

Waukesha County Land and Water Resource Management Plan 2012 Update



**Waukesha County
Department of Parks & Land Use
Land Resources Division**

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2012 Update**



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Land Resources Division**

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This plan is also available for viewing and downloading at:
www.waukeshacounty.gov/landandwaterplan

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Robert Bartholomew – Farmer, Town of Vernon
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Cover graphic: Fue Yang, Waukesha County Information Technology

Executive Summary

The Waukesha County Land and Water Resource Management (LWRM) Plan is a long-range planning document intended to guide the activities of the Land Resources Division (LRD) in its efforts to protect and improve local land and water resources for the next 10 years. This plan is mandatory for all counties under s. 92.10 Wisconsin Statutes, with more specific planning requirements contained in Chapter ATCP 50 Wisconsin Administrative Code. In general terms, this plan must describe how Waukesha County will help meet federal and state clean water goals while addressing other local natural resource issues.

Chapter I (Introduction) provides background on the LWRM planning process and how it relates to other local plans and natural resource programs. Chapter II (Resource Assessment) reviews the state of natural resources in Waukesha County, including the classification of various soil and water resources and an evaluation of the major watersheds in the county. This data is used in the rest of the document to plan the direction for future program efforts in this third generation LWRM Plan for Waukesha County. The first LWRM plan was adopted by the Waukesha County Board in 1999 as a prototype for the redesigned state program. The second generation LWRM Plan was adopted by the County Board in 2006 and is being updated through this document.

Planning Process and Goals

The plan goals from the 2006 LWRM Plan update were developed through an extensive nominal group process from two citizen advisory committees - one with an urban focus and one with a more rural perspective. To stay true to this process, those goals were only slightly modified to form the foundation for this 2012 plan update. The plan goals are listed below along with the percentage of LRD staff time allocated toward each goal:

1. Control Urban Runoff Pollution and Flooding (41%)
2. Protect the Quality and Quantity of Groundwater (6%)
3. Control Agricultural Runoff Pollution (13%)
4. Educate the Public on Conservation Issues (19%)
5. Preserve Targeted Farmland and Natural Areas (4%)
6. Support Water Monitoring and Improve Public Access to Water Resource Data (14%)
7. Reclaim Active Nonmetallic Mining Sites (3%)

Chapter III, the focal point of this plan, provides some background information on each of these goals, followed by more specific objectives and planned activities for each. It should be noted that the percentages shown above do not adequately represent the overlap that occurs between the goals. For example, the protection of groundwater (Goal #2) and natural areas (Goal #5) are both critical components of urban storm water regulations administered under Goal #1, where staff time is counted.

Assisting with the preparation of this 2012 plan update was a citizen advisory committee made up of a combination of the two groups from the 2006 plan. This committee (see previous page for a list of members) was sent a draft of Chapter III and later met to exchange comments and ideas, which have been incorporated into the final draft presented herein. A public informational meeting and hearing was also held on May 31, 2012, and the final plan approved by the Waukesha County Board on July 24, 2012 and the County Executive on July 30, 2012.

Nonpoint Pollution Control (Runoff)

Nonpoint sources of water pollution are the number one reason why water quality suffers in most lakes and streams in the state of Wisconsin and Waukesha County. This type of water pollution washes off the urban and rural landscapes during heavy rains or snowmelt periods and is carried directly to local water resources, usually with no treatment. Wisconsin has been a national leader in addressing this type of water pollution since 1979, and the redesign of the state nonpoint pollution control programs in the late 1990's

was the impetus to requiring county LWRM plans. Chapter NR 151, Wisconsin Administrative Code contains urban and agricultural nonpoint performance standards and prohibitions intended to meet water quality goals. Since counties are the primary local delivery system for state nonpoint programs, one of the key requirements for county LWRM plans is to describe local procedures that will be used to “ensure compliance” with state nonpoint pollution performance standards and prohibitions. These standards, and the procedures planned to implement them, are contained in Chapter IV and are briefly summarized below.

State nonpoint performance standards for rural areas focus on controlling agricultural runoff pollution from crop fields, animal feedlots, manure storage structures, and livestock pastures. This plan describes a systematic approach that will be used, including an information and education program, landowner contacts, land inventory/pollutant modeling, compliance notification, technical assistance, cost-sharing, and referring non-complying sites to DNR for enforcement, if necessary.

Urban nonpoint performance standards focus on controlling erosion from construction sites, managing post-construction runoff from parking lots, streets, buildings and other impervious areas, maximizing infiltration, maintaining vegetative buffers between impervious surfaces and water resources, and preventing polluted runoff through better land management. These standards are implemented through the county (and local) storm water and erosion control ordinances for new development projects, and MS4 storm water discharge permits for existing urban areas. Both of these methods rely on an effective information and education program that targets developers, engineers, contractors, municipal staff and the general public. To that end, Waukesha County has executed intergovernmental agreements with 25 local communities to implement a comprehensive storm water education program to help communities meet this part of the MS4 permit mandate. In a rapidly developing area like Waukesha County, implementing the urban nonpoint performance standards represents the single largest workload for the Land Resources Division.

Conclusion

This plan recognizes that water quality is a direct reflection of land use and management within its watershed and that groundwater and surface water are part of the same hydrologic system - and must be managed that way. Therefore, even though separate goals and objectives are listed for various target resources, the reality is that LRD program efforts are usually intimately intertwined with each other, as well as other programs, agencies and units of government. This is reflected in the large number of working agreements that the LRD has already executed with other groups.

This LWRM plan does not bring light to any “new” resource management issues or represent any shift in county policy or priorities relating to land and water conservation. Rather, it describes how limited county resources will continue to be focused on meeting water quality standards through a wide array of program methods, including education, technical assistance, cost-sharing grants, GIS technology, tax credits, low impact development, partnerships with other agencies and organizations, and regulation. Projected costs to continue existing programs, methods to track progress and impediments to plan implementation are all discussed in Chapter IV. The impediments include excessive state mandated cost-sharing requirements to control agricultural pollution and a continuous decline in state program grants to counties.

Surveys consistently show that clean water and natural resource protection are quality of life issues that are important to county residents and businesses alike. The vision of the Waukesha County Land and Water Resource Management Plan is to provide resource protection without sacrificing other county priorities, such as public safety and job growth. To that end, it is important that conservation programs adapt to changing conditions, but maintain focus on the long-term goals of natural resource protection for the benefit of all who live and work here - now and in the future.

Chapter I. Introduction

Land and Water Resource Management Plan Background

In the mid-1990's, the Wisconsin Legislature was interested in redesigning the state's nonpoint source water pollution abatement programs in order to address certain program shortfalls and looming financial issues. In 1996, during discussions among state agencies and the Wisconsin Land and Water Conservation Board, the Wisconsin Association of Land Conservation Employees (WALCE) proposed a locally led process based on County Land & Water Resource Management (LWRM) Plans. The proposal was to have the state adopt minimum nonpoint pollution performance standards and each county would describe how they will implement the standards through a LWRM plan. The implementation of these plans would be supported by a larger base allocation of grant funds to counties, rather than the previous competitive, and sometimes duplicative state grant processes, including the Priority Watershed Program (DNR) and the Soil and Water Resource Management Program (DATCP). The LWRM planning concept is based on the principle that local leaders and residents are best suited to identify and resolve local natural resource problems.

The WALCE proposal received support from state and federal conservation agencies, the Wisconsin Land and Water Conservation Board and state legislators, and the LWRM planning concept was subsequently signed into law as part of 1997 Wisconsin Act 27 (the 1997-1999 Biennial Budget Bill). Act 27 directed the Wisconsin Department of Natural Resources (DNR) to develop administrative rules that establish agricultural and non-agricultural performance standards to reduce nonpoint source pollution and meet water quality standards. The Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP) was directed to update Administrative Rule ATCP 50 to prescribe the conservation practices to implement the DNR performance standards and to redefine the grant programs available to counties to carry out their new duties.

LWRM plans are intended to function as a local planning process that assesses natural resource conditions and needs, guides decisions on how to meet water quality goals and conservation objectives, measures progress towards meeting those goals, and makes efficient use of local, state and federal resources. The initial round of "prototype" LWRM plans began in 1998, including Waukesha County, which was adopted by the County Board in 1999. The passage of 1999 Wisconsin Act 9 (1999-2001 Biennial Budget Bill) further amended state law by prescribing the minimum requirements of a LWRM plan, transferring county staffing grant funds from DNR to DATCP, and beginning the formal phase-out of the Priority Watershed Program. By 2002, all 72 counties in the state had approved LWRM plans prepared by following a guidance document produced by a statewide work team. In October 2002, after a contentious 5-year rule making process, a series of state administrative rules were finally promulgated by DATCP and DNR, implementing the requirements of 1997 Act 27 and 1999 Act 9. Most notable of this rule package were NR 151 (DNR), which contained the new agricultural and non-agricultural nonpoint pollution performance standards, and ATCP 50 (DATCP), which contained county LWRM planning and related grant requirements.

