Conservation staff offer program planning guidance and technical assistance aimed to control aquatic invasive species and nonpoint sources of water pollution in the watersheds of those lakes. Some lake districts also budget funds to help support the County's Aquatic Invasive Species Program as well as paying for conservation practices. These close-working relationships will continue.

COUNTY TREE PROGRAM AND THE STEWARDSHIP INCENTIVE PROGRAM (SIP)

Since 1993, the LWC has sponsored an annual tree sale. The purpose of the program is to encourage area residents to plant native trees, shrubs and prairie seed 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. Proceeds from the annual tree sale are available for use as cost share dollars.

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.

PRIORITIES:

The Land and Water Conservation Department (LWC) ranks individual requests for SIP funds using the following criteria:

- First priority is given to landowners within focused watershed areas, as identified in the program guidelines approved by the Land Conservation Committee; examples include the Cedar Creek watershed RCPP area and coldwater fishery streams such as Quaas, Stony and Lehner.
- The degree to which nonpoint pollution is impacting water resources.
- The extent to which other program dollars are or are not available or adequate to enable the landowner/manager to adopt conservation measures.
- The extent to which the funds will be used for practices designated as high priority in the LWRM Plan. These include nutrient management, residue management, streambank protection (buffers, livestock fencing, etc.).

ELIGIBLE PARTIES:

SIP funds may be made available to Washington County residents, local units of government and non-profit organizations who own, operate or manage:

- Land where sediment and/or nutrient runoff is causing a significant water quality problem.
- Land or facilities that do not comply with state or local nonpoint performance standards.

ELIGIBLE PRACTICES:

SIP funds may only be used towards Best Management Practices (BMPs) for which the LCD has determined that:

- The proposed BMP is the most cost-effective means for achieving resource protection objectives.

- The proposed BMP will achieve compliance with state or local nonpoint performance standards whichever is stricter.

OTHER CONDITIONS:

The recipient of SIP funds must, at a minimum, agree to the following:

- Have LCD staff conduct a runoff pollution assessment on the entire property. The assessment would be to determine and document compliance or noncompliance with state and or local minimum performance standards.
- Implement the BMP according to technical standards adopted by Washington County.
- Maintain the BMP for as long as specified in the contract.

LAND AND WATER CONSERVATION REGULATIONS

The following ordinances are more relevant to this Land and Water Resource Management Plan and are administered by the Land and Water Conservation. County ordinances will be revised in order to keep current with technical standards and new state laws. Below is a description of current regulations involving the LWC.

ANIMAL WASTE STORAGE FACILITIES (CHAPTER 135)

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 to be designed and built to technical standards and specification. A producer is required to obtain a permit for construction and allow LWC 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 (CHAPTER 238)

This code became effective January 1, 1998. It requires development activities to meet stormwater management and erosion control standards. Chapter 238 replaced similar provisions that existed in the County Land Division Ordinance since 1978. By meeting the requirements of Chapter 238 the non-agricultural performance standards would also be met.

Washington County amended its ordinance in 2008 which included higher infiltration requirement. The ordinance again in 2016 to stay consistent with state requirements and changes to NR151 Administrative Code and to comply with the Uniform Statewide Standards under s. 281.33, Stats, thus removing the increased infiltration rate language. Local municipalities were requested to amend their ordinance to match the counties model for consistent code language throughout the County.

MINING, NON-METALLIC (CHAPTER 265)

The Non-metallic Mining Reclamation Ordinance was adopted by the Washington County Board of Supervisors in June of 2001. Washington County amended its ordinance in 2007 to include removal of "startup" language, changes to the annual reporting/fee collection, and a few definition additions/modifications. The LWC 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.

COUNTY AND LOCAL REGULATIONS

One way the Washington County Board and local units of government establish policies is by adopting ordinances and planning documents. Ordinances are local laws prescribing rules of conduct and are enforced by County and local officials. Ordinances become a permanent part of the governmental code and may be amended from time to time. Planning documents are adopted to give guidance to County and local officials and should be referenced in deliberations on planning and zoning issues. Once policy has been approved by the County Board or local officials it is the responsibility of staff to implement those policies.

COMPREHENSIVE PLANNING AND ZONING

The comprehensive plan and zoning ordinance[33] 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 22,* 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. County zoning authority in these Towns is limited to shoreland-wetland overlay zoning, floodplain overlay zoning, and subdivision review. Comprehensive zoning exists in all the Cities and Villages within the County.

[33] Ordinance information are found at http://www.co.washington.wi.us

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 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.

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 Wisconsin Department of Natural Resources.

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. For the most part, the incorporated Villages and Cities, 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.

Table 22
Ordinance Administration in Washington County related to Natural Resource Issues

Community	Type of Ordinance					
	Zoning/ Ordinance	Floodplain Zoning	Shoreland or Shoreland/ Wetland Zoning	Subdivision Control	Construction Site Erosion Control and Stormwater	Nonmetallic Mining Reclamation
Cities						
Hartford (portion)	Own	Own	None	Own	Own	County
West Bend	Own	Own	Own	Own	Own	County
Villages						
Germantown	Own	Own	Own	Own	Own	County
Jackson	Own	Own	Own	Own	Own	County
Kewaskum	Own	Own	Own	Own	Own	County
Newburg (portion)	Own	Own	Own	Own	Own	County
Richfield	Own	Own	Own	Own	Own	County
Slinger	Own	Own	Own	Own	Own	County
Township						
Addison	Own	County	County	County	Own [1]	County
Barton	Own	County	County	County	County	Own [1]
Erin	Own	County	County	County	County	County
Farmington	Own	County	County	County	Own [1]	County
Germantown	Own	County	County	County	County	Own
Hartford	Own	County	County	County	County	Own [1]
Jackson	Own	County	County	County	Own	Own
Kewaskum	Own	County	County	County	Own	Own [1]
Polk	Own	County	County	County	Own [1]	County
Trenton	Own	County	County	County	Own [1]	County
Wayne	Own	County	County	County	Own	Own
West Bend	Own	County	County	County	Own [1]	County
Washington County	None	County	County	County	County	County

[1] Washington County administers ordinance for the Community
Source: SEWRPC and Washington County

Chapter V

INFORMATION & EDUCATION ACTIVITIES

A key component of implementing a sound Land and Water Resource Management Plan involves a strong education and outreach program. 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. Implementation of this strategy is intended to build awareness about local runoff pollution problems and encourage residents to implement conservation practices, which reduce nutrient and sediment loading. An educated populace is clearly a key to the future management of our resources, and therefore, education is a priority.

BENEFITS OF AN EDUCATION PROGRAM

The overall goal of the education program is to develop more knowledgeable citizens who can participate in public discussion and debate about environmental issues. With a basic understanding of natural resources, residents can respond intelligently about 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 know what 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 an education and public involvement program that allows for a dialogue around 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.

EDUCATIONAL PROGRAMMING

The LWC 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.

ONE ON ONE CONTACT WITH LANDOWNERS

There is no better way to convince a landowner to adopt new practices than having a conservation specialist actually spend time with them on their property. Landowners identified as having resource concerns or sensitive areas will be visited for a one-on-one discussion regarding land management practices. NR 151 Status Reviews are also a productive way to discuss with landowners their conservation goals and discuss progress and process in meeting those goals.

LENDING RESOURCE LIBRARY

An environmental resource library has been established and is stocked with curriculum material for all age levels. Materials include models, 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 LWC providing increased public accessibility to our programs. Currently, we highlight the following topics to educate Washington County residents, among others:

Urban Stormwater – MS4 Program	Cedar Creek Farmers-Producer Led Watershed Group
Aquatic Invasive Species	Conservation Education for Kids
Clean Sweep	Conservation & Nutrient Management Planning
Permits & Ordinance Administration	Groundwater Resources & Well Water Testing
Tree & Prairie Seed Sale	Land and Water Conservation Programs
Wisconsin's Runoff Rules	

Program details and updates are easily viewed while our printed outreach material encourages public use of the resource.

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. The newsletter has been well received and offers landowners, civic leaders, teachers, etc. a consolidated platform for current environmental issues and upcoming events. Our newsletter is available on the website in an effort to reach a larger audience as well as to accommodate the current trend to reduce paper documents.

Staff Presentations and Guest Lecturers

LWC staff members receive requests to speak on a variety of natural resource conservation topics. Presentations have been developed and are updated regularly to provide the public with the most current information. Presentations continue to be developed as new natural resource concerns and issues arise.

Nutrient Management

Wisconsin's Nutrient Management Performance Standards require farmers to follow a certified 590 Nutrient Management Plan. The LWC initiated an active role in nutrient management planning in 2003 and the educational approach involves hosting an annual *Nutrient Management Farmer Education Course* 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 for their farm. 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.

SNAPPlus farmer education trainings, in partnership with DATCP, are hosted every three to five years by the Division. By calculating potential soil and phosphorus runoff losses on a field-by-field basis while assisting in the economic planning of manure and fertilizer applications, SNAPPlus provides Wisconsin farmers with a tool for protecting soil and water quality.

Collaboration with Producer-Led Watershed Group

The Cedar Creek Farmers-Producer Led Watershed Group plans to continue to work toward improving the quality of soil and water in the Cedar Creek watershed by: 1) providing education and outreach (field days, workshops, tours) to area producers about the principles of soil health, soil improvement practices and water quality improvement conservation practices; 2) recruiting producers to apply for and install low-cost conservation BMPs to improve soil and water quality as part of the Cedar Creek Farmers incentive program; and 3) improving the image of agriculture by showcasing various local leadership, outreach activities, farm and/or field signs and being active in the community promoting good farming practices.

By assisting with the group's goal of improving soil health and farm profitability while providing leadership, direction and education, we can successfully show improvements in water quality.

Youth Programs

LWC staff participate in several local and statewide programs designed for youth education including the NACD-Conservation Poster Contest, the Wisconsin Envirothon, Conservation Summer Camps, Testing the Waters-Rural Conservation Tour, Storm Drain Stenciling and the National Ag Day Farm Tours.

Contractor Workshops

Contractor education workshops are conducted periodically. Awareness of soil and water conservation issues is critical to successful implementation of remedial measures and the maintenance of good contractor, landowner, and agency working relationships.

Others

In addition to the above educational activities, we also utilize social media, local newspapers, radio, workshops, field days, tours, demonstration projects, and have a presence at community events. Educational efforts will continue to focus on a number of areas to meet plan objectives. These include:

- 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
- Alternative agricultural practices
- Farmland preservation
- Comprehensive planning and preservation practices

As in the past, educational efforts oftentimes are developed collaboratively with other county departments, local municipalities and cooperating agencies (i.e., nature centers, land trusts, lake organizations, NRCS, SEWRPC, UWEX, WDNR, etc.). This is especially true when audiences are common to more than one educational effort. The audiences that the LWC focuses its educational activities towards are listed below.

- Agricultural producers
- Rural landowners
- Agricultural service providers
- Urban homeowners
- General public
- City, Town, Village, and County officials
- Developers, builders, surveyors, etc.
- Schools and youth educators
- Adult non-profit organizations

Chapter VI

GOALS, OBJECTIVES AND ACTIONS

INTRODUCTION

The Goals, Objectives and, to some extent, Actions were developed considering previous LWRM Plans, state mandates, resource assessments and concerns from the public. As discussed in Chapter I, public input was provided through an Advisory Committee and survey responses from a group of farmers attending a conservation program update meeting in January, 2020. The following details the main goals, objectives and general actions that will guide the annual work activities of the LWC through the lifespan of this plan, unless revised through DATCP's annual reporting process in response to new issues or programs. In an effort to streamline and narrow the focus for LWC activities, only those objectives from previously adopted LWRM Plans were brought forward for inclusion into this Plan. For the most part, those objects or actions not included fell outside the scope of Washington County's LWC and, where appropriate, have already been incorporated in the Multi-Jurisdictional Comprehensive Plan for Washington County: 2050.

The primary goals carried forward from previous LWRM Plans as they relate to the County's natural resources continue to be:

- Improve and implement planning strategies and programs that protect and preserve land and water resources
- Improve and protect surface and groundwater through the proper use of fertilizers and pesticides
- Reduce the quantity and improve the quality of stormwater runoff from developed and developing areas
- Reduce the human and environmental risks posed by animal waste
- Protect and improve the quality and quantity of groundwater
- Protect and enhance the productivity and sustainability of all cropland and reduce sediment delivery into streams, lakes and wetlands
- Reduce the human and environmental risks posed by hazardous waste

These goals are used to group and define objectives and actions for determining measurable work activities. Annual work planning for each goal provides direction to the LWC staff and subsequently reported to DATCP each year to assure accountability and program evaluation. See Appendix C for an example of a multi-year work plan. The following goals, objectives, and actions with some additions and minor rewording were reviewed and finalized with the Advisory Committee.

GOAL: IMPROVE AND IMPLEMENT PLANNING STRATEGIES AND PROGRAMS THAT PROTECT AND PRESERVE LAND AND WATER RESOURCES

1. Assist with the state's efforts to pursue water quality objectives through the implementation of TMDL limits in designated EPA 319 watersheds.
    a. Participate in the implementation of TMDL watershed plans designed to address water quality impairments
    b. Explore opportunities to participate in adaptive management, water quality trading and/or Multi-discharger programs.
    c. Participate in the development and implementation of 9-key element plans or other water quality improvement planning efforts.
2. Assure the reclamation of mines when operations are terminated through the administration of the County's Nonmetallic Mining Reclamation Ordinance.
    a. Continue to approve and permit sites and reclamation plans annually.
    b. Continue to monitor and inspect sites for compliance sites via remote sensing and ground-truthing techniques to ensure plan compliance and update financial assurances.
3. Promote identification, control and management of invasive plant and animal species.
    a. Continue to implement the goals and objectives of the Washington County Aquatic Invasive Species Strategic Plan.
    b. Assist with the efforts of the Southeastern Wisconsin Invasive Species Consortium.
    c. Work with and encourage County and Municipal Departments to identify, control and manage invasive species in parks and roadways.
    d. 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.).
    e. Assist lakes organizations regarding Aquatic Invasive Species (AIS) issues.
    f. Promote native species plantings by offering native tree, shrubs, and prairie plants through the annual LWC tree and native plant sale program.
    g. Continue participation in the WDNR Gypsy Moth Suppression Program.
4. Aid in the administration of the County's stormwater management program that meets EPA and NR216 stormwater permit requirements for the Urban Areas to meet requirements of WPDES MS4 Permit.
    a. Promote intergovernmental discussion, cooperation, and agreement regarding water quality improvement issues where appropriate.
    b. Advise and assist local governments with implementation and annual reporting, as requested. Promote and update "Cleanways for Waterways" website information.
    c. Continue to seek projects and funding that would allow the County to implement Best Management Practices on publically-owned lands and facilities.
5. Support the priorities identified in the County's Comprehensive Plan or other adopted plans and the strategic initiatives of the governing body.

Goal: Improve And Protect Surface And Groundwater Through The Proper Use Of Fertilizers And Pesticides

1. Assist farmers and private consultants with the development and implementation of nutrient management plans on cropland and sod farms.
    a. Continue to provide nutrient management related training programs.
    b. Assist producers with development and updates to their Nutrient Management Plans.
    c. Maintain a nutrient management database and monitoring procedure.
    d. Provide support to private agronomists.
2. Increase awareness of the proper use of fertilizer, pesticide and de-icers; promote natural landscaping for non-agricultural properties.
    a. Promote and assist with training / educational events for residential, departmental, utilities, public and private property owners and managers.
    b. Provide information regarding State phosphorus ban in fertilizer and proper lawn care.
    c. Promote natural landscaping and proper use of lawn products.

Goal: Reduce The Quantity And Improve The Quality Of Stormwater Runoff From Developed And Developing Areas

1. Implement the County's Erosion Control and Stormwater Management Ordinance or equivalent for new developments.
    a. Ensure consistency of the County's Erosion Control and Stormwater Management Code with State and Federal standards.
    b. Coordinate with town officials regarding status of ordinance implementation, updates and administration.
    c. Promote consistent language of Erosion and Stormwater Control Ordinances between all local governments.
    d. Continue to update and develop related policy and procedure forms.
    e. Increase awareness about impacts and proper management of stormwater runoff.
2. Assist local governments with the long-term function and maintenance of stormwater facilities through approved intergovernmental agreements.
    a. Maintain a stormwater facilities database on the types and locations of stormwater facilities.
    b. Assist with the inspection of existing stormwater facilities.
    c. Work with local governments to develop best alternatives strategies for long term maintenance.
    d. Provide guidance on the maintenance of Stormwater Facilities.
3. Promote the use of infiltration practices to help reduce flooding from developed and developing land.
    a. Promote increased use of infiltration basins, rain gardens, rain barrels, and other water infiltration methods.

4. Encourage the use of regional stormwater practices (RSPs).
    a. Promote function, design and maintenance benefits of RSPs.
    b. Advise and assist the Lake Districts on plans and projects related to water quality protection and regional stormwater management and benefits.

GOAL: REDUCE THE HUMAN AND ENVIRONMENTAL RISKS POSED BY ANIMAL WASTE

1. Continue application of the County's Manure Storage Ordinance.
    a. Continue to provide high quality technical review and planning assistance.
    b. Update the County Code to include new State and Federal standards.
    c. Continue to develop an inspection procedure and inspection schedule for existing manure storage facilities.
    d. Educate producers, town officials, agricultural lenders and contractors regarding requirements.
2. Assist livestock operations with meeting the Agricultural Performance standards by having no: overflowing manure storage facilities, unconfined manure stacks within Surface Water Quality Management Areas, significant discharge of process wastewater to waters of the state, 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.
    a. Maintain a livestock operations database and conduct on-site evaluations to determine compliance.
    b. Continue to develop and revise producer farm resource conservation plans which address these objectives.
    c. Educate producers, town officials, agricultural lenders and contractors regarding these objectives.
    d. Assist with the planning and development of livestock expansions, ensuring compliance with these requirements.

GOAL: PROTECT AND IMPROVE THE QUALITY AND QUANTITY OF GROUNDWATER

1. Increase awareness and ensure land-use practices protect the drinking water supply.
    a. Continue to assist with the location of sensitive (e.g., high bedrock, sandy soils, groundwater recharge potential) recharge areas.
    b. Work with livestock operation within the Silurian Bedrock performance standard area to reduce impacts to groundwater.
    c. Increase awareness and promote action for proper groundwater protection practices including well abandonments and proper management of fertilizers and pesticides.
    d. Continue to promote annual well water testing; maintain a database of result data that can be used to compose a county-wide groundwater quality report.
    e. Raise awareness about levels of nitrates, volatile organic compounds (VOCs) and other well contaminates.
2. Help to protect/preserve groundwater recharge areas, springs and other discharge points that feed cold and warm water streams.

a. Assist with the identification and mapping of springs, cold water streams and their recharge areas.

GOAL: PROTECT AND ENHANCE THE PRODUCTIVITY AND SUSTAINABILITY OF ALL CROPLAND AND REDUCE SEDIMENT DELIVERY INTO STREAMS, LAKES AND WETLANDS

1. Work with agricultural producers to achieve an erosion rate at or below "T" and the agricultural performance standard phosphorus index at or below 6 for cropland fields, pastureland, and winter grazing areas.
    a. Maintain a crop field database that identifies current conservation planning areas.
    b. Develop and revise producer resource conservation plans to achieve this objective bases on areas that do not have plans.
    c. Maintain conservation planning database and monitoring procedure to ensure continued compliance with standards.
2. Encourage riparian buffers that effectively augment existing programs, incorporating the 5-foot tillage setback agricultural performance standard.
    a. Actively promote buffer programs by providing educational materials, technical and funding assistance.
    b. Develop and administer a monitoring and maintenance program.
    c. Continue to work with local organizations and land trusts to leverage resources.
3. Guide efforts to establish and maintain permanent vegetation in concentrated flow channels or other areas where runoff would otherwise cause erosion or sediment delivery to surface waters.
    a. Implement countywide education effort to promote practice.
    b. Promote native vegetation plantings by offering native tree, shrubs, and prairie seed through annual LWC tree and native plant sale program.
4. Promote agricultural BMPs that improve soil health.
    a. Increase education about and use of BMPs such as conservation tillage (e.g. reduced till and no-till), and cover crops; including principles of balanced pH and micronutrient content of soils.
    b. Participate with and help foster Producer-Led Watershed Protection Groups.
    c. Raise awareness about the benefits of soil health and water quality practices.

GOAL: REDUCE THE HUMAN AND ENVIRONMENTAL RISKS POSED BY HAZARDOUS WASTE

1. Provide convenient and cost effective methods for residents to dispose of unused hazardous waste and possibly other recyclable material where limited disposal options exist.
    a. Continue to sponsor collection events through a combination of grants, user fees and base-level funding.
    b. Seek partnerships with local governments, health care facilities and the business community involving program initiatives.
2. Increase awareness on the hazards of dioxins, carcinogens and other harmful substances to county residents.

