Brown County

10-Year

Land and Water Resource

Management Plan

December 2016

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Credits for Plan Development

Citizens Advisory Committee

Allyson Watson	Brown County UW-Extension
Mike Mushinski	Brown County Land & Water Conservation Department
Rama Zenz	Brown County Land & Water Conservation Department
Jodi Arndt	Izaak Walton League
Tyler Welch	Cabela's
Dave Swanson	Green Bay Duck Hunters
Bernie Erickson	Green Bay Area Chapter of Great Lakes Sport Fishermen
Deborah Nett	Northeast Wisconsin Land Trust
Maureen Meinhardt	Baird Creek Preservation Foundation
Phil Ulmer	Farm Bureau
Dan Brick	Brickstead Dairy
Marv Biese	Plum Pride Holsteins
John Wiese	Wiese Bros. Farm
Dave Schlies	Old Settlers Dairy

Technical Advisory Committee

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Bill Hafs	NEW Water
Drew Zelle	WDATCP
Jason Petrella	Brown County Parks
Jessica Schultz	Fox-Wolf Watershed Alliance
Barry Bubolz	USDA-NRCS
Jim Snitgen	Oneida Tribe of WI
Kevin Fermanich	UWGB

Land Conservation Committee

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Chapter 1

Introduction

Land and Water Resource Management Plan Background

The need for local leadership in natural resources management is an important concept endorsed by both Federal and State government, including the United States Department of Agriculture's (USDA) 2002 Farm Bill, Natural Resources Conservation Service's (NRCS) Conservation Programs Manual, the EPA's Water Action Plan, 1997 Wisconsin Act 27, and Comprehensive Planning. Elected officials and policy makers have reaffirmed that local leadership and grassroots decision-making that involves a diverse team of interested groups and individuals, are the keys to successfully managing and protecting our natural resources. Following this principle, Wisconsin's 72 County Land Conservation Committees (LCC) continue to lead their communities in determining local conservation needs and priorities.

Locally led conservation is based on the principle that local leaders are best suited to identify and resolve local natural resource problems. It challenges local, state, and federal agency representatives and urban and rural neighbors to work together and take responsibility for addressing resource needs. Locally led conservation creates new opportunities, but also poses significant challenges to County committees to take a more active role as conservation leaders in their communities.

Plan Requirements

The 1997 Wisconsin Act 27 includes provisions for County Committees to develop County Land and Water Resource Management (LWRM) plans. County LWRM plans cover a ten-year period and are envisioned to be a local action or implementation plan with emphasis on program integration. This local planning process is not to be thought of as another "program" among the many others from the state and federal level. Rather, it is a process by which counties and their public stakeholders can assess their resource conditions and needs, decide how best to meet water quality goals, implement state performance standards and other local conservation objectives, and measure progress towards meeting these goals. The planning process will provide a more efficient and effective means to address resource issues, meet state standards, and more effectively leverage local, state, and federal resources.

Every citizen benefits from the protection and sustainable use of our natural resources. As standing committees to County Boards, County Committees are the primary local delivery system of natural resource programs. County Committees and Departments are the public's vital link with local landowners to promote the implementation of conservation practices and achieve greater environmental stewardship of the land.

Performance Standards and Prohibitions

Performance standards and prohibitions are a vital component of County LWRM plans. Through 1997 Wisconsin Act 27, the Legislature amended the statutes to allow County LCCs to develop and adopt standards and specifications for management practices to control erosion sedimentation and nonpoint source water pollution (NSP).

The statutes also require Wisconsin Departments of Natural Resources (DNR) and Agriculture, Trade, and Consumer Protection (DATCP) to develop performance standards for agriculture and non-agriculture nonpoint pollution sources. Chapter NR 151, Wisconsin Administrative Code, was first adopted in 2002 and revised in December 2010, after long deliberation and many public hearings, new state runoff rules took effect. DNR rule NR 151 sets performance standards for runoff and to protect water quality.

The Manure Management Prohibitions summarized from NR 151 Subchapter II are:

- No direct runoff from feedlots or stored manure into waters of the state
- No unlimited livestock access to waters of the state where high concentrations of animals prevent the maintenance of adequate or self-sustaining sod cover
- No overflow of manure storage structures
- No manure stacking in unconfined piles within a water quality management area (WQMA)

Performance Standards listed summarized from NR 151 Subchapter II are:

- Sheet, rill, and wind erosion – all land where crops or feed are grown, including pastures, shall be managed to achieve a soil erosion rate equal to, or less than, the "tolerable" (T) rate established for that soil.
- Tillage setback – no tillage operations may be conducted within five feet of the top of the channel of surface waters.

- Phosphorus index – croplands, pastures, and winter grazing areas shall average a phosphorus index of six or less over the accounting period and may not exceed a phosphorus index of 12 in any individual year within the accounting period.
- Manure storage facilities – all new, substantially altered or abandoned manure storage facilities must be constructed, maintained or abandoned in accordance with accepted standards to minimize the risk of structural failure and minimize leakage in order to comply with groundwater standards.
- Process wastewater handling – no significant discharge of process wastewater to waters of the state.
- Clean water diversions – runoff must be diverted away from contacting feedlots, manure storage areas and barnyards located in a WQMA.
- Nutrient management – manure, commercial fertilizer and other nutrients shall be applied in conformance with a nutrient management plan.

The DATCP rule ATCP 50 identifies the following conservation practices available to maintain compliance with the DNR standards. Specifically, the DATCP rule sets the requirements that nutrient management plan (NMP) must meet to comply with State law.

Practice or Activity	ATCP 50 Cost Share Rate	Funding Source
Manure Storage System	70%	Bonding Revenue
Manure Storage Abandonment	70%	Bonding Revenue
Access Road or Cattle Crossing	70%	Bonding Revenue
Cattle Mound	70%	Bonding Revenue
Critical Area Stabilization	70%	Bonding Revenue
Diversion	70%	Bonding Revenue
Field Windbreak	70%	Bonding Revenue
Filter Strip	70%	Bonding Revenue
Grade Stabilization Structure	70%	Bonding Revenue
Heavy Use Area Protection	70%	Bonding Revenue
Intensive Grazing Management	70%	SEG Funding

Livestock Fencing	70%	Bonding Revenue
Livestock Watering Facility	70%	Bonding Revenue
Milking Center Waste Control System	70%	Bonding Revenue
Nutrient Management for up to 3 years	Flat Rate	SEG Funding
Pesticide Management for up to 3 years	Flat Rate	SEG Funding
Relocating or Abandoning animal feeding operations	70%	Bonding Revenue
Roof	70%	Bonding Revenue
Roof Runoff System	70%	Bonding Revenue
Sediment Basin	70%	Bonding Revenue
Streambank and Shoreline Protection	70%	Bonding Revenue
Subsurface Drain	70%	Bonding Revenue
Terrace	70%	Bonding Revenue
Underground Outlet	70%	Bonding Revenue
Waste Transfer System	70%	Bonding Revenue
Water and Sediment Control Basin	70%	Bonding Revenue
Waterway System	70%	Bonding Revenue
Well Abandonment	70%	Bonding Revenue
Wetland Restoration	70%	Bonding Revenue
Conservation Tillage	70%	SEG Funding
Contour Farming	70%	SEG Funding
Strip-cropping	70%	SEG Funding

How these performance standards and prohibitions are to be implemented and enforced, and how violation and appeals are to be handled, will be detailed in subsequent portions of this plan.

Performance Standards and Prohibitions Incorporated into County Ordinances

Manure management prohibitions have been incorporated into the Brown County Animal Waste Management Ordinance, enacted in 1986 (updated 1999, 2006, 2007), to include the performance standards adopted in 2002. This ordinance regulates permitting of new and expanding animal waste storage facilities and feedlots, nutrient management planning and proper closure of vacated waste storage facilities. The ordinance is administered and enforced by the Land and Water Conservation Department (LWCD). The ordinance is projected to be updated include the performance standards adopted in 2011, and to reference new USDA-NRCS Technical Standards.

Brown County History

It is believed that human habitation of the area that would one day become Brown County may have existed near the Red Banks area along the east shore of the Bay of Green Bay as far back as 7000 B.C. Since then, many different Indian tribes have periodically inhabited the lands adjacent to the Bay of Green Bay and the Fox River. Prior to the 1600s, the Winnebago and Menomonee Indian tribes inhabited what is now Brown County. However, by the mid-1600s, other tribes, such as the Ottawa, Huron, Fox, Sauk, Potawatomi, and Ojibwa, moved into the area as they were displaced from their ancestral lands further east, and they, in turn, displaced the Winnebago and Menomonee tribes. The Oneida Tribe of Indians of Wisconsin began arriving in what is now Brown County in approximately 1820 after being displaced from New York State. The Oneida Tribe of Indians of Wisconsin historic or original reservation is located in west-central Brown County and includes parts of Hobart, Ashwaubenon, Green Bay, and Pittsfield.

Jean Nicolet has commonly been credited with being the first European to set foot in what would one day become the State of Wisconsin when he arrived at the Red Banks area in 1634. This event heralded a period of rapid change for the area adjacent to the bay and the Fox River as other French explorers and fur traders quickly followed Nicolet. By the mid-1600s, French missionaries also began to visit the area. These visits eventually became so numerous that in 1671 the first permanent European development, the St. Francis Xavier mission, was established along the Fox River near the De Pere rapids. In 1701, following this initial wave of French explorers, fur traders, and missionaries, the French government established a military stockade called Fort St. Francis in the area along the bay near the mouth of the Fox River where the Canadian National Railroad yards in the City of Green Bay are now located. By 1764, the first recorded settler, Augustin de Langlade, moved to this area and established a trading post.

Eventually, the French presence in this region gave way to British influences. In 1761, the French Fort St. Francis was rebuilt by the British and renamed Fort Edward Augustus. In 1763, France ceded the area to England. By the mid-1780s, the colony established by de Langlade, which would eventually become part of the City of Green Bay, had reached a population of about 50

people.

In 1783, England ceded this region to the United States. However, it was not until after the War of 1812 that the British presence was, in turn, supplanted by the American when pioneers from New England and New York outnumbered the original French-Canadian settlers. By 1812, the population of the settlement established by de Langlade had increased to about 250 people. In 1816, Fort Edward Augustus was once again rebuilt and renamed Fort Howard. At that point in time, the Fort Howard area was the second largest settlement in Wisconsin. By 1824, the settlement originally founded by de Langlade had reached a population of about 500 people with an additional 600 troops stationed at Fort Howard. In 1824, Brown County's first county courthouse was founded. In 1854, Green Bay incorporated as a city. Large-scale immigration into this area began by the late 1840s, so that by 1860 about 11,800 people inhabited the area identified today as Brown County.

Brown County was created in 1818 as part of the Michigan Territory, and at that time, it included much of Upper Michigan and all of Wisconsin from Lake Michigan to the Wisconsin River and south to Illinois. By the time the Wisconsin Territory was established in 1836, the southern one-third of Brown County had been removed to form new counties in the rapidly growing southeastern portion of the territory. When Wisconsin became a state in 1848, the counties of Door, Oconto, Outagamie, and Waupaca were created from Brown County. The following year, Kewaunee County was created. By 1853, Brown County was confined to its present size (534 square miles) when Shawano County was created. Brown County was formally established by congress in 1861.

Brown County's first cities, Navarino (which later became part of the City of Green Bay) and De Pere, were founded in 1829 along the shores of the Fox River near the Bay of Green Bay. Other early Brown County communities, Astor (which later became part of the City of Green Bay) and Wright (which later became the Village of Wrightstown), were also located along the Fox River. Jurisdictional changes continue to the present with incorporation of the Town of Allouez as a village in 1986, the Towns of Bellevue and Hobart as villages in 2002, and the Town of Suamico as a village in 2003. The 24 municipalities of present-day Brown County include 2 cities, 9 villages, and 13 towns. Since its inception, the City of Green Bay has always been and continues to be Brown County's largest community.

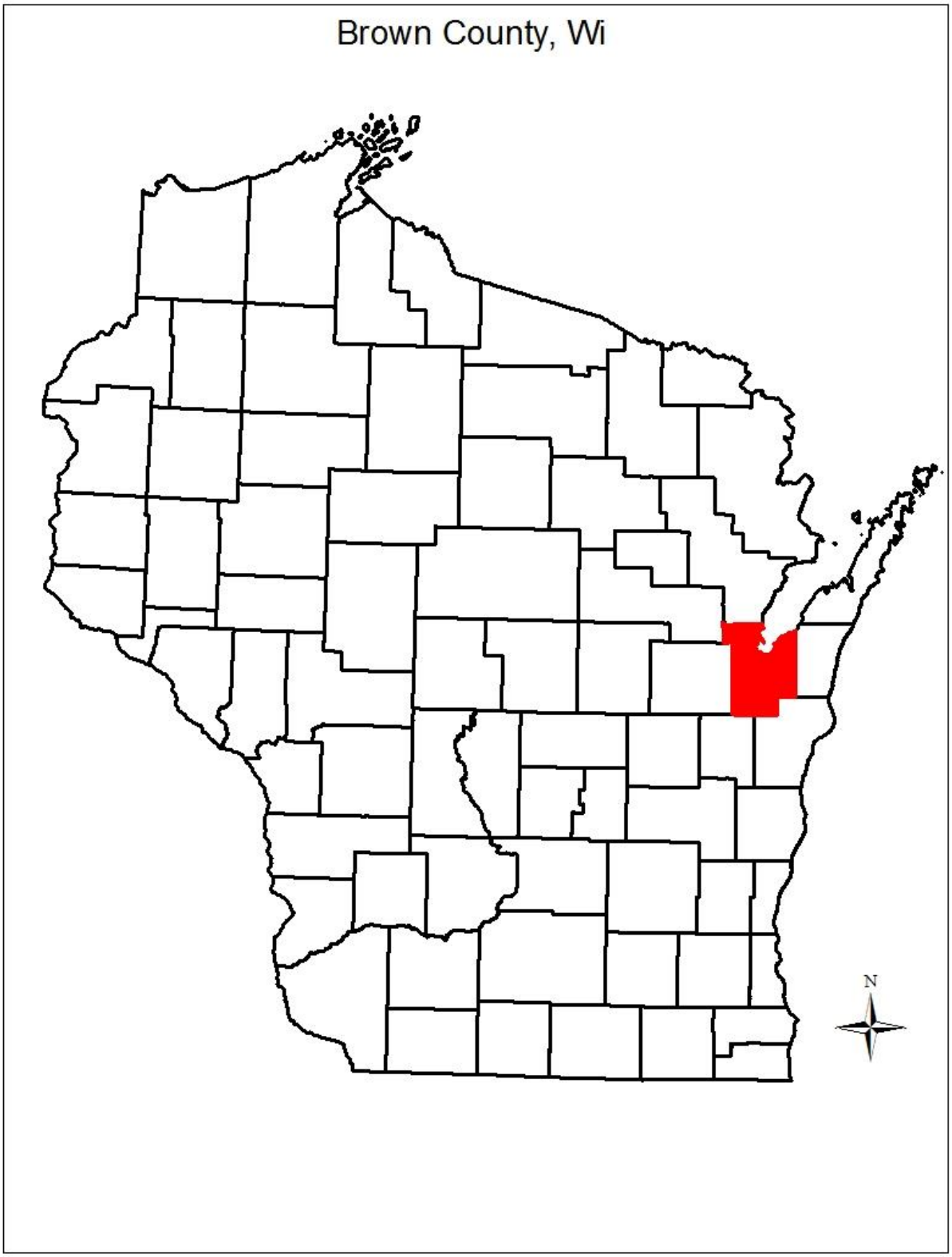
Geography and Geology

Locational Context

Brown County, encompassing an area of approximately 615 square miles, is located in northeast Wisconsin. Brown County, as of the 2010 Census, had 248,007 residents making it the fourth most populated county in Wisconsin. The county has a total of 24 municipalities comprised of 2 cities, 9 villages, and 13 towns. Brown County is bordered by Oconto County to the north,

Shawano County to the northwest, Outagamie County to the west, Calumet County to the southwest, Manitowoc County to the southeast, and Kewaunee County to the east. The maps below provide locational context of Brown County in Wisconsin and the townships and municipalities within.

Municipality	Population (2010 Census)	Population (2014 estimate)
City of Green Bay (county seat)	103,913	104,891
City of De Pere	23,806	24,555
Village of Allouez	13,975	13,943
Village of Ashwaubenon	16,943	17,111
Village of Bellevue	14,710	15,215
Village of Denmark	2,123	NA
Village of Hobart	6,187	7,861
Village of Howard	17,399	18,987
Village of Pulaski	3,539	NA
Village of Suamico	11,346	11,878
Village of Wrightstown	2,827	NA


Brown County, Wi
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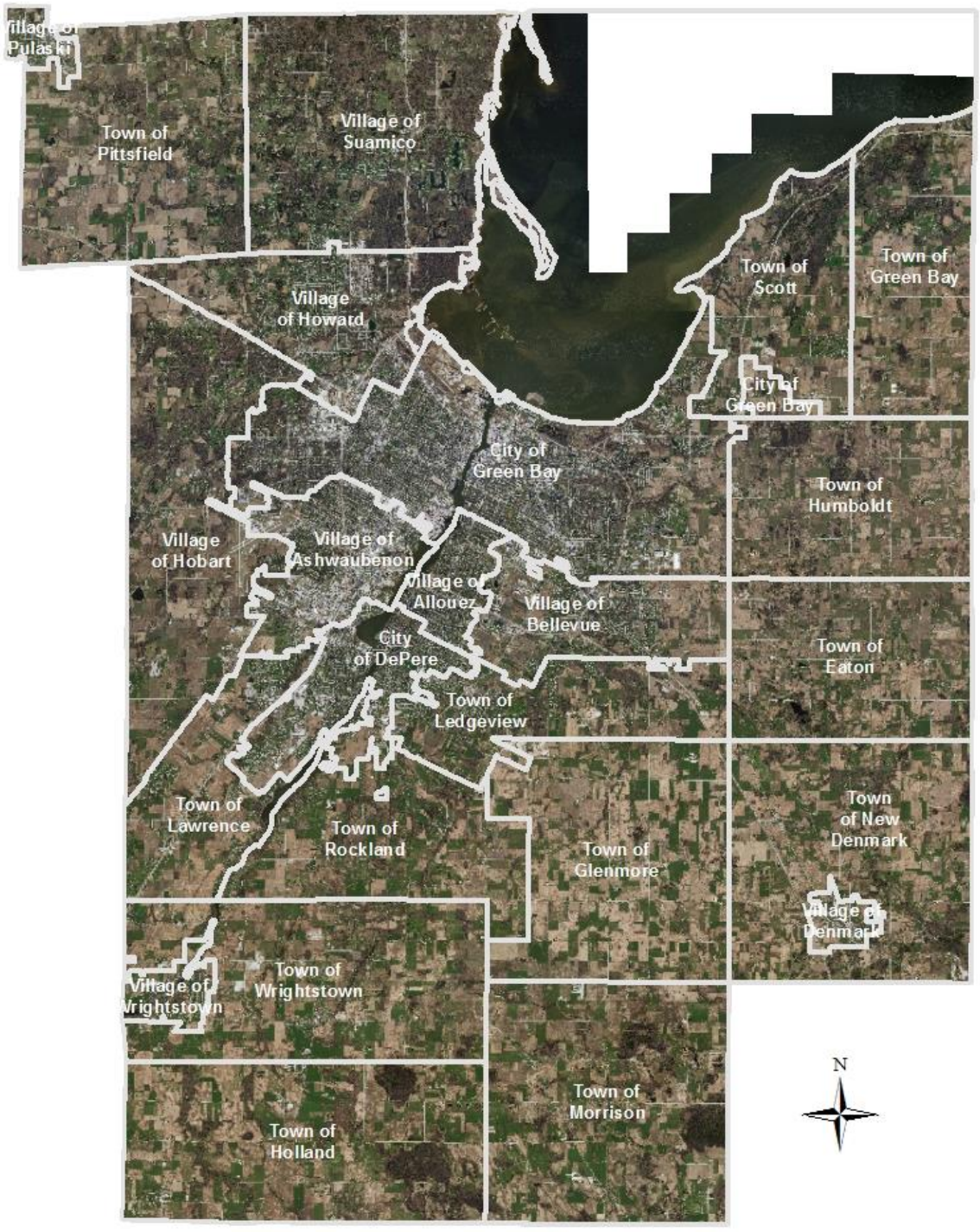
Municipal Boundries, Brown County



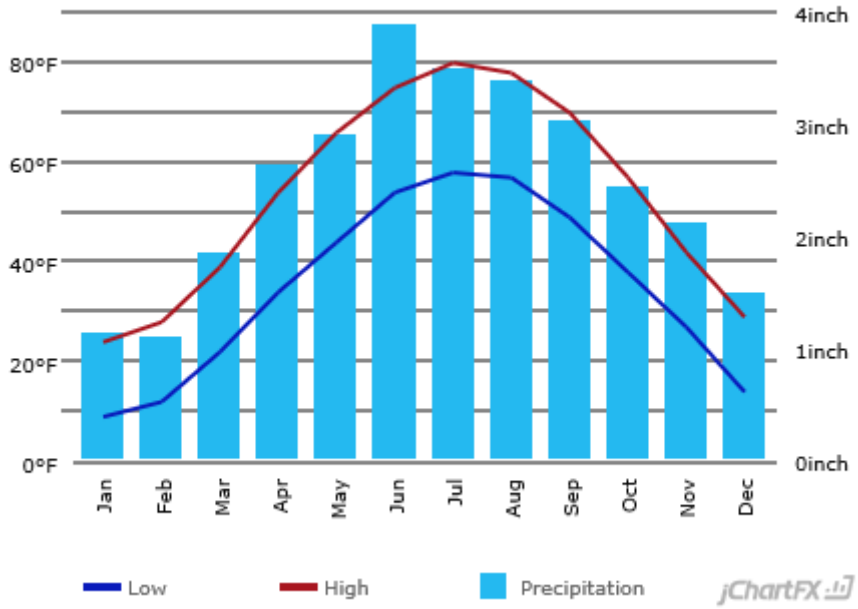
Climate

Brown County has a humid continental climate with some moderation due to the proximity to Lake Michigan. Like other areas with this type of climate, there are four distinct seasons, often with severe or extreme variation between them in terms of temperature and precipitation. Brown County experiences warm, humid, frequently hot summers and long, cold and snowy winters. The variance in temperature and precipitation between months is severe and often extreme.