This is the third generation Land and Water Resource Management Plan for Waukesha County, serving as an update to the second generation plan, adopted by the County Board in March 2006. This plan has been prepared in accordance with the requirements under ATCP 50, and is intended to guide the Land Resources Division (LRD) program efforts for the next 10 years.

Plan Requirements

DATCP is statutorily responsible for approving LWRM plans. The Wisconsin Land and Water Conservation Board (LWCB) is responsible for reviewing all county LWRM plans and making approval recommendations to DATCP. In order to be approved, a plan must address the following:

- Assessment of county natural resources, including water quality and soil erosion conditions;

- Water quality objectives derived in consultation with the DNR;
- Applicable performance standards and prohibitions related to the control of soil erosion and water pollution from nonpoint sources;
- Conservation practices needed to meet water quality objectives and to address soil erosion problems;
- A plan to identify priority producers and livestock operations in the county;
- Use of state and local regulations to implement the county plan;
- Encouragement of voluntary implementation of conservation practices through county strategies;
- Procedures to ensure compliance with the nonpoint performance standards and prohibitions;
- A multi-year description of planned activities, including priorities and expected costs;
- A system to monitor the progress of activities described in the plan;
- Information and education related to soil and water resource management strategies;
- Coordination of activities described in the plan with programs of other local, state, and federal agencies;
- Notification of affected landowners and land users of findings about key problems and needed conservation practices;
- Public participation in the planning process, including an advisory committee, public hearing and county board approval.

Looking Back (Major Accomplishments since 2006)

Before planning for the next 10 years, it is important to look back at the previous Waukesha County LWRM plan adopted in 2006 and reflect on progress made and program changes that have occurred. The most prominent program change has been the issuance of Municipal Separate Storm Sewer System (MS4) storm water discharge permits, which has affected 31 of the 37 communities in the county, including Waukesha County itself. This permitting process has instituted major changes in the way communities think about infrastructure projects and pollution prevention. Nonpoint pollution is now a primary issue being addressed whenever a new building, parking lot or road project is discussed, instead of being an after-thought as only a few years ago. A more detailed description of the MS4 permit program and a list of affected communities are provided in Chapter IV.

A review of the planned activities from the 2006 LWRM plan shows that much progress has been made. While too numerous to list all of the accomplishments, some program highlights and significant accomplishments since 2006 are listed below:

- Issued 338 storm water permits and conducted over 4000 construction inspections in 12 communities, preventing water pollution over from 2,200 acres of construction sites;
- Completed Watershed Protection Plans for Pebble Creek and the Mukwonago River in cooperation with SEWRPC and citizen advisory committees;
- Became the first community in the state to receive “Authorized Local Program” status by the DNR, allowing county storm water permits to also provide DNR permit coverage under NR 216;
- Composted over 45,000 tons of community yard waste and demonstrated the use of compost in reclaiming the county gravel pit through a series of test plots and field tours;
- Developed a comprehensive county-wide storm water education program and executed intergovernmental agreements with 25 communities to implement the program under the MS4 storm water discharge permit requirements;
- Hosted 7 annual storm water workshops for developers, engineers, contractors and municipal officials, consistently filling the 100-person capacity room and receiving high evaluation ratings from participants;
- Completed soil and water conservation teacher training workshops for 221 teachers and completed classroom presentations on nonpoint pollution to over 8000 students;
- Sponsored an average of 25 volunteer teams monitoring stream water quality each year, and hosted annual training and recognition events for participants;

- Administered \$1.7 million in federal Emergency Assistance Program funds to 32 low-moderate income home owners who suffered flood damages in 2008;
- Developed and enforced a series of technical standards and soil investigation protocol to prevent basement flooding from surface and groundwater in new home construction;
- Developed a storm water database linked to the county GIS-web system and populated it with photos, as-built data and maintenance agreements for over 600 storm water BMPs;
- Wrote a model storm water BMP maintenance ordinance and hosted an all-day community workshop on the topic, including training for communities to log into the county storm water database to view and upload BMP inspection reports and other BMP information;
- Expanded/updated a robust storm water web page at www.waukeshacounty.gov/stormwater and a public educational web page at www.waukeshacounty.gov/cleanwater.
- Implemented storm water BMPs on 14 county infrastructure projects and developed pollution prevention plans for all 16 county owned facilities;
- Cost-shared the proper abandonment of 37 residential wells to protect groundwater;
- Developed a GIS database to record agricultural nonpoint compliance checks and mapped all livestock facilities in the county;
- Completed an update to the County Comprehensive Plan (2009) and Farmland Preservation Plan (2011) in cooperation with the Planning and Zoning Division;

Plan Development Process

The plan goals from the 2006 LWRM Plan update were developed through an extensive nominal group process from two citizen advisory committees, one with an urban focus and one with a more rural perspective. To stay true to this process, those goals were only slightly modified to form the foundation for this 2012 plan update. The LRD drafted background information on each of the goals along with updated objectives and planned activities for this 2012 update. Together, these formed Chapter III – Plan Goals, Objectives and Planned Activities, merging two chapters from the 2006 LWRM plan.

The draft Chapter III was sent to an advisory committee made up of a combination of the two citizen groups from the 2006 plan. Membership of the committee, as shown at the front of this plan, included representatives from other local conservation agencies and organizations. The advisory committee met on February 23, 2012 - one week after the mailing - to exchange comments and ideas on the draft. These comments have been incorporated into the final draft presented herein. A public informational meeting and hearing was also held on May 31, 2012. No comments were submitted. A copy of the public hearing announcement is found in Appendix D.

Relationship to Other Plans

As noted earlier, the goals and objectives described in this plan are often interrelated and involve many other agencies and organizations involved in natural resource management. Below is a list of other planning efforts that are related to and will be coordinated with the implementation of this plan.

Comprehensive Development Plan for Waukesha County (2009)

In 1999, the Wisconsin Legislature enacted a comprehensive development planning initiative. Commonly referred to as “Smart Growth” law, this initiative required any community that enforces a zoning ordinance to adopt a comprehensive plan by January 1, 2010 that is consistent with the zoning ordinance. In response to this law and the on-going need to update existing development plans, Waukesha County, in cooperation with 27 local communities, the Southeastern Wisconsin Regional Planning Commission (SEWRPC) and the University of Wisconsin-Extension (UWEX) completed a comprehensive development plan for Waukesha County in 2009. This plan serves as an update to A Development Plan for Waukesha County Wisconsin (1996 - SEWRPC Community Assistance Planning Report No. 209). Under state law, the county plan was required to incorporate comprehensive plans adopted by local communities, coordinating development between the 37 municipalities in the county. The plan includes an analysis of population, economy,

housing, land use, natural and cultural resources, transportation, community facilities and intergovernmental cooperation. An annual plan update process was also adopted with the plan, which incorporates changes to the plan that are consistent with the adopted planning standards. A copy of the Waukesha County Comprehensive plan is available on the county web site:

www.waukeshacounty.gov/comprehensiveplan.

Waukesha County Farmland Preservation Plan (2011)

The Wisconsin Legislature adopted significant changes to the state's Farmland Preservation law (Chapter 91 Wis. Stats.) in 2009, commonly referred to as the "Working Lands Initiative". Under these law revisions, every county in the state was required to update their Farmland Preservation Plan, and two new preservation tools were made available – Agricultural Enterprise Areas and Purchase of Agricultural Easement (PACE) grants. Waukesha County completed their plan update in 2011 in accordance with the law, and incorporated the plan as Appendix D to the 2009 Waukesha County Comprehensive Plan. As part of this process, the LRD completed a 2010 inventory of agricultural lands in the county, which is presented in Chapter II. The Farmland Preservation Plan identified farmland to be preserved for agricultural uses in three towns in the county, which made those designated landowners eligible for the Farmland Preservation income tax credit. A copy of the adopted farmland preservation map is presented in Chapter IV.

Regional Water Quality Management Plans (208 Plans)

In 1974, the Southeastern Wisconsin Regional Planning Commission was designated as the water quality planning agency for southeastern Wisconsin pursuant to the terms of Section 208 of the Federal Water Pollution Control Act (P.L. 92-500) also known as the "Clean Water Act". In 1975, the SEWRPC initiated preparation of the Regional Water Quality Management Plan for Southeastern Wisconsin – 2000, which was formally adopted in 1979.