Chapter VII

IMPLEMENTATION BUDGET

BUDGET IMPLEMENTATION

To successfully implement the County's LWRM Plan adequate funding for staff and programs will be essential. Currently, there are 5.25 full-time employees dedicated to the Land & Water Conservation: Manager, three Conservation Technicians and Administrative Support staff that include the combined efforts of an office assistant, accountant and administrative manager, together equates to an approximate 0.75 FTE. This number also includes a grant funded Aquatic Invasive Species Coordinator that is shared 50% with Waukesha County through an intergovernmental agreement.

It is important to recognize that Washington County intends to carry out the goals and actions identified in this plan while utilizing limited public resources. The LWC understands that plan implementation must balance natural resource protection with other County priorities. Therefore, the level of implementation can be directly associated with the level of financial support allocated to LWC activities. Furthermore, conservation achievements are a reflection on the amount of base-level funding provided by the state to implement state programs. This funding is combined with limited County resources that focuses on local priorities along with other localized support and partnerships. This can be summarized in the following equation:

State Funding for State Program Implementation	+	County Funding for Local Priorities	+	Other Partnerships and Grants	=	Total Conservation Effort on LWRM Plan Goals

Presently, the majority of funding for the LWC staff activities is primarily comprised of County tax payers combined with grants received from DATCP, DNR and from specialized program grants through partner organizations. The cost estimates outlined below represent the best estimates of the LWC in order to maintain current staffing levels. No attempt is made to identify other sources of funding beyond current grants and programs. All of the estimated costs beyond the year this plan was developed is subject to the annual budget processes of the County and State; this plan makes no attempt to establish fiscal policy for the County or State and is provided solely to satisfy state LWRM planning requirements.

The projected staff costs over the next five years is outlined in *Table 23* below. Cost projections beyond this period are too variable and have limited value. 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 four possible courses of action. The first option would be for the County to gradually increase its portion of costs to maintain its staffing level. 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 the 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 fourth option will be to continue to seek outside grants that support staff; this option is the least desirable since oftentimes grants that support staff are project specific, require additional time for reporting and reimbursement, and do not provide security for employees. The table below shows the estimated costs given the first option.

Table 23:
Staff Costs by Source: 2019-2024[a]

Funding Source	2019		2020		2021		2022		2023		2024	
	COST	FTE[b]	COST	FTE	COST	FTE	COST	FTE	COST	FTE	COST	FTE
County	$170,675	2.5	$193,910	2.5	$237,600	3[d]	$290,170	3.5 [d]	$301,780	3.5	$313,850	3.5
State	$124,610	1.25	$136,560	1.25	$142,020	1.25	$147,700	1.25	$153,610	1.25	$159,750	1.25
Other Grants	$78,310[c]	1.5	$106,570	1.5	$75,890	1.0	$20,255	0.25[e]	$21,065	0.25	$21,910	0.25
Total	**$373,595**	**5.25**	**$437,040**	**5.25**	**$454,510**	**5.25**	**$458,125**	**5.0**	$476,455	**5.0**	$495,510	**5.0**
5-YEAR TOTAL (2020-2024)												
County:	**$1,337,310**											
State	**$739,640**											

[a] *Figures include 4% annual cost increases for salary and benefits*
[b] *Full Time Equivalent*
[c] *Positions funded by grant to focus on Aquatic Invasive Species and Cedar Creek Watershed RCPP Project Area*
[d] *Projected increase due to grant for Cedar Creek RCPP Area ending June 30, 2021.*
[e] *Reduction due to Aquatic Invasive Species Grant changing to annual allocation*

The second budget consideration involves financial assistance to landowners. This type of funding, referred to as cost sharing, is administered through the LWC 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 annual cost share needed for installing best management practices, at a base level for the next 5 years are listed in *Table 24*. 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 State and Federal government, and Foundations that focus on water quality improvements. 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 24:
Cost Share Needs by Practice Type [a]

Category	Annual Base Level Funding
Fertilizer & Nutrient Management	$10,000
Animal Waste Management	$100,000
Groundwater Protection	$1,000
Sedimentation & Cropland Sustainability	$20,000
Total State Funding	**$131,000**

[a] *Does not include the portion paid by the landowners.*

Chapter VIII

EVALUATION

The LWC 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 WDNR and DATCP.

ADMINISTRATIVE REVIEW

Administrative review will consist of tracking and reporting the accomplishments and 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
- Landowner contacts and advising
- Design and installation of best management practices
- Modeled pollution reductions
- Development of conservation and nutrient management plans
- Development of cost share agreements and other documentation
- Stormwater and erosion control plan reviews, permits issued and site inspections
- Manure storage permits issued
- Compliance monitoring and follow-up

The majority of these activities do not result in direct, measurable water quality improvements. Therefore, evaluating their effectiveness is often a subjective exercise. Decisions to modify activities will be an internal determination based on management decisions, program direction and local priorities. Administrative reports will also document the amount of funding committed to program implementation and funds distributed for cost sharing.

QUANTIFYING RESOURCE PROTECTION

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 B highlights the implementation of Best Management Practices in Washington County from 2010 through 2019. Methods to document measurable effects are listed below.

Planning Strategy

Using Geographic Information System (GIS) software, land use changes and conservation practice installation will be tracked and used in future models to evaluate progress towards TMDL implementation and restoration of nutrient, sediment or bacteria impaired waters. The LWC will continue to engage local municipalities seeking partnerships on water quality improvements. Nonmetallic Mines will continue to be monitored for compliance with County Code requirements and annual reports provided to the DNR identifying reclamation activity. Invasive species populations will continue to be mapped in the County, and land managers will be advised on management techniques to help control the spread of invasive plants and animals.

Fertilizer and Pesticide Management

The LWC will track the number of acres included in nutrient 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.

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 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 residential well water testing programs 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, satellite imagery and farm conservation plan updates will be used to track trends in soil erosion rates and tillage practices. Improvements in soil health, including such factors as compaction, organic matter and balanced micronutrients, will be monitored using standard soil quality testing methods as well as utilizing trend data from the

annual transect survey and acres of practices installed that promote soil health (e.g. Cover crops and no-till).

Reductions in sediment delivery to water bodies and wetlands will be quantified using either book values or computer models (e.g., SnapPlus, STEPL) 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. When evaluating sediment reductions from cropland, phosphorus load reductions may also be calculated and reported.

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's residents.

MONITORING WATER RESOURCES

The best evaluation of whether or not water quality goals are being met is by directly monitoring the resource, over time, and looking for trends. 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.

Until more comprehensive water quality monitoring can be conducted locally, LWC will continue to encourage and support DNR, USGS, and citizen-based monitoring. The LWC will continue to assemble ground and surface water quality data and appraisals from various sources and 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 sustain or increase their water quality monitoring activities
- Encourage SEWRPC, WDNR, and USGS to establish at least one stream flow gage in the Milwaukee River, Cedar Creek, and Rock River watersheds within the County – to determine pollutant loads and not just pollutant concentrations.
- Continue to partner in citizen monitoring and school monitoring efforts
- Building cooperative partnerships between volunteer and professional monitor efforts

MODELING VS MONITORING

Modeling is an alternative to actual water quality monitoring, but because modeling is usually based on hypothetical scenarios it often does not carry the weight that actual monitoring does, thus it can be viewed as subjective. Modeling, however, can still provide useful data for use in planning. Examples of computer programs that are used by the LWC that utilize modeling are Snap-Plus & RUSLE 2 for evaluating soil loss, EVAAL for determining potential for erosion in watersheds, BARNY for evaluating barnyard runoff, NDTI for evaluating watershed crop residue levels and tillage practices, and STEPL for estimating sediment and phosphors reductions in watersheds. As resources or technology become available that utilize modeling, the LWC will consult with the WDNR and evaluate whether to use those resources and technologies for assessing water quality within the county.

APPENDIX A
PUBLIC INPUT

INVITATION TO THE LWRM PLAN ADVISORY COMMITTEE

WASHINGTON COUNTY

Office of the County Administrator
Joshua Schoemann, County Administrator
Matt Furno, Deputy County Administrator
Ethan Hollenberger, Public Affairs Coordinator

Herbert J. Tennies
Government Center
432 E. Washington Street
P.O. Box 1986
West Bend, WI 53095-7986
(262) 306-2200

For Immediate Release: **November 11, 2019**
Contact: Ashley Reichert, County Clerk – 262-335-4301

County Seeking Committee Members for its Land and Water Resource Management Plan Development

Washington County is seeking applications from a broad spectrum of public interests and perspectives to serve on a local advisory committee overseeing the development of the County's Land and Water Resource Management Plan. Interested candidates should be able to attend 2-3 evening meetings between January and April 2020 likely to be held early evenings. Ideal candidates should have interest and be able to represent agriculture, farming, agriculture business, conservation, education, surface/groundwater including lakes, development/realtor or local government generally.

The Land and Water Resource Management Plan guides the annual work plans to implement conservation throughout Washington County. The Committee's role includes reviewing, developing goals and objectives, and assisting with prioritization of local conservation efforts. The plan is ultimately approved by the Washington County Board of Supervisors and the Department of Agriculture Trade and Consumer Protection.

To apply: Email applications to Ashley Reichert, County Clerk at ashley.reichert@co.washington.wi.us
Subject: LWRM Interest

Or

Mail or drop off applications to P.O. Box 1986, 432 E. Washington Street, West Bend, WI 53095 Attn: Ashley Reichert – LWRM Interest

Applications may include a resume and statement of interest but at a minimum, must contain an address and brief biography. The deadline for applications is Monday, December 2, 2019, at 12:00 p.m.

# # #

Washington County creates an environment for residents and businesses to enjoy our authentic quality of life through a well - governed and administered county dedicated to safe and secure communities; economic growth and vitality; effective mobility and reliable

PRODUCER AND ADVISORY COMMITTEE SURVEY

On January 22, 2020 the Land and Water Conservation Division hosted a Nutrient Management and Conservation Program Update luncheon. During this meeting a survey was presented to over 50 local producers regarding resources, programs and the State's performance standards. All attendees were asked to complete the survey in order to provide input into the County's Land and Water Resource Management Plan. The survey was also provided to members of the Advisory Committee at the start of the first meeting. The below slides provides the results from the surveys of each group. The last slide was a survey question only presented at the producer meeting and indicates where specific conservation improvements could be made on their specific operations.

The Advisory Committee was asked during their April 28th meeting to provide additional prioritization on resource concern issues and the general goals and objectives presented in Chapter 6. The results of the final prioritization of resource issues that the Advisory Committee felt should be a focus for programs by the Land and Water Conservation are listed below from highest priority to lowest. As mentioned in Chapter 1, the following list will be utilized in the formation of annual work plans and help guide activities for future programs.

1. Groundwater Protection
2. Surface Water Quality - TMDL Implementation
3. Nutrient Management Farmer Training Program
4. Promoting Soil Health
5. Producer-Led Group Collaboration
6. Aquatic Invasive Species
7. Partnering in Adaptive Management, Water Quality Trading Programs
8. Hazardous Waste Collection and Awareness
9. Riparian Buffer Initiative
10. Promotion of Regional Stormwater Control Facilities

Lastly, the Advisory Committee offered suggestions on issues that were not addressed or discussed in this plan. Only four additional items where brought forward by the committee and where applicable and appropriate were incorporated into this plan.

- Forestry management recommendations to deal with Emerald Ash Borer, Oak Wilt and Beech Bark Disease
- Promote the conservation advances adopted by producers to improve soil & environment
- Building a community's resilience to mitigate the effects of weather extremes
- Chloride concentration increases occurring in surface water and groundwater

RESOURCE CONCERNS

Greatest resource concerns in Washington County

(33 Responses)

1. Loss of Farmland to Land Development
2. Groundwater Quality
3. Soil Erosion
4. Soil Quality/Health
5. Air Quality
6. Surface Water Quality, Invasive Species, & Forest Stand Improvement
7. Animal Waste Management
8. Groundwater Usage
9. Fish/Wildlife Habitat
10. Threatened or Endangered Species

Advisory Committee

(7 Responses)

1. Groundwater Quality
2. Surface Water Quality
3. Fish/Wildlife Habitat
4. Groundwater Usage
5. Loss of Farmland to Land Development
6. Animal Waste Management
7. Soil Erosion
8. Threatened or Endangered Species
9. Forest Stand Improvement
10. Invasive Species,
11. Soil Quality/Health
12. Air Quality

PRIORITY AREAS

Priority Areas - Focus Efforts

(38 Responses)

1. Land Use / Farmland Protection
2. Groundwater Protection
3. Soil Erosion and Sediment Issues
3. Producer Led Watershed Projects
4. Animal Waste Management
5. Rural Development Construction Erosion Control and Stormwater Management
6. Voluntary Conservation Assistance
7. Regulatory Compliance with all Farms on the Agriculture Performance Standards

Advisory Committee

(7 Responses)

1. Regulatory Compliance with all Farms on the Agriculture Performance Standards
2. Groundwater Protection
3. Land Use / Farmland Protection
4. Animal Waste Management
5. Producer Led Watershed Projects
6. Soil Erosion and Sediment Issues
7. Rural Development Construction Erosion Control and Stormwater Management
8. Voluntary Conservation Assistance

FINANCIAL IMPACTS

Degree that conservation improves the bottom-line?

(39 Responses)

26 - Slightly Improve
11 - Greatly Improve
2 - Not Sure

Advisory Committee

(7 Responses)

3 – Greatly Improve
3 – Slightly Improve
1 – Slightly Decline

AGRICULTURAL PERFORMANCE STANDARDS

Focus on Compliance with Performance Standards

(36 Responses)

1. Prevent Direct Runoff from Feedlots/Stored Manure to Water
2. Limit Livestock Access to Surface Waters
3. No Stacking of Manure Within 300 Feet of Surface Waters
4. Meet Tolerable "T" Soil Loss
5. Ensure a 5 Foot Tillage Setback along Surface Waters: Ditches, Streams and Lakes
6. Meet the Animal Waste Spreading Restrictions in Shallow Bedrock Areas of the County
7. Divert Clean Water Around Feedlots/Storage Areas that are within 300 Ft of Surface Waters
8. Develop AND Follow an Annual Nutrient Management Plan
9. Prevent Overtopping of Waste Storage Facilities
10. Prevent Runoff from Feed Storage - Milkhouse Waste from Entering Surface Waters
11. Ensure Waste Storage Facilities Meet Technical Standards (New and Old)
12. Properly Abandon Waste Storage Facilities that are No Longer Used

Advisory Committee

(7 Responses)

1. Prevent Direct Runoff from Feedlots/Storage
2. Prevent Runoff from Feed Storage and/or Milkhouse Waste
3. No Stacking of Manure Within 300 Feet of Surface Waters
4. Prevent Overtopping of Waste Storage Fac
5. Divert Clean Water Around Feedlots/Storage Areas that are within 300 Ft of Surf Waters
6. Limit Livestock Access to Surface Waters
7. Ensure a 5 Foot Tillage Setback along Surface Waters: Ditches, Streams and Lakes
8. Meet Tolerable "T" Soil Loss
9. Meet the Animal Waste Spreading Restrictions in Shallow Bedrock Areas of the County
10. Develop AND Follow an Annual Nutrient Management Plan
11. Ensure Waste Storage Facilities Meet Technical Standards (New and Old)
12. Properly Abandon Waste Storage Facilities that are No Longer Used

YOUR OPERATION

Areas for Improvement Identified by Farmer for their Operation

(34 Responses)

24 - Soil Health
16 - Soil Erosion
12 - Reducing/No Tillage
10 - Barnyard/Feedlot Runoff
9 - Nutrient Management
5 - Gully Erosion
5 - Manure Spreading
4 - Manure Storage
3 - Grazing Pasture Management
2 - Feedpad/Feed Storage Runoff
1 - Milkhouse Waste

AFFIDAVIT OF PUBLICATION

State of Wisconsin Circuit Court Washington County

PROOF OF PUBLICATION

Telephone Number: 262-335-4800

ACCT Number: 197260

Notice is hereby given that a public hearing will be held at a meeting of the Washington County Land Use and Planning Committee in Room 2024 at the Washington County Herbert J. Tennies Government Center, 432 E. Washington Street, West Bend, Wisconsin on Thursday, June 25, 2020 at 7:30 A.M., there will be heard and considered:

The Public Hearing for public comment on the Draft Update to the Washington County Land & Water Resource Management Plan (2021-2030). A brief overview of the Plan will begin at 7:30 A.M., in Room 2024. The purpose of this hearing is to hear public opinion on the Draft of the Washington County Land & Water Resource Management Plan (3rd Generation 2021-2030) which is required to meet WI Stats., Chapter 92.10(6). The Plan is used to guide county land and water conservation program efforts for the next 10 years and will also help the county qualify for future state and federal grants. The Washington County Land and Water Resource Management Plan may be viewed online at: (www.co.washington.wi.us/lcd). The plan may also be viewed in Suite 2300 at the Washington County Planning and Parks Department, 333 E. Washington Street, West Bend, WI, during the hours of 8:00 am to 4:30 pm Monday - Friday.

Written comments will be accepted until 4:30 pm on June 24, 2020. Written comments or questions about this hearing or plan can be directed to the: Washington County Land & Water Conservation Division, Attn: Paul Sebo, 333 E. Washington St., Ste 2300, West Bend, WI 53095 or by calling (262) 335-4800. Written comments will be read at the public hearing and given the same weight as oral testimony.

Dated this 5th day of June, 2020

NOTE: Hearings will not start prior to their scheduled time. Individuals attending this public hearing will not need to arrive at the meeting more than 5 minutes prior to the time stated on this legal notice.

Jamie Ludovic, Director of Community Development & Communications Planning & Parks Department

Publish: 6/11, 6/18

WNAXLP

Washington Co. Land & Water
Conservation Division
333 E Washington St #2300
West Bend WI 53095-2003

RECEIVED
JUN 22 2020
WASHINGTON COUNTY
PLANNING AND PARKS DEPT.

R OF: PH 6/25/2020 draft update
104691015

71.69

I, Charlotte Speener ,being sworn, state:

I am the billing coordinator of the Daily News, a public newspaper of general circulation, printed and published in the English language in the City of West Bend, in Washington County, Wisconsin, and fully complying with the laws of Wisconsin relating to the publication of legal notices.

The notice, of which a printed copy attached hereto, is a true copy taken from the newspaper as published on the following dates.

6/11/20;6/18/20

Signed: Charlotte Speener
Charlotte Speener, Billing Coordinator

STATE OF WISCONSIN
WASHINGTON COUNTY
SS.

Personally came before me, this date of June 18, 2020 the above named Charlotte Speener to me known to be the person who executed the foregoing instrument and acknowledged the same.