Brown County's monthly mean temperatures range from 16.6°F in January to 69.1°F in July. In July, the warmest month, the average high temperature is 81.2 °F. There are 6.1 days of temperatures greater than 90°F, 68 days where the high remains at or below freezing, and 19 days with sub 0°F lows annually. From December to February, even during thaws, the temperature rarely reaches 50°F. Extremes have ranged from −36°F in January to 104°F in July.

The wettest month is August, when on average 3.77 inches of precipitation falls, mostly in the form of rainfall. The driest month is February, when the majority of precipitation falls as low moisture-content snow due to cold, dry air. On average, 1.01 inches of precipitation falls in February.

Climate – Green Bay, WI



Geology and Topography

The topography of Brown County has been greatly modified by glacial action and today is generally characterized by gently rolling moraines. The western two-thirds of the County is associated with the roughly 4-mile-wide Fox River Valley, a continuation of the same depression forming the Bay of Green Bay. This area slopes gently northeastward from Lake Winnebago in east central Wisconsin, drains to the bay, and is generally level to gently rolling. This lowland area contains many glacial landforms, including eskers, moraines, and remnants of extinct glacial lakes. During glacial times, the flat marshy land west and south of the bay had been covered by the bay. Most streams in the area flow northeastward and parallel to the escarpment to the bay. Most streams also possess shallow channels, except in a few instances where the streams have cut through softer underlying glacial landforms, such as the Fox River in Wrightstown.

Forming the eastern boundary of the Fox River Valley is a steep escarpment referred to as the Niagara Escarpment, which rises relatively abruptly as high as 200 to 250 feet above the valley floor. East of and alongside most of the Niagara Escarpment is a narrow strip of level land. East of that is generally a slightly rolling plain that drains east and southeast toward Lake Michigan. The headwaters of a number of streams that drain to Lake Michigan are located within this area. However, gaps in the Niagara Escarpment allow two streams—Baird Creek and Bower Creek—to flow westward to the Bay of Green Bay. The area is generally well drained but has many small wet depressions in places.

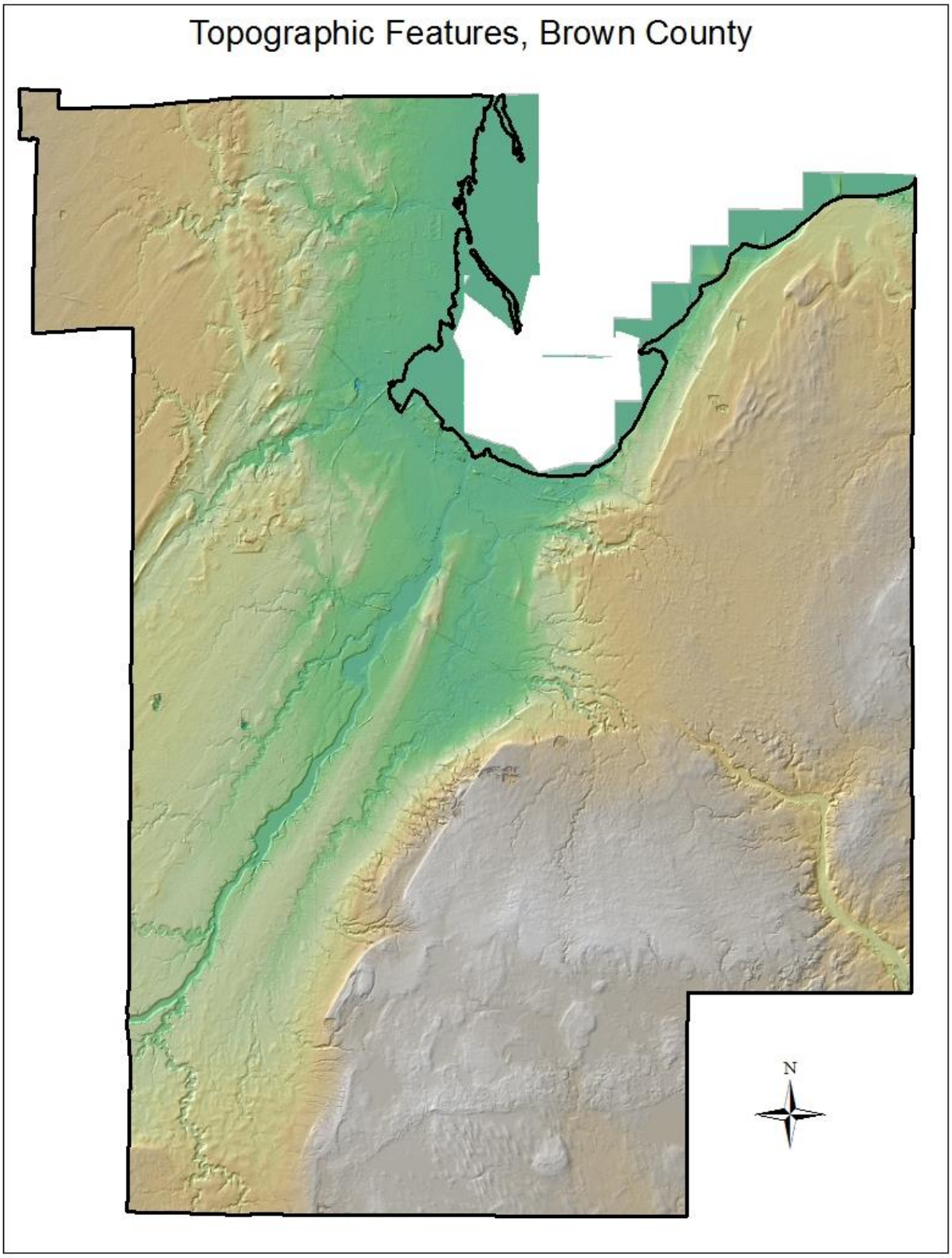
Due to its location between two lobes of the last glacier to advance through Wisconsin, the southeastern portion of the County is extremely hilly and has many poorly drained depressions. This area, which extends into southeastern Wisconsin, is the beginning of the Kettle Moraine area of the State.

Land relief within the County ranges from approximately 600 feet above sea level to approximately 1,000 feet above sea level. The low point in the County, at an elevation of about 580 feet, is located in the City of Green Bay where the Fox River enters the bay. The highest point in the County is located in the Town of Holland, southeast of the unincorporated community of Greenleaf, at an elevation of about 1,020 feet.

The most dominant topographical feature in Brown County is the Niagara Escarpment, which rises relatively abruptly above the valley floor. This escarpment it the exposed edge of a ridge with a steep face on the generally west and north side and a gentle slope on the east and south sides. Most portions of the rocky Niagara Escarpment ledge face in Brown County face northwest and vary in height from 5 feet to upwards of 200 feet.

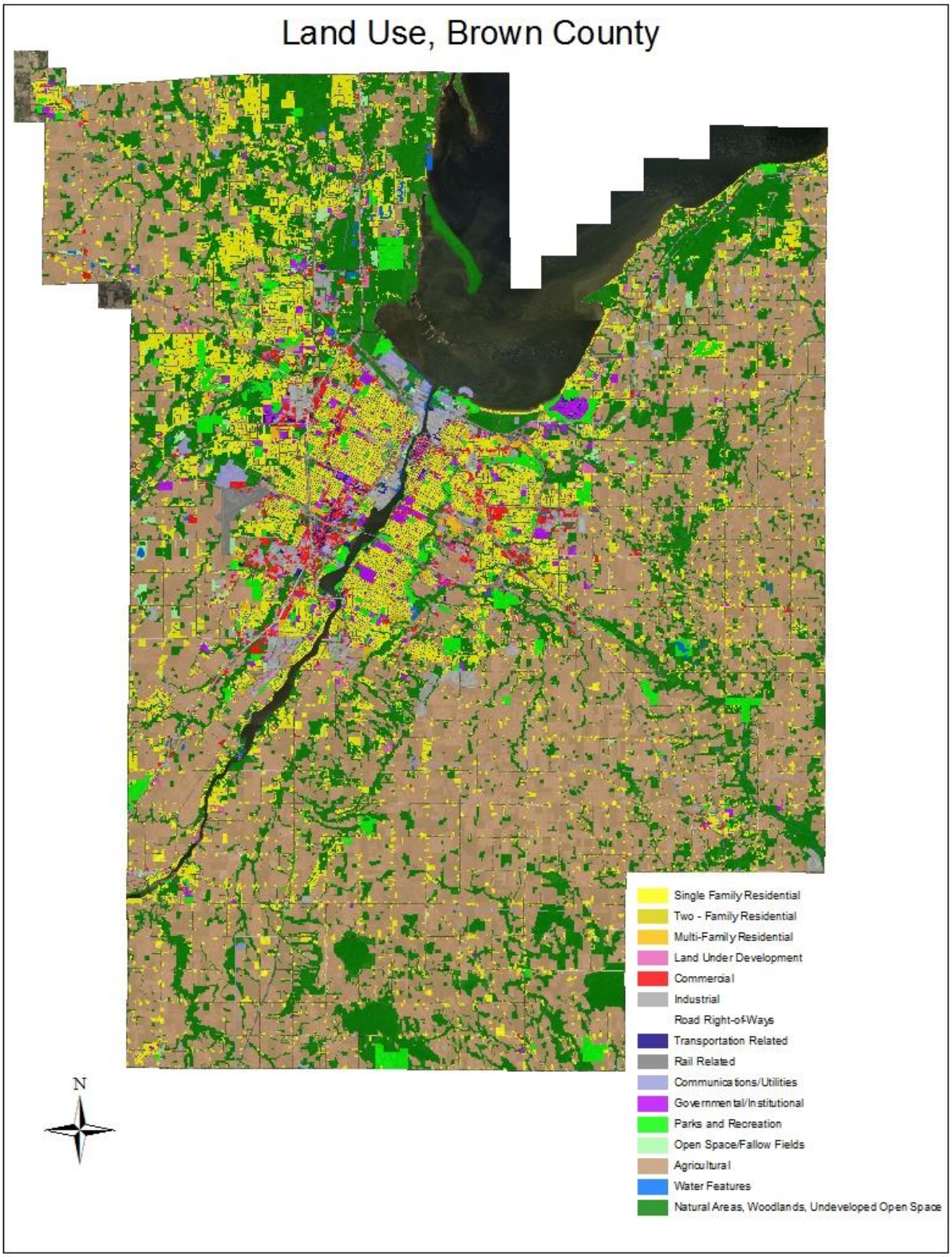
The “ledge”, as it is locally known, was formed by the exposure of a layer of eastward to southeastward tilting rocks that are older, harder, and more resistant to weathering and erosion than the underlying rocks. Over time, the underlying rocks have been eroded away, leaving the edge of the more resistant rocks exposed. The steep, straight cliff faces have been accentuated by the scouring action of glaciers. The Niagara Escarpment extends in a southwest-northeast direction through the eastern portion of Brown County (approximately five miles east of and parallel to the Fox River) until it nears the northeast side of the City of Green Bay where it is located adjacent to the bay. The Niagara Escarpment continues southwest into central Wisconsin and to the northeast through Door County, Upper Michigan, Canada, and back into the United Sates in Upstate New York. The Door County Peninsula and Niagara Falls are two exceptional and well-known features located along this escarpment.

Additionally, many of the areas within Brown County along the Niagara Escarpment are associated with karst features. Karst features consist of cracked and fractured bedrock, such as limestone, that is close to the surface. This bedrock is easily dissolved by water, and its cracks and layers allow water and pollutants to easily reach the groundwater. Sinkholes, shallow soils, sinking streams, and springs are commonly found in such areas. These features are located adjacent to the escarpment and more extensively in the Towns of Green Bay and Scott. Because of the fragility of these features and their susceptibility to groundwater contamination, minimum setbacks from these features should be considered for barnyards, manure storage areas, and chemical and manure spreading.


Topographic Features, Brown County
N

Land Use

Land Use	2000		2014		Change 2000-2014	Change 2000-2014
	Acres	%	Acres	%	Acres	%
Residential	44,657	13.0	45,465	13.3	808	0.2
Commercial	4,740	1.4	5,105	1.5	365	0.1
Industrial	6,050	1.8	6,661	1.9	611	0.2
Transportation	25,339	7.4	26,509	7.7	1,170	0.3
Communication/ Utilities	1,526	0.4	1,546	0.5	20	<0.1
Institutional/ Governmental	3,590	1.0	3,657	1.1	67	<0.1
Outdoor Recreation	10,939	3.2	10,992	3.2	53	<0.1
Agricultural	180,331	52.6	168,686	49.2	-11,645	-3.4
Natural Areas	65,458	19.1	74,009	21.6	8,551	2.5
GRAND TOTAL	**342,629**	**100.0**	**342,629**	**100.0**	**----**	**----**


Land Use, Brown County
N
Single Family Residential
Two - Family Residential
Multi-Family Residential
Land Under Development
Commercial
Industrial
Road Right-of-Ways
Transportation Related
Rail Related
Communications/Utilities
Governmental/Institutional
Parks and Recreation
Open Space/Fallow Fields
Agricultural
Water Features
Natural Areas, Woodlands, Undeveloped Open Space

Shoreland

Shorelands are the areas of interface between land and water. In its natural condition, shorelands are comprised of thick and diverse vegetation that protect lakes, rivers, and streams by filtering out pollutants and sediments. Natural shorelands also provide scenic beauty and critical habitat for fish and wildlife. However, shorelands are very susceptible to small changes in the surrounding environment. Even slight increases in sediment or nutrient loadings have profound negative impacts on the shoreland area, riparian zone, and surface water feature. When shoreland areas are developed, if proper erosion control and stormwater management techniques are not in place during and after construction, vegetation is lost, surface water quality is degraded, and fish and wildlife habitat is lost.

Within Brown County, when one thinks of shorelands, one generally thinks of the Green Bay or Fox River shorelines. However, it is important to note there are many miles of shorelands associated with smaller rivers and streams, such as the East River, Duck Creek, Suamico River, Baird Creek, Plum Creek, and the Branch River, as well as the innumerable unnamed tributaries throughout the County. Except for surface water which seeps into the groundwater table, all Brown County surface water eventually reaches Lake Michigan through the Fox River and Bay of Green Bay or the countless other streams and rivers that flow through Brown County. In order to improve the water quality of Lake Michigan and the Bay of Green Bay, we need to begin by improving the management of our shoreland areas within Brown County.

Wetlands

Wetlands are characterized by water at or near the ground level, by soils exhibiting physical or chemical characteristics of waterlogging, or by the presence of wetland-adapted vegetation. Wetlands are significant natural resources that have several important functions. They enhance water quality by absorbing excess nutrients within the roots, stems, and leaves of plants and by slowing the flow of water to let suspended pollutants settle out. Wetlands help regulate storm runoff, which minimizes floods and periods of low flow. They also provide essential habitat for many types of wildlife and offer recreational, educational, and aesthetic opportunities to the County.

The Wisconsin Department of Natural Resources Wetlands Inventory Map identifies the general locations of wetlands throughout the State and Brown County. Wetlands that are less than two acres in size are typically identified with a point symbol, however, due to the county-wide scale of the map, they would not be legible and are, therefore, not included. The WDNR digital wetlands inventory identifies approximately 38,142 acres (59.6 square miles) of wetlands within Brown County. As depicted on the map, the largest contiguous areas of wetlands are associated with the west shore of the bay in Howard and Suamico, the Red Banks Alvar area southwest of Dyckesville, the Baird Creek and Neshota River headwaters in Humboldt and Eaton, and the large wetland areas in eastern Holland and eastern Morrison. Other more

isolated wetlands are scattered throughout the County or located along waterways.

Woodlands

Prior to human-induced changes and development, it is generally accepted that Brown County consisted primarily of vast tracts of climax forests. These large undisturbed woodlands were believed to consist of mature hardwoods dominated by sugar maple, basswood, hemlock, and American beech. However, such woodlands rarely contained pure stands of timber but were more likely a mixture of tree species that grew well together. Such common mixtures or groupings included beech, sugar maple, basswood, red oak, white oak, and black oak associations and beech, hemlock, sugar maple, yellow birch, white pine, and red pine associations. After more than 300 years of human-made changes, such as clearing, burning, and filling, many of these woodlands have disappeared, and very few, if any, virgin stands of timber remain. It is estimated that, prior to human settlement of this area, woodlands once occupied about 460 square miles, or about 86 percent of the County.

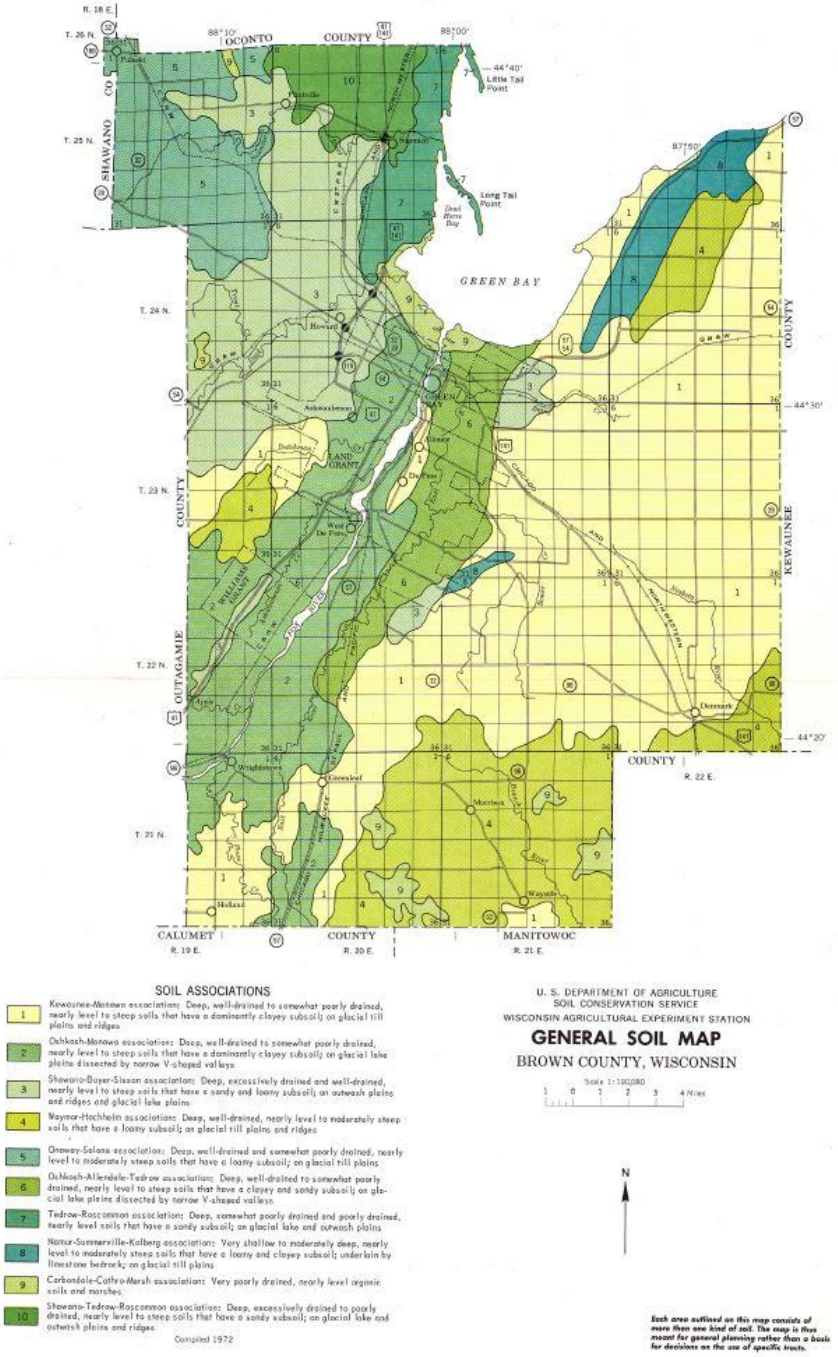
Due to human activities, wooded lands within Brown County are now less extensive and of lesser quality while those areas that still remain are typically less ecologically diverse and more disturbed than before. These areas typically consist of successional stages of woody growth or mature second growth rather than the climax forests of the past. In addition, the majority of these lands are grazed rather than left undisturbed, and the variety of species within typical existing woodlands is substantially less than would historically be found in a mature forest. A relatively recent trend is the establishment of new areas of trees and shrubs primarily attributable to the landscaping activities associated with urban development. However, these areas of often-exotic species of trees and shrubs are typically neither dense enough nor extensive enough to be considered woodlands.