In 1995, the SEWRPC published an update and status report to the original regional water quality management plan. This report describes the implementation activities that had occurred since adoption of the original plan, identified progress on meeting the water quality objectives, and identified issues still needing to be addressed in the ongoing planning process. In 2007, SEWRPC completed 208 plan updates for the Milwaukee River and Root River watersheds in Waukesha County.

Regional Water Supply Planning

SEWRPC recently completed a three-phased multi-agency effort to inventory local groundwater resources, develop a regional groundwater model, and develop and publish a Regional Water Supply Plan for Southeast Wisconsin (2010). The plan is based upon an adopted regional comprehensive plan design year of 2035, recommends a sustainable water supply for every community in southeast Wisconsin. This plan includes several recommendations that affect LRD programs, including encouraging water conservation, infiltration of runoff and protection of groundwater quality from polluted runoff. A copy of the plan is available for purchase or public viewing on the SEWRPC web site:

www.sewrpc.org/SEWRPC/Environment/RegionalWaterSupplyPlan.htm.

Regional Storm Water Management and Watershed Protection Plans

Many communities are investing in regional storm water management planning to coordinate new developments with existing storm water systems, plan for system upgrades or to satisfy state MS4 storm water discharge permit requirements. Storm water management planning by watershed rather than by individual parcel during the development process allows a community to consider the cumulative downstream impacts of land use and storm water management decisions prior to development. This type of up-front planning can also help coordinate activities between local units of government within the same watershed. Watershed protection planning takes this process a step further. This gets communities to work together toward a common goal of protecting a particular water resource by coordinating land use and storm water planning along with related program efforts within a watershed. Storm water planning by watershed is also used to determine options for reducing runoff pollution from existing development, which may be required to satisfy municipal storm water discharge permits under NR 216 Wis. Admin. Code.

The LRD has assisted SEWRPC in preparing watershed protection plans for the Pebble Creek, Mukwonago River, and Pewaukee River Watersheds.

Basin Water Quality Management Plans

The Department of Natural Resources (DNR) also prepares area-wide water quality management plans for drainage basins encompassing Waukesha County. Waukesha County contains portions of five major watershed basins: the Illinois Fox River, Milwaukee River, Root-Pike Rivers, and the Upper and Lower Rock River basins, as shown in Map II-9. During the preparation of this plan, the most recent “State of the Basin” reports prepared by the DNR were reviewed and the recommendations incorporated as appropriate.

Priority Watershed Plans

From 1979 to 2005, the DNR administered the Nonpoint Source Water Pollution Abatement Program, resulting in the preparation of Priority Watershed plans for several watersheds in Waukesha County. These include the Root River (1980), the Oconomowoc River (1986), the Menomonee River (1991), the Upper Fox River (1993) and the Muskego-Wind Lakes watersheds (1994). Upon adoption, these plans became subset amendments to the Regional Water Quality Plans. The watershed plans identified resource issues of concern and recommended specific nonpoint source pollutant reduction goals by subwatershed. State grants for technical assistance and cost-share dollars were made available to encourage landowners to install conservation practices for water quality improvement. Counties were a primary local delivery system for the program and were provided grants for conservation staff and program support. As noted in the introduction section of this plan, this program was redesigned by the state legislature in 1997-1999 and state funding for watershed projects was phased out by the end of 2005. Additional information regarding these watersheds is provided in Chapters II and III of this plan.

Lake Management Plans

Sixteen lake organizations in Waukesha County have organized lake districts under Chapter 33 of the Wisconsin Statutes. The largest lake in the county, Lake Pewaukee, has an active sanitary district. Many of the other lakes have active lake associations. Collectively these groups represent thousands of county residents who have a vested interest in protecting and improving water quality. Through grants made available through the DNR and other sources, many of these groups have prepared water quality management plans, aquatic plant management plans, lake protection and recreational use plans to address specific concerns on a particular water resource. Many of the activities identified in these plans complement activities identified in the Land and Water Resource Management Plan. During lake management planning and implementation, LRD staff regularly provides technical information, educational services or other resources to the various lake organizations, especially related to storm water runoff.

Total Maximum Daily Load (TMDL) Plans

TMDL plans is a federally mandated watershed planning program under the Clean Water Act designed to improve water quality in lakes and streams that are not meeting water quality standards. A list of these water resources is called the 303(d) list, named after the applicable section of the federal law. This list is updated every two years by the DNR and reported to the EPA. Under the TMDL planning process, water quality of a specific stream is measured and a plan is developed which establishes the maximum amount of pollution the stream can tolerate to meet water quality standards and water use objectives. Through extensive modeling, a TMDL plan “allocates” tolerable pollutant discharges between point and nonpoint sources throughout the watershed. During plan implementation, pollutant trading can occur between sources. The DNR encourages counties to act as “brokers” of the pollutant trading that can occur. An example is a sewage treatment plant paying for nutrient management planning or a manure storage facility on a farm upstream. A TMDL plan may affect the minimum state nonpoint pollution control standards for both urban and agricultural areas, and therefore may affect other goals in this plan. As of 2012, TMDL plans are being written for the Upper Rock River and Milwaukee River watersheds.

Coordination with Other Agencies and Partners

During the preparation of this plan, other agencies with a focus on natural resource protection were consulted and given the opportunity to comment on the content and focus of the plan. In particular the DNR was consulted on the priorities contained in the basin water quality management plans. The Natural Resources Conservation Service (NRCS) was also given the opportunity to provide their input. Both of these agencies were also members of the LWRM Plan Advisory Committee. Presently the LRD and NRCS for Waukesha County are co-located in the Waukesha County Administration Center with the LRD and have daily interaction on conservation related activities around the county. Other conservation partners either participated on the LWRM Plan Advisory Committee or were invited to participate, as shown in Appendix C.

Related Waukesha County Ordinances

Chapter 14 and the Appendices of the Waukesha County Code of Ordinances contain the following ordinances related to management of land and water resources in Waukesha County. A complete copy of the following may be viewed at: www.waukeshacounty.gov/landconservation.

Storm Water Management and Erosion Control Ordinance

The Waukesha County Storm Water Management and Erosion Control Ordinance was most recently updated by the Waukesha County Board in March of 2005. The new version of the ordinance incorporated the standards of the Department of Natural Resources administrative rule NR 151 for non-agricultural runoff control. The purpose of the ordinance is to establish regulatory requirements for land development and land disturbing activities aimed to minimize the threats to public health, safety, welfare and the natural resources of Waukesha County from construction site erosion and post-construction storm water runoff. The LRD administers this ordinance in all unincorporated areas of the county. More details are provided in Chapters III and IV.

Nonmetallic Mining Reclamation Ordinance

The Waukesha County Nonmetallic Mining Reclamation ordinance was adopted in July of 2001. The ordinance is intended to establish effective standards for nonmetallic mine reclamation in accordance with uniform statewide standards under NR 135. The reclamation requirements are intended to rehabilitate nonmetallic mining sites, protect the environment and allow for other post-mining land uses. The LRD administers the ordinance in portions of the county and currently has 16 operations under permit. In addition, some local units of government have adopted their own ordinances based on the statewide model. More details on the location of regulated sites and the communities that have adopted ordinances are provided in Chapter II.

Animal Waste Management Ordinance

The Waukesha County Animal Waste Management Ordinance, initially adopted by the Waukesha County Board of Supervisors in 1987, regulates the design, construction, alteration, and use of animal waste storage facilities. This ordinance is administered by the LRD. A landowner must obtain a permit for constructing, enlarging, or substantially altering an animal waste storage facility. Facilities must be constructed in accordance with Natural Resource Conservation Service Technical Guide standards.

Waukesha County Zoning Code

The Zoning Code applies to the Townships of Genesee, Oconomowoc, Ottawa and Vernon. The Code is designed to provide standards for land development to provide for adequate sanitation, drainage, safety, convenience of access, the preservation and promotion of the environment, property values and general attractiveness. The LRD often provides technical assistance to zoning staff relating to erosion control, storm water management, soil investigations and basement flooding related issues.

Shoreland and Floodland Protection Zoning Ordinance

The Shoreland and Floodland Zoning Ordinance is state mandated under Chapter NR 115 to protect or improve the quality and aesthetics of lakes and streams. It generally applies to lands in unincorporated Townships and annexed lands within 1,000 feet of a lake and 300 feet of a river or stream and is administered by the Planning and Zoning Division. The LRD often provides similar technical assistance as noted under the zoning code and will assist with updating the code to meet recent revisions to NR 115, including restrictions on impervious surfaces and mitigation planning.