Signed: Nancy Bellin
Nancy Bellin
Notary Public, Wisconsin

My Commission expires: 10/4/22

NANCY BELLIN NOTARY PUBLIC STATE OF WISCONSIN

WASHINGTON COUNTY 2020 ANNUAL WORK PLAN
LOCALLY-IDENTIFIED PRIORITIES

Table 1: Planned activities and performance measures by category

CATEGORY (goal and objective from LWRM plan can be added in each category)	PLANNED ACTIVITIES WITH BENCHMARKS If applicable identify focus areas, e.g. HUC 12 watershed code (examples of types of "planned activities" in italics)	PERFORMANCE MEASUREMENTS (examples in italics)
• *Cropland*		
Cropland, soil health and/or nutrient management	10 whole farm resource conservation plans developed 30 Nutrient Management plan annual updates 3 grassed waterway practices to control gully erosion 100 Acres Cover Crops thru PLWPG 100 Acres No-Till thru PLWRPG HUC 12 Focus: 040400030301, 040400030303, 040400030207	# acres of cropland in compliance with performance standard # units of practice(s) installed # lbs of P reduced using SnapPlus # tons of soil saved (using approved method) # lbs of sediment reduced (using any approved method) $ amount of cost-share funds provide
• *Livestock*		
Livestock	2 - Feed Storage Runoff Control Practices HUC 12 Focus: 040400030106 1 Roofed Manure Storage HUC 12 Focus: 040400030303 1 – Waste Transfer System - Barnyard HUC 12 Focus: 070900010105	# units of practice(s) installed # of livestock facilities in compliance with a performance standard # lbs of P reduced using Barny Model $ amount of cost-share funds provide

WASHINGTON COUNTY 2020 ANNUAL WORK PLAN
LOCALLY-IDENTIFIED PRIORITIES

- *Water quality*

Water quality/quantity (other than activities already listed in other categories)	3,430 Feet Streambank Stabilization HUC 12 Focus: 040400030302 3 acres Wetland Restoration HUC 12 Focus: 040400030301	# units of practice(s) installed # lbs of P reduced using appropriate method # tons of sediment reduced using appropriate method $ amount of cost-share funds provide

- *Forestry*

Forestry **N/A**	*Practice installation*	*Type and units of practice(s) installed* *Amount of cost-share dollars spent* *# lbs of sediment reduced (using any approved method)* *# lbs of P reduced (using any approved method)*

- *Invasive*

Invasive species	7 Early Detection Surveys 3 Meander Plant Surveys 2 Point Intercept Survey 200 Hours of Watercraft Inspections Provide Outreach and Education about AIS	# and Type of surveys completed # of boats inspected and people reached # of educational events and people attended

- *Wildlife*

Wildlife-Wetlands-Habitat (other than forestry or invasive species)	Wildlife Damage and Abatement Program Native Tree and Prairie Seed Sale	# of landowners assisted # of trees and pounds of seed sold

- *Urban*

Urban issues	Update County Storm Water Management Plan to maintain compliance with new MS4 Permit. 12 Permits issued to development projects 20 Inspections of existing stormwater facilities Work with 8 local municipalities to implement process for long-term maintenance of storm water facilities	Plan developed and annual aeport on MS4 permit activities # of permits issued per ECSM Ordinance # of facilities inspected for long-term maintenance # of practices identified that need maintenance and schedule sets for maintenance activities

WASHINGTON COUNTY 2020 ANNUAL WORK PLAN
LOCALLY-IDENTIFIED PRIORITIES

- *Watershed*

Watershed strategies	Assist the planning and implementation of the Milwaukee River TMDL & two 9-Key Element Plans: Cedar-Ulao and Fredonia-Newburg HUC 12 Focus: 040400030301, 040400030302, 040400030303, 040400030107, 040400030209	# of project identified and future implementation scheduled
	Partnering with MMSD & NRCS to implement program goals of the Cedar Creek RCPP HUC 12 Focus: 040400030301, 040400030302, 040400030303	# of landowner contacts # and type of practices installed
	Assist the Cedar Creek Farmers Producer-led Group to meet program and grant goals HUC 12 Focus: 040400030301, 040400030302, 040400030303	# lbs of sediment or # lbs of P reduced using SnapPlus # of sponsored outreach events # of producers contracted # and type of practices installed
	Develop a MDV Watershed Plan based upon priorities identified in the LWRM Plan. HUC 12 Focus: 070900010102, 070900010105	Plan successfully developed and entered into MDV database (BITS)

- *Other*

Other	Maintain 12 permits for active mining sites	# of annual inspections and compliance determinations
	Conduct Annual Transect Survey	Report successful completion of survey
	Offer Hazardous Waste Collection to residents	Types and amounts of material collected

- Table 2: Planned activity related to permits and ordinances

Permits and Ordinances	Plans/application reviews anticipated	Permits anticipated to be issued
Manure storage construction and transfer systems	2	2
Manure storage closure	0	0
Nonmetallic/frac sand mining	Maintain 11 Active Plans and 1 Plan Amendment	Maintain 12 Active NMM Sites
Stormwater and construction site erosion control	15	15
Other		

WASHINGTON COUNTY 2020 ANNUAL WORK PLAN
LOCALLY-IDENTIFIED PRIORITIES

Table 3: Planned inspections

Inspections	Number of inspections planned
Total Farm Inspections	
For NR 151	10
Animal waste ordinance	4
Stormwater and construction site erosion control	70
Nonmetallic mining	12

Table 4: Planned outreach and education activities

Activity	Number
Tours	0
Field days	1
Trainings/workshops	3
School-age programs (camps, field days, classroom)	4
Newsletters	2
Social media posts	6
News release/story	2

Table 5: Staff Hours and Expected Costs (staff can be combined or listed individually)

Staff/Support	Hours	Costs
County Conservationist	2080	$107,200
Conservation Technician	6240	$260,400
AIS Coordinator	1040	$37,500
Support Staff	1040	$29,000
Cost Sharing (can be combined)		
Bonding	N/A	$48,000
SEG	N/A	$10,000
Producer-Led Grant	N/A	$45,000
County / Local Funding	N/A	$6,000

Appendix C
Land and Water Conservation BMP Achievements (2010-2019)

Best Management Practices	Number of BMPs Installed through LWCD Program and Technical Assistance	Cost Share Funds Supplied (State & Local Funds) Does not include Federal or Landowner share
Barnyard Runoff Control System	8	$146,040
Closure of Waste Storage	3	$40,280
Riparian Buffers (7,760 Lin Ft)	4	$30,525
Rock Lined Waterway	1	$16,835
Manure Storage	5	$606,010
Manure Transfer	1	$8,180
Milking Center Waste Control	1	$4,770
Nutrient Management (2,497 Acres)*	15	$80,300
Roof Structure over Feedlot	4	$260,690
Roof Runoff Control System	4	$12,810
Streambank Protection	1	$6,830
Underground Outlets	2	$5,175
Vegetated Waterways (13,620 Lin Ft)	17	$99,165
Well Decommissioning	5	$4,160
Total	**71**	**$1,321,770**

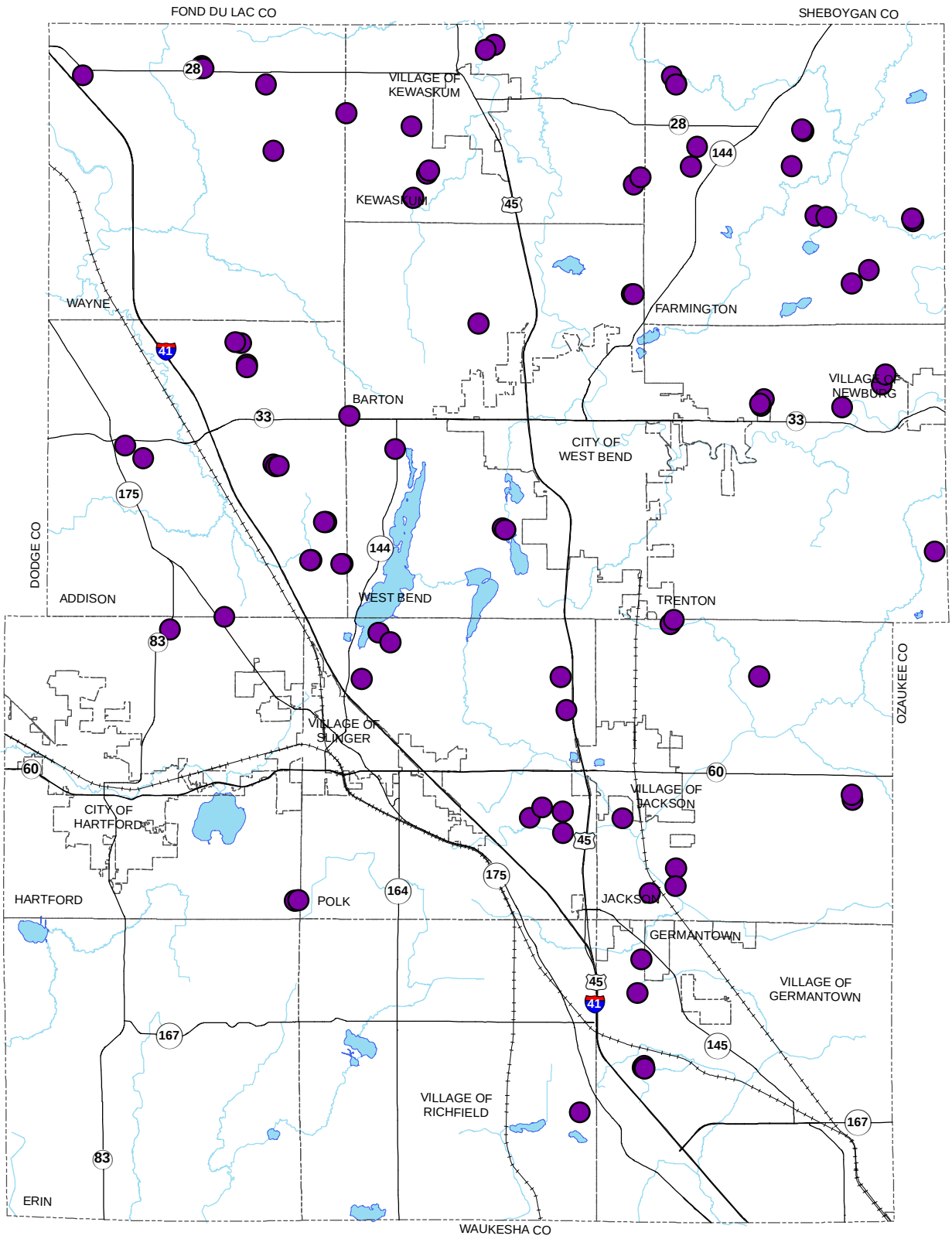
* *BMP not identified on map*

Permits issued through Land and Water Conservation Division Last Five Years

Washington County Code	**2015**	**2016**	**2017**	**2018**	**2019**
Animal Waste Storage Facility	2	5	3	1	0
Erosion Control Stormwater Management	8	10	12	19	12
Non Metallic Mining Reclamation	14	14	13	13	12

Appendix C - Map

Land and Water Conservation BMP Achievements (2010-2019)



Best Management Practices (2010-2019)

N
W E
S

0 0.5 1 2 3 4 Miles

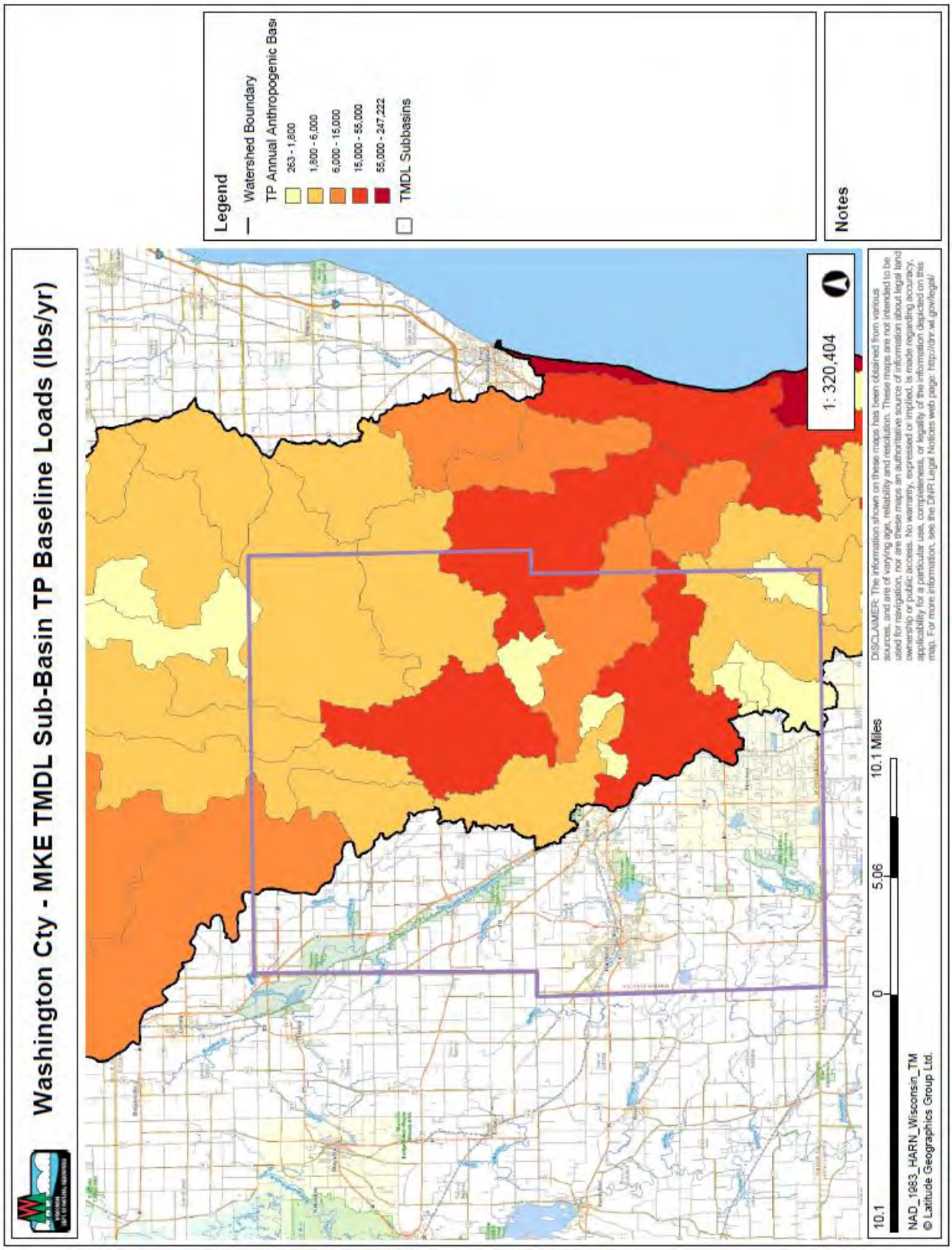
Source: WASHINGTON COUNTY

APPENDIX D
PRIORITY RANKING AND FACTORS TO GUIDE CONSERVATION ACTIVITIES

In Chapter 4, it was discussed that the following prioritization factors will be utilized to help guide conservation activity. The factors listed in Chapter 4 as also listed below can be used to create that initial inventory to set priority areas of focus and were the greatest water quality improvements are needed and where successful implementation of practices could be achieved.

Prioritization factors	Data Location
1. Phosphorus & TSS baseline loading from the Milwaukee River TMDL and the Rock River TMDL.	Maps 1 - 4
2. Impaired waters	Map 5
3. Nine-Key Element Plan areas	Map 5
4. Water Quality Initiatives (RCPP, Adaptive Management, WQT, MDV)	Map 5
5. Outstanding resource waters/exceptional resource waters	Map 5
6. Stream Order & Natural Community Designations	Figure 11, Chapter III
7. Highly erodible soils & modeling results (EVAAL and STEPL)	Appendix E
8. Percent agriculture land cover using the Normalized Difference Tillage Index (NDTI)	Map 6 & 7
9. Water Quality Monitoring Data	Inventory Not Complete
10. Number of livestock operations	Inventory Not Complete
11. Groundwater contamination susceptibility & Depth to the Bedrock	Figure 17 & 18, Chapter III
12. Lake development & MS4 Urbanized Area designations	Washington County MS4 Map
13. Active partners (producer groups, lake organizations)	Cedar Creek Watershed Area of Map 5

Map 1


Washington Cty - MKE TMDL Sub-Basin TP Baseline Loads (lbs/yr)
Legend
Watershed Boundary
TP Annual Anthropogenic Base
263 - 1,800
1,800 - 6,000
6,000 - 15,000
15,000 - 55,000
55,000 - 247,222
TMDL Subbasins
Notes
1: 320,404
10.1
0
5.06
10.1 Miles
DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: http://dnr.wi.gov/legal/
NAD_1983_HARN_Wisconsin_TM
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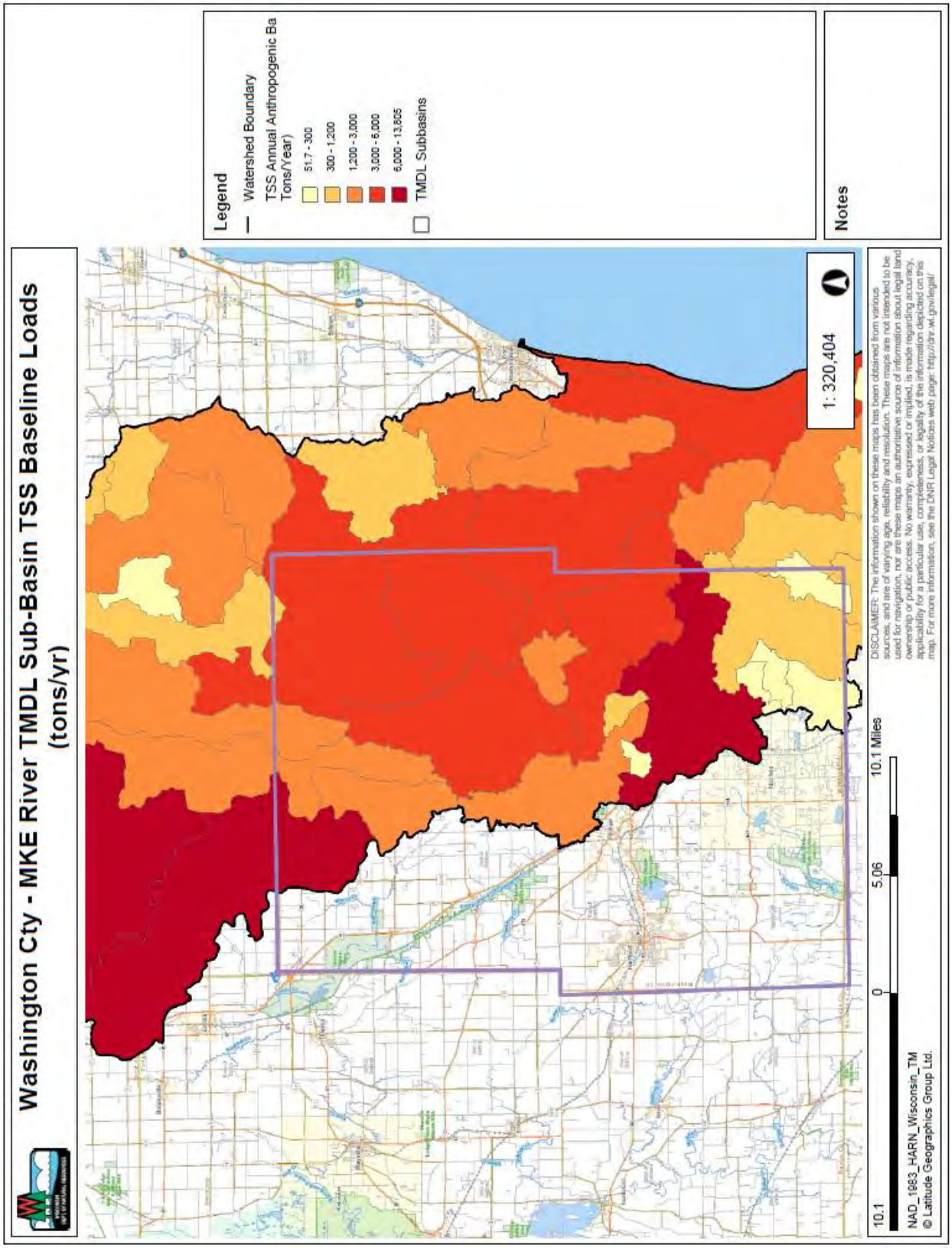
Map 2


Washington Cty - MKE River TMDL Sub-Basin TSS Baseline Loads
(tons/yr)
Legend
Watershed Boundary
TSS Annual Anthropogenic Ba
Tons/Year)
51.7 - 300
300 - 1,200
1,200 - 3,000
3,000 - 6,000
6,000 - 13,805
TMDL Subbasins
Notes
1: 320,404
10.1
0
5.06
10.1 Miles
DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: http://dnr.wi.gov/legal/
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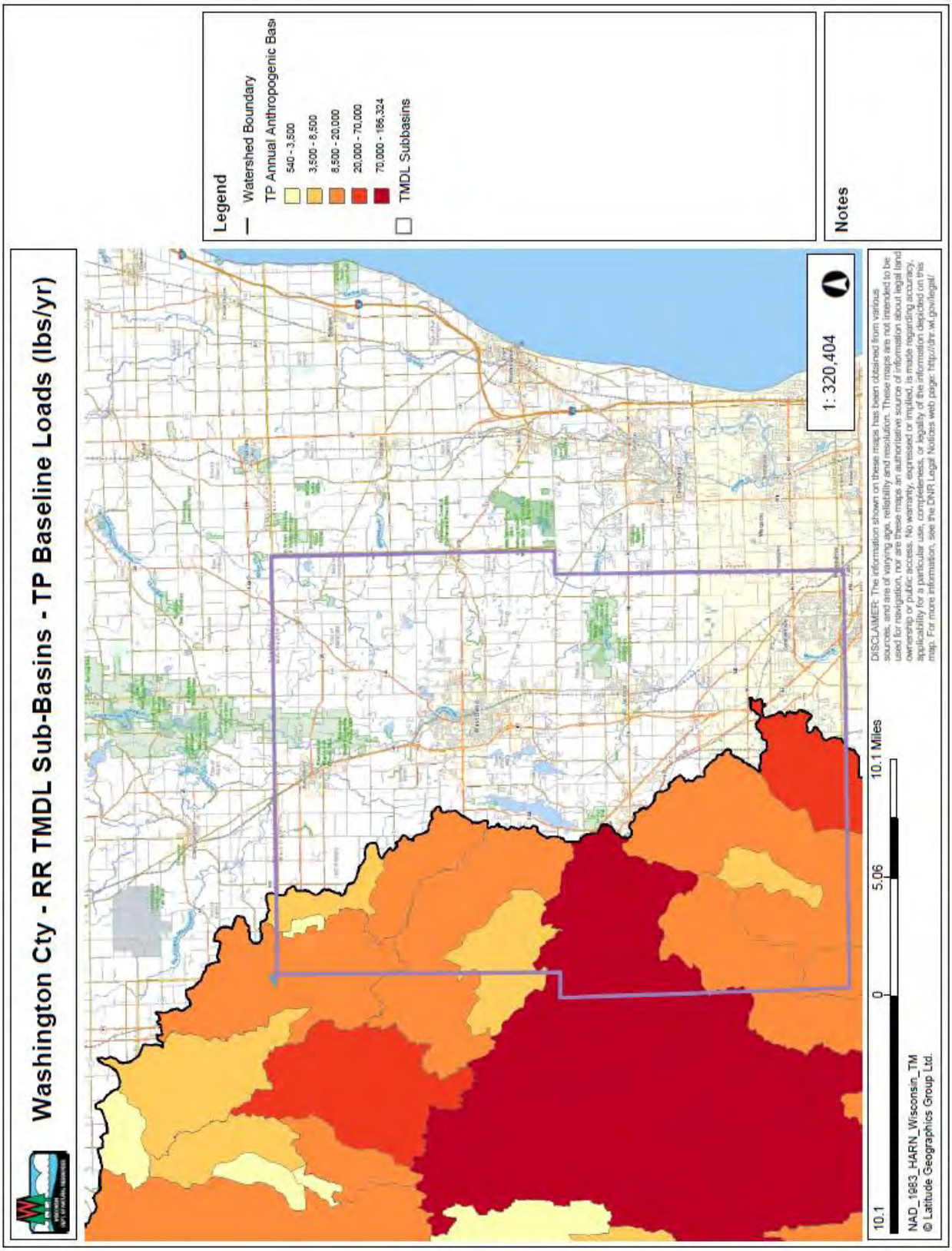
Map 3