The remaining relatively large areas of mature second growth woods can be found in the northern portion of the Towns of Scott and Green Bay, the Reforestation Camp area and west shore wetlands areas in the Village of Suamico, and areas along Duck Creek in the Village of Hobart and City of Green Bay. Numerous small woodlots are also scattered throughout the rural parts of Brown County. According to the 2014 land use inventory, woodlands encompassed 75 square miles, or about 14 percent of the County.

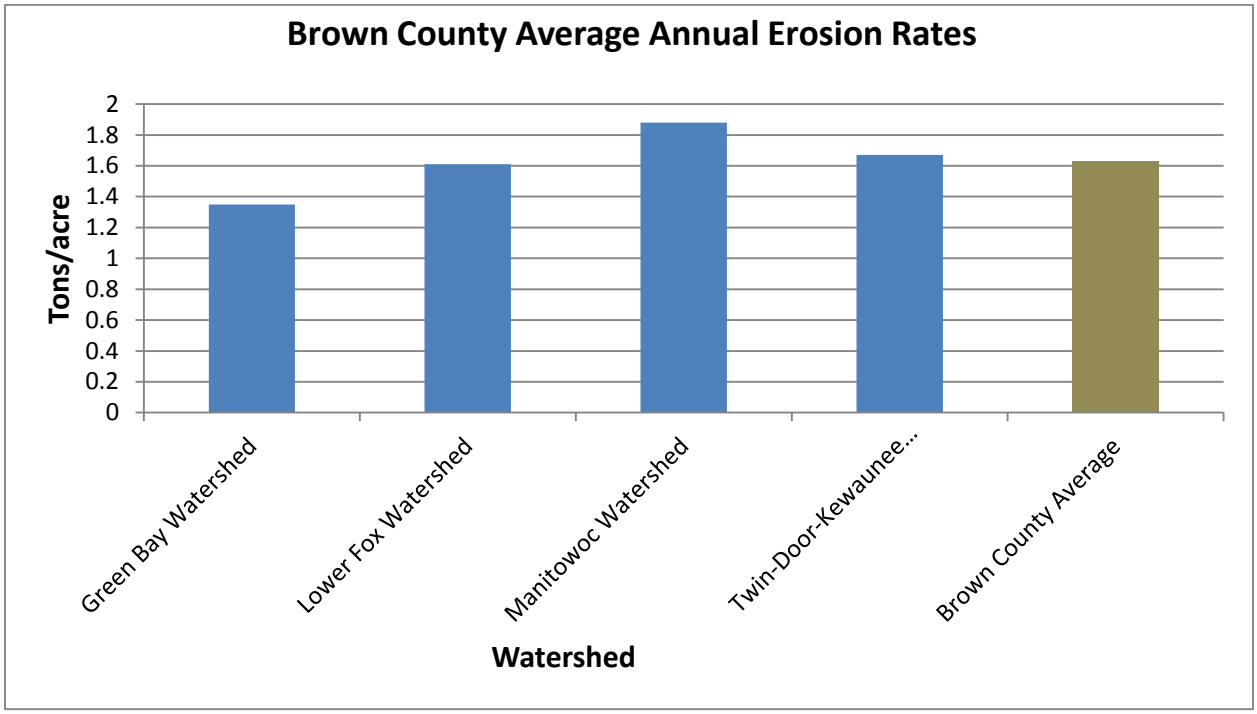
Soils and Soil Erosion

Most of the soils of Brown County formed in glacial till and lake sediments that have high clay content. The characteristic subsoil and substratum are slowly permeable clay loam to clay. These soils have slight to moderate limitations for agriculture due to slow permeability, unfavorable shrink-swell potential, wetness, and maintenance of tilth. Other soils in the county formed in loamy or sandy glacial till, outwash sand and gravel, and lacustrine sediment. The moderate to rapid permeability and friable consistence of these soils provide, for the most part,

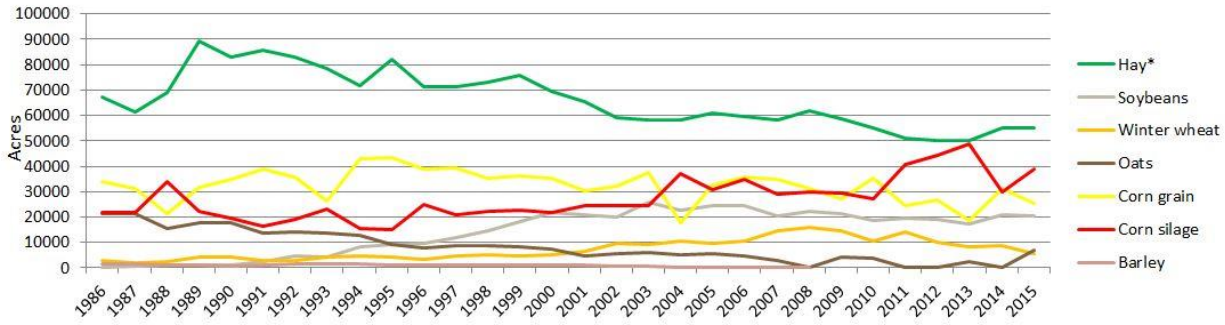
slight to moderate limitations for agriculture. There are 10 soil associations within Brown County comprising mainly of Kewaunee-Manawa (39%), Oshkosh-Manawa (16%), Shawano-Boyer-Sisson (13%), Waymore-Hochheim (12%), and the Onaway-Solona (6%). These associations are generally found do be deep, well-drained soils located on glacial till plains and ridges.



Soil erosion from agricultural cropland continues to be the major source of sediment to impaired waters in the county. By tabulating soil loss data from a subset of nutrient management plans we determined the average erosion rate from agricultural cropland is 1.63 tons/acre/year. While constant efforts to reduce this rate have been in place, the increased need for forages to feed dairy cattle, removal of fence rows and enlargement of fields all have continued to cause additional erosion problems. Cropping trends in the county over the last thirty years have shown a decrease in the amount of hay acres and an increase in annual row crops especially corn silage. These annual crops leave soils more susceptible to erosion than the perennial alfalfa. The 1.63 ton/acre/yr. average soil erosion rate is below tolerable soil loss on most soils in the county; this eroded soil is still causing substantial water quality problems.



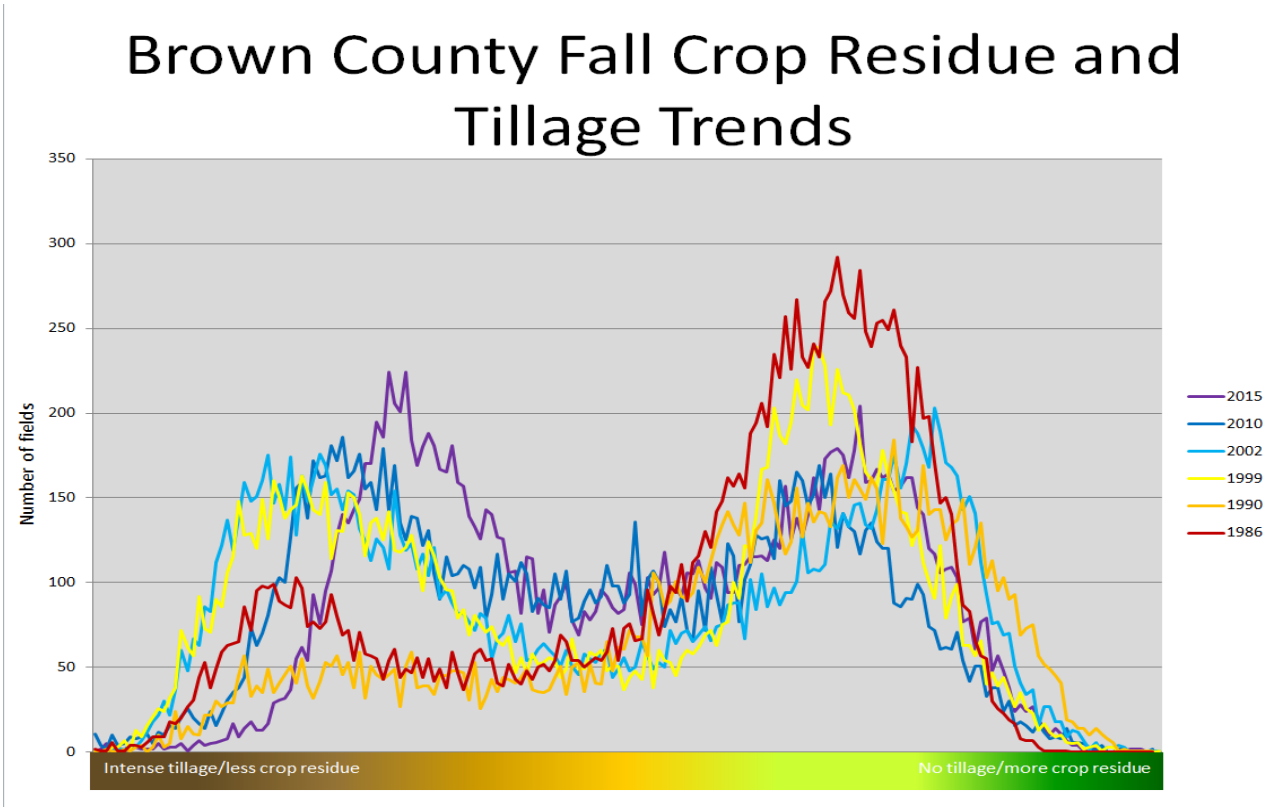
Brown County Cropping trends



Source: National Agricultural Statistics Service

*NASS data for Brown County hay acres was not available for 2009-2014. County values were calculated based on historic percent of state total.

We have also been looking at tillage and cropland trends through the use of the Normalized Difference Tillage Index (NDTI). NDTI uses satellite data to remote sense the amount of bare soil and tillage intensity. Different field conditions (i.e. tilled soil, vegetated soil, etc.) reflect light differently, this difference can be used to quantify fields of similar condition at the time of the satellite image. From the past 30 years we were able to find six years of useable Landsat data to identify fall field conditions from the post-harvest to pre-snow cover period. This data shows a trend toward lower residue and more tilled cropland going into winter; this is consistent with the NASS cropping data showing a trend toward more annual forages (corn silage) and less perennial cover crops (alfalfa). The histogram below shows the trends in fall field conditions in the fall of 1986, 1990, 1999, 2002, 2010, and 2015. The x-axis is the spectrum of field conditions from intensely tilled and little/no surface residue on the left to no tillage and substantial plant residue cover on the right. The y-axis is the number of fields at any field condition.



The NDTI from 1986 and 1990 show a similar trend of many more fields toward the right of the x-axis. The more recent years show while fall tillage is becoming less intensive, the amount of fields tilled with low residue cover is increasing while the amount of fields with high residue cover is decreasing. This trend is likely leading to more soil erosion and sediment delivery to surface waters.

NDTI analysis will continue in the future as a tool to measure the impact of LWCD and Demonstration Farms efforts. It will also be used to prioritize efforts to areas where residue is especially low.

Natural Resources

Surface Water

Except for portions of southern and eastern portions of the County, the majority of water in Brown County, including major rivers such as the Fox River, East River, Duck Creek, and the Suamico River, flows into the Bay of Green Bay. The Fox River flows in a northeasterly direction through the approximate middle of Brown County.

Due to past point-source pollution, the Lower Green Bay and Fox River is a designated Area of Concern (AOC) under the United States – Canada Great Lakes Water Quality Agreement (Annex 2 of the 1987 Protocol). According to the U.S. Environmental Protection Agency, an AOC is a geographic area within the Great Lakes, *"…that fails to meet the general or specific objectives of the agreement where such failure has caused or is likely to cause impairment of beneficial use of the area's ability to support aquatic life.*" The AOC boundary is the water bodies of the Fox River from De Pere dam to the Bay, and Lower/Inner Green Bay. The Lower Fox River basin is 640 square mile watershed of Fox River from Lake Winnebago outlet to Bay. The causes of impairment of the Fox River and Lower Green Bay have historically been thought of the result of point sources of pollution (end of pipe), such as industrial discharges and sewage treatment plants. Paper companies using polychlorinated biphenyls (PCBs) to make carbonless copy paper discharged nearly 700,000 pounds of these chemicals into the Fox River, between about 1954 and 1971. The dangers posed by PCBs were unknown until the early ´70s, but their use and discharge into the environment were outlawed by federal environmental regulations in 1976. The ban was successful, but because PCBs bind to dirt and break down very slowly, they are still found today in the sediment of the Lower Fox River and Green Bay.

A Natural Resource Damage Assessment (NRDA) of the Fox River and Green Bay identified companies that were historically responsible for the release of PCBs into the Fox River. Several of these companies have made agreements, through the NRDA process, to fund natural resource restoration projects in the Fox River Valley and surrounding areas. The Fox River NRDA and PCB cleanup are $106M and $1B efforts that include projects that preserve/improve habitat for wildlife, construction of environmental education centers and nature trails, and studying the feasibility of reintroducing wild rice in certain areas of the state. Although additional progress remains to be made on point sources, nonpoint source pollution is now (post Clean Water Act) recognized as the major contributor to poor water quality in the Fox River and Lower Green Bay.

In addition to being designated as an AOC, the Lower Fox River (defined as the river stretch

between the Lake Winnebago outlet through the Lower Bay of Green Bay) is listed on the state's list of impaired waters under the Clean Water Act because of excessive total phosphorus (TP) and total suspended solids (TSS) loadings, primarily from nonpoint sources. Excessive TP and TSS loadings cause low dissolved oxygen levels, degraded habitat, and poor water quality. According to the U.S. Environmental Protection Agency, nonpoint source pollutants may include:

- Excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas;
- Oil, grease, and toxic chemicals from urban runoff (streets, parking lots, roofs) and energy production;
- Sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks;
- Bacteria and nutrients from livestock, pet wastes, and faulty septic systems.

The Lower Green Bay Remedial Action Plan (RAP), first developed in 1987, includes the Fox River below the De Pere Dam and the lower bay south of a line between Long Tail Point and Point au Sable. The RAP identified a total of 11 use impairments and two suspected use impairments, and identifies opportunities to mitigate some of these issues. For example, the restoration of the Cat Island Chain of Islands in the lower Bay to hold clean dredge materials and create an expanse of aquatic and wildlife habitat was a concept first discussed in the RAP. Reversing the hypereutrophic (high levels of nutrients resulting in large algae blooms) conditions in the river and bay is a top priority for the AOC and the RAP set the stage for the development of a Total Maximum Daily Load (TMDL) report for the Lower Fox River.

On May 18, 2012, the U.S. Environmental Protection Agency approved the TMDL report for the Lower Fox River. A TMDL is required under the Clean Water Act for all 303(d) impaired waters. According to the TMDL, 63.0 percent of the total phosphorus and 97.6 percent of the total suspended solids within the Lower Fox River Basin are from nonpoint sources, such as residential yards, streets, parking lots, farm fields, and barnyards. Proper management of Brown County's shoreland zones and environmentally sensitive areas will be a critical component of reducing total phosphorus and total suspended solids to attain the goals identified in the TMDL.

Lower Fox River TMDL restoration goals include:

- *Reduce excess algal growth*. Aesthetic reasons aside, reducing blue-green algae will reduce the risks associated with algal toxins to recreational users of the river and bay. In addition, a decrease in algal cover will also increase light penetration into deeper waters of the bay.

- *Increase water clarity in Lower Green Bay*. Achieving an average Secchi depth measurement of at least 1.14 meters will allow photosynthesis to occur at deeper levels in the bay, as well as improve conditions for recreational activities such as swimming.
- *Increase growth of beneficial submerged aquatic vegetation in Lower Green Bay*. This will help reduce the re-suspension of sediment particles from the bottom of the bay up into the water column, which will increase water clarity.
- *Increase dissolved oxygen levels.* This will better support aquatic life in the tributary streams and main stem of the Lower Fox River.
- *Restore degraded habitat.* This will better support aquatic life.

During the early spring snowmelt period or immediately following spring and summer rain storms, the effect of nonpoint sources of pollution becomes very apparent in the Fox River. The water turns dark brown, loaded with suspended solids which carry excess nutrients and other pollutants from a multitude of nonpoint sources. The solids are carried into the lower bay and as the water flow slows, the solids drop out of the water column and are deposited in the lower Bay. The photo documenting a Fox River sediment plume was taken in April 2011 and is included in the Brown County Land and Water Conservation Department 2011 Annual Report and 2012 Work Plan.

In addition to the excess total phosphorus and total suspended solids entering the bay from the Fox River, the tributaries to the Fox River and those that drain directly into the Bay of Green Bay also contributes significant nonpoint source pollution loads. Specifically, additional 303(d) listed rivers and streams within Brown County and their subject pollutants include Apple Creek (TP and TSS), Ashwaubenon Creek (TP and TSS), Baird Creek (TP and TSS), Bower Creek (TP and TSS), Branch River (Polychlorinated biphenyls (PCBs)), Duck Creek (TP, TSS, and Mercury), Dutchman Creek (TP and Ammonia), East River (TP, TSS, and Unspecified Metals), Kewaunee River (PCBs), Neshota River (TP), and Plum Creek (TP and TSS). See Appendix A for a complete list of the impaired waters in Brown County. 9-Key Element plans for the Plum-Kankapot Watersheds, along with the Upper East Watershed, have been approved by EPA and WDNR in Brown County. The Apple Creek 9-Key Element Plan development has also begun with Outagamie County taking the lead role in that process. The Plum-Kankapot, which is the highest phosphorous and sediment loading watershed per cropland acre in the Lower fox is currently in the implementation stage (as per

TMDL subwatershed Schedule see page 56). Brown County, along with Fox-wolf Watershed Alliance, has been actively applying for funding to move the Upper East subwatershed into the implementation phase without any success to date.

In spite of continued pollution-related challenges, a significant part of Brown County's identity is defined by the Fox River and Bay of Green Bay. Improving the quality of the water of these features through proper urban and agricultural management along the innumerable tributaries will ensure the surface water quality of the bay and river does not degrade, but rather, continues to improve. The health of the Fox River, Bay of Green Bay, and other rivers, creeks, and streams tributary to them have a profound impact on the regional economy.

Although much work remains to be done in the area of nonpoint source pollution, since the advent of the Clean Water Act, the waters of the Fox River and lower bay have improved to the point where it is now recognized as a world-class walleye fishery, hosting anglers from throughout the United States during the spring spawning run. The Bay of Green Bay is now a well-known location for trophy-sized northern pike, muskellunge, and smallmouth bass. According to the American Sportfishing Association, sport fishing provides $2.27 billion in economic impact per year in the State of Wisconsin. By continuing to improve the water quality of the Fox River and Bay of Green Bay, Brown County can continue to capture its share of this economic resource.

Other Surface Water Features

Other significant surface water resources in Brown County include its three named natural lakes: Lily, Middle, and Third Lakes located adjacent to one another in the eastern portion of the County. Also included are the numerous smaller rivers and streams, the biggest of which include Duck Creek, the East River, and the Suamico River.

Lily Lake

Lily Lake is a 43 acre seepage lake that is up to 21 feet in depth at its deepest point. The entire shoreline is buffered by woodlands and wetlands and contains a county park at its northern end.

Due to the generally shallow nature of the lake, periodic winterkills of fish have occurred during severe winters with extended cold snaps and heavy snow, most recently during the winter of 2013-2014. Brown County utilizes an aerator to maintain dissolved oxygen levels during the winter months. However, an aerator can only maintain dissolved oxygen levels in relatively close proximity to the aerator, and during especially severe winters may not be adequate to prevent winterkill in other parts of the lake. According to the Wisconsin Lakes Book, the lake

contains northern pike, largemouth bass, and panfish. The lake is popular for day fishing trips either from the fishing docks or from a non-motorized (except electric trolling motor) watercraft. The lake is also popular with kayakers, canoeists, and bird watchers.

From 2006 through 2009, the Brown County Planning Commission, with funding provided from the Wisconsin Department of Natural Resources, prepared a series of reports about Lily Lake. The reports started from a watershed perspective, with the final report focusing exclusively on Lily Lake and its water, vegetative, and fishery characteristics. The series of reports found that Lily Lake is becoming more eutrophic in nature due to increasing aquatic vegetation and increasing dissolved phosphorus levels.

Middle Lake

Middle Lake is a seven acre seepage lake located immediately south of Lily Lake, separated by approximately 450 feet of wooded wetlands. The northern shoreline is within the boundaries of Lily Lake County Park, while the southern shoreline is parceled into two separate residential lots. The entire shoreline of Middle Lake, including the privately-held lands, is heavily wooded due to the wetlands that surround it. Since wetlands surround Middle Lake, there is currently no improved public access to the lake. The maximum depth of Middle Lake is seven feet.