Plan Review and Approval

Following the review of the draft Land and Water Resource Management plan by the advisory committees on February 23, 2012, and the public hearing on May 31, 2012, the plan was presented to the Waukesha County Land Use, Parks and Environment Committee and the Waukesha County Board of Supervisors. At their meeting on July 24, 2012 the Waukesha County Board of Supervisors adopted a resolution of approval for the Waukesha County Land and Water Resource Management Plan - 2012 Update. This resolution was then forwarded to the Waukesha County Executive who approved it on July 30, 2012 (See Appendix F).

In accordance with state law, this plan was also reviewed by the Wisconsin Department of Natural Resources (DNR), the Department of Agriculture, Trade, and Consumer Protection (DATCP) and the Land and Water Conservation Board (LWCB). The LWCB recommended approval at their meeting on June 5, 2012. The plan was also forwarded to the DATCP Secretary who signed an order approving the Waukesha County Land and Water Resource Management Plan - 2012 Update on August 28, 2012 (See Appendix G).

Chapter II. Resource Assessment

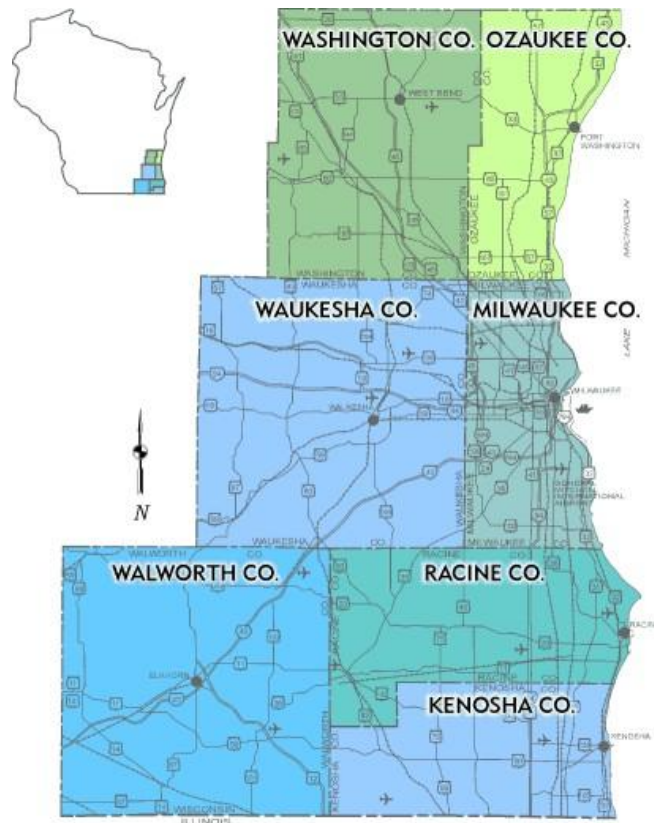
Introduction

Waukesha County is a rapidly urbanizing county bordering the west side of Milwaukee in southeastern Wisconsin, as shown in Figure II-1 below. The county is made up of 16 survey townships, covering approximately 580 square miles or 371,600 acres. Located within its borders are 37 municipalities, including 7 cities, 18 villages and 12 towns, as shown in Map II-1.

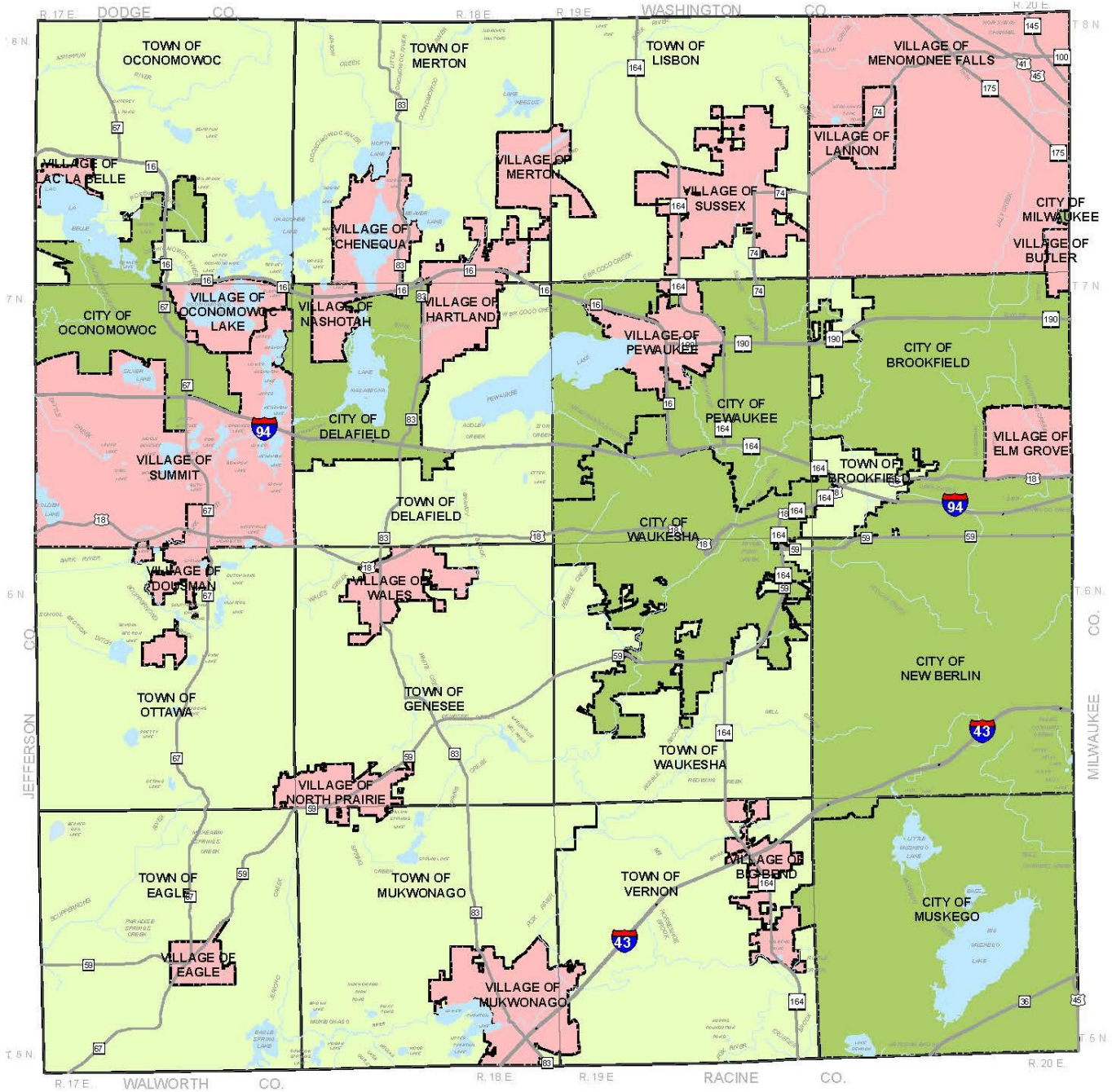
The natural resource base of Waukesha County is one of the most important factors influencing the quality of life and the economy for residents within the county and the region. Without sufficient understanding and recognition of the character and importance of the various elements of the natural resource base, human use and alteration of the natural environment proceeds at the risk of excessive costs in terms of both monetary expenditures and environmental degradation. A sound and meaningful planning effort must therefore acknowledge that natural resources are limited, and that land use decisions be properly adjusted to the natural resource base so that serious and costly environmental problems can be avoided.

This chapter presents descriptive information pertaining to the natural resource base of Waukesha County. This information was used by the LRD and the LWRM Plan Advisory Committees as a basis for identifying resource concerns and generating the goals and objectives presented in Chapter III.

Figure II-1
Location of Waukesha County



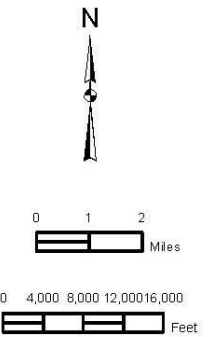
Map II-1 Waukesha County Municipalities



Legend

- VILLAGES
- CITIES
- TOWNS

Source: Waukesha County



Population

Current population estimates for the 37 municipalities and a cumulative total for the county are shown in Table II-1 below. Figure II-2 shows the population growth in Waukesha County between 1960 and 2010, as well as projections for 2035. Figure II-3 shows the number of households (see Appendix for definition) during this same time period. A projection of population and households is important for land use and public facility planning. Households directly influence the demand for urban land as well as the demand for transportation and other public facilities and services. Note that while the population of the county is projected to increase by 24% to 446,800 by 2035, the number of households is projected to increase by 29% to 174,100 due to the projected lower number of persons per household.