Washington Cty - RR TMDL Sub-Basins - TP Baseline Loads (lbs/yr)
Legend
Watershed Boundary
TP Annual Anthropogenic Base
540 - 3,500
3,500 - 8,500
8,500 - 20,000
20,000 - 70,000
70,000 - 186,324
TMDL Subbasins
Notes
1: 320,404
10.1
0
5.06
10.1 Miles
NAD_1983_HARN_Wisconsin_TM
© Latitude Geographics Group Ltd.
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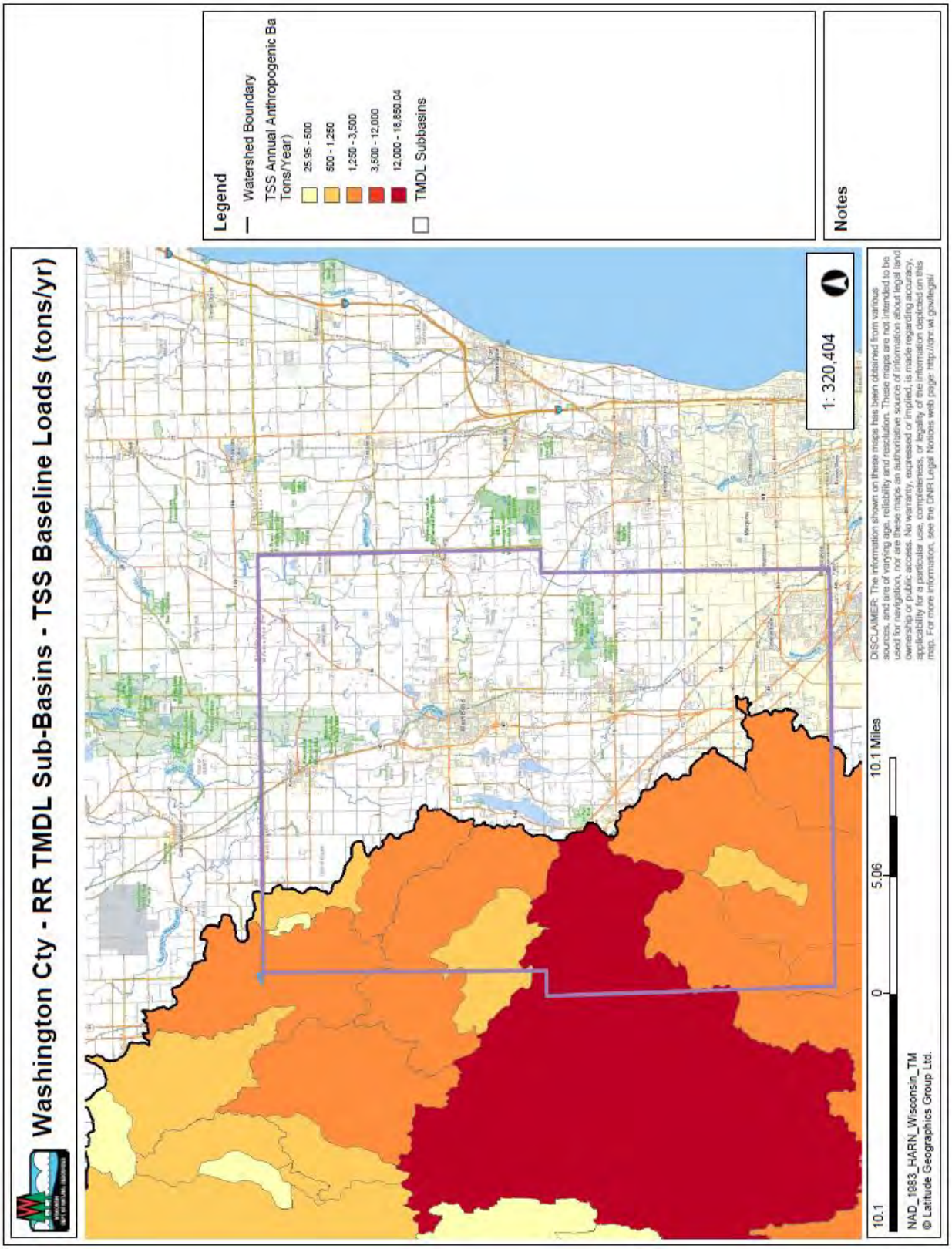
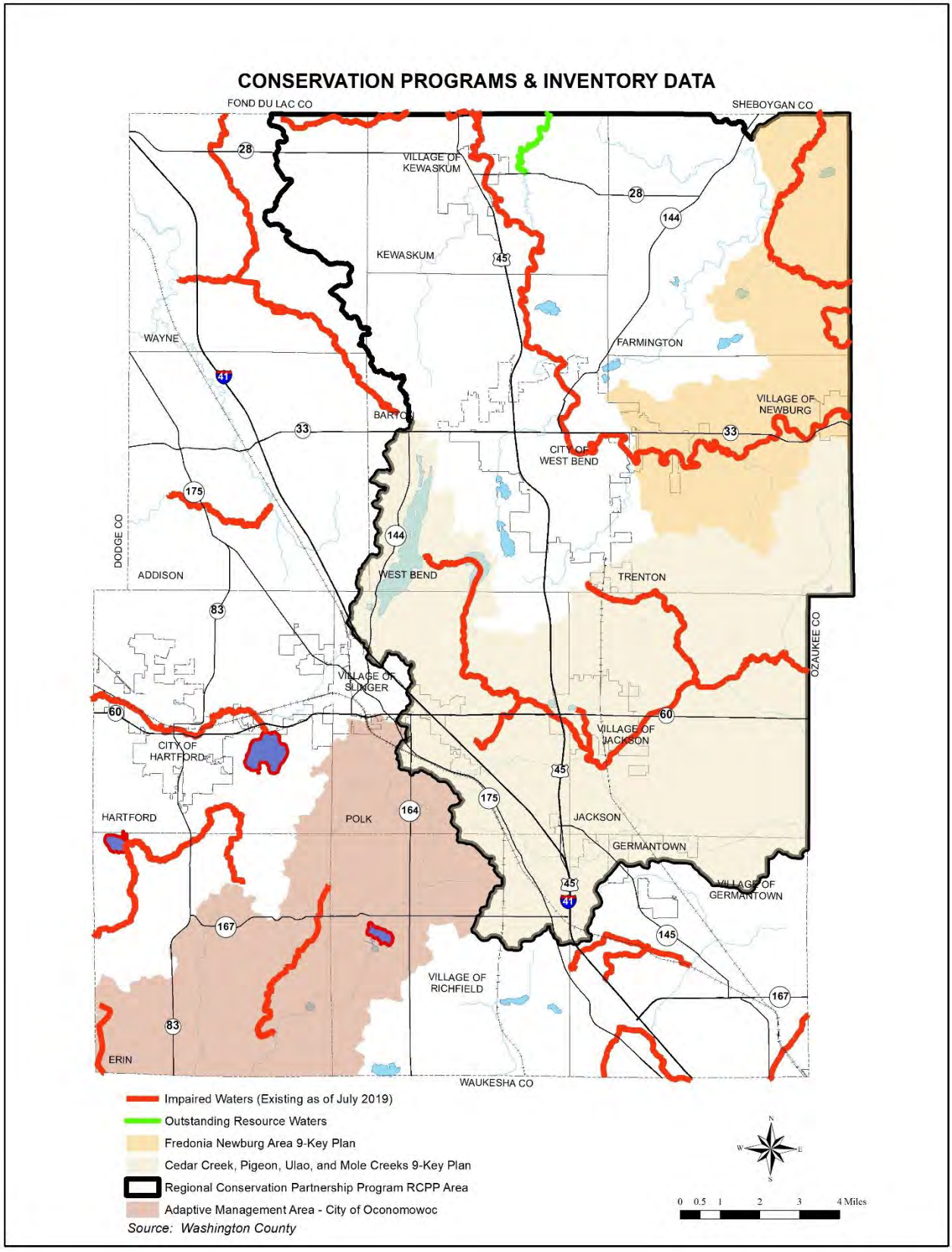
Map 4

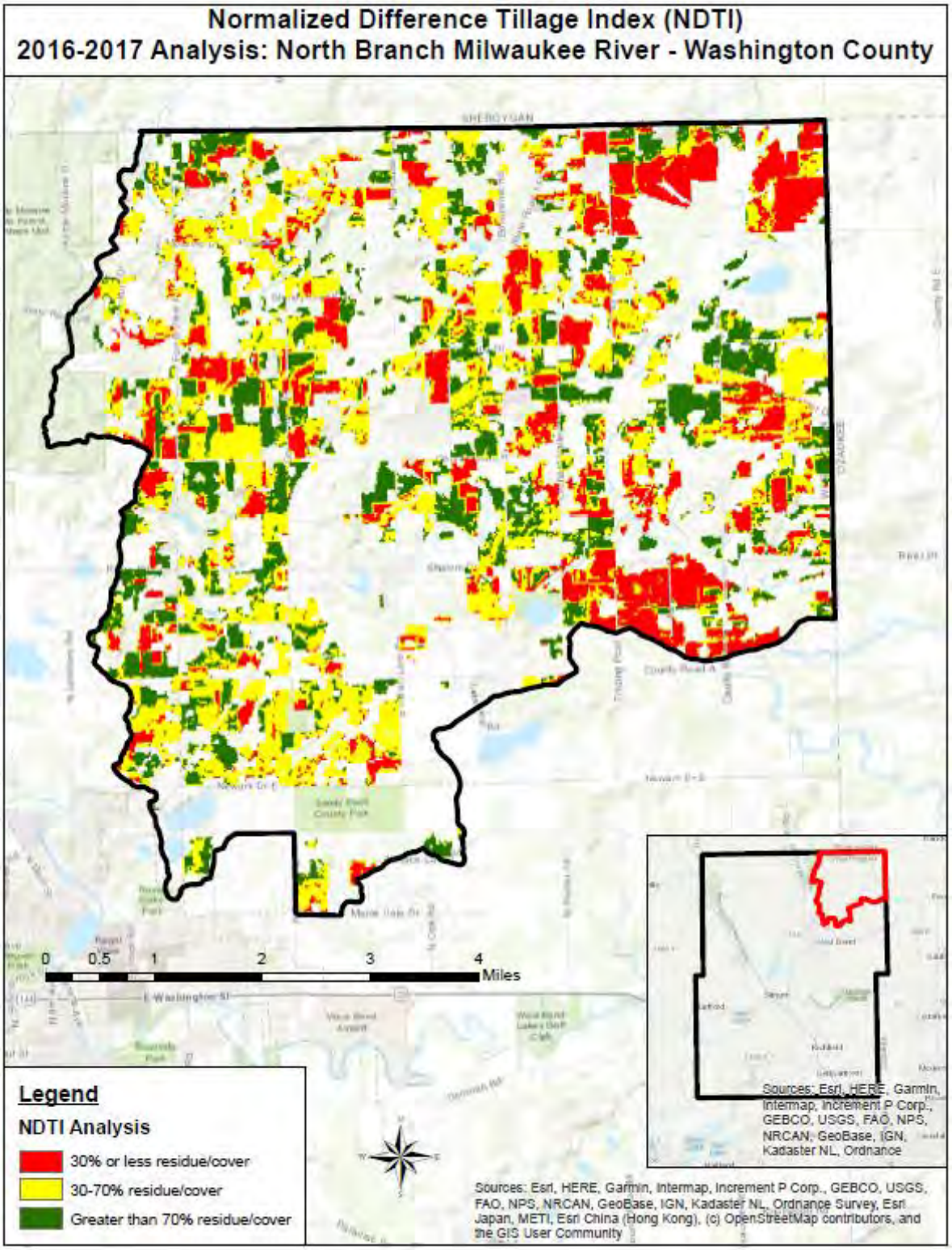

Washington Cty - RR TMDL Sub-Basins - TSS Baseline Loads (tons/yr)
Legend
Watershed Boundary
TSS Annual Anthropogenic Ba
Tons/Year)
25.95 - 500
500 - 1,250
1,250 - 3,500
3,500 - 12,000
12,000 - 18,850.04
TMDL Subbasins
Notes
1: 320,404
10.1
0
5.06
10.1 Miles
NAD_1983_HARN_Wisconsin_TM
© Latitude Geographics Group Ltd.

Map 5


CONSERVATION PROGRAMS & INVENTORY DATA
FOND DU LAC CO
SHEBOYGAN CO
VILLAGE OF KEWASKUM
KEWASKUM
WAYNE
FARMINGTON
VILLAGE OF NEWBURG
BARTON
CITY OF WEST BEND
DODGE CO
ADDISON
WEST BEND
TRENTON
OZAUKEE CO
VILLAGE OF SLINGER
CITY OF HARTFORD
VILLAGE OF JACKSON
HARTFORD
POLK
JACKSON
GERMANTOWN
VILLAGE OF GERMANTOWN
VILLAGE OF RICHFIELD
ERIN
WAUKESHA CO
Impaired Waters (Existing as of July 2019)
Outstanding Resource Waters
Fredonia Newburg Area 9-Key Plan
Cedar Creek, Pigeon, Ulao, and Mole Creeks 9-Key Plan
Regional Conservation Partnership Program RCPP Area
Adaptive Management Area - City of Oconomowoc
Source: Washington County
0 0.5 1 2 3 4 Miles

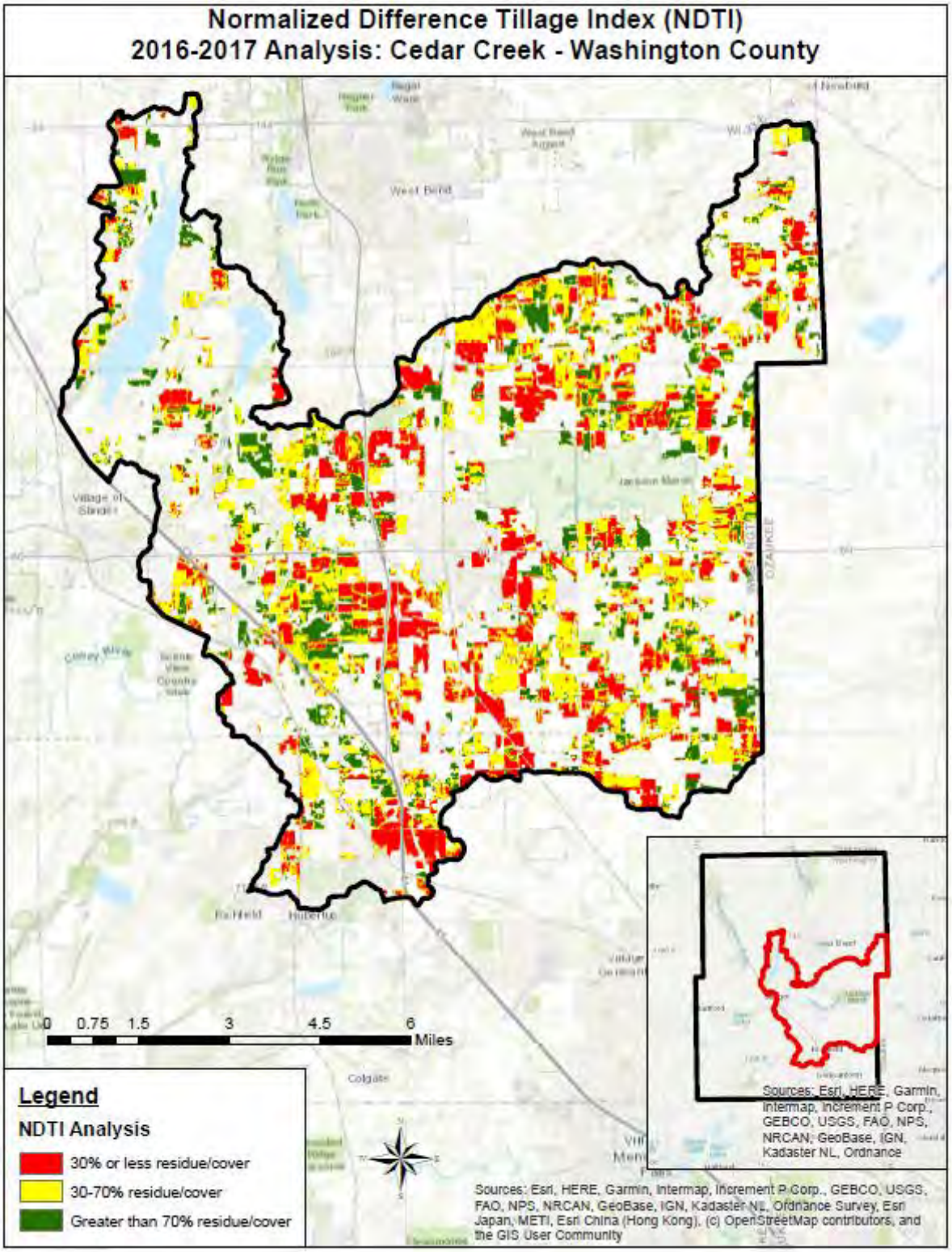
Map 6

Normalized Difference Tillage Index (NDTI) analyzes the electromagnetic spectrum bands of satellite imagery to identify cropping practices such as tillage methods and use of cover crops.



Map 7

Normalized Difference Tillage Index (NDTI) analyzes the electromagnetic spectrum bands of satellite imagery to identify cropping practices such as tillage methods and use of cover crops.