Third Lake

Third Lake is a six acre seepage lake and is the southernmost lake in the Lily Lake system, lying approximately 1,200 feet to the southwest of Middle Lake. All of the shoreline of Third Lake is in private ownership, however, as with Middle Lake, Third Lake is surrounded by a heavily wooded wetland, providing a buffer to impacts from neighboring residential and agricultural activities. Third Lake has an intermittent tributary that drains the lake from its southern end, eventually reaching the Neshota River. The maximum depth of Third Lake is 15 feet.

Duck Creek

Duck Creek is a tributary to the Bay of Green Bay and is located in the Villages of Hobart and Howard in the western portion of the County. From its headwaters in Outagamie County, it flows northeasterly until it flows into the bay in the Village of Howard. It is a slow-moving stream and is classified as a Warm Water Sport Fishery. Agricultural and limited rural development are located along the majority of this stream; although, significant amounts of urban development outside its floodway and wetlands are present in the Village of Howard and the extreme northeastern portion of the Village of Hobart. Key threats to the health of this waterway are sedimentation due to erosion from construction sites and farm fields and excessive nutrients caused by nonpoint source pollution due to storm runoff from lawns, roadways, farms including croplands, and other sources.

East River

The East River is a major tributary of the Fox River. It is a navigable river that flows northward 39 miles from its headwaters in northern Calumet County to one mile upstream of the Bay of

Green Bay/Fox River mouth, and it is east of and generally parallel to the Fox River. In Brown County, it extends about 33 miles from the Brown County/Calumet County border east of STH 32/57 to its downstream end at the Fox River one mile south of the Bay of Green Bay and drains about 148 square miles of the County. It is a sluggish, hard water, and very turbid stream. The northernmost third of the river is classified as a Warm Water Sport Fishery. While urban development is adjacent to approximately the northern third of the stream, agricultural lands are adjacent to the remainder of the stream. Many of its banks have been pastured and are badly eroded. Sediments have blanketed the streambed (filling in pools and riffles), thereby degrading habitat for fish species and associated fauna. The East River continues to be exposed to many adverse environmental impacts, including sedimentation, excessive nutrient inputs, low levels of dissolved oxygen for a Warm Water Sport Fishery, loss of in-stream habitat, excessive suspended solids leading to turbidity, and fish kills due to nonpoint source pollution, cropland erosion, and barnyard runoff. For these reasons, the East River has also been identified as an Impaired Water.

In 1987, the East River was designated as a priority watershed under the Wisconsin Nonpoint Source Water Pollution Abatement Program. Subsequently in March 1993, a report titled "Nonpoint Source Control Plan for the East River Priority Watershed Project" was prepared by a consortium of state, county, and local agencies. The intent of the plan is to guide the implementation of nonpoint source control measures within the East River watershed and to provide the basis for the WDNR to enter into cost-share and local assistance grants to implement water quality improvement measures. The plan's implementation recommendations, including education, installation of vegetative buffer strips, and other techniques, should continue to be implemented throughout the East River Watershed to continue the East River's improvement in overall water quality.

Suamico River

The Suamico River is a major river in northwestern Brown County and drains to the bay. It is a navigable river that flows eastward 16 miles from its headwaters in Shawano and Outagamie Counties to the bay in the Village of Suamico. In Brown County, it is a sluggish, hard water, and very turbid stream. The easternmost portion of the river is classified as a Warm Water Sport Fishery with bottom materials comprised of sand and silt. The remainder is classified as a Full Fish and Other Aquatic Life Water with bottom materials comprised of cobble and gravel. Agricultural and rural residential land uses are adjacent to the majority of the stream. The Suamico River continues to be impacted by nonpoint source pollutants including fine sediments carried by stormwater and excess phosphorus.

Branch River

The Branch River begins in southeastern Brown County and continues to flow to the southeast, eventually joining the Manitowoc River, where it flows into Lake Michigan in Manitowoc. The Branch River is sluggish, hard water, turbid stream. Bottom materials largely consist of silt, sand, and gravel. The river flows through primarily agricultural areas of southeastern Brown County and northwestern Manitowoc County, and therefore, is occasionally negatively affected by nonpoint source agricultural runoff.

Neshota River

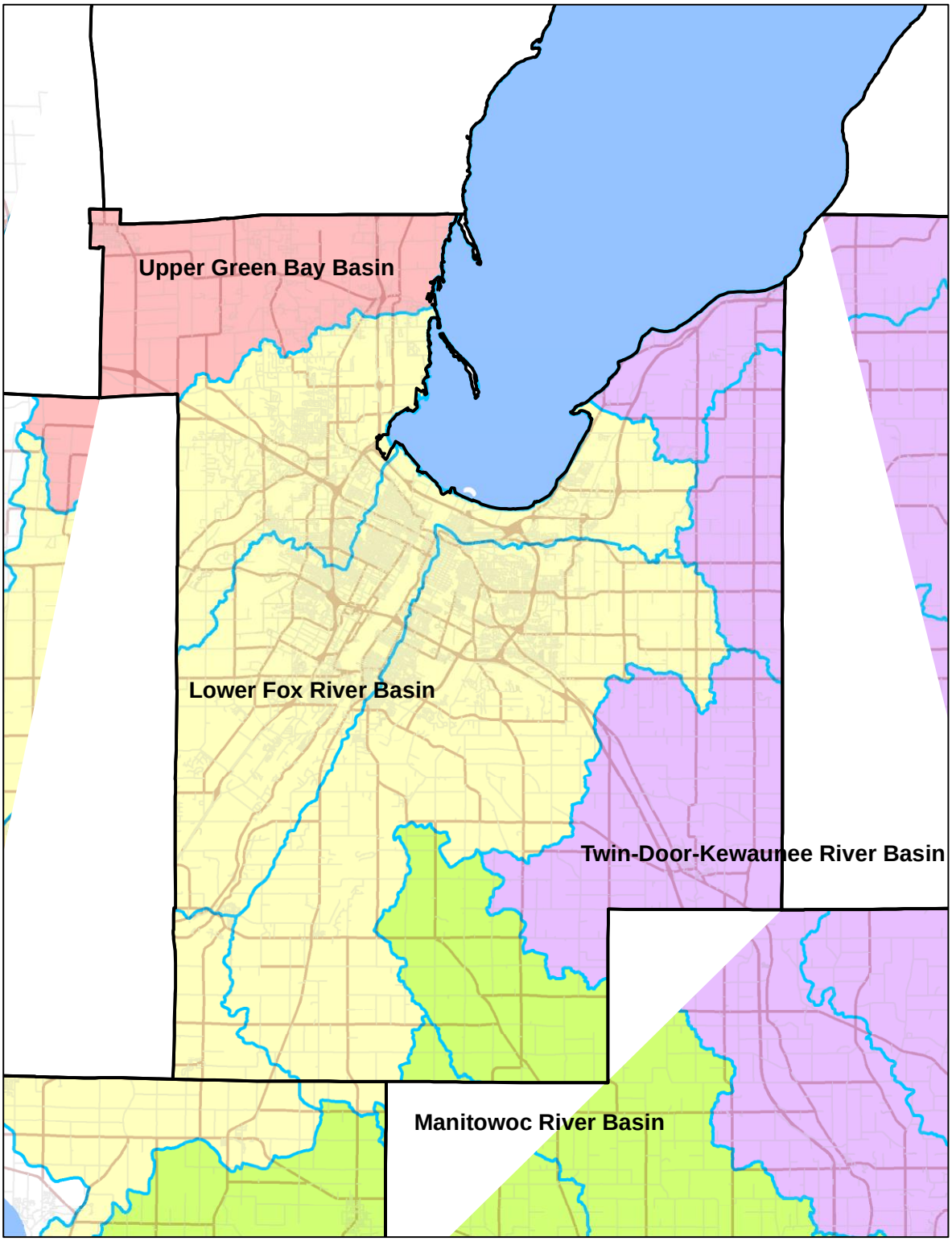
The Neshota River begins at its headwaters in the Town of Ledgeview in central Brown County and flows to the southeast, to the West Twin River and Lake Michigan in Two Rivers. The Neshota River is a sluggish, hard water, turbid stream. Bottom materials consist of silt, cobble, and gravel. Although its shoreline is largely wooded, its small tributaries, and therefore, the Neshota River are negatively affected by fine sediments carried by stormwater and other nonpoint source pollutants.

Watershed Basins

Brown County is located within the Great Lakes-St. Lawrence drainage basin. Approximately one-fourth of the County is drained by streams tributary to Lake Michigan, and the remainder of the area is drained by streams tributary to the Bay of Green Bay and through the bay to Lake Michigan. A watershed is an area of land where all of the water on it and under it drains to the same place. Within this area of land, all living things are linked by the common waterway. (See HUC-10 watershed map below.) The Lower Fox River Basin has pollution load reduction targets identified in the TMDL. The goals of other Brown County watershed are to meet State Water Quality Standards for sediment and phosphorus.

As other TMDL initiatives are developed, such as the Manitowoc River Basin, these reductions goals can be applied to other watersheds.

HUC-10 Watershed Map



Lower Fox River Basin

About 311 square miles of the County, or about 58 percent, are located within the Lower Fox River Basin. Portions of the Apple and Ashwaubenon Creeks Watershed, the Duck Creek Watershed, the East River Watershed, and the Plum Creek Watershed are located within this area. These lands generally drain northeastward to the Bay of Green Bay.

The East River Watershed encompasses about 206 square miles, or about 38 percent of the County from an area of land extending inland from the Fox River and lower Bay of Green Bay, stretching from the town of Red Banks to the village of Wrightstown. Approximately 90 percent of the watershed is in Brown County and the remaining in Calumet and Manitowoc Counties. The watershed contains many small streams and several large rivers draining directly to the Fox River. Principal streams in the watershed are the Fox River, Baird Creek, Bower Creek and the East River. Rural land uses are predominant in the watershed (152-square miles, 73 percent). Agricultural uses and related open space account for 80 percent of the rural areas. Woodlands and wetlands together cover about 15 percent of the watershed (WDNR 1991). Urban land uses (including developing areas) occupy about 57-square miles, or 27 percent of the watershed. The predominant urban uses are residential (35 percent), and parks and open undeveloped space (48 percent).

The Apple and Ashwaubenon Creeks Watershed encompass about 47 square miles, or about 9 percent of the County. Major streams within this area include Apple, Ashwaubenon, and Dutchman Creeks.

The Plum Creek Watershed encompasses about 13 square miles, or about 2 percent of the County. Major streams within this area include Plum Creek.

The Duck Creek Watershed encompasses about 48 square miles, or about 9 percent of the County. Major streams within this area include Duck and Trout Creeks.

Twin-Door-Kewaunee River Basin

About 115 square miles of the County, or about 21 percent, are located within the Twin-Door-Kewaunee River Basin. Portions of the Kewaunee River Watershed, the Red River and Sturgeon Bay Watershed, and the West Twin River Watershed are located within this area. The lands within the Kewaunee River Watershed and the West Twin River Watershed generally drain southeastward to Lake Michigan, while the lands within the Red River and Sturgeon Bay Watershed generally drain northwestward to the Bay of Green Bay.

The West Twin River watershed is located in north central Manitowoc and southeastern Brown Counties, with a small portion extending into southwestern Kewaunee County. The West Twin

River begins at the confluence of the Neshota River and Devils River and has a combined watershed area of 176 square miles. The West Twin River Watershed encompasses about 75 square miles, or about 14 percent of the County. There are 29 named streams and rivers in the watershed and five lakes that are 10 acres or larger, as well as, a number of high quality spring pond wetlands. Major streams within this area include the Devils and Neshota Rivers and King and Twin Hill Creeks.

The Kewaunee River Watershed is located in Kewaunee County and the eastern edge of Brown County and is 91,009 acres in size. It contains 295 miles of streams and rivers and 7,313 acres of wetlands. In Brown County the watershed encompasses about 27 square miles, or about 5 percent of the planning area. The watershed is dominated by agriculture (75%) and is ranked high for nonpoint source issues affecting streams and groundwater. Upper reaches of the watershed have forage fisheries because of low flows and warm water temperatures. Most of the remainder of the watershed supports warm water sport fisheries, although several tributaries and one section of the Kewaunee River are designated as trout fisheries. All perennial streams within the watershed experience seasonal anadromous migrations of trout and salmon from Lake Michigan.

The Red River and Sturgeon Bay Watershed is located primarily in Door County, but also covers the northwestern corner of Kewaunee County and the northeastern corner of Brown County. The watershed is 89,060 acres in size and contains 149 miles of streams and rivers, 20,800 acres of lakes and 16,378 acres of wetlands. The watershed is dominated by agriculture (57%), wetlands (18%) and forest (14%), and is ranked medium for nonpoint source issues affecting streams and high for nonpoint source issues affecting groundwater. In Brown County the watershed encompasses about 13 square miles, or about 2 percent of the planning area. Major streams within this area include Gilson Creek.

Upper Green Bay Basin

About 69 square miles of the County, or about 13 percent, are located within the Upper Green Bay Basin. A portion of the Suamico and Little Suamico Rivers Watershed is located within this area. The Suamico and Little Suamico Rivers arise in eastern Shawano County and flow easterly to Green Bay, draining 139 square miles. Streams in this watershed are generally small and shallow and are not conducive to the development of a sport fishery. The depth to groundwater is often shallow and large swampy areas are common. Near Green Bay, and inland for several miles, wetlands are especially prominent and are valuable spawning habitat for Green Bay sport fish species. Primary land use in the watershed is agricultural, with dairy farming most prevalent. Population in the watershed likely will expand as the city of Green Bay grows outward with residential areas spreading to rural regions as subdivisions and housing projects are built. Shallow depths to groundwater and tight soil conditions make areas in the watershed unfavorable for surface application of manure.

Manitowoc River Basin

About 42 square miles of the County, or about 8 percent, are located within the Manitowoc River Basin. Portions of the Branch River Watershed and the Lower Manitowoc River Watershed are located within this area. These lands generally drain southeastward to the Manitowoc River just west of the City of Manitowoc.

The Branch River Watershed is located in the northwest corner of Manitowoc County and the southern part of Brown County. The watershed is 69,443 acres in size and includes 186 miles of streams and rivers, 166 acres of lakes and 8943 acres of wetlands. The watershed is dominated by agriculture (78%) and wetlands (13%) and is ranked high for nonpoint source issues affecting streams and groundwater. The Branch River Watershed encompasses about 40 square miles, or about 7 percent of the County. Major streams within this area include the Branch River.

The Lower Manitowoc River Watershed encompasses about 2 square miles, or about 1 percent of the County. More than 90 percent of the watershed is within Manitowoc County; the remaining portions lie within Brown and Calumet counties. Land use is primarily agricultural, approximately 67 percent, and about 5 percent is in urban use. Major streams within this area include Mud Creek.

Surface Water Quality

Nonpoint water pollution issues that have been identified as concerns in the county are:

- Cropland soil erosion
- Animal waste management
- Streambank erosion
- Improper well abandonment
- Pesticide and fertilizer runoff
- Stormwater runoff
- Construction site erosion control

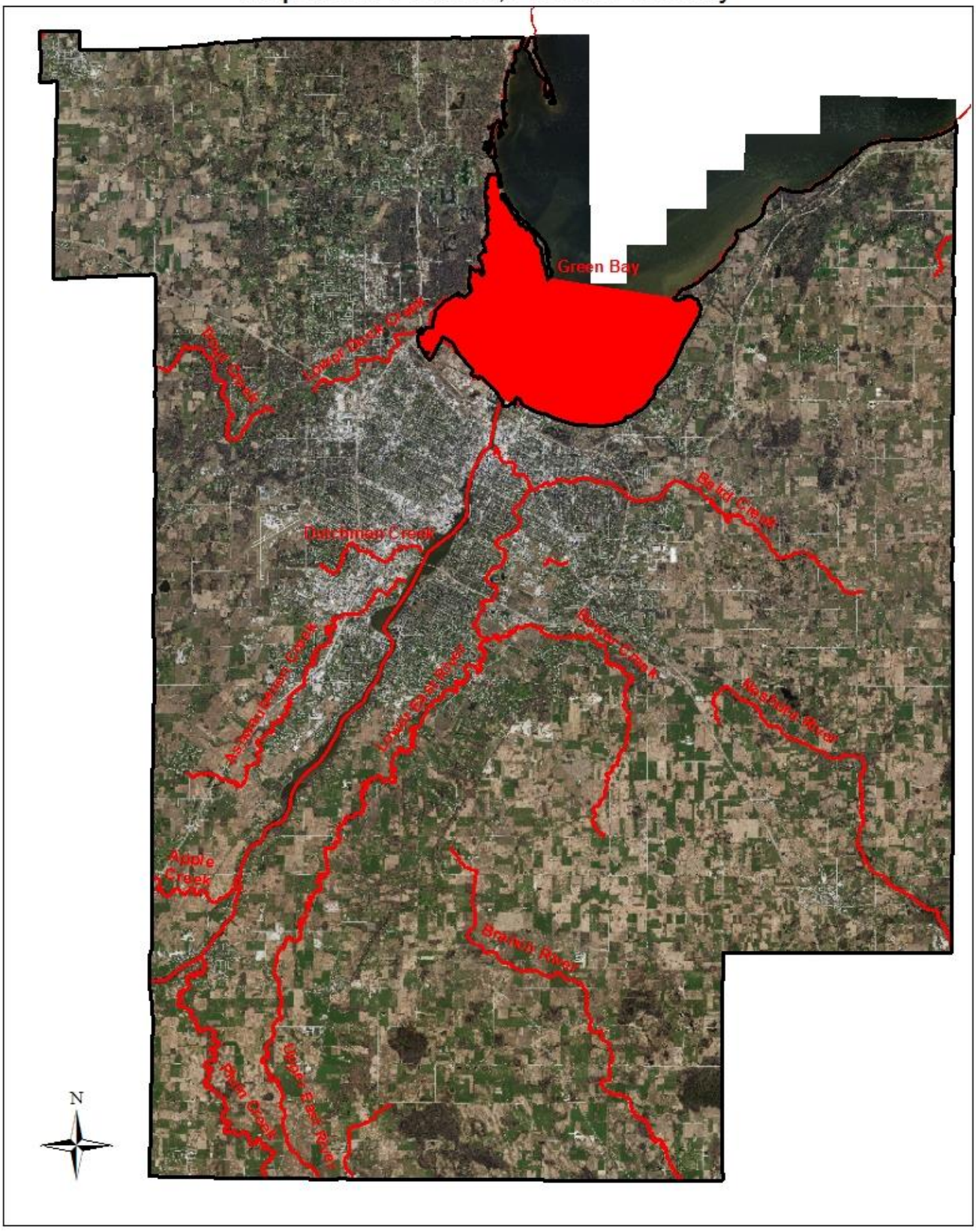
Impaired Waters (EPA 303d List)

Under requirements of the Environmental Protection Agency, a listing of waters under the Clean Water Act (s. 303d) must occur every two years. This list, which identifies water not meeting water quality standards, has been characterized as an impaired waters list. Brown County waters on the 303d impaired waters may be listed as a result of airborne or waterborne contamination. The 2014 EPA approved 303d list for Brown County is shown below. A full list of water resources in Brown County can be found in Appendix A. (Ongoing water quality monitoring stations and data results within the Lower Fox River Basin can be found in the approved 9-Key Element Plans for both the Plum-Kankapot and Upper East River.)