**Table II-1
2011 Estimated Municipal Populations in Waukesha County**

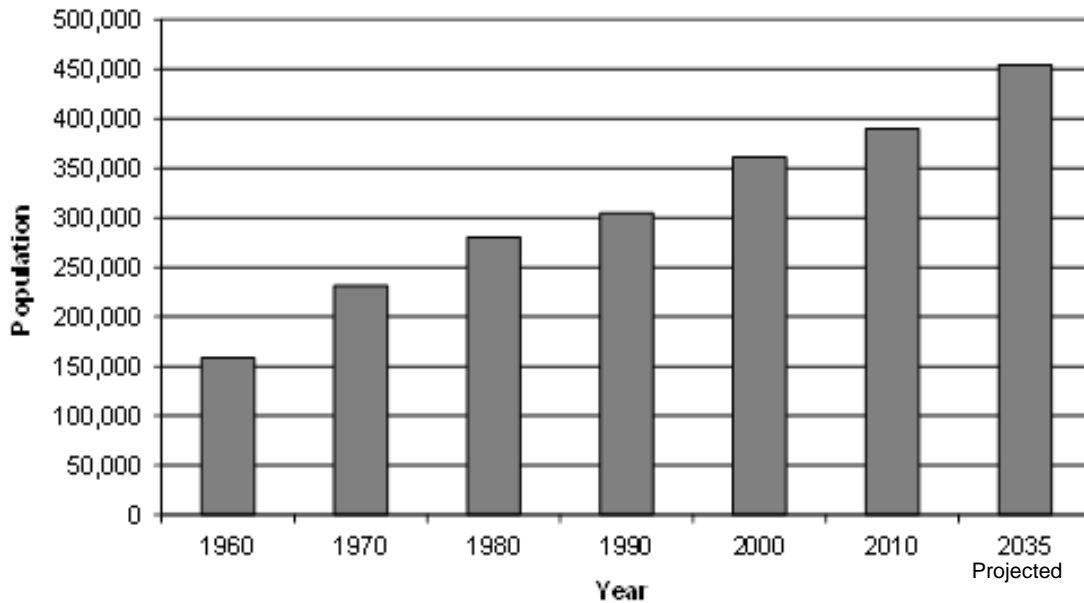
Municipality		2011 Population Estimates	Municipality		2011 Population Estimates
Town of:	Brookfield	6,109	Village of:	Big Bend	1,290
	Delafield	8,374		Butler	1,840
	Eagle	3,510		Chenequa	589
	Genesee	7,331		Dousman	2,304
	Lisbon	10,174		Eagle	1,948
	Merton	8,353		Elm Grove	5,941
	Mukwonago	7,972		Hartland	9,115
	Oconomowoc	8,474		Lac La Belle	290
	Ottawa	3,867		Lannon	1,106
	Vernon	7,600		Menomonee Falls	35,675
	Waukesha	9,133		Merton	3,364
City of:	Brookfield	37,890	Mukwonago	7,272	
	Delafield	7,092	Nashotah	1,391	
	Muskego	24,168	North Prairie	2,146	
	New Berlin	39,594	Oconomowoc Lake	595	
	Oconomowoc	15,805	Pewaukee	8,159	
	Pewaukee	13,294	Summit	4,671	
	Waukesha	70,735	Sussex	10,552	
			Wales	2,544	
				Waukesha County Total	390,267

Source: Wisconsin Department of Administration

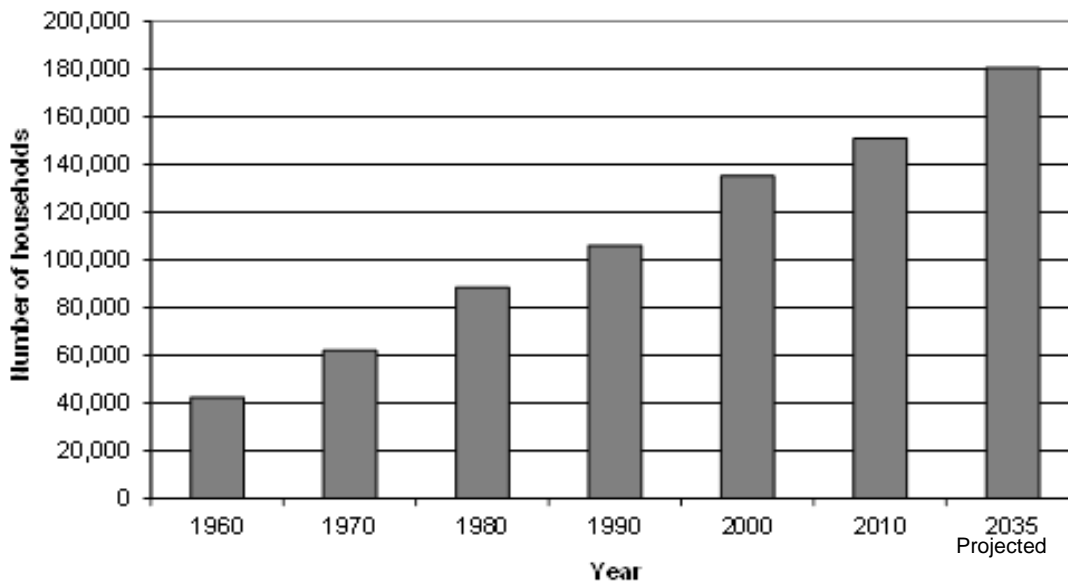
The population and household projections were generated by the Southeastern Wisconsin Regional Planning Commission (SEWRPC) as part of the regional land use planning process. These estimates include natural increases in population (births/deaths) and net in-migration to the county from other areas, and represent the intermediate of three projections prepared by SEWRPC.

Figure II-3 shows that the number of households in the County increased by 42% between 1990 and 2010, representing a significant demand for land in the county, especially in the unsewered communities.

**Figure II-2
Historical and Projected Population for Waukesha County: 1960-2035**



**Figure II-3
Historical and Projected Number of Households for Waukesha County: 1960-2035**



The remainder of this chapter will review the natural resource features and land use of the county. It should be noted that impacts on many of these resources have been and will continue to be directly or indirectly influenced by the population data presented above.

Geology and Physiography

Topographic elevation in Waukesha County, as depicted in Map II-2, ranges from approximately 730 feet above mean sea level in the extreme eastern portions of the County along tributaries of the Menomonee

River in Brookfield, Elm Grove, and Menomonee Falls, to 1,233 feet at Lapham Peak in the Town of Delafield, a variation of over 500 feet. Most of the high points in the County are located along the Kettle Moraine stretching southwest from the Town of Merton to the Town of Eagle.

Four major stages of glaciation, the last of which was the Wisconsin stage, ending approximately 10,000 years ago in the State, have largely determined the physiography, topography, and soils of Waukesha County. As noted above, the dominant physiographic and topographic feature in Waukesha County is the Kettle Moraine, an interlobate glacial deposit formed between the Green Bay and Lake Michigan lobes of the continental glacier that moved in a generally southerly direction from its origin in what is now Canada. The Kettle Moraine, which is oriented in a general northeast-southwest direction across the western half of the county, is a complex system of kames, or crudely stratified conical hills; kettle holes formed by glacial ice blocks that became separated from the ice mass and melted to form depressions and small lakes as the meltwater deposited material around the ice blocks; and eskers, long, narrow ridges of drift deposited in abandoned drainageways. The remainder of the County is covered by a variety of glacial landforms and features, including various types of moraines, drumlins, kames, outwash plains, and lake basin deposits.