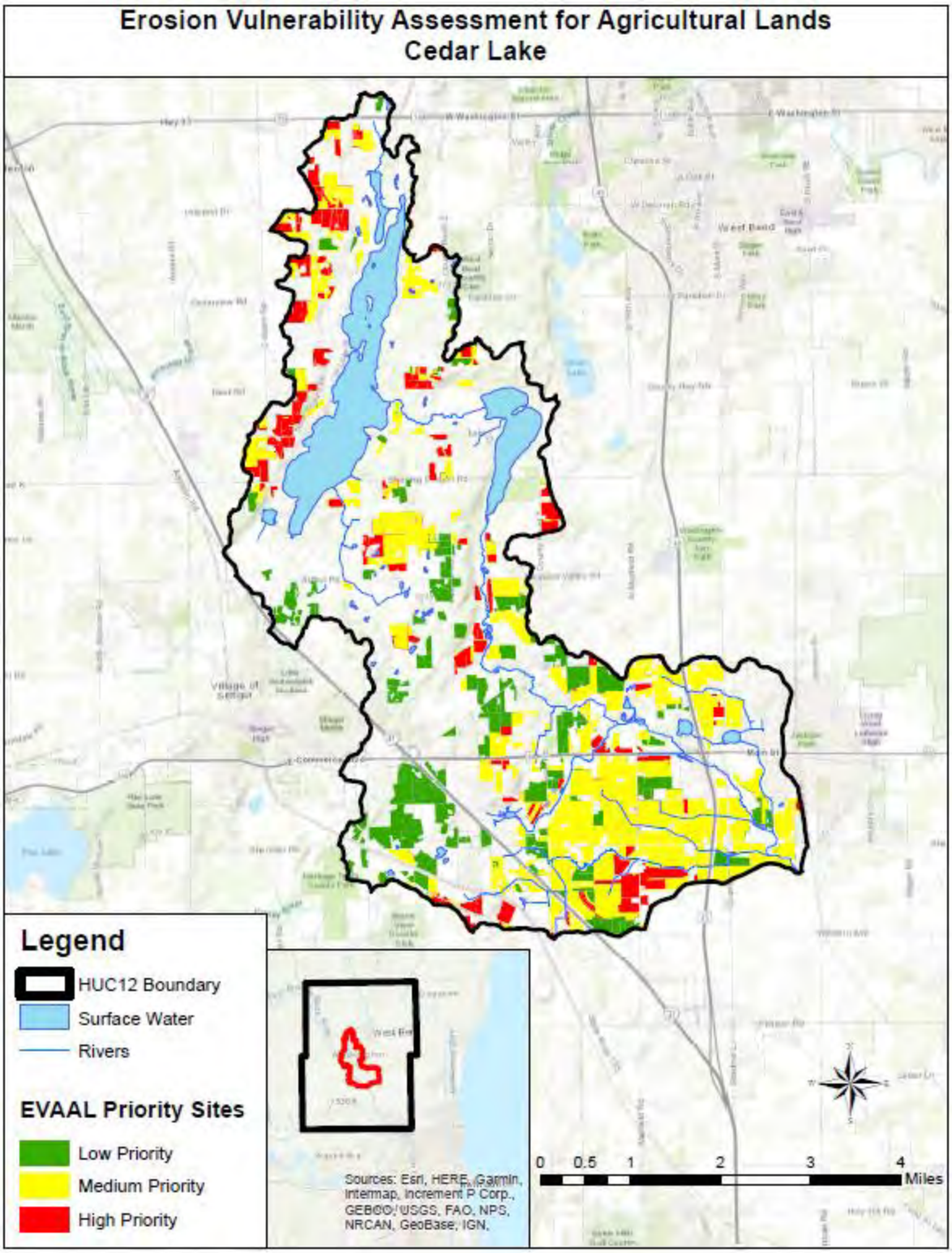


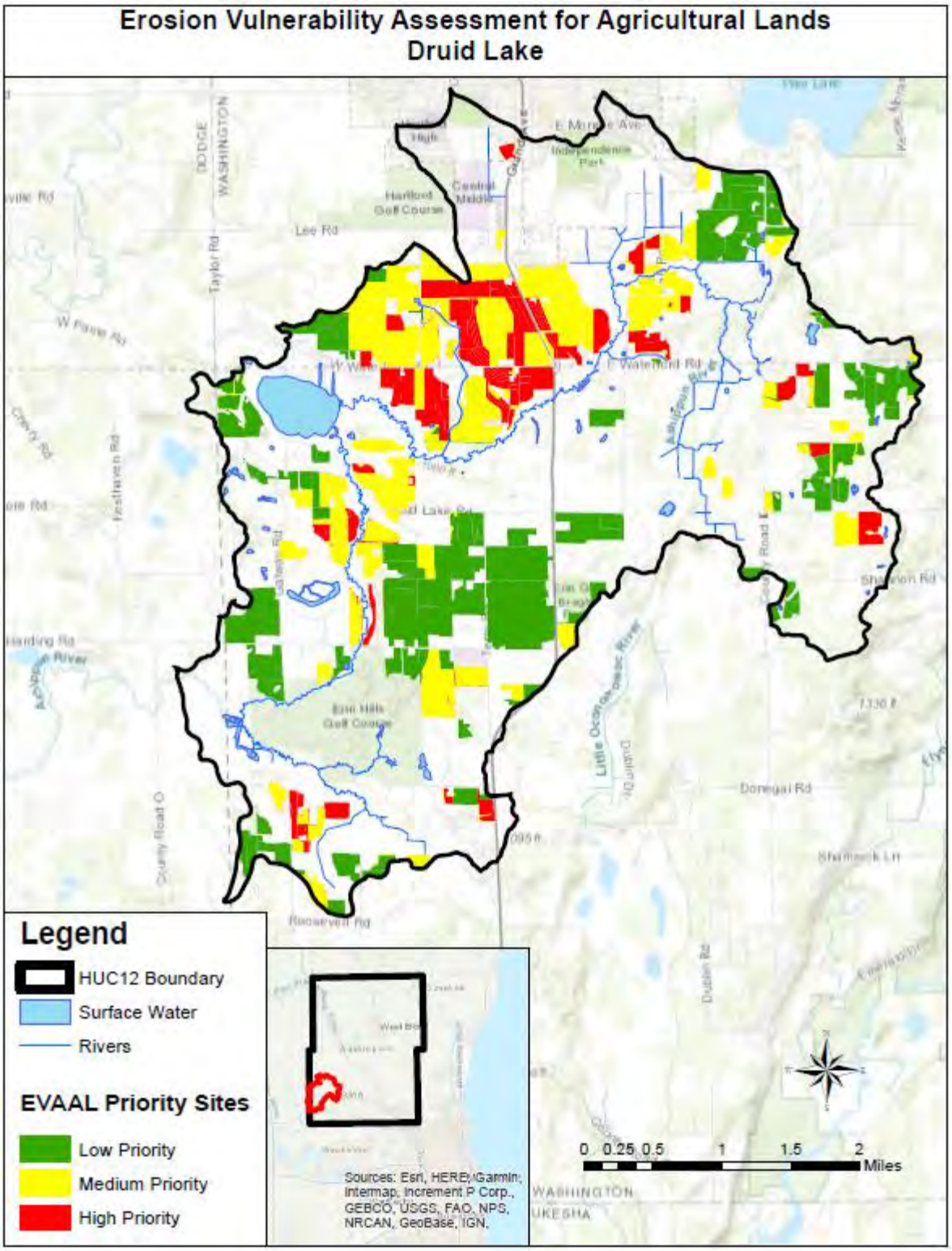
Appendix E
Agricultural EVAAL Modeling

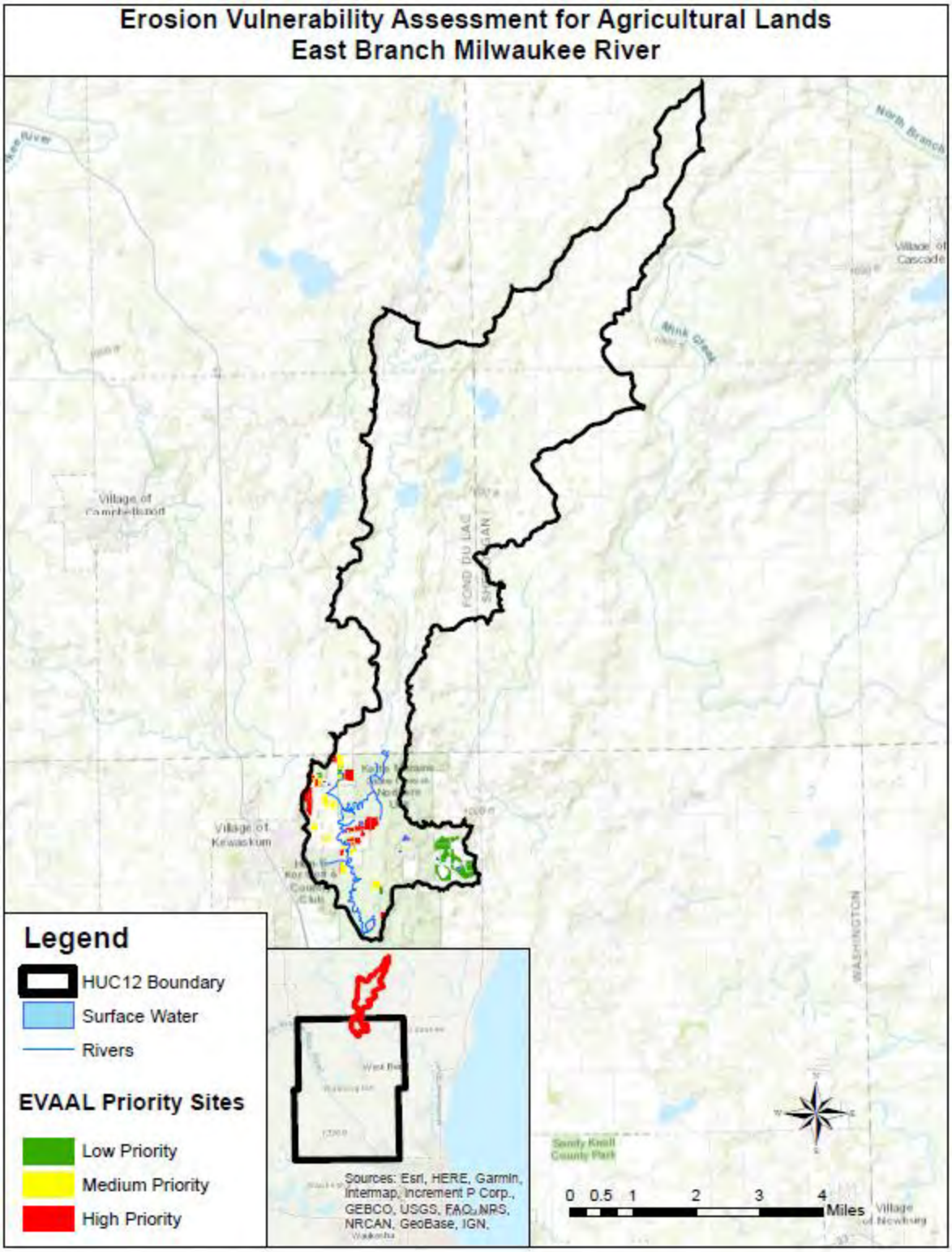
The Wisconsin Department of Natural Resources (DNR) developed an Erosion Vulnerability Assessment for Agricultural Lands (EVAAL) model that identifies vulnerable croplands within a watershed. The model evaluates croplands' relative vulnerability to sheet, rill and gully erosion that may contribute to downstream surface water quality problems. The model uses information about topography, soils, rainfall and land cover areas within a watershed and prioritizes those areas based on soil erosion and sediment delivery potential.

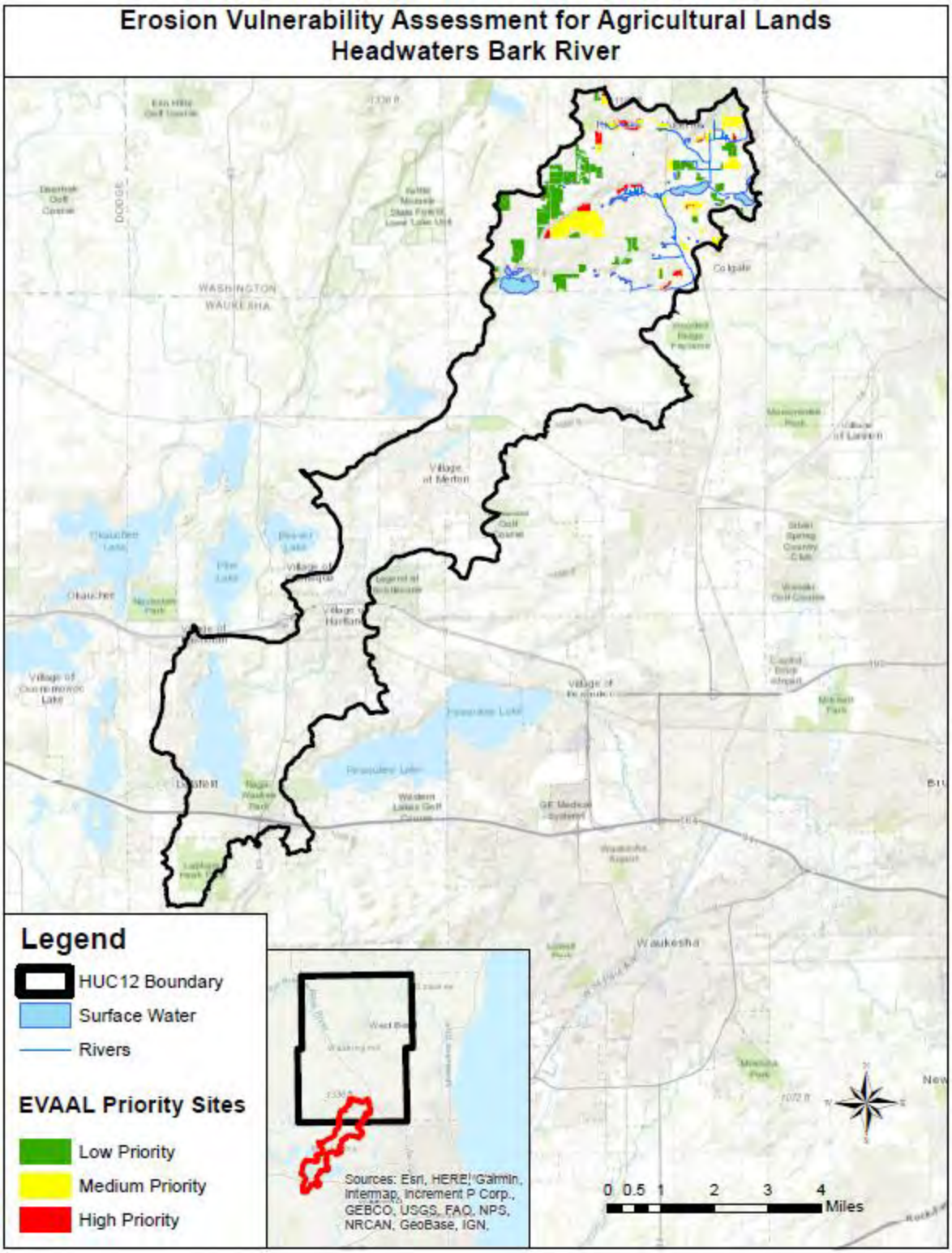
Identifying where soils are vulnerable to erosion is important, because erosion contributes sediment and nutrients such as nitrogen and phosphorus to streams. These contributions increase pollutant loading and can result in increased stream turbidity. EVAAL Version 1.0.1 (December 2015) was used to assess the vulnerability of agricultural lands to erosion throughout Washington County. Each agricultural area was assigned an average Erosion Vulnerability Score (accompanying maps) within each HUC 12 watershed. The resulting data from the EVAAL modeling will be used to prioritize agricultural areas in order to prioritize funding.

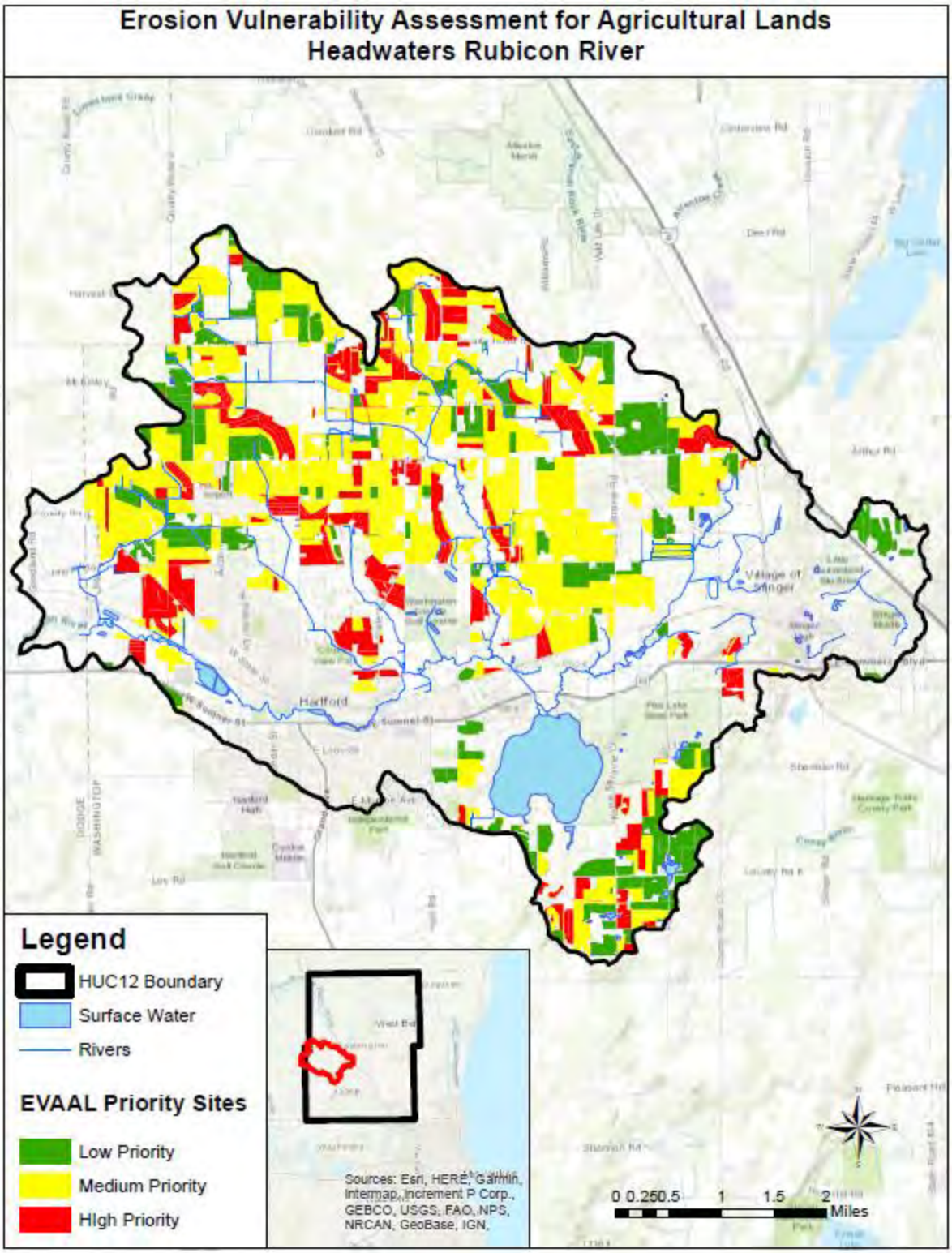
Additional information about the model can be found on the DNR's website: Erosion Vulnerability Assessment for Agricultural Lands (EVAAL)

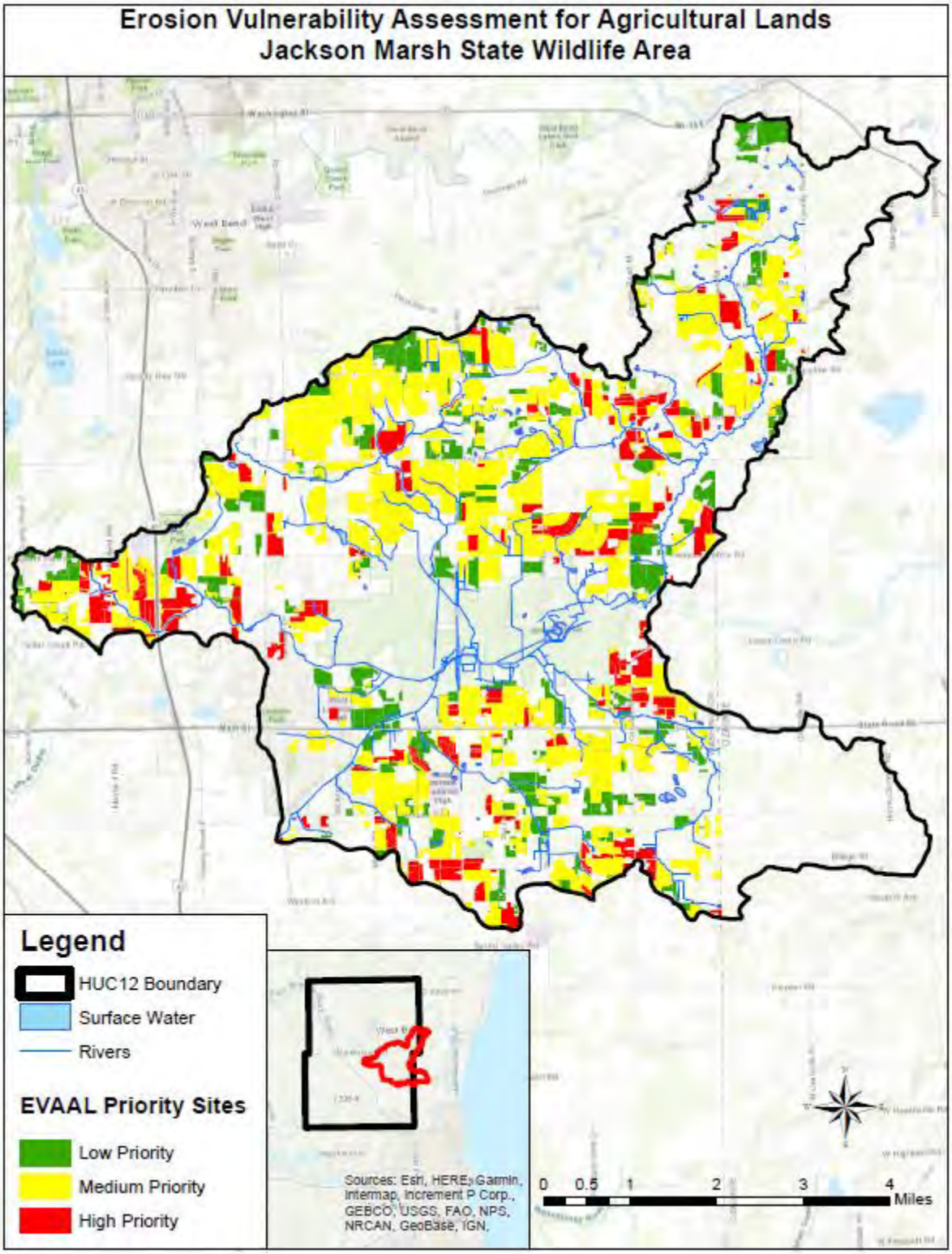

Erosion Vulnerability Assessment for Agricultural Lands
Cedar Lake
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
0 0.5 1 2 3 4
Miles