County	Waterbody Name	Water Type	Total miles/acres	Date Listed	Source Category	Pollutant	Impairment Indicator	TMDL Priority
Brown	Apple Creek	River	3.99 miles	4/1/1998	NPS	Sediment/TSS/TP	Elevated water temperature, degraded habitat, low DO	Approved TMDL 2012 (4A)
Brown, Outagamie	Apple Creek	River	19.89 miles	4/1/1998	NPS	Sediment/TSS/TP	Elevated water temperature, degraded habitat, low DO	Approved TMDL 2012 (4A)
Brown	Ashwaubenon Creek	River	15 miles	4/1/2008	PS/NPS	Sediment/TSS/TP	Degraded habitat, low DO	Approved TMDL 2012 (4A)
Brown	Baird Creek	River	3.5 miles	4/1/2006	NPS	Sediment/TSS/TP	Degraded habitat, low DO	Approved TMDL 2012 (4A)
Brown	Baird Creek	River	9.6 miles	4/1/2008	PS/NPS	Sediment/TSS/TP	Degraded habitat, low DO	Approved TMDL 2012 (4A)
Brown	Bower Creek	River	3 miles	4/1/2008	NPS	Sediment/TSS/TP	Degraded habitat, low DO	Approved TMDL 2012 (4A)
Brown	Bower Creek	River	10 miles	4/1/2008	NPS	Sediment/TSS/TP	Degraded habitat, low DO	Approved TMDL 2012 (4A)
Brown	Duck Creek	River	4.96 miles	4/1/1998	NPS	Sediment/TSS	Degraded habitat	Approved TMDL 2012 (4A)
Brown	Duck Creek	River	4.96 miles	4/1/2002	Atmospheric deposition	Mercury	Contaminated fish tissue	Medium – Mercury atmospheric deposition (5B)
Brown	Duck Creek	River	4.96 miles	4/1/2008	NPS	TP	Low DO	Approved TMDL 2012 (4A)
Brown	Dutchman Creek	River	4.04 miles	4/1/1998	NPS	TP	Low DO	Approved TMDL 2012 (4A)
Brown	Dutchman Creek	River	4.04 miles	4/1/1998	NPS	Ammonia (unionized) – toxic	Chronic aquatic toxicity	Low – TMDL needed (5A)
Brown	East River	River	14.15 miles	4/1/1998	NPS	Sediment/TSS/TP	Degraded habitat, low DO	Approved TMDL 2012 (4A)
Brown	East River	River	14.15 miles	4/1/1998	NPS	Unspecified metals	Chronic aquatic toxicity	Low – TMDL needed (5A)
Brown	Trib to the East River	River	.73 miles	4/1/1998	Contaminated	PCBs	Chronic aquatic toxicity	Low – TMDL needed (5A)

						sediments		
Brown, Calumet	East River	River	28.1 miles	4/1/2002	NPS	Sediment/TSS/TP	Degraded habitat, low DO	Approved TMDL 2012 (4A)
Brown	Green Bay (inner bay, AOC)	Bay/harbor	13,867.36 acres	4/1/1998	PS/NPS	Sediment/TSS/TP	Degraded habitat, low DO	Low – Approved TMDL 2012 (4A)
Brown	Green Bay (inner bay, AOC)	Bay/harbor	13,867.36 acres	4/1/1998	Contaminated sediment	PCBs	Contaminated fish tissue, contaminated sediment	Low – TMDL needed (5A)
Brown	Lower Fox River (mouth to De Pere dam)	River	7.39 miles	4/1/1998	PS/NPS	TP	Low DO	Approved TMDL 2012 (4A)
Brown	Lower Fox River (mouth to De Pere dam)	River	7.39 miles	4/1/1998	Contaminated sediment	PCBs	Contaminated fish tissue, contaminated sediment	TMDL needed (5A)
Brown	Lower Fox River (mouth to De Pere dam)	River	7.39 miles	4/1/2008	PS/NPS	Sediment/TSS	Degraded habitat	Approved TMDL 2012 (4A)
Brown, Outagamie	Lower Fox River (De Pere dam to middle Appleton dam)	River	24.79 miles	4/1/1998	PS/NPS	TP	Low DO	Approved TMDL 2012 (4A)
Brown	Plum Creek	River	13.86 miles	4/1/1998	PS/NPS	Sediment/TSS	Elevated water temperature, degraded habitat	Approved TMDL 2012 (4A)
Brown, Calumet	Plum Creek	River	2.55 miles	4/1/1998	PS/NPS	Sediment/TSS	Elevated water temperature, degraded habitat	Approved TMDL 2012 (4A)
Brown	Plum Creek	River	13.86 miles	4/1/2008	PS/NPS	TP	Degraded biological community, degraded habitat	Approved TMDL 2012 (4A)

Impaired Waters, Brown County



Groundwater

Groundwater begins as precipitation. This precipitation (rain or snow) falls upon the land, and some runs off into lakes, rivers, streams, or wetlands. Some evaporates back into the atmosphere, and plants take some up. Groundwater is that precipitation that soaks into the ground past plant roots and down into the subsurface soil and rock. A layer of soil or rock that is capable of storing groundwater and yielding it to wells is called an aquifer. There can be a number of aquifers within an area, one above another. The top of the aquifer closest to the ground's surface is called the water table. It is the area below which all the openings between soil and rock particles are saturated with water.

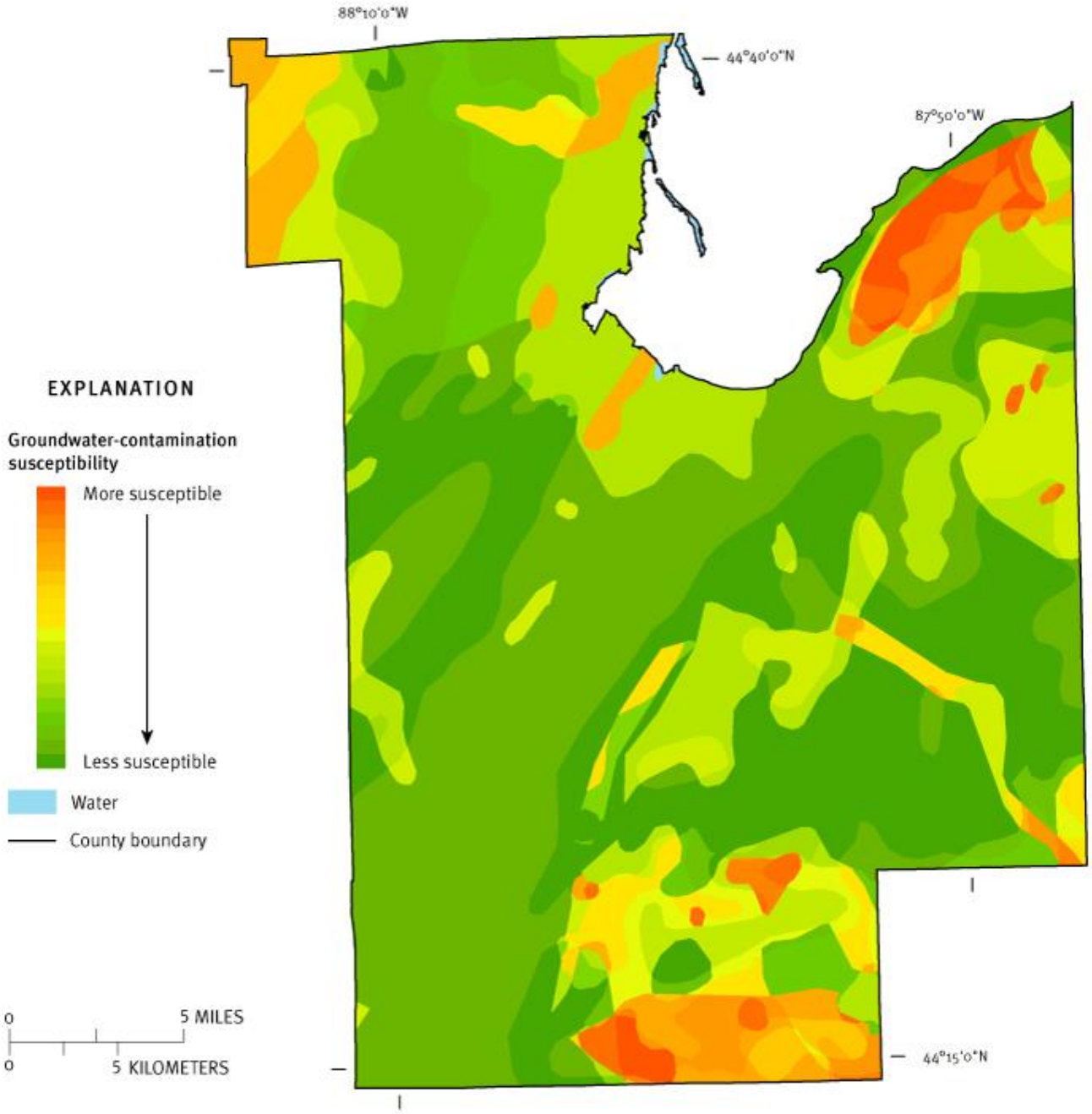
Like surface water, groundwater moves from high areas to low areas. It discharges at those places where the water table intersects the land's surface, such as in lakes, streams, and wetlands. Groundwater provides base flows for many of Brown County's rivers and streams, and therefore, provides water necessary for aquatic plants, fish, crustaceans, and amphibians to survive during dry spells or droughts.

In addition to providing base flows for lakes, rivers, streams, and wetlands, groundwater serves as the sole source of drinking water for approximately 43,000 primarily rural Brown County residents. The other approximately 205,000 primarily metropolitan area residents receive their drinking water from Lake Michigan.

Historically, groundwater levels have decreased as demand for drinking water increased, resulting in a "cone of depression" under first Green Bay and then under the metropolitan area. The cone size decreased dramatically following Green Bay's switch from groundwater to Lake Michigan water as its drinking water source, however, as the suburban municipalities grew in population, the groundwater levels again dropped. With most suburban municipalities now utilizing Lake Michigan water either through the Green Bay Water Utility or Central Brown County Water Authority, groundwater levels are again rebounding back to their historic levels.

With rebounding groundwater levels, quantity of groundwater is not necessarily as large a concern as it may have been 10 years ago. However, threats to groundwater remain, including naturally occurring problems with radium and arsenic. A major concern in areas of Brown County on top of the escarpment with karst (fractures in shallow bedrock) features, such as parts of the Towns of Glenmore, Morrison, Rockland, Wrightstown, Scott, and Green Bay, is bacteriological contamination from nutrient (manure) spreading and/or malfunctioning privately owned waste treatment systems (POWTS). The karst features create direct conduits for bacteria from these sources to reach the groundwater and enter homeowners' wells. In addition to fractured bedrock, improperly sealed and abandoned wells also provide conduits to the County's groundwater resource. Deep wells with proper casings and when wells are abandoned, properly sealing them, are the primary means to prevent creating or drinking contaminated groundwater.

Brown County – Groundwater-Contamination Susceptibility Analysis



This groundwater-contamination susceptibility map is a composite of five resource characteristic maps, each of which was derived from generalized statewide information at small scales, and cannot be used for any site-specific purposes.

Map source: Schmidt, R.R., 1987, Groundwater contamination susceptibility map and evaluation: Wisconsin Department of Natural Resources, Wisconsin's Groundwater Management Plan Report 5, PUBL-WR-177-87, 27 p.

Figure created for the "Protecting Wisconsin's Groundwater Through Comprehensive Planning" web site, 2007, *http://wi.water.usgs.gov/gwcomp/*

Wildlife Habitat

Wildlife habitat, as well as the other natural resources mentioned in this chapter, is part of Brown County's biodiversity. Biodiversity (or biological diversity) is the full spectrum and inter-relationships of all plants and animals (including humans), their composition and distribution, and the landscapes and functions they assume. Biodiversity provides a way of thinking that takes into account the landscape, species, communities, and systems that comprise the environment and allows us to take an integrated approach to the management of our natural surroundings. This approach is critical because humans depend on nature and a healthy environment, and human actions have a profound impact upon the natural environment. Thus, it is a continuing challenge to balance the needs of a growing human population with maintaining a diverse, productive, and resilient natural environment.

Since much of the County is either developed or actively farmed, existing wildlife habitat is generally found along or near the County's rivers, streams, and wetlands, creating linear environmental corridors for wildlife habitat and passage. Although the corridors are generally associated with rivers, streams, and wetlands, there may also be adjacent areas of upland wildlife habitat consisting of mature hardwoods or prairie. The wildlife habitat corridors with a mixture of habitats create the greatest opportunities for diverse flora and fauna.

In addition to water feature based linear corridors, fencerows along the boundaries of agricultural fields provides critical habitat for pheasant, whitetail deer, small mammals, raptors, and songbirds. As agricultural practices increase in scale, many smaller farm fields are being combined into much larger fields to accommodate the increased size of agricultural equipment and efficiencies associated with modern agricultural practices, which is reducing the amount of fencerow habitat.

As previously noted, waterway corridors, wetlands, contiguous upland areas, and fencerows provide critical wildlife habitat in the rural parts of Brown County. Projects that bring in multiple partners, such as the northern pike habitat restoration effort, should be encouraged by Brown County as a small, but vital step in improving wildlife habitat. As local communities update their local comprehensive plans, there should be continued recognition of the importance of wildlife habitat to the rural character of these communities as well as to the biodiversity of the County as a whole.

Invasive Species

One of the major issues inhibiting the creation of healthy wildlife habitat in Brown County is the presence of exotic invasive flora and fauna. Plant species such as phragmites austrailis and purple loosestrife overwhelm and simplify wetlands, thereby severely limiting the use of the wetland for diverse species of plants, animals, birds, invertebrates, fish, and reptiles. Other non-native plant species, such as garlic mustard take over wooded uplands, reduce native herbaceous plants and correspondingly negatively impact native insects and the birds/wildlife that feeds on the insects. Wild parsnip is a non-native plant that can cause painful burns when its juices touch a person's skin and the skin is exposed to sunlight. Brown County should continue to encourage the removal of existing invasive plant species and the planting of native species to avoid the introduction of new invasive species.

The waters of Green Bay, and by extension, the Fox River have already experienced the impacts of invasive aquatic species such as the sea lamprey, zebra and quagga mussels, round goby, spiny water flea, viral hemorrhagic septicemia (VHS), and common carp. A new threat on the horizon is the potential for Asian carp species to migrate into the Great Lakes from the Mississippi River basin via the Chicago Sanitary and Ship Canal or other inadvertent introduction. Experience from the Mississippi River demonstrates that Asian carp species have a devastating effect on boating and fishing due to their ability to jump out of the water when disturbed by boat propellers. Furthermore, their voracious feeding habits tend to overwhelm the ecosystem and severely negatively impact native fish species. Considering how integral fishing and tourism is to Brown County, the County should actively to educate its citizens on the negative impacts such invasive aquatic species can have on the environment and the economy and the importance of keeping them out of our waterways.

Threatened and Endangered Species

Federal and state laws protect endangered and threatened species. Activities that impact state- or federally-listed animals on public or private lands and plants on public lands are prohibited under the related state and federal laws. This protection is usually accomplished during the federal and state permit review process, but it is ultimately the responsibility of a project proponent and property owner to ensure that they are not in violation of the endangered species laws.

Protection of such species is a valuable and vital component of sustaining biodiversity. An endangered species is one whose continued existence is in jeopardy and may become extinct. A threatened species is one that is likely, within the foreseeable future, to become endangered. A special concern species is one about which some problem of abundance or distribution is suspected but not yet proven. The main purpose of the special concern category is to focus

attention on certain species before they become endangered or threatened. Both levels of government prepare their own separate lists of such plant and animal species but do so working in cooperation with one another, as well as with various other organizations and universities. The Wisconsin Department of Natural Resources Bureau of Endangered Resources monitors endangered, threatened, and special concern species and maintains the state's Natural Heritage Inventory (NHI). This program maintains data on the locations and status of rare species in Wisconsin. Because some species are very sensitive, their actual locations are kept vague in order to protect them. Data for these species is only available at the town-range level by county. The WDNR Bureau of Endangered Species maintains the list and regularly provides updates. The full listing for Brown County may be found at http://dnr.wi.gov/topic/NHI/Data.asp.

In addition to the plant and animal species listed in the NHI, Brown County contains important examples of the following natural community types. Descriptions of the natural communities located in Brown County are provided from the WDNR Bureau of Endangered Resources. Although communities are not legally protected, they are unique components of Wisconsin's landscape and may provide critical habitat for rare, threatened, and endangered species. The Niagara Escarpment is a primary example of a very prominent, yet unique, ecosystem that harbors several plant and animal species that are found nowhere else in the County.

Northern Mesic Forest - This open wetland community is dominated by sedges and grasses. There are several common subtypes: Tussock meadows, dominated by tussock sedge (Carex stricta) and Canada bluejoint grass (Calamagrostiscanadensis); Broad-leaved sedge meadows, dominated by the robust sedges (Carex lacustris and/or C.utriculata); and Wire-leaved sedge meadows, dominated by such species as woolly sedge (Carex lasiocarpa) and few-seeded sedge (C. oligosperma). Frequent associates include marsh bluegrass (Poa palustris), manna grasses (Glyceria spp.), panicled aster (Aster lanceolatus), joy-pye-weed (Eupatorium maculatum), and the bulrushes (Scirpus atrovirens and S. cyperinus).

Southern Dry-mesic Forest - Red oak (Quercus rubra) is a common dominant tree of this upland forest community type. White oak (Q. alba), basswood (Tilia americana), sugar and red maples (Acer saccharum and A. rubrum), and white ash (Fraxinus americana) are also important. The herbaceous understory flora is diverse and includes many species listed under Southern Dry Forest plus jack-in-the-pulpit (Arisaema triphyllum), enchanter's-nightshade (Circaea lutetiana), large-flowered bellwort (Uvularia grandiflora), interrupted fern (Osmunda claytoniana), Lady Fern (Athyrium Filix-femina), tick-trefoils (Desmodium glutinosum and D. nudiflorum), and hog peanut (Amphicarpa bracteata). To the detriment of the oaks, mesophytic tree species are becoming increasingly important under current management practices and fire suppression policies.

Northern Dry-mesic Forest - In this forest community, mature stands are dominated by white and red pines (Pinus strobus and P. resinosa), sometimes mixed with red oak (Quercus rubra) and red maple (Acer rubrum). Common understory shrubs are hazelnuts (Corylus spp.), blueberries (Vaccinium angustifolium and V. myrtilloides), wintergreen (Gaultheria procumbens), partridge-berry (Mitchella repens); among the dominant herbs are wild sarsaparilla (Aralia nudicaulis), Canada mayflower (Maianthemum canadense), and cow-wheat (Melampyrum lineare). Stands usually occur on sandy loams, sands or sometimes rocky soils.

Northern Wet Forest - These weakly minerotrophic conifer swamps, located in the north, are dominated by black spruce (Picea mariana) and tamarack (Larix laricina). Jack pine (Pinus banksiana) may be a significant canopy component in certain parts of the range of this community complex. Understories are composed mostly of sphagnum (Sphagnum spp.) mosses and ericaceous shrubs such as leatherleaf (Chamaedaphne calyculata), Labrador-tea (Ledum groenlandicum), and small cranberry (Vaccinium oxycoccos) and sedges such as (Carex trisperma and C paupercula). The Natural Heritage Inventory has split out two entities, identified (but not strictly defined) by the two dominant species (see Black Spruce Swamp and Tamarack Swamp).

Shrub-Carr - This wetland community is dominated by tall shrubs such as red-osier dogwood (Cornus stolonifera), meadowsweet (Spiraea alba), and various willows (Salix discolor, S. bebbiana, and S. gracilis). Canada bluejoint grass (Calamagrostis canadensis) is often very common. Associates are similar to those found in Alder Thickets and tussock-type Sedge Meadows. This type is common and widespread in southern Wisconsin but also occurs in the north.

Emergent Marsh - These open, marsh, lake, riverine and estuarine communities with permanent standing water are dominated by robust emergent macrophytes, in pure stands of single species or in various mixtures. Dominants include cattails (Typha spp.), bulrushes (particularly Scirpus acutus, S. fluviatilis, and S. validus), bur-reeds (Sparganium spp.), giant reed (Phragmites australis), pickerel-weed (Pontederia cordata), water-plantains (Alisma spp.), arrowheads (Sagittaria spp.), and the larger species of spikerush such as (Eleocharis smallii).

Great Lakes Beach - This beach community usually occurs in association with active dune systems. The beaches of the Great Lakes are extremely dynamic features, strongly influenced by water level changes and storm events. They support a suite of very specialized organisms, although unprotected shorelines may be entirely unvegetated. The plant species found in this community include (along Lake Michigan) seaside spurge (Euphorbia polygonifolia) and American

sea-rocket (Cakile edentula).

Alvar - This rare community consists of areas of thin discontinuous soil overlying horizontal beds of limestone or dolomite in the vicinity of Great Lakes shorelines. They are characterized by relatively low tree cover and a distinctive biota which includes elements of rock pavement, prairie, savanna and boreal forest communities. Among these are regional endemics, some very rare. This community type is much more common and better developed in Michigan and Ontario than in Wisconsin. Small coniferous and deciduous trees (cedar, fir, pine, oak, aspen, birch) are scattered among an assemblage of species that can include big bluestem (Andropogon gerardii), little bluestem (Schizachyrium scoparium), Indian-grass (Sorghastrum nutans), and wood lily (Lilium philadelphicum), as well as shoreline plants such as silverweed (Potentilla anserina) and dwarf lake iris (Iris lacustris).

Southern Sedge Meadow - Widespread in southern Wisconsin, this open wetland community is most typically dominated by tussock sedge (Carex stricta) and Canada bluejoint grass (Calamagrostis canadensis). Common associates are waterhorehound (Lycopus uniflorus), panicled aster (Aster simplex), blue flag (Iris virginica), Canada goldenrod (Solidago canadensis), spotted joe-pye-weed (Eupatorium maculatum), broad-leaved cat-tail (Typha latifolia), and swamp milkweed (Asclepias incarnata). Reed canary grass (Phalaris arundinacea) may be dominant in grazed and/or ditched stands. Ditched stands can succeed quickly to Shrub-Carr.

Great Lakes Ridge and Swale - This is a complex of semi- to fully-stabilized, often forested beach / dune ridges alternating with wet open to forested swales, found on the shores of the Great Lakes but best-developed along Lake Michigan. Both parallel the coast and offer exceptionally complex and diverse habitats for wetland, upland, and Great Lakes shoreline plants. Ridges may support assemblages similar to boreal, northern mesic or northern dry-mesic forests. Water depth is a controlling factor in the swales, and the vegetation may run the gamut from open (emergent marsh, fen, or sedge meadow), shrub (bog birch, alder), or forested wetlands (often white cedar, black ash are prominent in these).