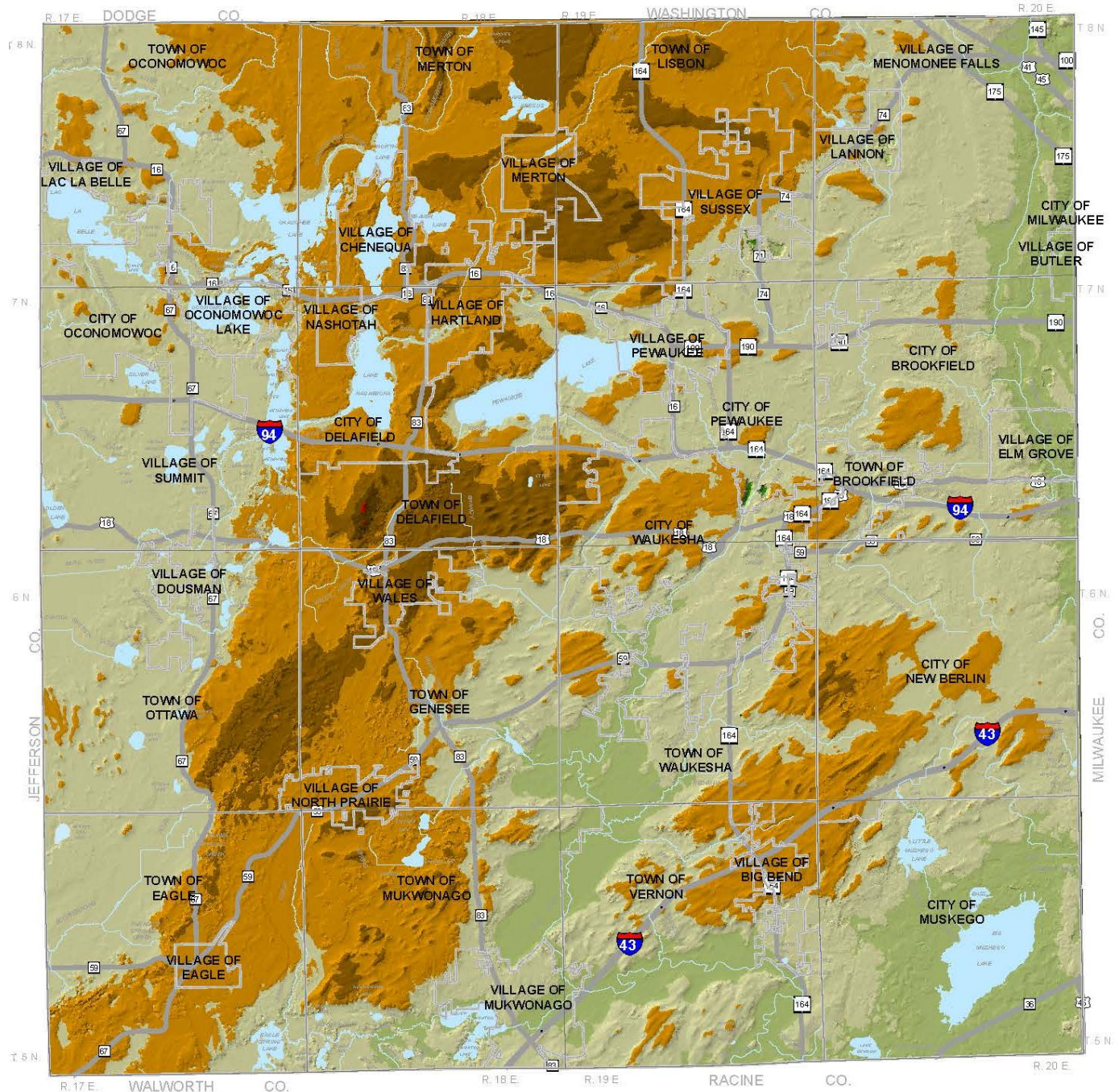
The combined thickness of unconsolidated glacial deposits, alluvium, and marsh deposits overlying bedrock exceeds 50 feet throughout most of the County, as shown in Map II-3. Thicknesses are greatest where glacial materials fill the bedrock valleys and in areas of topographic highs formed by end moraines. The most substantial glacial deposits, from 300 to 500 feet thick, are located in the northwestern part of the County in the lakes area and in portions of the Towns of Mukwonago and Vernon. The thinnest glacial deposits, often less than 20 feet thick, are found along an approximately six-mile-wide band traversing the County in a northeasterly direction from the Village of Eagle to the Villages of Lannon and Menomonee Falls.

Bedrock Geology

Bedrock topography was shaped by preglacial and glacial erosion of the exposed bedrock. The consolidated bedrock underlying Waukesha County generally dips eastward at a rate of about 10 feet per mile. The bedrock surface ranges in elevation from about 900 feet above mean sea level, at Lapham Peak, to approximately 500 feet above mean sea level in the eastern portion of the County. The bedrock formations underlying the unconsolidated surficial deposits of Waukesha County consist of Precambrian crystalline rocks; Cambrian sandstone; Ordovician dolomite, sandstone, and shale; and Silurian dolomite. Figure II-4 shows a generalized cross-section of the bedrock geology of Waukesha County. The uppermost bedrock unit throughout most of the County is Silurian dolomite, primarily Niagara dolomite, underlaid by a relatively impervious layer of Maquoketa shale, which acts as an aquitard – minimizing groundwater movement into the underlying materials. This is discussed further in the groundwater section. In some of the pre-Pleistocene valleys in the southwestern and central portions of the County, however, the Niagara dolomite is absent and the uppermost bedrock unit is the Maquoketa shale.

Geologic properties can influence the manner in which land is used, since geologic conditions, including the depth to bedrock, can affect the cost and feasibility of building site development and provision of public facilities and infrastructure. As noted in the following sections, the geology of the county can also play a significant role in resource management issues, such as groundwater and mineral extraction.

Map II-2 Topography of Waukesha County

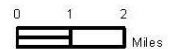


Legend

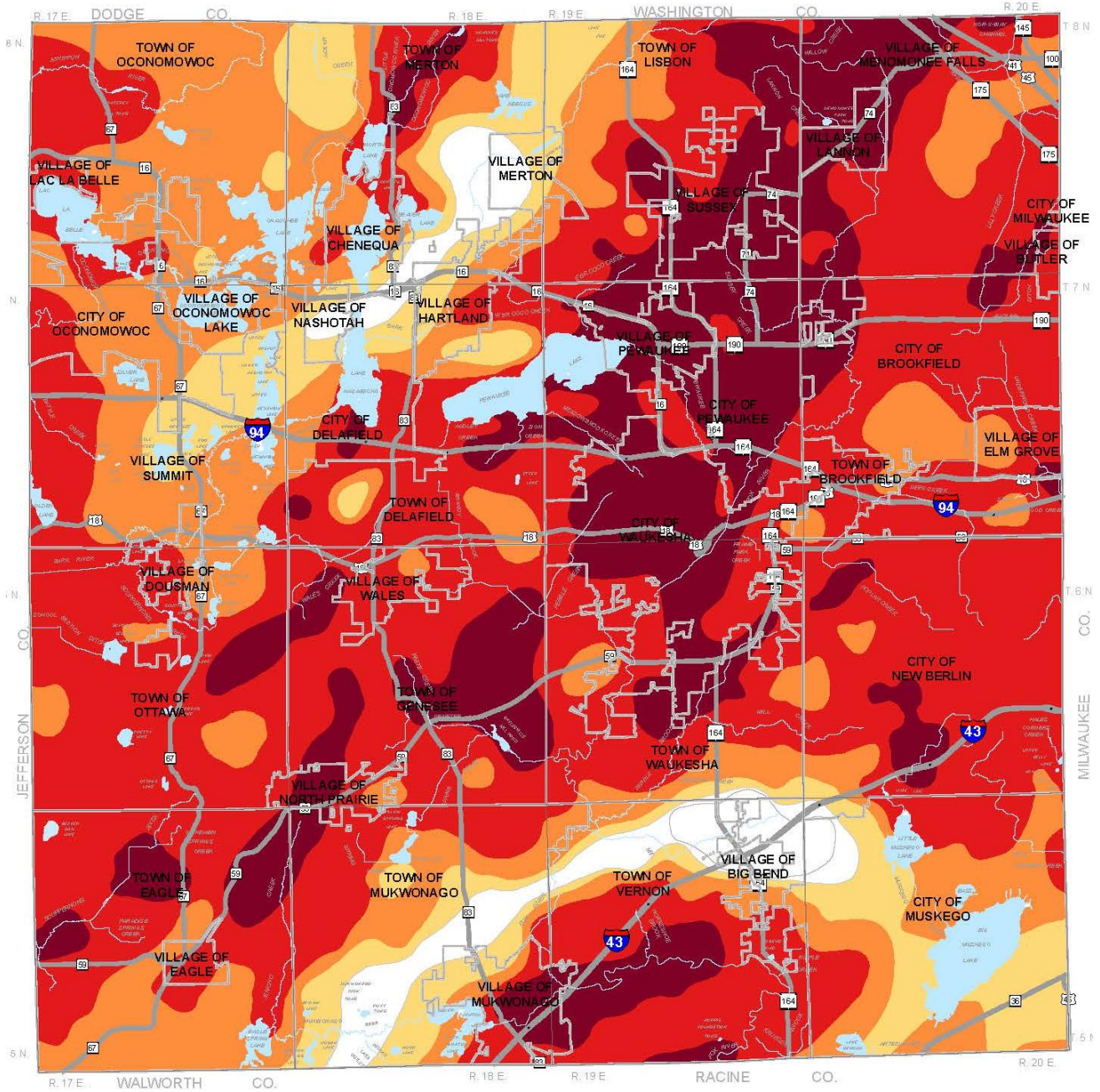
Elevation (In Feet)