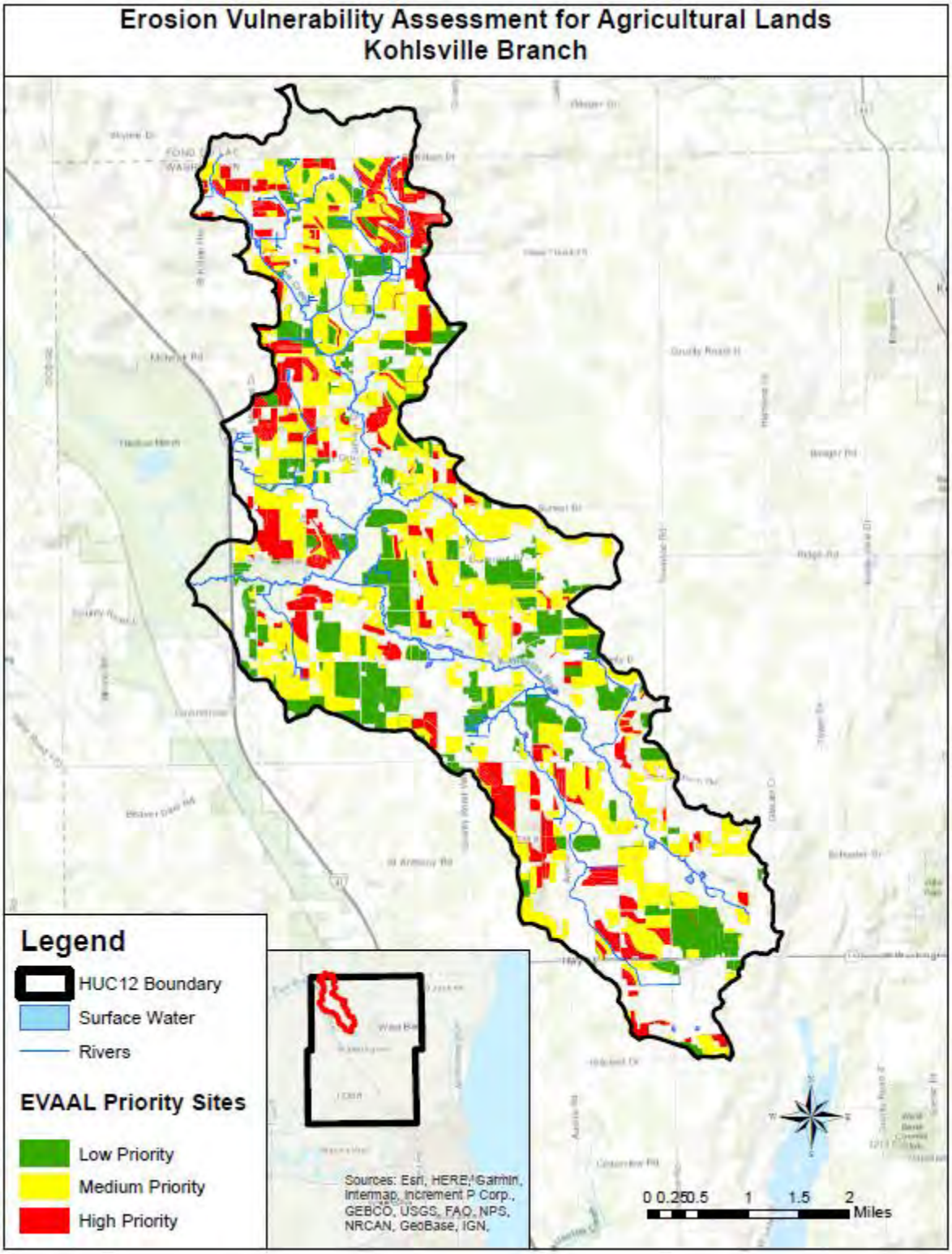

Erosion Vulnerability Assessment for Agricultural Lands
Druid Lake
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
0 0.25 0.5 1 1.5 2
Miles
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN.
Lee Rd
Taylor Rd
Donegal Rd
Dublin Rd
Roosevelt Rd
Shamrock Ln
Sharon Rd
Harding Rd
Hartford Golf Course
Independence Park
Elm Hills Golf Course
Little Oconomowoc River
DODGE
WASHINGTON
WAUKESHA

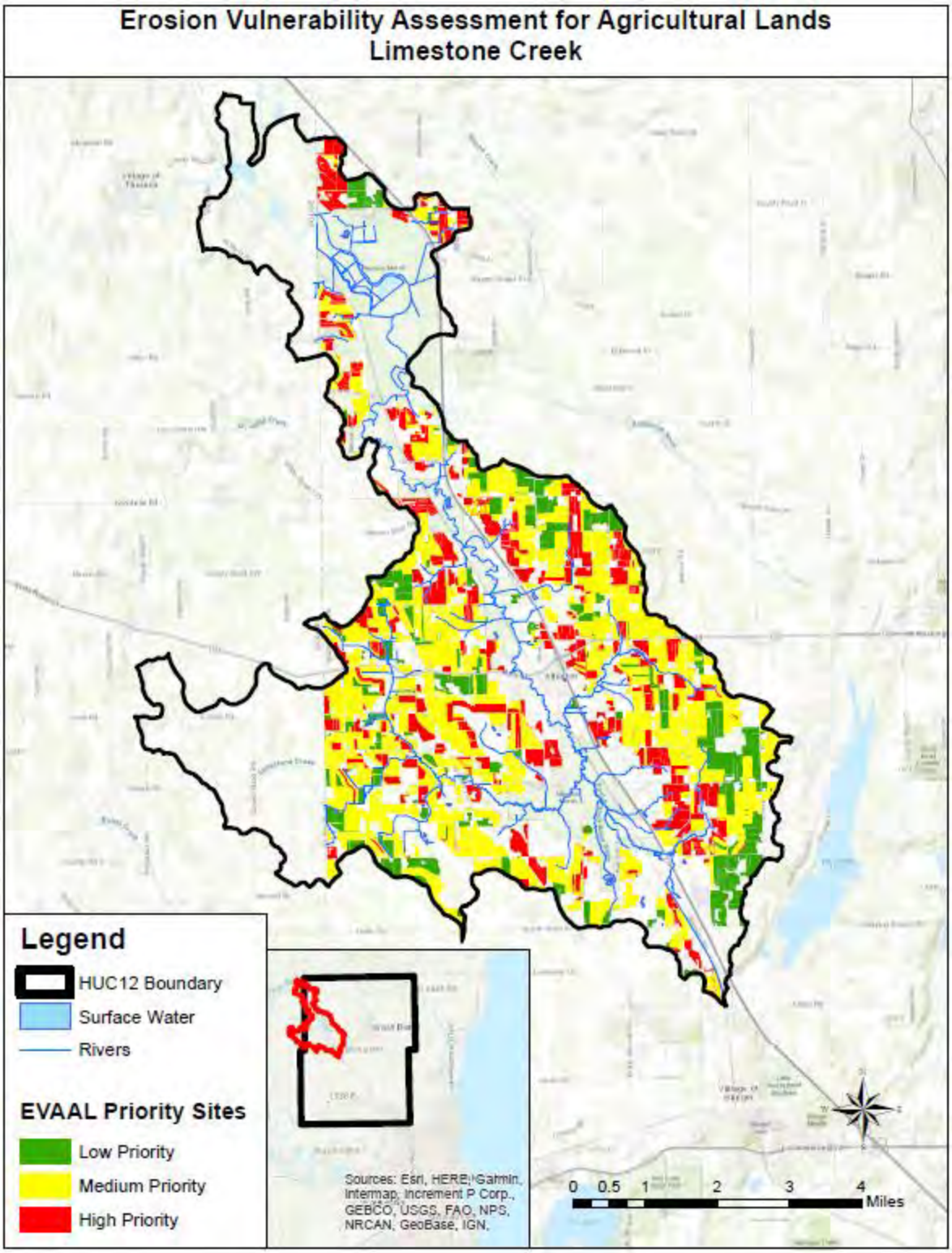

Erosion Vulnerability Assessment for Agricultural Lands
East Branch Milwaukee River
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
0 0.5 1 2 3 4 Miles
Village of Kewaskum
Village of Cascade
Village of Newburg
Sandy Knoll County Park
WASHINGTON
FOND DU LAC

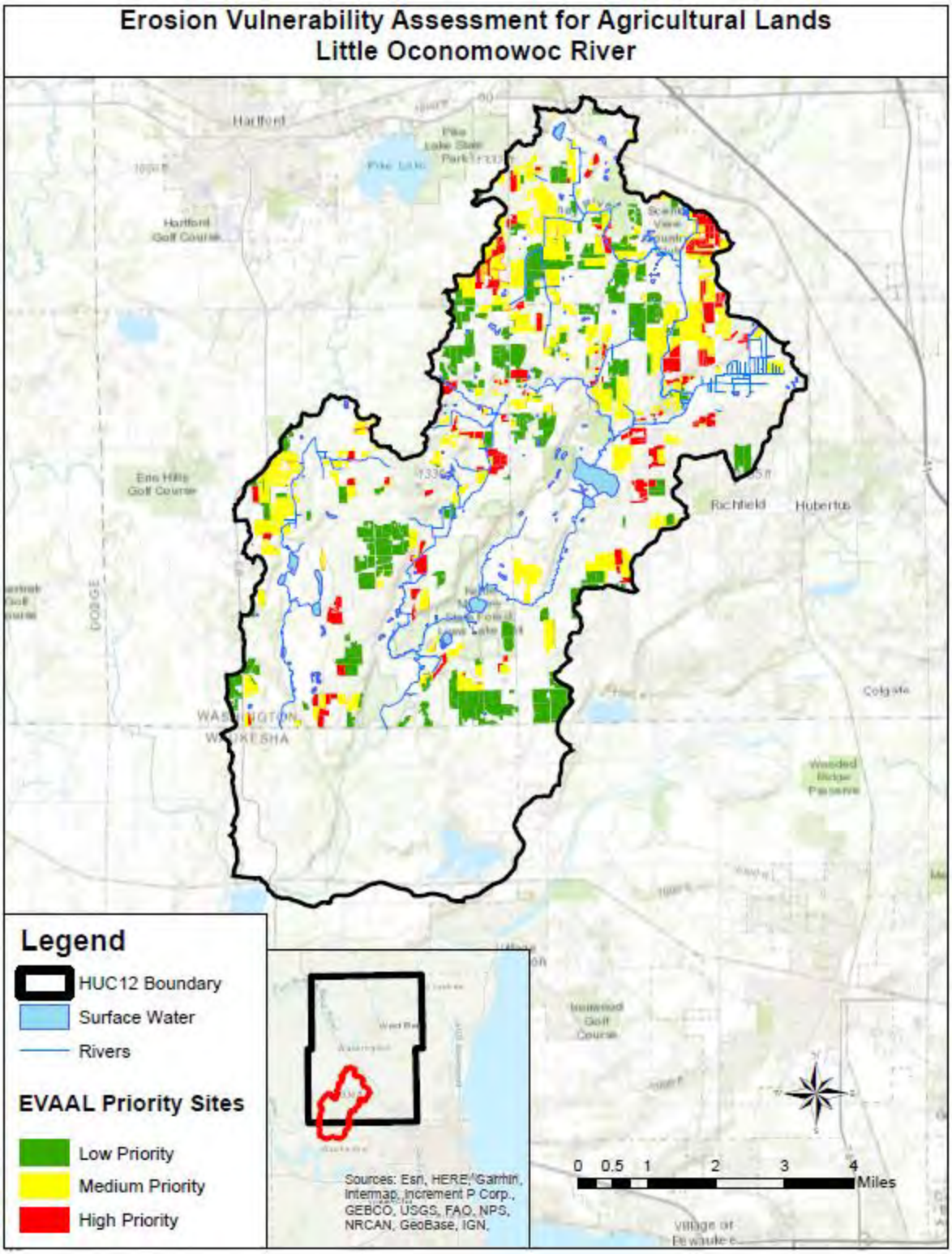

Erosion Vulnerability Assessment for Agricultural Lands
Headwaters Bark River
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
0 0.5 1 2 3 4
Miles
WASHINGTON
WAUKESHA
Colgate
Village of Merton
Chenoa
Lisbon
Waukesha

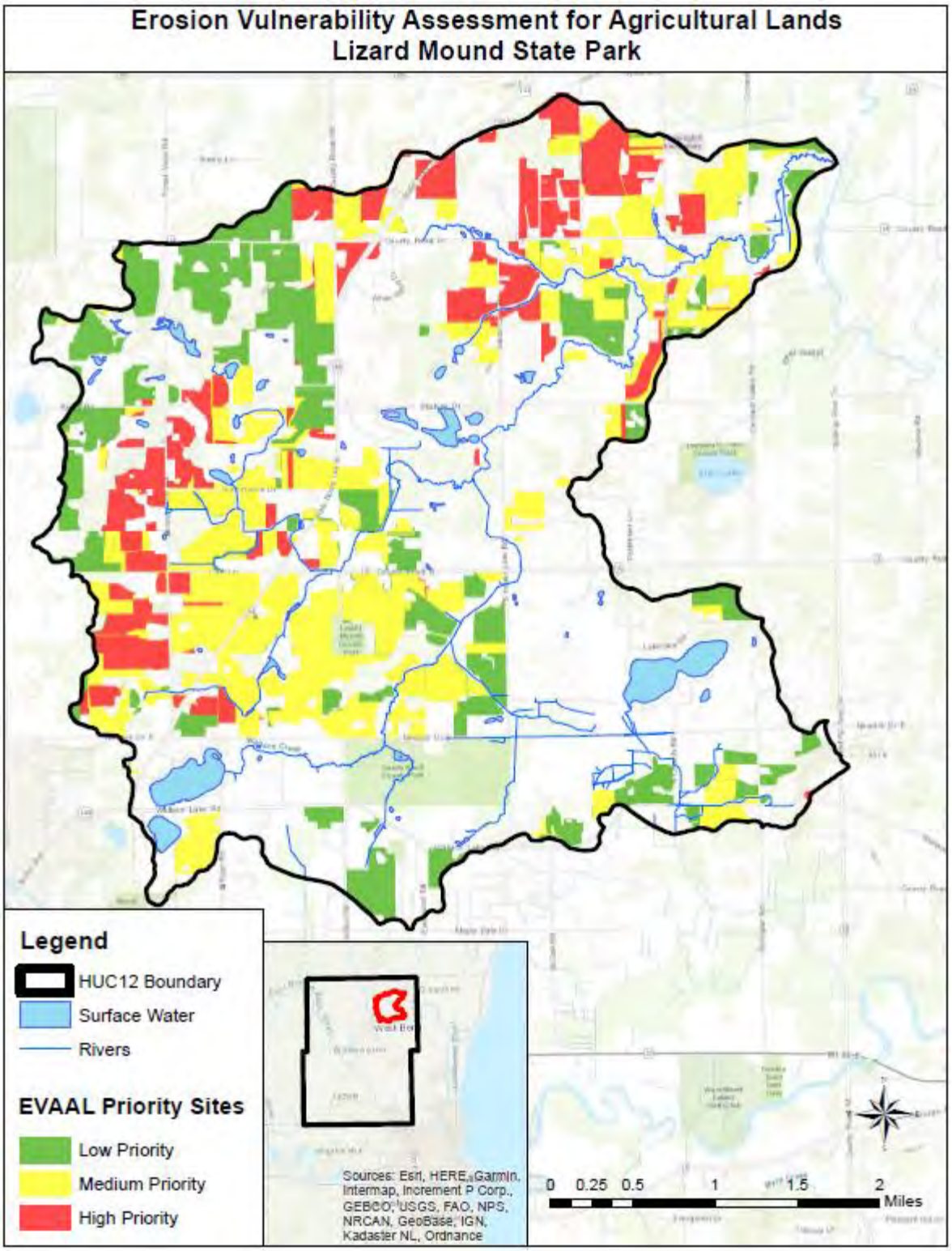

Erosion Vulnerability Assessment for Agricultural Lands
Headwaters Rubicon River
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
Hartford
Village of Slinger
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
0 0.25 0.5 1 1.5 2
Miles

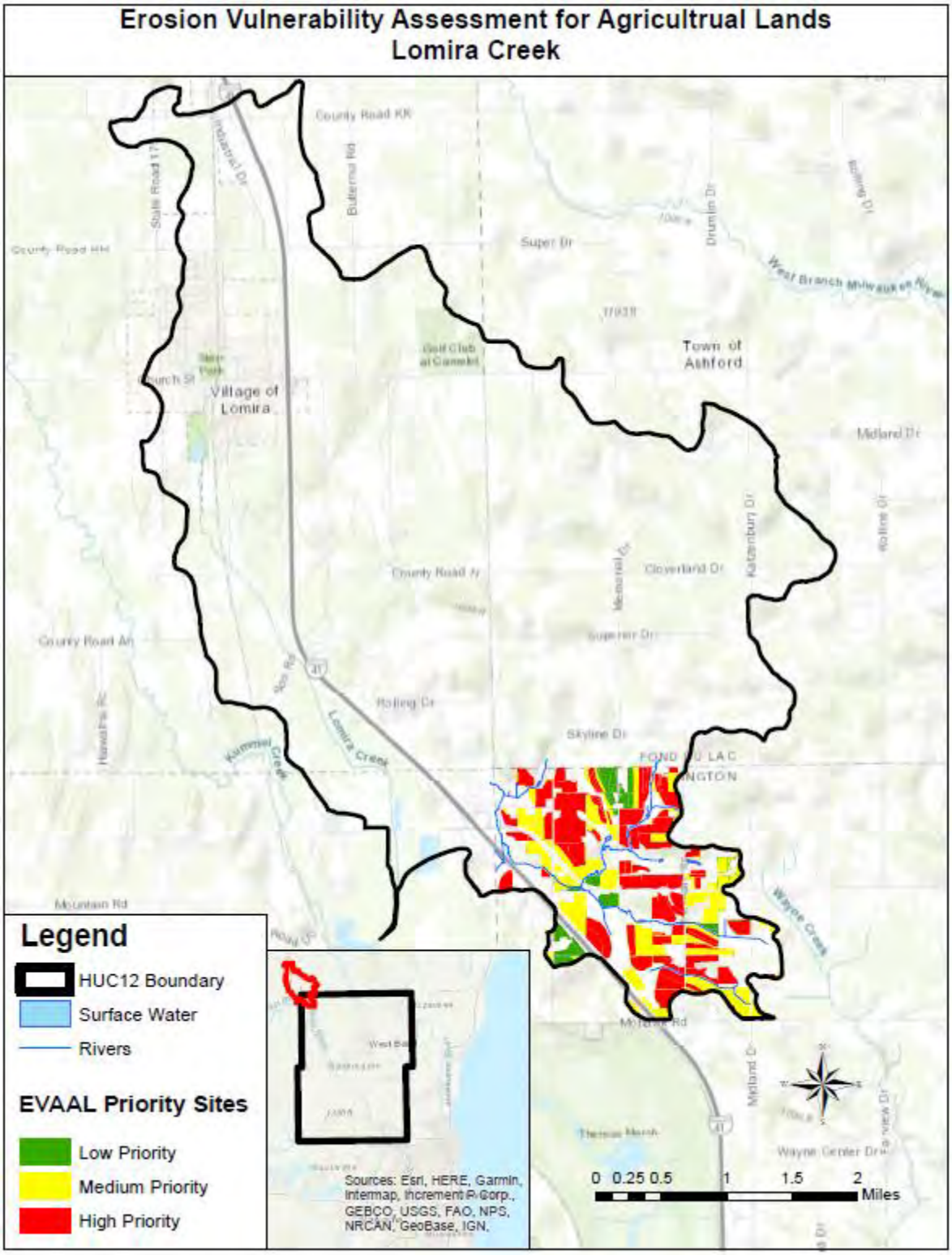

Erosion Vulnerability Assessment for Agricultural Lands
Jackson Marsh State Wildlife Area
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
0 0.5 1 2 3 4
Miles