Moist Cliff - This "micro-community" occurs on shaded (by trees or the cliff itself because of aspect), moist to seeping mossy, vertical exposures of various rock types, most commonly sandstone and dolomite. Common species are columbine (Aquilegia canadensis), the fragile ferns (Cystopteris bulbifera and C. fragilis), wood ferns (Dryopteris spp.), rattlesnake-root (Prenanthes alba), and wild sarsaparilla (Aralia nudicaulis). The rare flora of these cliffs vary markedly in different parts of the state; Driftless Area cliffs might have northern monkshood (Aconitum noveboracense); those on Lake Superior, butterwort (Pinguicula vulgaris); or those in Door County, green spleenwort (Asplenium viride).

Northern Wet-Mesic Forest - This forested minerotrophic wetland is dominated by white cedar (Thuja occidentalis), and occurs on rich, neutral to alkaline substrates. Balsam fir (Abies balsamea), black ash (Fraxinus nigra), and spruces (Picea glauca and P. mariana) are among the many potential canopy associates. The understory is rich in sedges (such as Carex disperma and C. trisperma), orchids (e.g., Platanthera obtusata and Listera cordata), and wildflowers such as

goldthread (Coptis trifolia), fringed polygala (Polygala pauciflora), and naked miterwort (Mitella nuda), and trailing sub-shrubs such as twinflower (Linnaea borealis) and creeping snowberry (Gaultheria hispidula). A number of rare plants occur more frequently in the cedar swamps than in any other habitat.

Rare species and natural communities are critical components of Brown County's biodiversity, and protecting these resources is essential to ensure the long-term sustainability of the County's ecology.

Chapter 2

The Planning Process, Public Participation and Identification of Concerns

Formation of Committees

This plan's development was led by the Brown County Land and Water Conservation Department, who in coordination with Brown County UW-Extension, formed two advisory committees. The *Citizens Advisory Committee* (CAC) and *Technical Advisory Committee* (TAC) met multiple times throughout the months of February and March to discuss the concerns and opportunities that this plan would incorporate.

The CAC consisted of ten members, of which none of the members had ever participated in a Land and Water Conservation planning process. LWCD staff members Mike Mushinski and Rama Zenz attended both meetings to serve in an advisory capacity, and group meetings were facilitated by UW-Extension educator Allyson Watson. Members of the CAC represented various interests and industries, such as agriculture, the Baird Creek Preservation Foundation, outdoor recreation-geared retailers, Northeast Wisconsin Land Trust, the Izaak Walton League, etc.

Members of the TAC represented government and partner organizations that Brown County Land and Water Conservation Department works with or reports to on a regular basis, such as, the Wisconsin Department of Natural Resources, UW-Extension, U.S. Fish and Wildlife, NEW Water, USDA Natural Resource Conservation Service, Oneida Nation of Wisconsin, and UW-Green Bay. The TAC included ten members, as well. A list of members of both of these committees is located on the credits page of this plan. This plan would not have been developed without the dedication of these committee members in attending multiple meetings to influence the direction of this plan.

Initial Planning Process

Initial planning for the Land and Water Plan update began in late December 2015. Land and Water Conservation Department head Mike Mushinski and UW-Extension educator Allyson Watson reviewed the expectations of the plan update as well as the past plan and progress made on that plan in recent years. At this time, the composition of advisory committees was also discussed, in an effort to better engage community members who may have not been

involved in such efforts in the past. By reviewing the work plan and measurables for the past five year plan, areas of high impact were identified. These findings, along with the concerns and opportunities exposed through committee brainstorming exercises, defined the direction of this new plan.

A Citizen's Perspective: Concerns and Opportunities

The first CAC meeting in February 2016 focused on highlighting what the Land and Water Conservation Department's role is in the bigger picture of industry and conservation practices. The group established what their chief concerns were, with issues falling under five distinctive categories:

1. Eco-Tourism and Accessibility to Natural Resources
2. Quality and Quantity of Land/Water Resources
3. Industrial/Agricultural Practice Shifts
4. Education and Outreach for Public and Industry
5. Facing Future Development and Population Growth

From here, the group identified what specific goals they had, based on the summary of these concerns. From here, three goal areas emerged from the CAC:

1. Providing Technical Assistance Related to Water Quality
2. Implementing Practices that Promote Economic and Environmental Health
3. Actively Collaborating to Restore and Enhance Habitats

An overarching goal was submitted from the CAC:

"Our goal is to develop a Land and Water Conservation plan that restores and enhances environmental quality while allowing for economic prosperity through community involvement and education."

The next time the CAC met, one month later in March 2016, the TAC had shortened the list of concerns and opportunities down to areas where Land and Water Conservation had jurisdiction and precedent to engage. At this meeting, the group divided into small workgroups of 2-4 members and determined where past programming already fit into established concerns and opportunities. From here, the CAC could identify where (from their perspective) programming was most impactful, and if there were any gaps between community needs and the types of programming that the Land and Water Conservation Department might be able to offer.

The CAC ranked the following Priorities and Programming efforts by the Land and Water Conservation Department as most impactful:

1. Working Lands Initiative (both assisting landowners in compliance as well as developing and implementing schedules of compliance)
2. Northern Pike Habitat Restoration Project (all facets of this programming ranked highly with participants)
3. NRCS Contribution Agreement (installing sediment and phosphorus reduction practices)
4. Agriculture Shoreland Management Ordinance (installing riparian buffers)
5. Great Lakes Demonstration Farm Network (both transfer of information and technology, as well as creating opportunities for others to test research at demonstration farms)

The TAC met in February and March 2016, as well, and reviewed the findings of the CAC. In February 2016, the TAC narrowed the list of CAC concerns and opportunities to issues where Land and Water Conservation Department not only has jurisdiction, but also has programming tools available to resolve the issue. A draft plan format was developed, as well, based on the TAC findings.

At the March 2016 meeting the TAC evaluated measurables and future expectations that the Land and Water Conservation Department will be subject to in coming years from various state agencies. A discussion of staff, resources and what comprised a workload that is comprehensive, but not overbearing took place. New measurables and language modifications were proposed for the measurables set forward in the last 5 year work plan.

The new plan developed in 2016 will be produced in two forms, one that is streamlined for DATCP in accordance with the departmental requirements. The second plan will be highly legible for staff, elected officials and interested community members. This not only highlights the level of public input included in this plan, but makes clear what Land and Water Conservation Department's role is in our community's water and natural resource health.

Timeline of Discussion

A specific timeline and development from meetings and discussions can be seen as follows:

January 29, 2016	Initial TAC meeting, held at Land and Water Conservation Department offices, reviewed timeline for planning process.
February 10, 2016	First CAC meeting, held at Kress Family Library, De Pere, reviewed timeline for planning process, established concerns and challenges.
February 17, 2016	Second TAC meeting, held at Land and Water Conservation department offices, discussed and narrowed list of CAC concerns and challenges, established plan priorities.
March 10, 2016	Second CAC meeting, held at Kress Family Library, De Pere, evaluated five year work plan for past LWC plan and ranked most impactful programming to carry into future plan.
March 17, 2016	Third TAC meeting, held at Land and Water Conservation department office, set measurable goals and adjusted verbiage for plan draft.
May 1, 2016	Send out draft plan to TAC and CAC for review.
May 13, 2016	Make edits (if requested) to plan before state submission.
May 16, 2016	Target date to submit plan to DATCP for initial review
July 2016	Target month to received copy with comments of plan draft from DATCP
August 2016	Target month to hold open hearing for public comment
September 2016	Target month to present to County Planning, Development & Transportation Committee (oversees Brown County Land and Water Conservation department) for approval.
December 2016	DATCP approval (scheduled)
January 2017	Present to County Board of Supervisors for approval.

Goals and Objectives

Goal 1: Provide Technical Assistance Related to Water Quality

Objectives:

1. Working Lands Initiative
2. Animal Waste Management Ordinance
3. Fox P Trade
4. Assist DNR in Drafting TMDL Implementation Plan
5. Groundwater Protection Areas
6. Brown County Community Digester Feasibility Study
7. Silver Creek Watershed Project
8. Plum/Kankapot Creeks Watershed Project

Goal 2: Implement Practices that Promote Economic and Environmental Health

Objectives:

1. Great Lakes Demonstration Farm Network
2. Agriculture Shoreland Management Ordinance
3. Wildlife Damage Program
4. Land and Water Conservation Department Administration
5. NRCS Contribution Agreement

Goal 3: Actively Collaborate to Restore and Enhance Habitats

Objectives:

1. 9 Key Element Watershed Plan
2. Multi-County Conservation Practice Tracking System
3. West Shore Northern Pike Habitat Restoration Project

Chapter 3

Implementing State Performance Standards and Prohibitions

The goals and objectives detailed in Chapter 4 will drive resource management in Brown County for the next ten years. Implementing the state performance standards and prohibitions (see Chapter 1 for a list of State Performance Standards and Prohibitions) through these goals and objectives pushes this plan forward. The goals deal with these standards and prohibitions and detail how they are intended to be carried out.

State Standards and Prohibitions

NR 151.02 states "All land where crops or feed are grown shall be cropped to achieve a soil erosion rate equal to, or less than, the "tolerable" (T) rates established for that soil". The following strategy will be employed to meet this directive.

Erosion Reduction

Once erosion areas are identified and verified, they can be addressed in a number of ways. Voluntary adoption of rotational changes (e.g. reduction in row crop years), residue management and cover crop practices and grasses waterways for ephemeral erosion is the initial option. Cost sharing can be offered for the cropland practices and the grassed waterways. The second option is to require a practice be installed where cost sharing must be made available. Compliance and enforcement with required erosion standards will follow guidelines set in NR 151.09. We will provide these identified areas with data and analyses through the following methods:

- Identify priority farms with potentially high erosion rates determined with EVAAL
- Verify erosion rates with RUSLE II and inventory by parcel and expand search to surrounding parcels with the same soils, slopes and operators to locate additional priority sites
- Offer solutions to achieve desired soil erosion reduction

Manure and Cropland Management

Agricultural Performance Standards detailed in NR 151 .03- 151.07 are as follows:

- Tillage Setback
- Phosphorus Index
- Manure Storage facilities
- Process wastewater handling
- Clean Water diversion
- Nutrient Management

In addition to the previous requirements, NR 151.08 titled *Manure Management Prohibitions* requires that all livestock producers comply with the following:

- No overflow of manure storage facilities
- No unconfined manure piles in a WQMA
- No direct runoff from a feedlot or manure storage into waters of the state
- No unlimited access by livestock to waters of the state where high animal concentrations prevent the maintenance of adequate sod or self-sustaining vegetative cover

Brown County Animal Waste Management Ordinance

Manure management prohibitions have been incorporated into the Brown County Animal Waste Management Ordinance enacted in 1986 (updated 1999, 2006, 2007) to include the performance standards adopted in 2002. This ordinance regulates any construction, reconstruction, enlargement, abandonment or substantial altering of any feedlot or manure storage facility. A permit must be secured to proceed and the county must review and approved site plans before such a permit is issued. Any permitted projects must meet NRCS technical standards for construction. The Brown County Animal Waste Management Ordinance updated in 2013 contains all state prohibitions and standards except Tillage Setback, Phosphorus Index, Process Waste Water, and meeting T on pastures. The ordinance is projected to be updated to include all standards and prohibitions in the near future. All standards and prohibitions are implemented via Farmland Preservation compliance inspections, citizen complaints, watershed project areas, and demonstration farms network as the reason for inspecting the parcel for compliance with the performance standards and prohibitions.

Compliance and Enforcement of Standards and Prohibitions

Compliance or Noncompliance Notification Process

The following is a generalized description of the compliance notification process Brown County will follow which mirrors the more detailed process contained in NR 151.

Compliance Notification Process

- Written notification shall be made to landowner or operator indicating determination of compliance
- Notice shall be sent certified mail, return receipt requested, or via personal delivery
- Notice shall include:
    - Performance standard(s) or prohibition(s) complied or complied with
    - Cropland or livestock facility status of existing or new operation
    - Determination which best management practices or other corrective measures are needed to comply with performance standard(s) or prohibition(s) and whether or not they are eligible for cost sharing
- If cost sharing is available for eligible costs:
    - There shall be a written offer of cost sharing
    - Offer to provide or coordinate the provision of technical assistance
    - A compliance period to meet the performance standard(s) or prohibition(s)
    - An explanation of possible consequences if the landowner or operator fails to comply with the provisions of the notice, including enforcement or loss of cost sharing or both
    - An explanation of state or local appeals procedures
- If no eligible costs are involved:
    - A compliance period to meet the performance standard(s) or prohibition(s)
    - An explanation of consequences if the landowner or operator fails to comply with the provisions of the notice
    - An explanation of state or local appeals procedures
- If the landowner or operator is determined to be in compliance with the performance standard(s) or prohibition(s), compliance must be maintained by the existing landowner or operator and heirs or subsequent owners

Compliance Tracking

- Compliance is currently tracked by landowner according to corresponding operators in an Excel spreadsheet

- The DATCP FPP database will be used to track all Certificates of Compliance, program inspections, etc.
- In the future, we would like to track compliance through a geospatial tracking system

Enforcement Process

NR 151.09 (7) and NR 151.095 (8) detail enforcement of cropland standards and livestock standards.

- If no action is taken by the landowner/operator to come into compliance after a noncompliance notification has been issued, the county will request DNR assistance for elevated enforcement actions
- DNR may then take enforcement actions pursuant to s. 281.98 Stats. or other appropriate actions

Enforcement Under the Animal Waste Management Ordinance

Any person who violates, neglects, or refuses to comply with or resists the enforcement of any provision of this ordinance shall be subject to a forfeiture of not less than $250 plus costs of prosecution of each violation. An unlawful violation includes failure to comply with any standard of this ordinance or with any condition or qualification attached to the permit. Each day that a violation exists shall be a separate offense. Failure to obtain proper permit is considered a violation. Brown County Land and Water Conservation Department shall refer all enforcements to the Brown County Corporation Counsel for commencement of enforcement action.

Appeals Process

Under authority of Chapter 68, Wisconsin Statutes the Brown County Land Conservation Committee, created under Sections 59.878 Wisconsin Statutes and by the Brown County Board of Supervisors on May 19, 1982, acting as an appeal authority under Section 68.09(2) Wisconsin Statutes is authorized to hear and decide all appeals where it is alleged that there is error in any order, requirement, decision, or determination by the County Land and Water Conservation Department in administering this ordinance. The rules, procedures, duties and powers of Land Conservation Committee and Chapter 68 Wisconsin Statutes, apply to this ordinance. Appeals may be taken by any person having a substantial interest which is adversely affected by this

order, requirement, decision, or determinations made by the County Land and Water Conservation Department.

Chapter 4

Priority Farm Implementation Strategy

Working Lands Initiative

In 2009 the Working Lands Initiative changed the Farmland Preservation Program to require conservation compliance in order to be eligible to participate in the program. Brown County has 431 participants in 16 towns.

Currently a spreadsheet system is used to track Farmland Preservation participation, inspections, and compliance. While reliable, this system has gotten cumbersome and inefficient. However, Brown County is currently working with Outagamie, Calumet, and Winnebago Counties as well as Fox-Wolf Watershed Alliance to develop a multi-county tracking system to track many of the similar projects we work on. This system will track, both quantitatively as well as spatially utilizing GIS, complaints, compliance/noncompliance, inspections, and installed practices. Given the recent shift towards more watershed based planning and programs, it is felt that it is important to track program implementation consistently across county lines. This should help streamline watershed planning, applying for grants, implementation, and grant reporting.

<u>Implementation Strategy</u>

- Inspect land owned by Farmland Preservation participants for conservation compliance in 2-3 townships per year
- Systematically working though all towns in the county which will allow for re-inspections every four years
- Began inspections in towns in the Lower Fox TMDL area in order to gain understanding of the land and allow landowners to take advantage of available funding
- Non-compliant participants are given a schedule of compliance and technical assistance to achieve compliance
- Participants are assisted in applying for funding though EQIP/GLRI
- A contribution agreement with NRCS provides funding for necessary staff as well as opening the door for many NRCS projects

I & E Strategy

- Annual Certification
- Wisconsin and Brown County Standards and Prohibition letter
- One on one site visits with landowners

TMDL Implementation

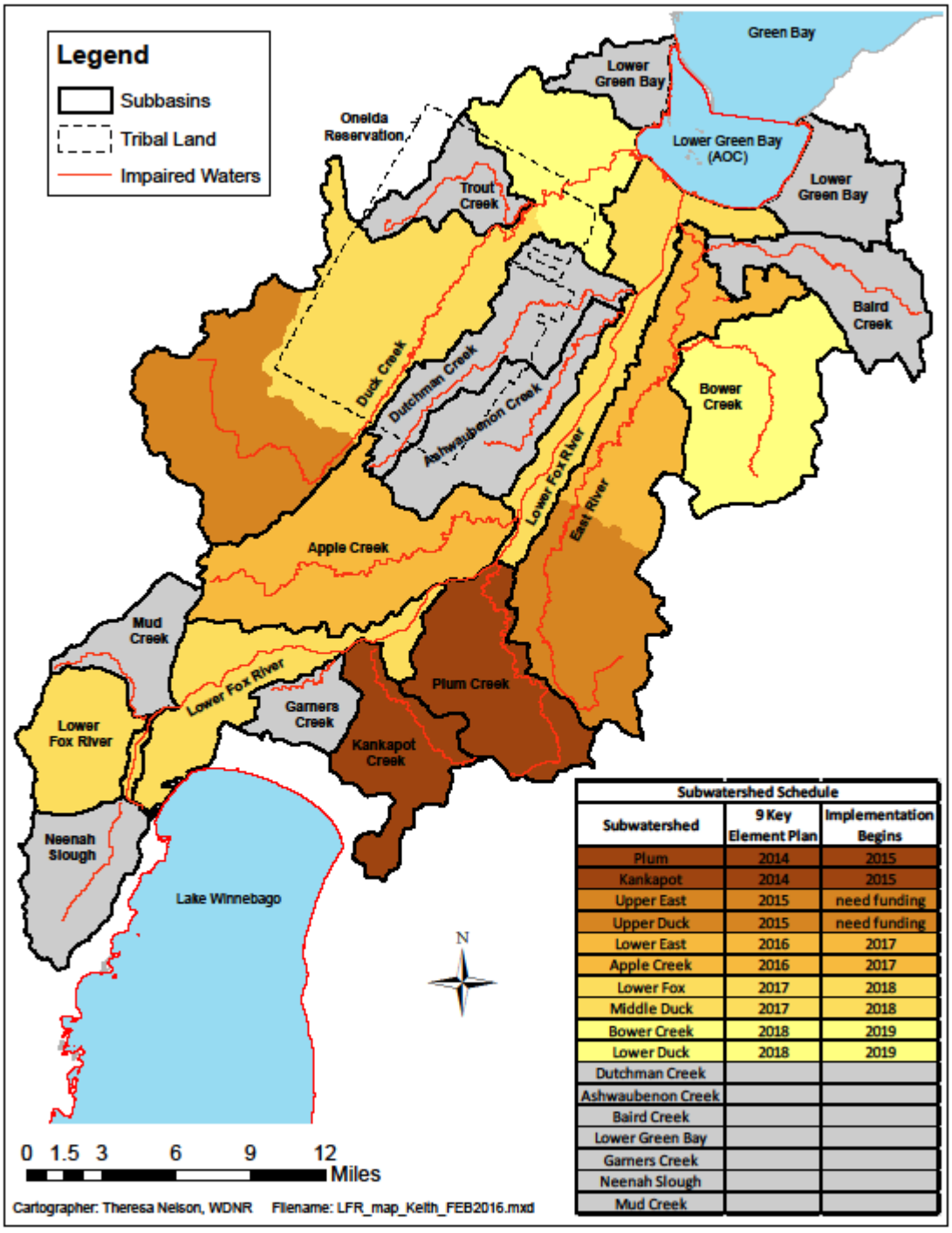
The agricultural performance standards contained in NR 151 will serve as the foundation for TMDL implementation. Cropland and facilities that are enrolled in conservation programs such as the Farmland Preservation Program or sites that are eligible for GLRI or NRCS funding will be given a higher priority ranking. Where possible, highest loading farm sites (as determined by EVAAL or similar models) within these priority areas will be completed first. Water quality targets and necessary reductions to TSS and TP can be located in the 2012 TMDL Report. Additional 9 key element plans will be developed as time and resources allow and will theoretically follow the Lower Fox River Basin TMDL Implementation Schedule (page 55). Upon plan approval, additional funding will be applied for to implement the approved plan.