- 1200 - 1232
- 1100 - 1200
- 1000 - 1100
- 900 - 1000
- 800 - 900
- 700-800
- <700

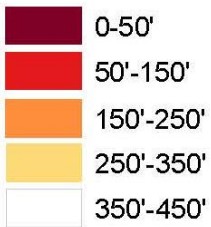
Source: Waukesha County



Map II-3 Generalized Depth to Bedrock: Waukesha County



Legend

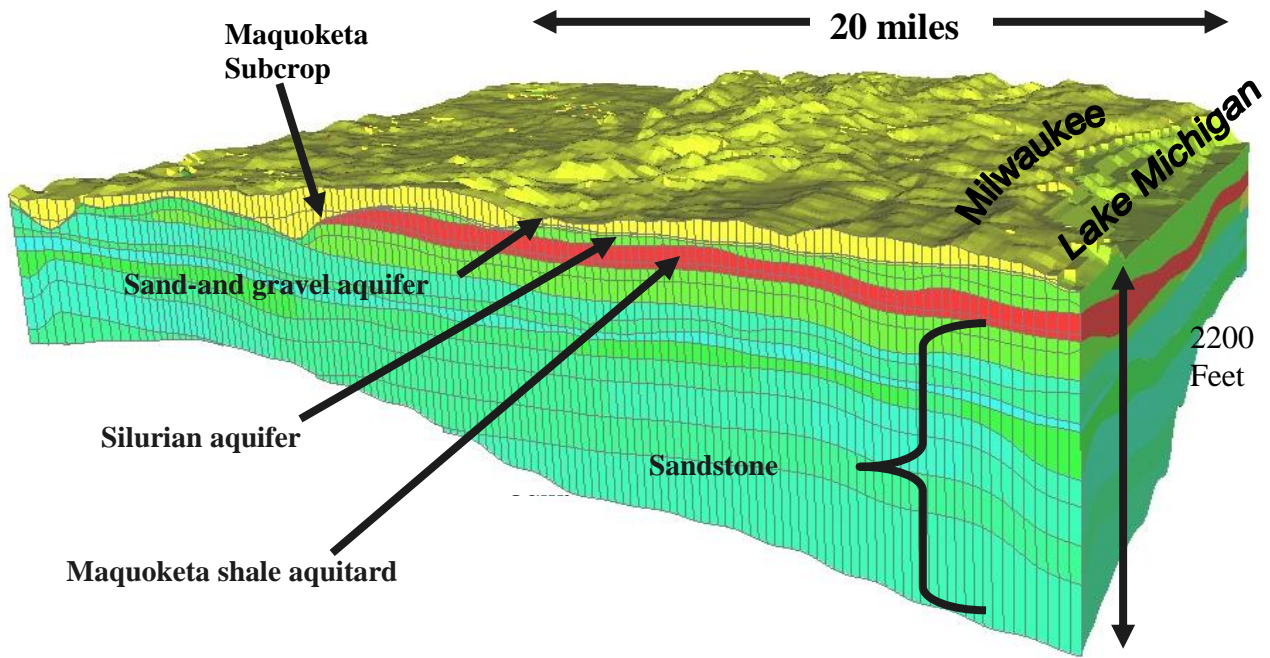


Source: Waukesha County & WGNHS



Figure II-4

General Hydrogeology of Southeast Wisconsin

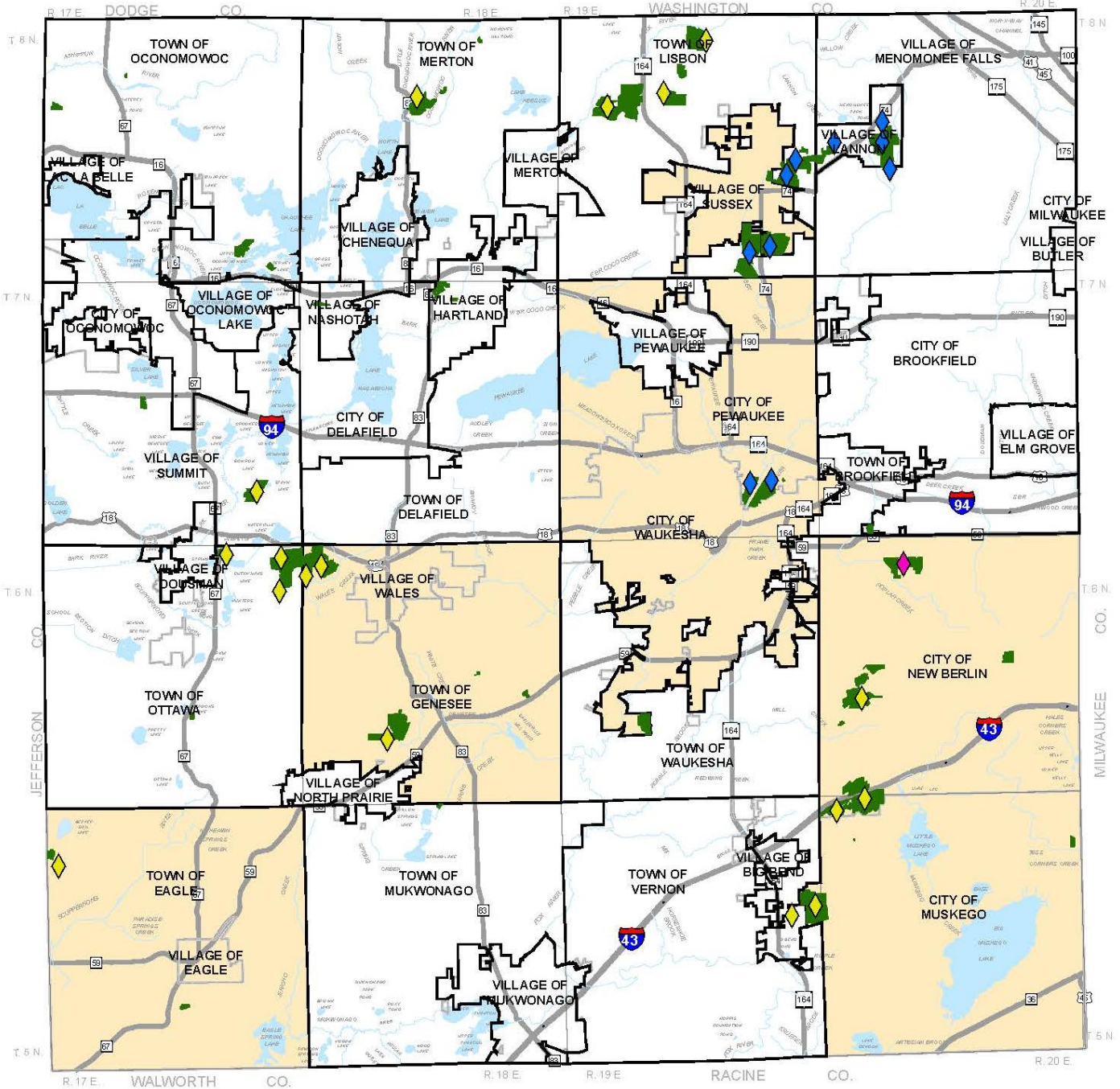


Nonmetallic Mineral Extraction in Waukesha County

In the case of potential mineral extraction areas, the geologic attributes of the County are a valuable and irreplaceable resource. Local land use planning efforts have recognized this fact by planning for future mine expansions and incorporating code provisions to avoid land use conflicts. The Waukesha County Mineral Extraction Advisory Committee (MEAC) was established in the mid-1990's to help facilitate these efforts.

In 2000 extractive land use in Waukesha County totaled about 4000 acres, or approximately 1.1 percent of the total area of the county. This area consists primarily of lands devoted to the extraction of sand, gravel and stone but also includes lands formerly used for such purposes and which lay idle in 2000. By state mandate, Waukesha County adopted a nonmetallic mine reclamation ordinance in 2001 that required new and existing mines to prepare and implement a reclamation plan. These reclamation plans will be implemented over a period of many years depending on the expected operational lifespan of the quarry or gravel pit. At present there are 28 permitted nonmetallic mining operations in the county, 16 issued by the LRD and 12 by other communities that have adopted reclamation ordinances. The general location and type of mining operation are shown in Map II-4. In total, there are currently 10 active limestone quarries, 17 sand and gravel pits and one peat mining operation in the county.