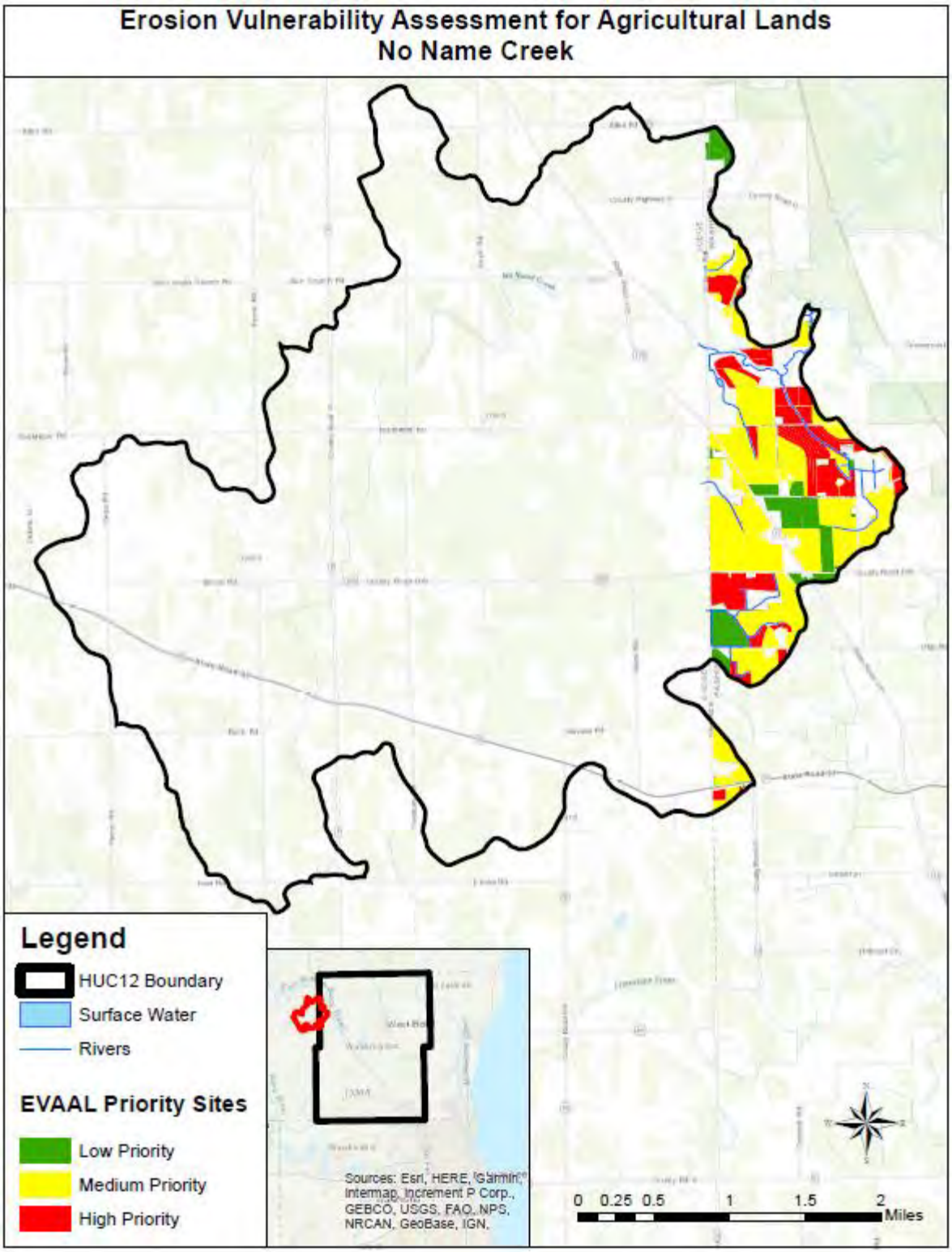

Erosion Vulnerability Assessment for Agricultural Lands
Kohlsville Branch
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
0 0.25 0.5 1 1.5 2
Miles

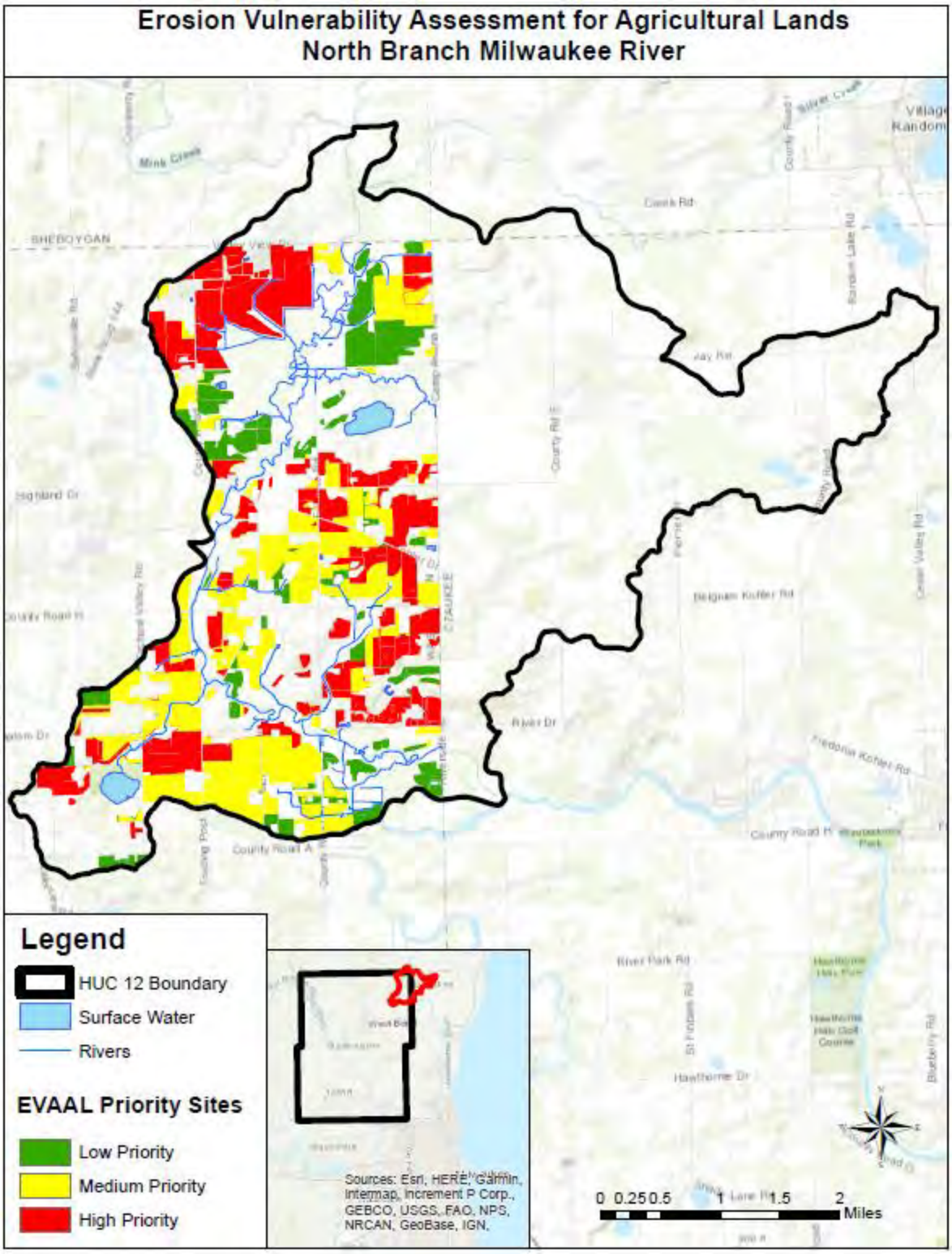

Erosion Vulnerability Assessment for Agricultural Lands
Limestone Creek
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
0 0.5 1 2 3 4
Miles

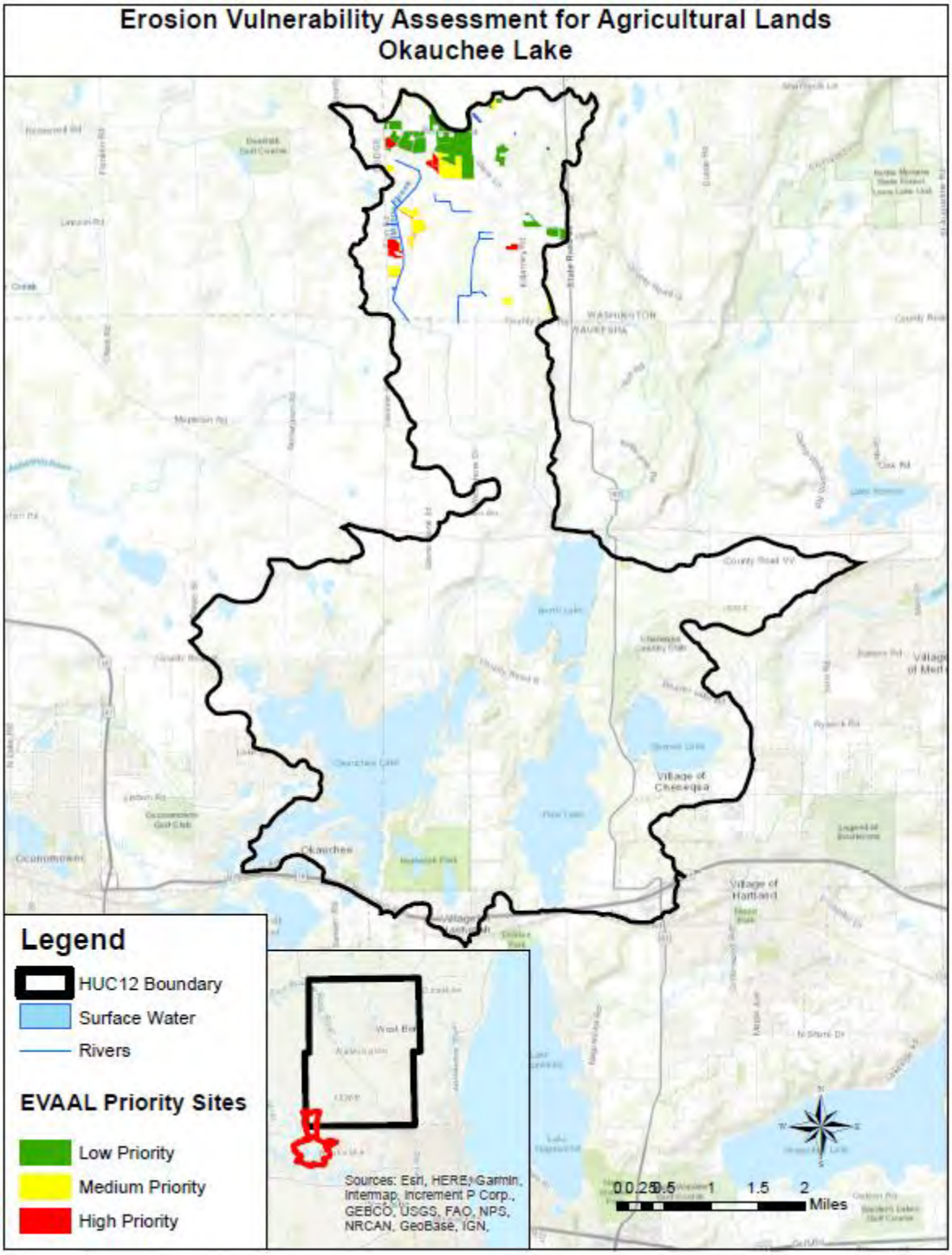

Erosion Vulnerability Assessment for Agricultural Lands
Little Oconomowoc River
Hartford
Hartford Golf Course
Pike Lake State Park
Pike Lake
Ene Hills Golf Course
Richfield
Hubertus
Colgate
WASHINGTON
WAUKESHA
DODGE
Wooded Ridge Preserve
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
0 0.5 1 2 3 4
Miles
Village of Pewaukee

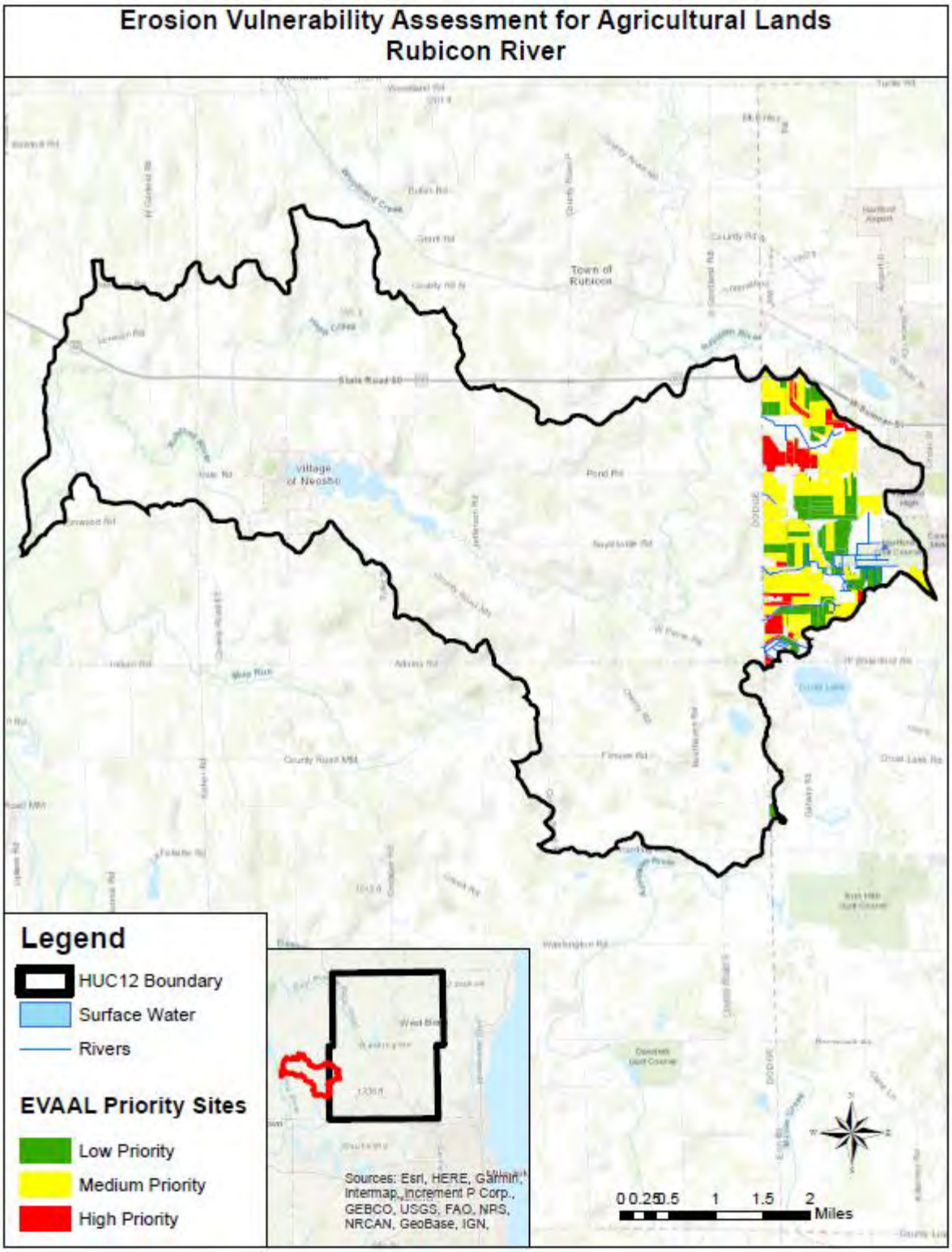

Erosion Vulnerability Assessment for Agricultural Lands
Lizard Mound State Park
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance
0 0.25 0.5 1 1.5 2
Miles

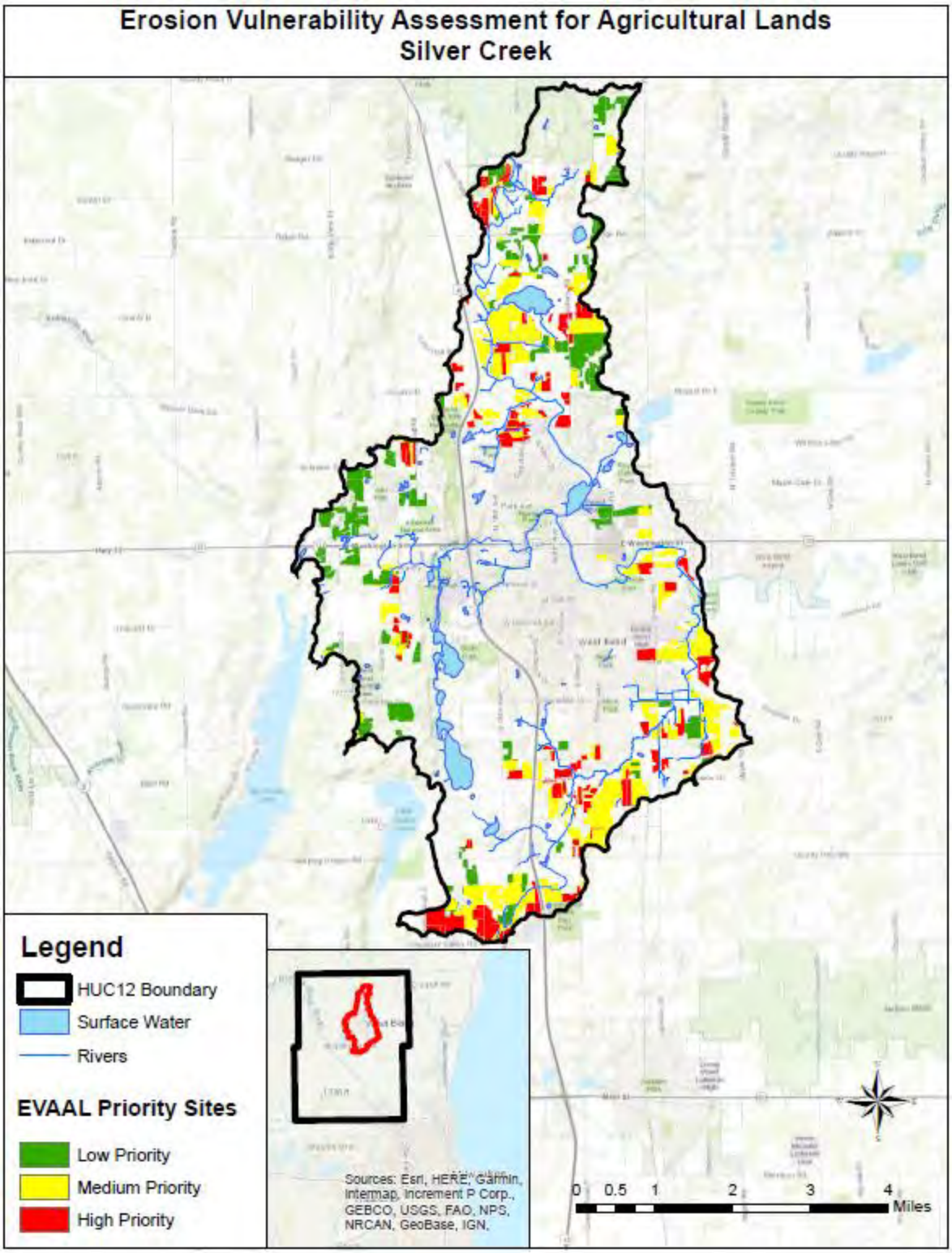

Erosion Vulnerability Assessment for Agricultrual Lands
Lomira Creek
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
Town of Ashford
Village of Lomira
Lomira Creek
Wayne Creek
West Branch Milwaukee River
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
0 0.25 0.5 1 1.5 2
Miles


Erosion Vulnerability Assessment for Agricultural Lands
No Name Creek
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
0 0.25 0.5 1 1.5 2
Miles


Erosion Vulnerability Assessment for Agricultural Lands
North Branch Milwaukee River
Legend
HUC 12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
0 0.25 0.5 1 1.5 2
Miles


Erosion Vulnerability Assessment for Agricultural Lands
Okauchee Lake
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
0 0.25 0.5 1 1.5 2
Miles
Village of Chenequa
Village of Hartland
Okauchee


Erosion Vulnerability Assessment for Agricultural Lands
Rubicon River
Town of Rubicon
Village of Neosho
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
0 0.25 0.5 1 1.5 2
Miles