Implementation Strategy

- Implementation will occur on a sub-watershed scale (HUC 12) and proceed on a sub-watershed by sub-watershed basis
- When possible, implementation will start in the highest phosphorus loading sub-watershed and continue in descending order
- An inventory (barnyard, streambank, cropland, tile, culverts, etc.) of each sub-watershed will be completed prior to implementation
- The computer model STEPL (or similar model) will be used to quantify P and TSS reductions from installed BMPs.
- Utilize NRCS EQIP funding through additional contribution agreements to implement P and TSS reductions in the Lower Fox River Watershed.
- Work with Fox-Wolf Watershed Alliance to secure funding for the approved 9-Key Element Plan for the Upper East River Watershed.
- Implement approved 9 key element plan for the Plum/Kankapot subwatershed

I & E Strategy

- Basin Buzz newsletter
- TMDL mailings to landowners
- On one on site visits with landowners



Subwatershed Schedule		
Subwatershed	9 Key Element Plan	Implementation Begins
Plum	2014	2015
Kankapot	2014	2015
Upper East	2015	need funding
Upper Duck	2015	need funding
Lower East	2016	2017
Apple Creek	2016	2017
Lower Fox	2017	2018
Middle Duck	2017	2018
Bower Creek	2018	2019
Lower Duck	2018	2019
Dutchman Creek		
Ashwaubenon Creek		
Baird Creek		
Lower Green Bay		
Garners Creek		
Neenah Slough		
Mud Creek		

Lower Fox River Basin
TMDL Implementation Schedule

Demonstration Farm Network

The Demonstration Farm Network will conduct demonstrations of the effectiveness and adaptability of conservation systems to reduce erosion and sedimentation, control phosphorus runoff and address nonpoint source pollution issues.

Implementation Strategy

- Establish sites within the Lower Fox River to test the effectiveness of current and innovative conservation systems (currently 6 demo farm sites exist in the Lower Fox River Basin)
- Establish an effective mechanism to transfer technology and conservation system effectiveness information to land management agencies, producers, and the public
- Create opportunities for stakeholders to test their research, technical assistance, and program implementation at the demonstration sites
- Along with the Great Lakes Commission, NRCS and Outagamie County, create and implement an information/outreach strategy to share information and lessons learned from the project to managers, researchers, and stakeholders across the Great Lakes basin
- Explore and implement interseeding technologies
- Implement manure application technologies such as low disturbance applications
- Design seed variety combinations that function as high quality cover crop plantings
- Define soil health benefits and parameters in conjunction with the University of Wisconsin-Green Bay
- Quantify sediment and phosphorus attenuations with edge of field monitoring and paired watershed study in conjunction with USGS

I & E Strategy

- Farm Tours 7-8 per year
- Presentations at regional conferences 2-3 per year
- Conduct workshops 1-2 per year
- On site technology tours, large and small groups 4-5 per year
- Conservation equipment demonstrations 2-3 per year
- Local Media interviews and education
- State farm paper interviews
- Local, State and Federal officials tours

Animal Waste Management Ordinance

Since its adoption in 1986, the Brown County Animal Waste Management Ordinance has issued over 300 permits. This ordinance regulates the location, construction, installation, alteration, design, and use of animal waste storage facilities and animal feedlots as to protect the groundwater and surface water resources of the county. The ordinance is projected to be updated to include all performance standards and prohibitions and to reference new USDA-NRCS Technical Standards.

Implementation Strategy

- A permit must be obtained for:
    - A new animal waste storage facility or altering an existing animal waste storage facility
    - A new feedlot or altering an existing animal feedlot
    - Abandonment of a waste storage facility
- Landowners must plan and document the availability of acceptable acreage of cropland per animal unit for all future expansions of their livestock operations
- All agriculture operations are required to have a Nutrient Management Plan according to USDA-NRCS Technical Standard 590 (2005 version). A component of this plan is a map highlighting where application of nutrients on agriculture fields is restricted or prohibited
- Agriculture producers who land apply animal waste from December 1st through March 31st must obtain a winter spreading plan from the County
- Properly abandon animal waste storage facilities that have not been utilized for a period of 24 months

I & E Strategy

- Direct mailings to landowners, town officials, and contractors
- One on one site visits with landowners
- Winter spreading plan notification letter (annually)
- 500 A.U. inspection letter and site visit (annually)

Annual Farm Inspections

Inspections of livestock operations over 500 animal units are conducted annually to determine continued compliance with provisions required under the Animal Waste Management Ordinance, which includes the Wisconsin Agricultural Performance Standards and Prohibitions.

Implementation Strategy

- Collect information on animal unit numbers, nutrient management plan status, and any changes to the operation that impacts compliance
- Technical and financial assistance is offered, if eligible and available, for any needed changes to be met

I & E Strategy

- Direct mailings to landowners
- One on one site visits with landowners

Northern Pike Restoration Project Implementation Strategy

Since 2007 the Northern Pike Restoration Project has been creating and enhancing wetland spawning areas along the west shore of Green Bay. Beginning in 2013 the project was expanded north into Oconto County and in 2015 site monitoring along the East River and its tributaries has been conducted to look at pike spawning migration. Natural Resources Damage Assessment (NRDA) funding has provided over $850,000 which was used to leverage an additional $700,000 in both federal and private funding. As additional funds become available through future NRDA settlements, opportunities to continue and/or expand the project will be explored.

Implementation Strategy

- Inventory impediments along East River and its tributaries
- Prioritize projects using trapping data
- Fyke net and floy tag pike on Fox River tributaries and west shore sites
- Continue to coordinate and apply for funding to complete restoration projects
- Remove impediments to fish migration
- Construct pike spawning wetlands

I & E Strategy

- Promote pike project video documentary
- Co-host field day events at the Izaak Walton project site
- Elected officials tour
- Public fyke netting and floy tagging events

Chapter 5

Work Plan with Evaluation, Monitoring, and Targeted Benchmarks

The following table illustrates the 5-year work plan. Our goals and objectives will likely take more than 5 years to be fully implemented. Each year, progress toward reaching plan goals will be evaluated and priorities will be reevaluated and possibly reestablished.

5 Year Work Plan

5 year Work Plan Goal and Objective description	**2017-2021 Annual Goals**	Accomplishments				
		2017	2018	2019	2020	2021
Priority 1 – Working Lands Initiative (WLI) The Working Lands Initiative is a statewide effort that protects and preserves agricultural lands, by ensuring that they remain in agricultural use. The Land and Water Conservation Department offers technical assistance to landowners that participate in this program.						
1. Assist landowners in complying with NR151 (relates to agricultural run-off pollution) and ATCP50 (relates to soil and water resource management) on their agricultural property	8,000 acres					
2. Develop and implement schedules of compliance to meet state conservation standards	80					
3. Installation of sediment and phosphorus reduction practices.	50					
Priority 2 – Lower Fox Demonstration Farm Network (LFDFN) The Lower Fox Demonstration Farm Network is a locally driven effort that is farmer-led in nature. Through a process of research and implementation, farmers transition into new cropping practices and farm management practices that can improve soil health, expand crop yields and greatly reduce agricultural run-off on Brown County farms.						
1. Host field day events at demonstration farm sites that highlight new equipment, technologies, etc.	2					
2. Conduct conference/workshop	1					
3. Present LFDFN information at regional water quality conferences	2					
4. Group Tours of Demonstration Farms	8					
Priority 3 – Animal Waste Management Ordinance The Animal Waste Management Ordinance regulates the location and construction of animal waste storage facilities and feedlots in order to better protect surface and groundwater in Brown County.						
1. Develop new nutrient management plans	1,000 acres					

5 year Work Plan Goal and Objective description	2017-2021 Annual Goals	Accomplishments				
		2017	2018	2019	2020	2021
2. Review current nutrient management plans (acres reviewed & reported)	120,000 acres					
3. Inspect farm operations that have >500 animal units	38					
4. Prepare winter spreading plans upon request	80					
5. Upon request, inspect animal waste complaints (complaint driven)	20					
6. Construction practice installation	20					
Priority 4 – Agriculture Shoreland Management Ordinance The Agriculture Shoreland Management Ordinance requires vegetated buffer strips along every stream in Brown County's unincorporated municipalities.						
1. Install riparian buffers (a vegetated buffer strip)	3-5 miles					
Priority 5 – Priority Watershed Planning Watershed plans consistent with EPA's 9 key elements provide a framework for improving water quality in a holistic manner within a geographic watershed. Now that these plans have been developed, Brown County Land and Water Conservation wants to move into implementation.						
1. Collaborated with Outagamie County and DNR to implement approved Upper East 9-Key element plan. Great Lakes Restoration Initiative funding proposal submitted. Continued pursuit of funding is necessary for implementation.	40 production sites, 96 miles stream, 12,000 cropland acres					
2. Co-author final report with strategy recommendations for Apple Creek.	1					
3. Utilize EVAAL and Stream Power Index model to target high priority fields for conservation control in the Upper East River watershed and Apple Creek.						
4. Assist landowners in complying with NR151 (relates to agricultural run-off pollution) and ATCP50 (relates to soil and water resource management) on their agricultural property						

5 year Work Plan Goal and Objective description	**2017-2021 Annual Goals**	Accomplishments				
		2017	2018	2019	2020	2021
5. Develop and implement schedules of compliance to meet state conservation standards						
6. Installation of sediment and phosphorus reduction practices.						
Priority 6 – Multi-County conservation practice tracking system Brown County seeks to work effectively with neighboring counties to communicate best practices and collaborate on shared goal of conservation practice installation and tracking.						
1. Map features within GIS tracking system	50					
Priority 7 – Wildlife Damage Program The Wildlife Damage Program is one that assists farmers when wildlife damages their crops. Damage prevention assistance and partial compensation to farmers help abate animal nuisances. Shooting permits are issued in some instances to remove wildlife such as deer, bear, geese, turkeys, etc. This program is implemented via landowner inquiries/damage complaints.						
1. Provide technical support to landowners	15					
2. Provide cost-share for abatement to landowners	2					
3. Process damage claims for crop loss	8					
4. Coordinate with DNR application for shooting permits and damage claims.	5					
Priority 8 – West Shore Northern Pike Habitat Restoration Project The West Shore Northern Pike Habitat Restoration Project is an effort to bring pike back to their historic breeding grounds through the restoration of their natural habitats. This includes restoring wetlands, reducing sediment and pollutants from entering the habitat area, installing vegetated buffers, and removing impediments to fish navigation.						
1. Install riparian buffers	1 miles					
2. Install critical area habitat/wetland restorations	3 acres					
3. Conduct area wide monitoring program to determine project success.	35 sites					
4. Stream impediments removed	3					

5 year Work Plan Goal and Objective description	**2017-2021 Annual Goals**	Accomplishments				
		2017	2018	2019	2020	2021
Priority 9 – Fox P Trade Water quality trading consists of permit holders being able to maintain compliance with DNR-issued permits by achieving pollutant reduction less expensively in another section of the watershed. The idea behind this is that it achieves the same positive benefit to the watershed as a whole, but provides an alternative option for a permit holder where pollutant reduction is prohibitively expensive.						
1. Provide technical assistance to develop credit model – number model runs	TBD					
2. Work with landowner to establish trading credits – develop trading plans	1					
3. Attend Fox P Trade work group team meetings	12					
Priority 10 – Assist DNR in drafting the Total Maximum Daily Load Implementation Plan Total Maximum Daily Load is a regulatory term in the U.S. Clean Water Act which describes the maximum amount of pollutants that a body of water can receive while still meeting clean water quality standards. The Wisconsin DNR is involved in determining which TMDL standards must be achieved and by what timeframe in Brown County. Land and Water Conservation Dept. are critical to implementation of these goals.						
1. Attend bi-monthly planning meetings of Agricultural Runoff Team	6					
2. Attend bi-monthly TMDL implementation team meetings	6					
Priority 11 – Land and Water Conservation Department Administration This section refers to programming and efforts that the Land and Water Conservation Department leads.						
1. Annual seedling tree sale	11,000					
2. $.50 per agriculture acre fee (# bills sent)	3,350					
3. Review non-metallic mining reclamation plans	3-5					
4. Newsletter (in partnership with Fox Wolf Watershed Alliance's Basin Buzz)	2					
Priority 12 – Groundwater Protection Areas Groundwater protection areas refer to locations where sensitivity is needed in order to protect groundwater quality.						
1. Provide cost-sharing to abandon unused wells	5					

5 year Work Plan Goal and Objective description	**2017-2021 Annual Goals**	Accomplishments				
		2017	2018	2019	2020	2021
Priority 13 – Brown County Community Digester Feasibility Study An anaerobic digester collects manure and converts the organic matter into methane, used in the production of natural gas. There has been an ongoing effort to research the potential of bringing such technology into Brown County.						
1. Select firm and complete feasibility study						
Priority 14 – Adaptive Management Silver Creek Watershed Project						
1. Attend meetings	3					
2. Technical assistance requests	6					
Priority 15 – Plum/Kankapot Creeks Watershed Project						
1. Meet with Outagamie County and Fox Wolf Watershed Alliance						
2. Assist Outagamie and Calumet counties in achieving the milestones outlined in Table 27 of the Nonpoint Source Implementation Plan for Plum and Kankapot Creeks Watershed.	See plan for milestones/goals					

Annual DATCP Reporting

GOAL/OBJECTIVE (Include LWRM plan references, i.e. goal number and objective number)	PLANNED ACTIVITIES WITH BENCHMARKS (identify focus areas if applicable, e.g. HUC 12 watershed)	ANNUAL ESTIMATE OF STAFF COSTS (Hours if not accounted for)	ANNUAL ESTIMATE OF COST-SHARING	PERFORMANCE MEASUREMENTS
Farm inspections to implement state performance standards and prohibitions	Conduct 38 farm inspections of operations >500 animal units Review 120,000 acres of current nutrient management plans (acres reviewed and reported) Develop 1,000 acres of new nutrient management plans Prepare 80 winter spreading plans/issue permits Inspect/follow-up on animal waste complaints	2040 hrs.		# of inspections performed # follow letter sent # of compliance certificates, compliance schedules or letters issued Acres of NMP reviewed # of winter spreading plans issued # of complaints investigated #staff hours
Cropland conservation practices installed to implement state performance standards and prohibitions	Develop and implement 80 schedules of compliance to meet state conservation standards Assist landowners in complying with NR151 and ATCP50 (acres) Provide technical assistance including design preparation and construction oversight	4160 hrs.	$500,000 (NRCS EQIP)	# staff hours # and type of practice(s) installed cost-share dollars spent # lbs of sediment reduced (approved method used) # lbs of P reduced (approved method used) # acres of cropland walked # compliance schedules developed
Livestock facility conservation practices installed to implement state performance standards and prohibitions	Install livestock practices within GLRI area of the county Provide technical assistance including design preparation and construction oversight	2100 hrs.	$500,000 (NRCS EQIP)	# staff hours Type and units of practice(s) installed Amount of cost-share dollars spent # lbs of sediment reduced (approved method used) # lbs of P reduced (approved method used)

GOAL/OBJECTIVE (Include LWRM plan references, i.e. goal number and objective number)	PLANNED ACTIVITIES WITH BENCHMARKS (identify focus areas if applicable, e.g. HUC 12 watershed)	ANNUAL ESTIMATE OF STAFF COSTS (Hours if not accounted for)	ANNUAL ESTIMATE OF COST-SHARING	PERFORMANCE MEASUREMENTS
Permits issued or obtained in connection with practices installed	Issue permits in accordance with the Brown County Animal Waste Management ordinance	1800 hrs.		# of staff hours # permits issued and types
Conservation practices installed to implement LWRM priorities	Provide technical assistance including design preparation and construction oversight	300 hrs.	$40,000	# of staff hours expended for design and installation Type and units of practice(s) installed cost-share dollars spent # lbs of sediment reduced (approved method used) # lbs of P reduced (approved method used)
Lower Fox Demonstration Farm Network implementation	Host 2 field days 7-8 on-site tours Conduct 1 Conference/Workshop Present LFDFN information at 2 regional conferences	2080 hrs.		# of field days held # of tours # of workshops # conferences attended and presented at # of acre of cover crop/reduced tillage practices implemented by county farmers measured using NDTI
Northern Pike Restoration Project	Install 1 mile of riparian buffers Install 3 acres of wetland restorations Conduct area wide monitoring program at 35 sites Remove 3 stream impediments	1560 hrs.	$125,000	Miles of buffers installed Acres of wetland restorations # impediments removed # monitoring sites

Appendix A

Total Waters – Streams

WBIC	Waterbody Name	Segment	Watershed	Start Mile	End Mile	Length/Size	ORW/ERW	303d List?	Pollutant	Impairment
121600	Dutchman Creek (Dutchman Creek)	2	LF02	4.06	16.03	11.97	None	N		
410200	Trout Creek (Trout Creek)	1	LF05	0	12.77	12.77	None	Y	Total Phosphorus, Sediment/Total Suspended Solids	Sediment/Total Suspended Solids
88600	Unnamed (Unnamed)	1	TK01	0	4.33	4.33	None	N		
118300	Unnamed (Local Water)	1	LF01	0	6.51	6.51	None	N		
5021329	Unnamed (Local Water)	1	MA03	0	6.78	6.78	None	N		
124200	Unnamed (Local Water)	1	LF02	0	4.37	4.37	None	N		
125200	Unnamed (Local Water)	1	LF03	0	9.39	9.39	None	N		
125300	Unnamed (Local Water)	1	LF03	0	4.57	4.57	None	N		
409900	Unnamed (Local Water)	1	LF05	0	1.11	1.11	None	N		
410500	Unnamed (Local Water)	1	GB01	0	5.37	5.37	None	N		
119700	Unnamed (Local Water)	2	LF01	2.56	4.39	1.83	None	N		
5020933	Unnamed (Local Water)	1	LF01	0	1.3	1.3	None	N		
5020187	Unnamed (Local Water)	1	TK01	0	3.94	3.94	None	N		
5020041	Unnamed (Local Water)	1	TK01	0	2.33	2.33	None	N		
5019923	Unnamed (Local Water)	1	TK01	0	8.63	8.63	None	N		
5018737	Unnamed (Local Water)	1	LF02	0	4.17	4.17	None	N		
5018670	Unnamed (Local Water)	1	LF05	0	6.61	6.61	None	N		
5015765	Unnamed (Local Water)	1	GB01	0	0.89	0.89	None	N		
5015368	Unnamed (Local Water)	1	GB01	0	0.67	0.67	None	N		
5015123	Unnamed (Local Water)	1	GB01	0	0.79	0.79	None	N		
3000404	Unnamed (Local Water)	1	GB01	0	1.53	1.53	None	N		
3000400	Unnamed (Local Water)	1	GB01	0	4.14	4.14	None	N		
3000333	Unnamed (Local Water)	1	LF02	0	0.42	0.42	None	N		
3000564	Unnamed (Local Water)	1	GB01	0	2.39	2.39	None	N		
3000562	Unnamed (Local Water)	1	GB01	0	2.74	2.74	None	N		
3000560	Unnamed (Local Water)	1	GB01	0	1.11	1.11	None	N		
3000559	Unnamed (Local Water)	1	GB01	0	2.38	2.38	None	N		
3000558	Unnamed (Local Water)	1	GB01	0	5	5	None	N		
3000555	Unnamed (Local Water)	1	GB01	0	0.55	0.55	None	N		
3000553	Unnamed (Local Water)	1	GB01	0	0.74	0.74	None	N		
3000550	Unnamed (Local Water)	1	GB01	0	1.96	1.96	None	N		
3000549	Unnamed (Local Water)	1	GB01	0	3.4	3.4	None	N		
3000166	Unnamed (Local Water)	1	GB01	0	3.08	3.08	None	N		
3000130	Unnamed (Local Water)	1	MA03	0	3.55	3.55	None	N		
3000113	Unnamed (Local Water)	1	LF02	0	1.1	1.1	None	N		
3000112	Unnamed (Local Water)	1	LF02	0	2.29	2.29	None	N		
3000112	Unnamed (Local Water)	2	LF02	0	2.29	2.29	None	N		

WBIC	Waterbody Name	Segment	Watershed	Start Mile	End Mile	Length/Size	ORW/ERW	303d List?	Pollutant	Impairment
5015101	Unnamed (Unnamed Stream)	1	GB01	0	0.86	0.86	None	N		
5016244	Unnamed (Unnamed Stream)	1	GB01	0	1.48	1.48	None	N		
5015801	Unnamed (Unnamed Stream)	1	GB01	0	0.89	0.89	None	N		
5015733	Unnamed (Unnamed Stream)	1	GB01	0	0.65	0.65	None	N		
5014803	Unnamed (Unnamed Stream)	1	GB01	0	0.54	0.54	None	N		
5015792	Unnamed (Unnamed Stream)	1	GB01	0	1.99	1.99	None	N		
5016056	Unnamed (Unnamed Stream)	1	GB01	0	0.49	0.49	None	N		
3000114	Unnamed (Unnamed Stream)	1	GB01	0	0.84	0.84	None	N		
5015856	Unnamed (Unnamed Stream)	1	GB01	0	0.88	0.88	None	N		
5016061	Unnamed (Unnamed Stream)	1	GB01	0	0.72	0.72	None	N		
5015649	Unnamed (Unnamed Stream)	1	GB01	0	1.13	1.13	None	N		
5016192	Unnamed (Unnamed Stream)	1	GB01	0	0.55	0.55	None	N		
5015097	Unnamed (Unnamed Stream)	1	GB01	0	0.88	0.88	None	N		
5014801	Unnamed (Unnamed Stream)	1	GB01	0	0.38	0.38	None	N		
5016225	Unnamed (Unnamed Stream)	1	GB01	0	1.04	1.04	None	N		
3000565	Unnamed (Unnamed Stream)	1	GB01	0	0.69	0.69	None	N		
5016029	Unnamed (Unnamed Stream)	1	GB01	0	0.94	0.94	None	N		
3000167	Unnamed (Unnamed Stream)	1	GB01	0	1.09	1.09	None	N		
3000561	Unnamed (Unnamed Stream)	1	GB01	0	1.06	1.06	None	N		
5015593	Unnamed (Unnamed Stream)	1	GB01	0	0.94	0.94	None	N		
5014962	Unnamed (Unnamed Stream)	1	GB01	0	1.8	1.8	None	N		
5014996	Unnamed (Unnamed Stream)	1	GB01	0	1.14	1.14	None	N		
5014892	Unnamed (Unnamed Stream)	1	GB01	0	1.68	1.68	None	N		
5014841	Unnamed (Unnamed Stream)	1	GB01	0	0.51	0.51	None	N		