Erosion Vulnerability Assessment for Agricultural Lands
Silver Creek
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
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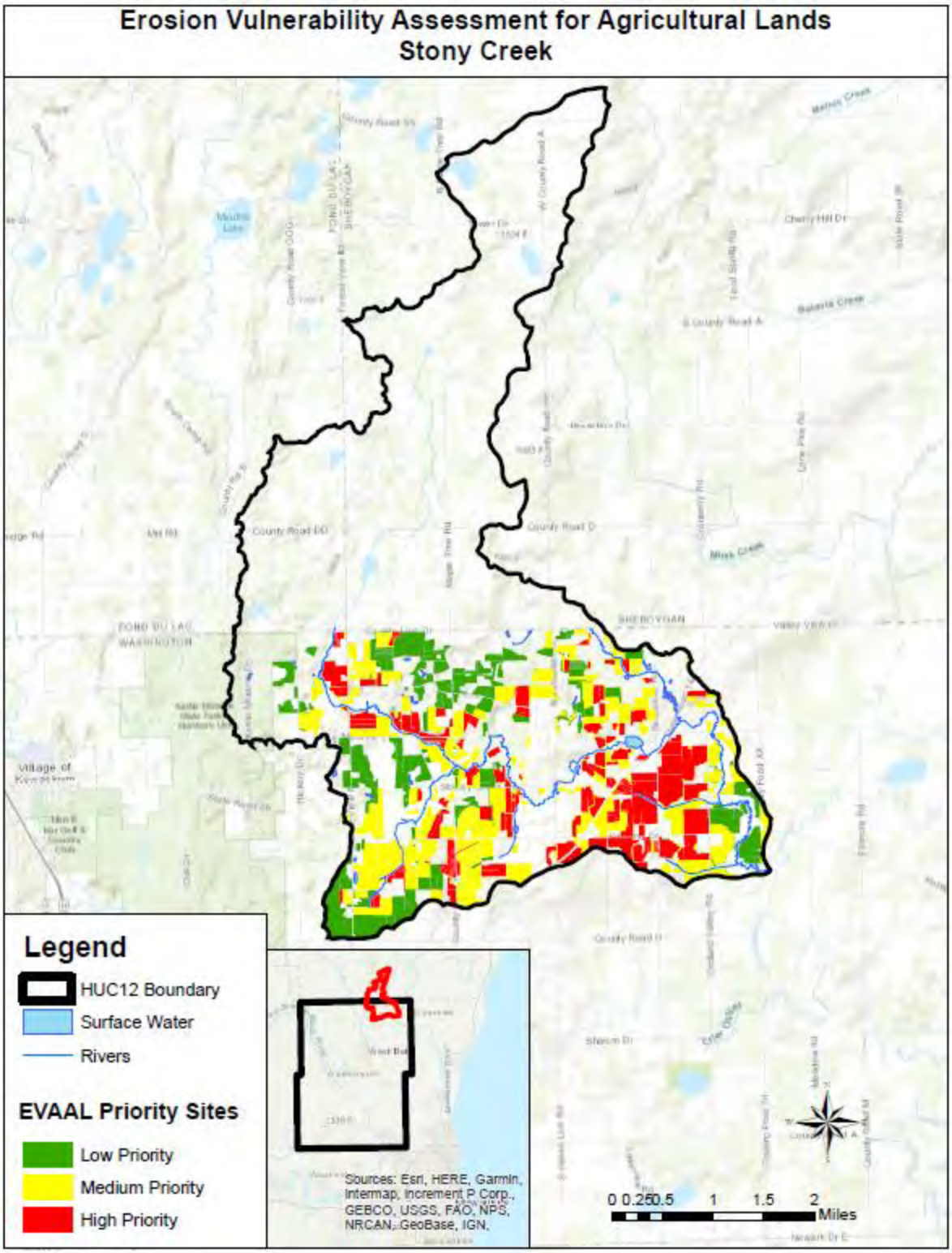
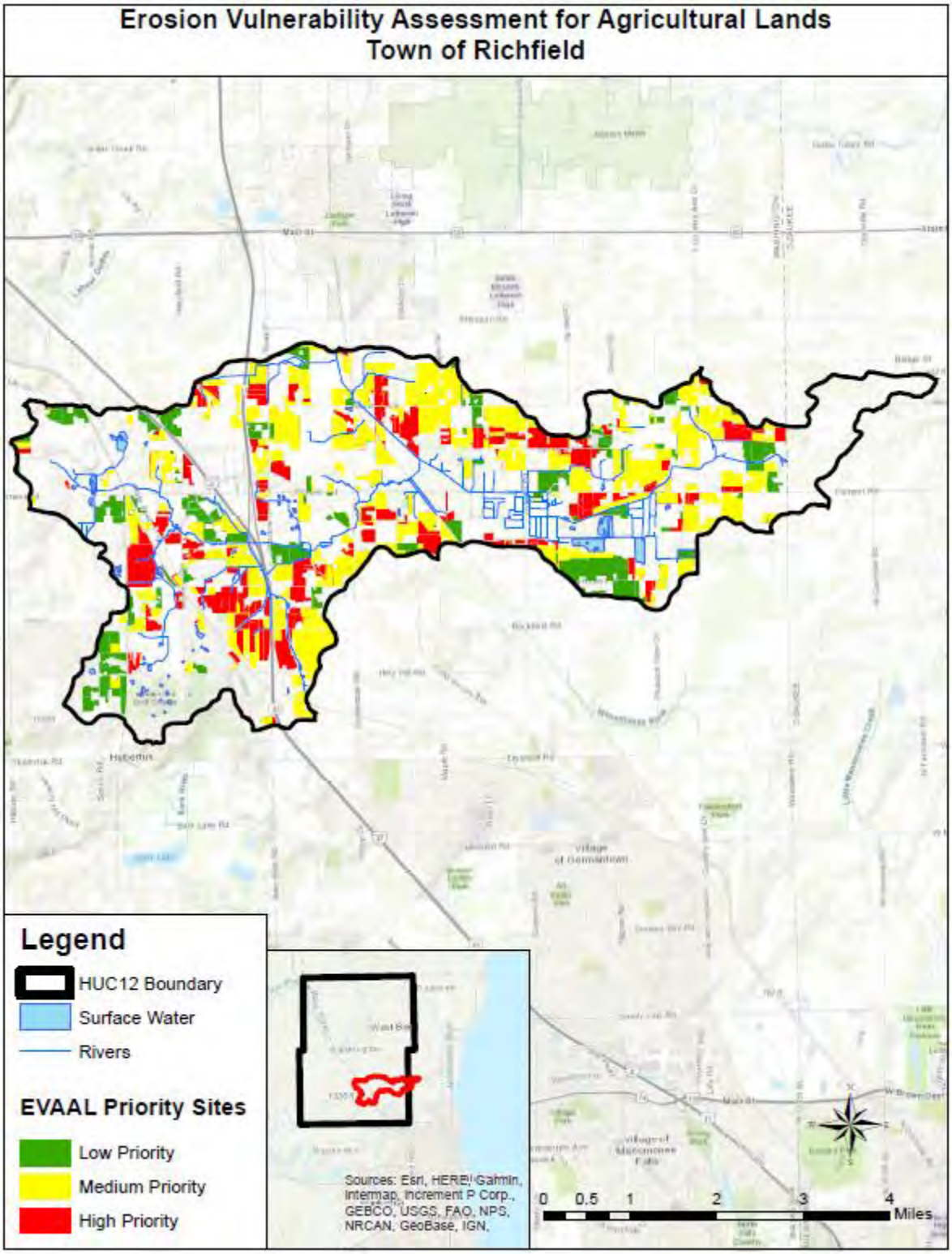
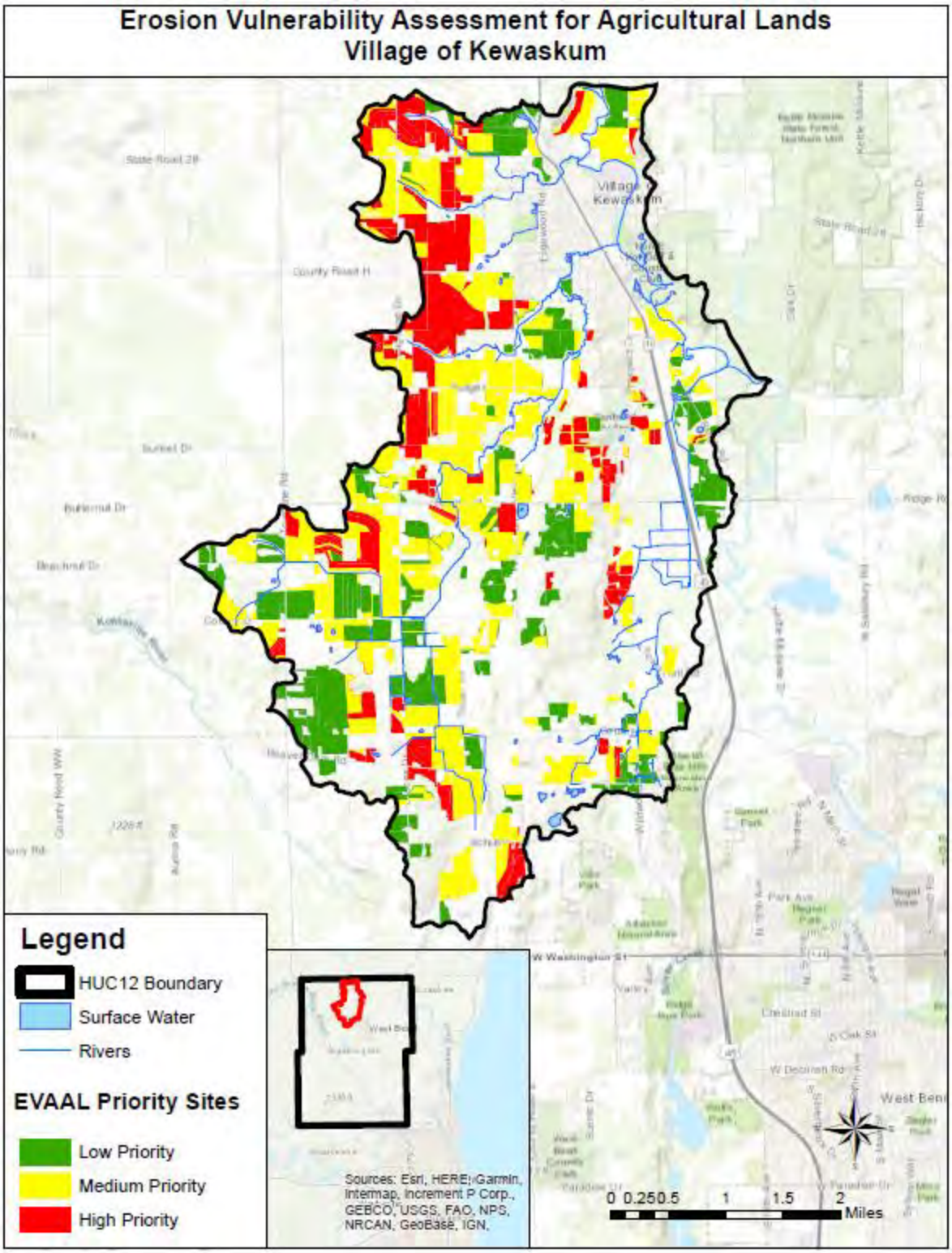
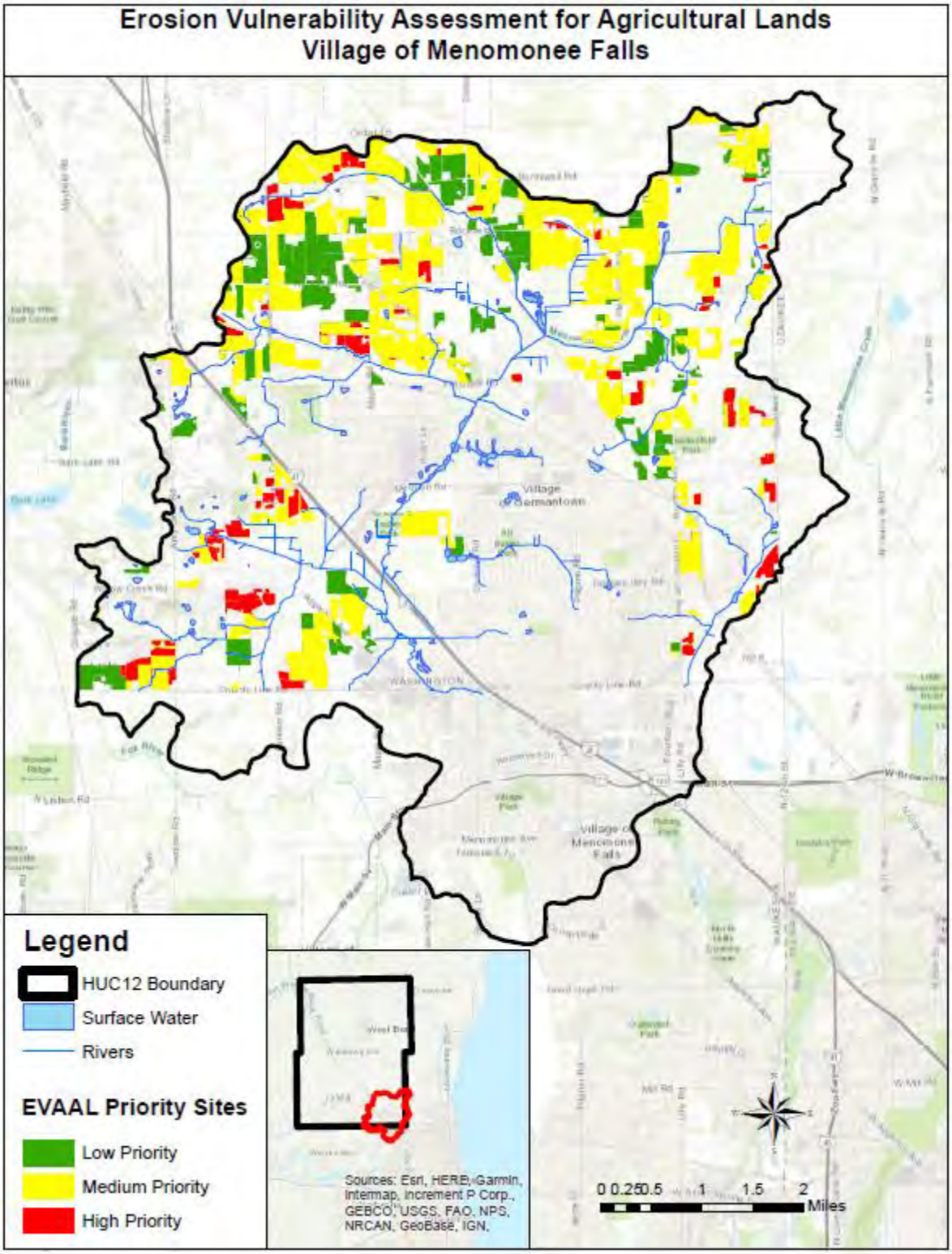
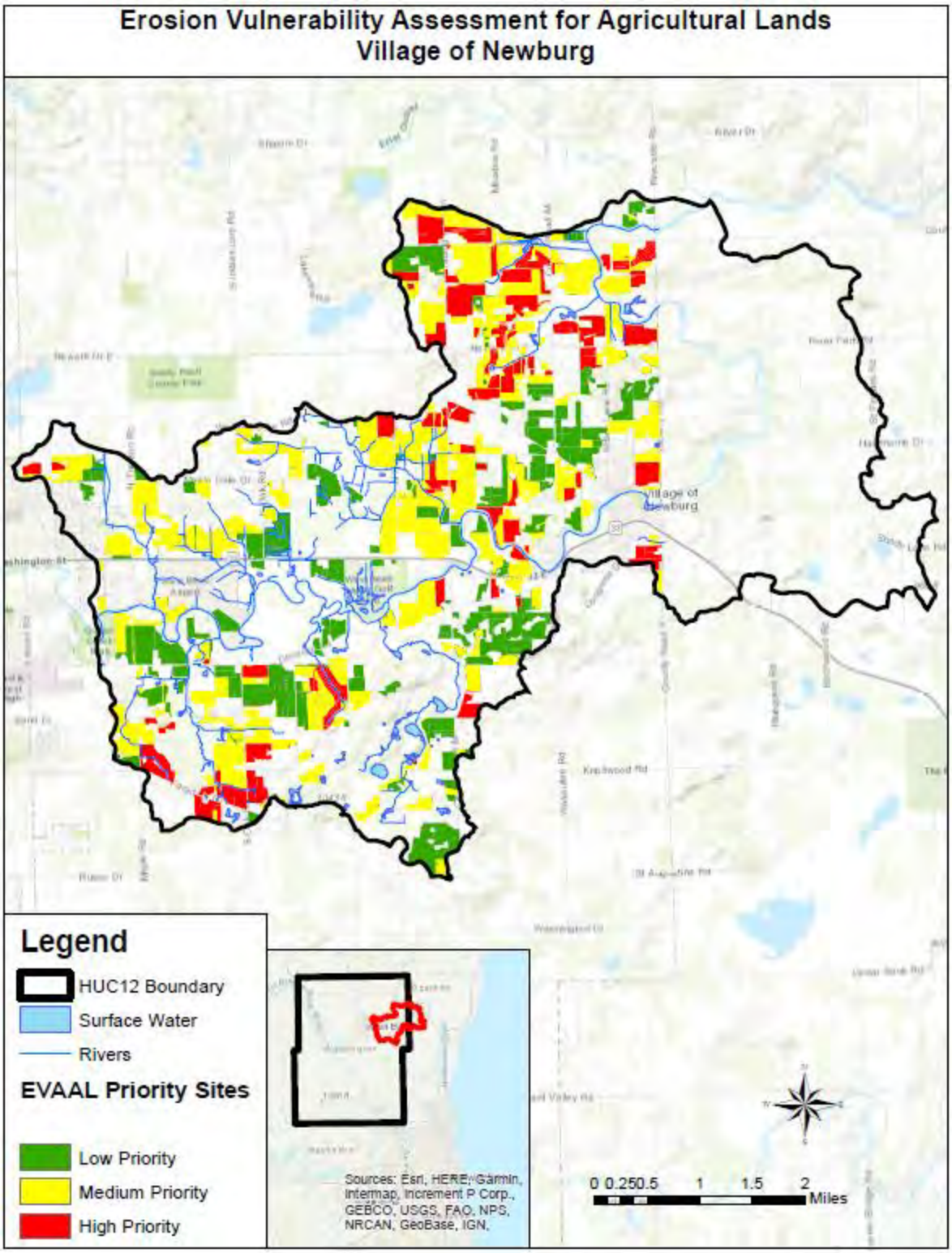
0 0.5 1 2 3 4
Miles

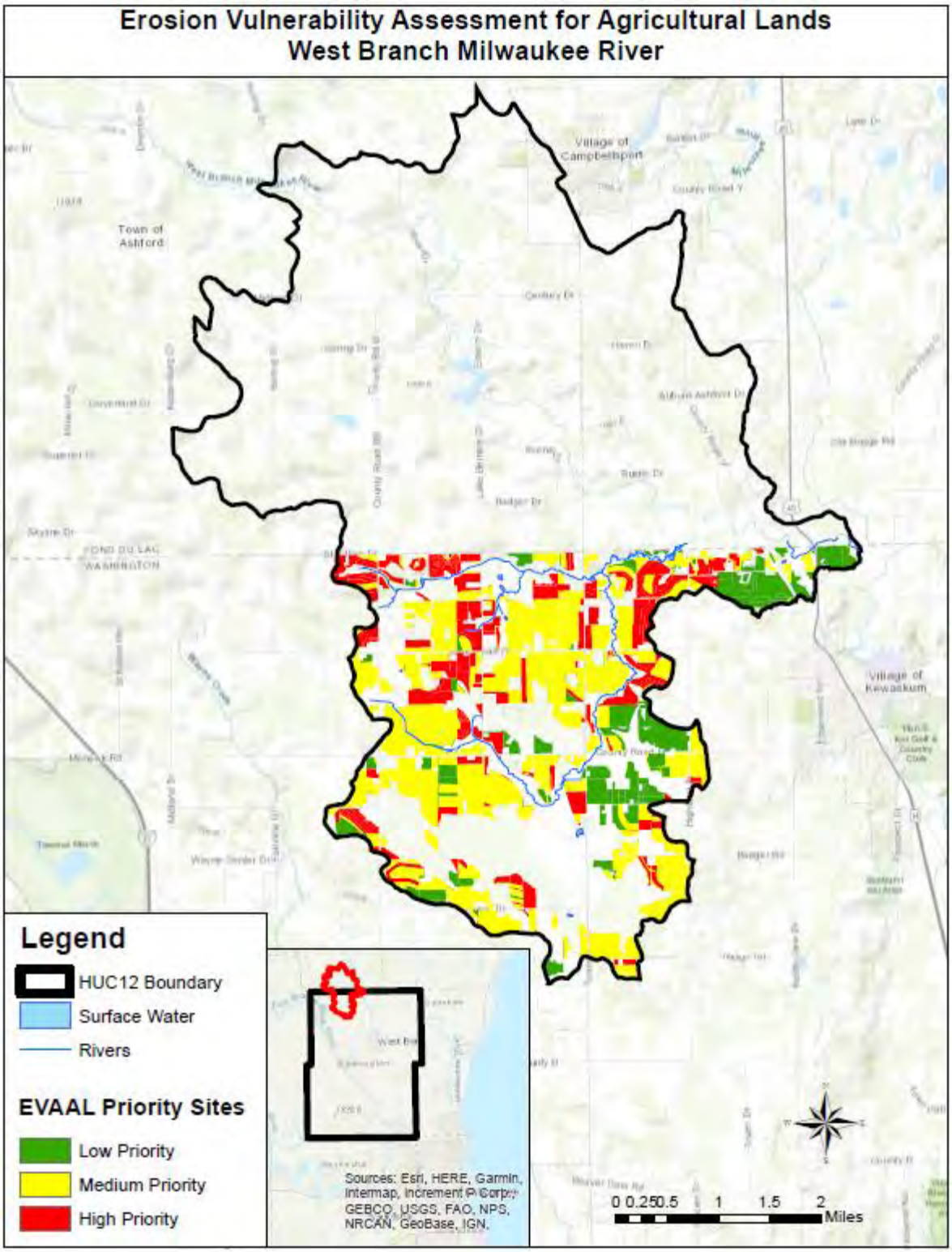

Erosion Vulnerability Assessment for Agricultural Lands
Stony Creek
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
0 0.25 0.5 1 1.5 2
Miles


Erosion Vulnerability Assessment for Agricultural Lands
Town of Richfield
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
0 0.5 1 2 3 4
Miles


Erosion Vulnerability Assessment for Agricultural Lands
Village of Kewaskum
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
0 0.25 0.5 1 1.5 2
Miles


Erosion Vulnerability Assessment for Agricultural Lands
Village of Menomonee Falls
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
0 0.25 0.5 1 1.5 2
Miles


Erosion Vulnerability Assessment for Agricultural Lands
Village of Newburg
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
0 0.250.5 1 1.5 2
Miles


Erosion Vulnerability Assessment for Agricultural Lands
West Branch Milwaukee River
Village of Campbellsport
Town of Ashford
Village of Kewaskum
Legend
HUC12 Boundary
Surface Water
Rivers
EVAAL Priority Sites
Low Priority
Medium Priority
High Priority
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN.
0 0.25 0.5 1 1.5 2
Miles