WBIC	Waterbody Name	Segment	Watershed	Start Mile	End Mile	Length/Size	ORW/ERW	303d List?	Pollutant	Impairment
3000568	Unnamed (Unnamed Stream)	1	GB01	0	1.21	1.21	None	N		
411500	Potter Creek (Unnamed Stream)	2	GB01	6.03	8.64	2.61	None	N		
5015190	Unnamed (Unnamed Stream)	1	GB01	0	1	1	None	N		
5015170	Unnamed (Unnamed Stream)	1	GB01	0	1.23	1.23	None	N		
5015839	Unnamed (Unnamed Stream)	1	GB01	0	0.64	0.64	None	N		
5015504	Unnamed (Unnamed Stream)	1	GB01	0	1.64	1.64	None	N		
5015290	Unnamed (Unnamed Stream)	1	GB01	0	2.68	2.68	None	N		
5015947	Unnamed (Unnamed Stream)	1	GB01	0	1.38	1.38	None	N		
5016147	Unnamed (Unnamed Stream)	1	GB01	0	0.49	0.49	None	N		
5015156	Unnamed (Unnamed Stream)	1	GB01	0	0.57	0.57	None	N		
5015832	Unnamed (Unnamed Stream)	1	GB01	0	0.56	0.56	None	N		
5014911	Unnamed (Unnamed Stream)	1	GB01	0	0.51	0.51	None	N		
75000	Mud Creek (Mud Creek (Reedsville) T19n, R21e, S34)	1	MA02	0	19.95	19.95	None	N		
89600	Twin Hill Creek (Twin Hill Creek)	1	TK01	0.01	5.95	5.94	None	N		
5015725	Unnamed (Unnamed Stream)	1	GB01	0	0.61	0.61	None	N		
5014880	Unnamed (Unnamed Stream)	1	GB01	0	0.61	0.61	None	N		
5014891	Unnamed (Unnamed Stream)	1	GB01	0	0.61	0.61	None	N		
117900	Fox River (Lower Fox River (Mouth To De Pere Dam)}	1	LF01	0	7.39	7.39	None	Y	PCBs, Total Phosphorus, Sediment/Total Suspended Solids	Low DO, Degraded Habitat, Contaminated Sediment, Contaminated Fish Tissue
409700	Duck Creek (Duck Creek)	1	LF05	0	4.96	4.96	None	Y	Total Phosphorus, Sediment/Total Suspended Solids, Mercury	Low DO, Degraded Habitat, Contaminated Fish Tissue
411800	Little Suamico River (Little Suamico River)	1	GB01	0	23.78	23.78	None	Y	Total Phosphorus	Degraded Biological Community
117900	Fox River (Lower Fox River (De Pere Dam To Middle Appleton Dam))	2	LF01,LF02,LF03,LF04	7.39	32.18	24.79	None	Y	PCBs, Total Phosphorus	Contaminated Fish Tissue, Low DO

WBIC	Waterbody Name	Segment	Watershed	Start Mile	End Mile	Length/Size	ORW/ERW	303d List?	Pollutant	Impairment
125100	Plum Creek (Plum Creek)	1	LF03	0	13.86	13.86	None	Y	Total Phosphorus, Sediment/Total Suspended Solids	Degraded Biological Community, Elevated Water Temperature, Degraded Habitat
124100	Apple Creek (Apple Creek)	3	LF01,LF02	0	3.99	3.99	None	Y	Total Phosphorus, Sediment/Total Suspended Solids	Low DO, Elevated Water Temperature, Degraded Habitat
121600	Dutchman Creek (Dutchman Creek)	1	LF02	0	4.04	4.04	None	Y	Total Phosphorus, Ammonia (Unionized) - Toxin	Chronic Aquatic Toxicity, Low DO
122200	Ashwaubenon Creek (Ashwaubenon Creek)	1	LF01,LF02	0	15	15	None	Y	Total Phosphorus, Sediment/Total Suspended Solids	Low DO, Degraded Habitat
118400	Bower Creek (Bower Creek)	1	LF01	0	3	3	None	Y	Total Phosphorus, Sediment/Total Suspended Solids	Low DO, Degraded Biological Community, Degraded Habitat
118000	East River (East River)	2	LF01	14.15	42.25	28.1	None	Y	Unspecified Metals, Total Phosphorus, Sediment/Total Suspended Solids	Chronic Aquatic Toxicity, Low DO, Degraded Biological Community, Degraded Habitat
89100	Unnamed (T22n, R22e, S23 SE SW (Denmark Creek))	1	TK01	0	4.65	4.65	None	N		
411600	West Branch Suamico River (West Branch Suamico River)	1	GB01	0	9.03	9.03	None	N		
3000574	Unnamed (Unnamed Stream)	1	GB01	0	3.34	3.34	None	N		
3000557	Unnamed (Unnamed Stream)	1	GB01	0	4.65	4.65	None	N		
3000576	Unnamed (Unnamed Stream)	1	GB01	0	1.75	1.75	None	N		
5016113	Unnamed (Unnamed Stream)	1	LF05	0	3.23	3.23	None	N		
410800	Unnamed (Unnamed Stream)	1	GB01	0	2.73	2.73	None	N		
412100	Unnamed (Unnamed Stream)	1	GB01	0	9	9	None	N		
3000556	Unnamed (Unnamed Stream)	1	GB01	0	2.13	2.13	None	N		
3000566	Unnamed (Unnamed Stream)	1	GB01	0	2.81	2.81	None	N		
5015271	Unnamed (Unnamed Stream)	1	GB01	0	1.47	1.47	None	N		
5015490	Unnamed (Unnamed Stream)	1	GB01	0	1.28	1.28	None	N		
5015166	Unnamed (Unnamed Stream)	1	GB01	0	2.45	2.45	None	N		
5015112	Unnamed (Unnamed Stream)	1	GB01	0	2.23	2.23	None	N		

WBIC	Waterbody Name	Segment	Watershed	Start Mile	End Mile	Length/Size	ORW/ERW	303d List?	Pollutant	Impairment
3000551	Unnamed (Unnamed Stream)	1	GB01	0	1.62	1.62	None	N		
3000402	Unnamed (Unnamed Stream)	1	GB01	0	1.21	1.21	None	N		
411700	South Branch Suamico River (South Branch Suamico River)	2	GB01	3.52	7.3	3.78	None	N		
411700	South Branch Suamico River (South Branch Suamico River)	1	GB01	0	3.52	3.52	None	N		
409700	Duck Creek (Duck Creek)	3	LF05	4.96	25.69	20.73	None	N		
5018099	Unnamed (Trib To The East River)	1	LF01	0.65	1.38	0.73	None	Y	PCBs	Chronic Aquatic Toxicity
3000021	Unnamed (Mahone Creek)	1	LF01	0	2.75	2.75	None	N		
5020912	Unnamed (Trib to East River)	1	LF01	0	1.27	1.27	None	N		
3000354	Unnamed (Creek 13-4)	1	LF05	0	1.35	1.35	None	N		
125100	Plum Creek (Plum Creek)	2	LF03	13.87	16.42	2.55	None	Y	Sediment/Total Suspended Solids	Elevated Water Temperature, Degraded Habitat
101200	Gilson Creek (Gilson Creek)	2	TK07	0	0.4	0.4	None	N		
411000	Haller Creek (Haller Creek)	2	GB01	0	2.25	2.25	None	N		
410100	Beaver Dam Creek (Beaver Dam Creek)	2	LF05	4	5.79	1.79	None	N		
119000	Unnamed (Bower Creek)	1	LF01	0	5.63	5.63	None	N		
5020719	Unnamed (Trib of East River)	1	LF01	0	1.52	1.52	None	N		
5016736	Unnamed (Thornberg Creek)	1	LF05	0	0.91	0.91	None	N		
121800	Unnamed (Dutchman Creek)	1	LF02	0	4.14	4.14	None	N		
411100	Unnamed (Hidden Lake Creek)	1	GB01	0	2.47	2.47	None	N		
3000554	Unnamed (Dune Creek)	1	LF05	0	1.15	1.15	None	N		
3000563	Unnamed (Suamico River)	1	GB01	0	1.21	1.21	None	N		
71300	Branch River (Branch River)	3	MA03	20.15	36.78	16.63	None	Y	PCBs	Contaminated Fish Tissue
410900	Suamico River (Suamico River)	1	GB01	0	4	4	None	N		
123200	North Branch Ashwaubenon Creek (North Branch Ashwaubenon Creek)	1	LF02	0	7	7	None	N		

WBIC	Waterbody Name	Segment	Watershed	Start Mile	End Mile	Length/Size	ORW/ERW	303d List?	Pollutant	Impairment
118000	East River (East River)	1	LF01	0	14.15	14.15	None	Y	Unspecified Metals, Total Phosphorus, Sediment/Total Suspended Solids	Chronic Aquatic Toxicity, Low DO, Degraded Habitat
119700	Unnamed (BIRCH CREEK)	1	LF01	0		2.56	None	N		
125500	Unnamed (Tributary to Plum Creek)	1	LF03	0	2.21	2.21	None	N		
3000022	Unnamed (Un Creek)	1	LF01	0	8.35	8.35	None	N		
410050	Unnamed (Thornberry Creek)	1	LF05	0	1.43	1.43	None	N		
410000	Unnamed (Lancaster Creek)	2	LF05	4.61	10.9	6.29	None	N		
410000	Unnamed (Lancaster Creek)	1	LF05	0	4.61	4.61	None	N		
90700	Kewaunee River (Kewaunee River)	5	TK03	16.36	27.89	11.53	None	Y	PCBs	Contaminated Fish Tissue
71900	Unnamed (Unnamed Creek (T20n R22e S20 NE SE))	1	MA03	0	5	5	None	N		
72300	Unnamed (Unnamed Creek (T21n R21e S21))	1	MA03	0	1.5	1.5	None	N		
101200	Gilson Creek (Gilson Creek)	1	TK07	0.4	3.99	3.59	None	N		
92200	School Creek (School Creek)	2	TK03	5.6	14.14	8.54	None	N		
88200	Neshota River (Neshota River)	2	TK01	3	17.22	14.22	None	Y	Total Phosphorus	Water Quality Use Restrictions
410900	Suamico River (Suamico River)	2	GB01	4	16	12	None	N		
411400	North Branch Suamico River (North Branch Suamico River)	1	GB01	0	5	5	None	N		
410100	Beaver Dam Creek (Beaver Dam Creek)	1	LF05	0	4	4	None	N		
411500	Potter Creek (Potter Creek)	1	GB01	0	6	6	None	N		
411000	Haller Creek (Wilson Creek)	1	GB01	2.25	6.28	4.03	None	N		
124100	Apple Creek (Apple Creek)	2	LF02	3.99	23.88	19.89	None	Y	Total Phosphorus, Sediment/Total Suspended Solids	Low DO, Elevated Water Temperature, Degraded Habitat
123400	South Branch Ashwaubenon Creek (South Branch Ashwaubenon Creek)	1	LF02	0	6	6	None	N		
122600	Hemlock Creek (Hemlock Creek)	1	LF02	0	7	7	None	N		

WBIC	Waterbody Name	Segment	Watershed	Start Mile	End Mile	Length/Size	ORW/ERW	303d List?	Pollutant	Impairment
125600	Unnamed (Unnamed Creek(T21n,R19e,S36))	1	LF03	0	2	2	None	N		
120500	Unnamed (Unnamed Creek(T22n,R20e,S31))	1	LF01	0	10	10	None	N		
120200	Unnamed (Birch Creek (T22n,R20e,S20))	1	LF01	0	4	4	None	N		
118400	Bower Creek (Bower Creek)	2	LF01	3	13	10	None	Y	Total Phosphorus, Sediment/Total Suspended Solids	Low DO, Degraded Habitat
118100	Baird Creek (Baird Creek)	1	LF01	0	3.5	3.5	None	Y	Total Phosphorus, Sediment/Total Suspended Solids	Low DO, Degraded Habitat
121200	Unnamed (Unnamed Creek(T21n,R20e,S18))	1	LF01	0	1	1	None	N		
118100	Baird Creek (Baird Creek)	2	LF01	3.5	13.1	9.6	None	Y	Total Phosphorus, Sediment/Total Suspended Solids	Low DO, Degraded Habitat
92200	School Creek (School Creek)	1	TK03	0	5.6	5.6	None	N		
91000	Scarboro Creek (Scarboro Creek)	4	TK03	7	15	8	None	N		
92500	Unnamed (Unnamed Trib (T25n, R23e, S33))	1	TK03	0	6	6	None	N		
89200	Unnamed (Langes Corners Creek (Unnamed Trib T22n, R22e, S15 SW NE))	1	TK01	0	3.42	3.42	None	N		
89900	Devils River (Devils River)	2	TK01	6	15.77	9.77	None	N		
89300	Unnamed (T22n, R22e, S15 NW NE(Langes Corner))	1	TK01	0.01	4.28	4.27	None	N		
89500	Unnamed (Unnamed Trib T22n, R22e, S03 SE SW)	1	TK01	0	9	9	None	N		
89700	Unnamed (Unnamed Trib T22n, R22e, S05 SE NE)	1	TK01	0	1.27	1.27	None	N		
89400	King Creek (King Creek)	1	TK01	0	5.65	5.65	None	N		
88900	Unnamed (Unnamed Trib T22n, R22e, S25 NW SW)	1	TK01	0	3.71	3.71	None	N		
88200	Neshota River (Neshota River)	1	TK01	0	3	3	None	N		

Total Waters – Lakes

WBIC	Waterbody Name	Watershed	Length/Size (Acres)	ORW/ERW	303d List?
5542104	Unnamed (Local Water)	GB01	3.07	None	N
5546342	Unnamed (Local Water)	LF05	1.52	None	N
5546474	Unnamed (Local Water)	LF01	3.85	None	N
5590549	Unnamed (Local Water)	LF01	12.67	None	N
5547788	Unnamed (Local Water)	LF02	2.57	None	N
5549953	Unnamed (Local Water)	TK01	3.72	None	N
5547065	Unnamed (Local Water)	LF01	11.02	None	N
5542649	Unnamed (Local Water)	GB01	12.1	None	N
5542574	Unnamed (Local Water)	GB01	12.97	None	N
5543311	Unnamed (Local Water)	GB01	2.78	None	N
5543348	Unnamed (Local Water)	GB01	2.21	None	N
5543559	Unnamed (Local Water)	GB01	22.95	None	N
5543303	Unnamed (Local Water)	GB01	18.18	None	N
5543620	Unnamed (Local Water)	GB01	2.26	None	N
5543811	Unnamed (Local Water)	LF01	7.39	None	N
5543843	Unnamed (Local Water)	LF01	2.83	None	N
5544034	Unnamed (Local Water)	LF01	19.58	None	N
5544519	Unnamed (Local Water)	LF05	2.64	None	N
5545408	Unnamed (Local Water)	TK03	4.47	None	N
5545033	Unnamed (Local Water)	LF01	5.16	None	N
5545707	Unnamed (Local Water)	LF05	5.35	None	N
5546415	Unnamed (Local Water)	LF01	2.4	None	N
5546438	Unnamed (Local Water)	LF01	2.29	None	N
5546574	Unnamed (Local Water)	LF01	2.54	None	N
5546591	Unnamed (Local Water)	LF01	4.38	None	N
5546458	Unnamed (Local Water)	LF01	2.52	None	N
5546471	Unnamed (Local Water)	LF01	2.25	None	N
5547426	Unnamed (Local Water)	TK01	3.92	None	N
5547475	Unnamed (Local Water)	TK01	3.67	None	N
5547166	Unnamed (Local Water)	LF01	3.98	None	N
5547622	Unnamed (Local Water)	TK01	2.58	None	N
5547636	Unnamed (Local Water)	TK01	2.46	None	N

WBIC	Waterbody Name	Watershed	Length/Size (Acres)	ORW/ERW	303d List?
5547641	Unnamed (Local Water)	TK01	10.19	None	N
5547304	Unnamed (Local Water)	TK01	6.55	None	N
5547317	Unnamed (Local Water)	TK01	3.53	None	N
5547389	Unnamed (Local Water)	TK01	2.76	None	N
5547709	Unnamed (Local Water)	TK01	5.77	None	N
5547717	Unnamed (Local Water)	TK01	3.43	None	N
5547833	Unnamed (Local Water)	TK01	4.46	None	N
5549237	Unnamed (Local Water)	TK01	2.94	None	N
5549238	Unnamed (Local Water)	LF01	2.97	None	N
5549690	Unnamed (Local Water)	TK01	3.98	None	N
5550520	Unnamed (Local Water)	TK01	2.58	None	N
5550279	Unnamed (Local Water)	TK01	3.35	None	N
5551544	Unnamed (Local Water)	TK01	2.67	None	N
5552242	Unnamed (Local Water)	MA03	6.95	None	N
5584635	Unnamed (Local Water)	GB01	25.78	None	N
5591002	Unnamed (Local Water)	LF05	4.89	None	N
5591006	Unnamed (Local Water)	LF01	11.01	None	N
907000175	Invalid WBIC. Not in ROW (Local Water)	LF01	2.08	None	N
5591395	Unnamed (Unnamed Lake)	GB01	36.86	None	N
5591396	Unnamed (Unnamed Lake)	GB01	5.75	None	N
5591397	Unnamed (Unnamed Lake)	GB01	8.24	None	N
124400	Unnamed (Un Lake)	LF02	2.24	None	N
408900	Unnamed (Un Lake)	LF05	0.93	None	N
117800	Bay Beach Lagoons (Bay Beach Lagoons)	LF01	49.76	None	N
121100	Un Spring (Unnamed)	LF01	1.29	None	N
411300	Unnamed (Unnamed Lake)	GB01	5.09	None	N
120700	Un Spring (Unnamed)	LF01	0.67	None	N
120000	Un Spring (Unnamed)	LF01	1.79	None	N
409600	Unnamed (Lake Michigan)	LF01	61.7	None	N
120100	Un Spring (Unspring)	LF01	1.6	None	N
120300	Un Spring (Un Spring)	LF01	0.67	None	N
122500	Un Spring (Unnamed)	LF02	0.5	None	N
3000065	Unnamed (Un Lake)	LF05	5.56	None	N
121400	Unnamed (Un Lake)	LF01	0.44	None	N
89000	Unnamed (Un Lake)	TK01	1.13	None	N

WBIC	Waterbody Name	Watershed	Length/Size (Acres)	ORW/ERW	303d List?
115800	Unnamed (Un Lake)	LF01	1.15	None	N
119900	Unnamed (Un Lake)	LF01	1.67	None	N
116000	Unnamed (Un Lake)	LF01	10.08	None	N
115900	Unnamed (Un Lake)	LF01	2.55	None	N
410300	Unnamed (Un Lake)	LF05	1.01	None	N
409400	Unnamed (Un Lake)	LF05	1.08	None	N
409200	Unnamed (Un Lake)	LF05	2.15	None	N
409100	Unnamed (Un Lake)	LF05	1.3	None	N
409000	Unnamed (Un Lake)	LF05	3.07	None	N
93800	Unnamed (Un Lake)	LF01	3.29	None	N
409300	Unnamed (Un Lake)	LF05	0.83	None	N
409500	Unnamed (Un Lake)	GB01	0.52	None	N
89800	Third Lake (Third Lake)	TK01	5	None	N
83000	Middle Lake (Middle Lake)	TK01	7	None	N
82900	Lilly Lake (Lilly Lake)	TK01	40	None	N
	Lake Michigan (Inner Bay)		13,777		

Appendix B

Local, State and Federal Partners

Wisconsin Department of Natural Resources
Wisconsin Department of Agriculture, Trade and Consumer Protection
United States Department of Agriculture-Natural Resources Conservation Service
United States Department of Agriculture –Farm Services Agency
United States Fish and Wildlife Service
United States Environmental Protection Agency
Ducks Unlimited
The Nature Conservancy
The Great Lakes Commission
Fox-Wolf Watershed Alliance
NEW Water (Green Bay Metropolitan Sewerage District)
Bay-Lake Regional Planning Commission
National Fish and Wildlife Foundation
Alliance for the Great Lakes
University of Wisconsin-Green Bay
University of Wisconsin-Extension
Oneida Tribe of Indians of Wisconsin
Green Bay Area Chapter of Great Lakes Sport Fishermen
Village of Suamico
Izaak Walton League of Brown County
Baird Creek Preservation Foundation
Town of Pittsfield
Oconto, Outagamie and Calumet Counties
Brown County Parks