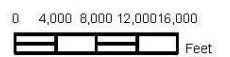
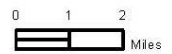
Map II-4 Extractive Areas of Waukesha County: 2012



Legend

- ◆ Sand & Gravel
- ◆ Limestone Quarries
- ◆ Peat Mine
- Extractive Areas (2000 Land Use Plan)
- Regulatory Authority - County
- Regulatory Authority - Local

Source: Waukesha County & SEWRPC



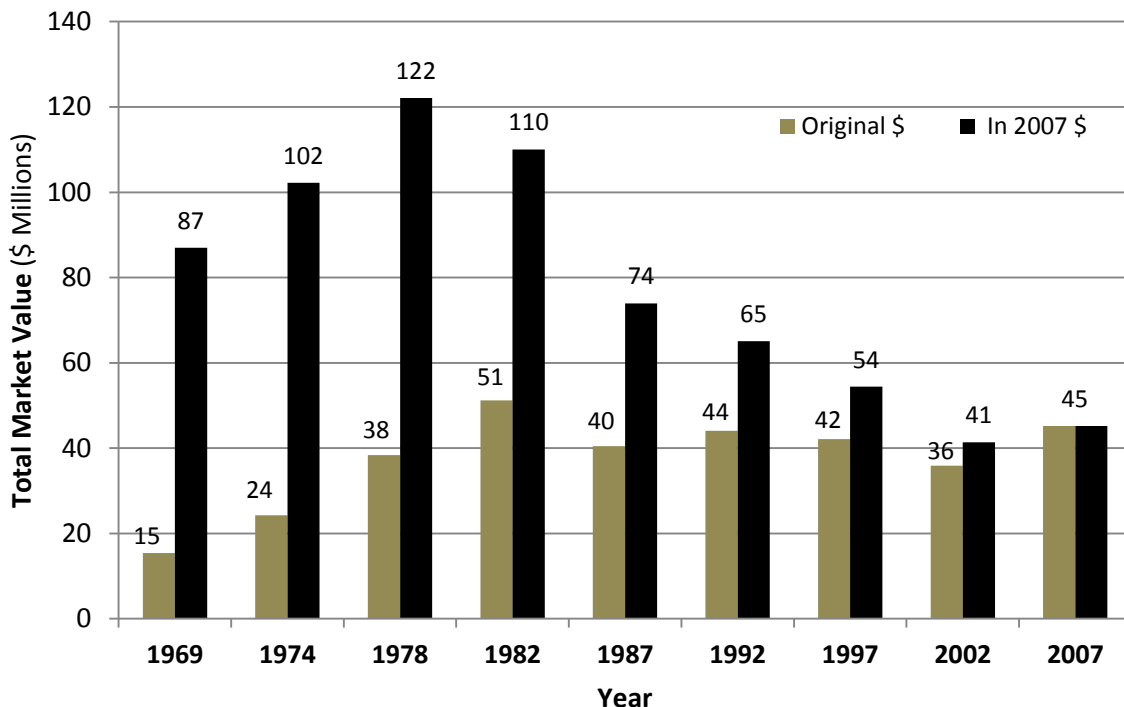
Soils

Soil properties exert a strong influence on the manner in which land is used, since they affect the costs and feasibility of building site development and provision of public facilities. Soils are also an invaluable resource for agricultural and landscaping purposes. Soil surveys have provided definitive data on the physical, chemical, and biological properties of the soils and interpretations of the soil properties for planning, engineering, agricultural and resource conservation purposes. Due to the glaciations of the county, the soil parent material is primarily composed of variations of glacial deposits, with accumulated organics making up most of the lowlands. Soil types vary considerably across the county due to the variations in parent material. For example, the Green Bay glacial lobe left a denser till with higher clay content along the eastern portion of the county, while west of the Kettle Moraine is primarily made up of a more coarse textured outwash material. Below is a review of some of the soil features, uses and limitations in Waukesha County.

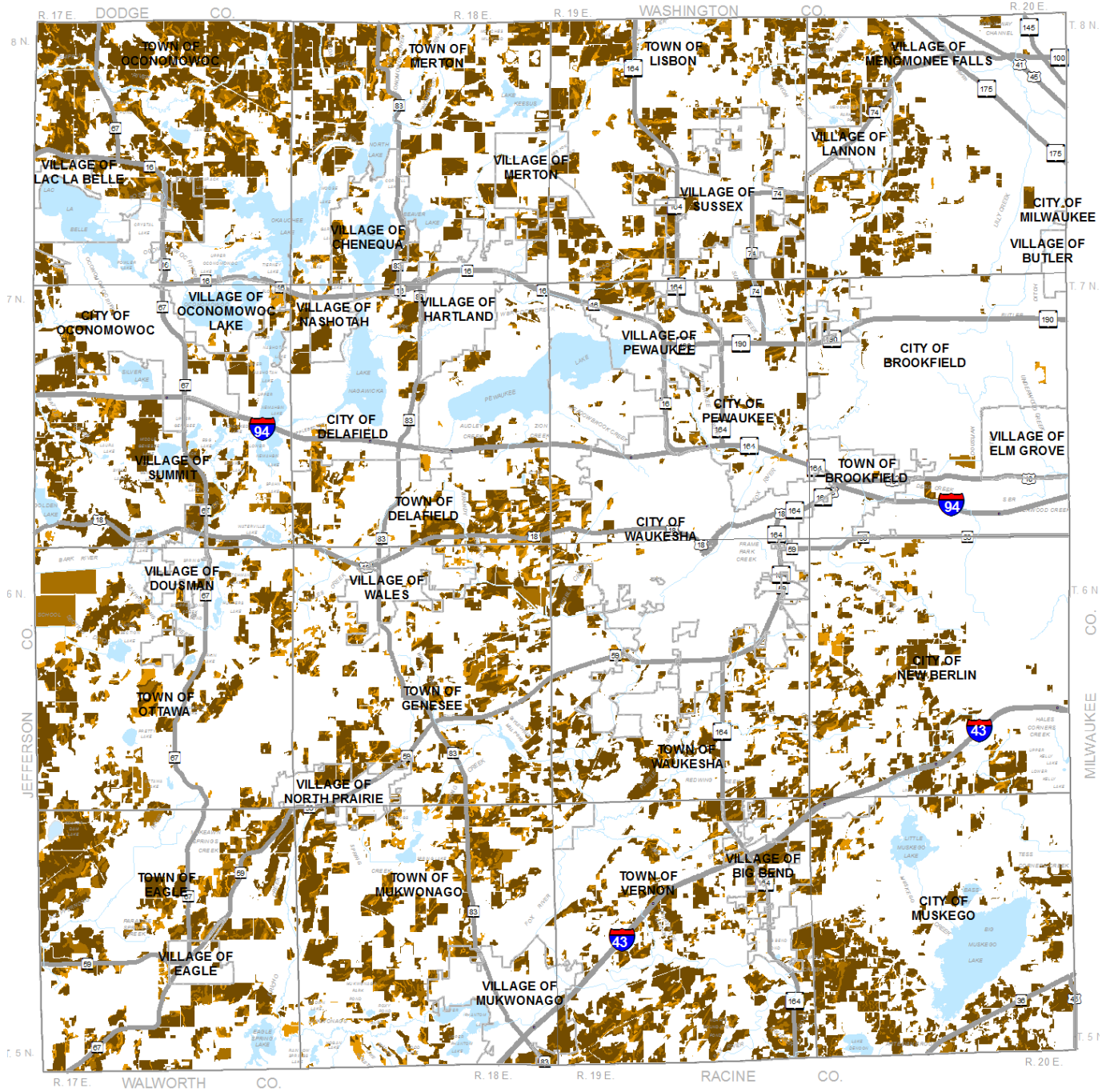
Agricultural Soil Classification and Production

Map II-5 shows the lands in agricultural uses in Waukesha County in 2010 and the classification of those soils for agricultural purposes. This map is based on a generalized agricultural inventory conducted by the LRD during the update of the county Farmland Preservation Plan in 2010. This map shows that 85,526 acres or 23% of the county was in agricultural uses in 2010. Of this total, approximately 70% are classified as “prime” agricultural soils, 19% are classified as “Soils of Statewide Importance, and 11% fall into the “other” category, usually due to steep slopes, high groundwater or droughty soils. These inventory results show there has been a dramatic 57% loss in agricultural lands in the county since 1963. More information on the land use changes is provided near the end of this chapter. Figure II-5 shows that the value of agricultural products sold remained relatively steady over the last three decades without an inflationary adjustment. However, when adjusted for inflation, 2007 sales reflect a 63% reduction over the last 30 years.

Figure II-5
Market Value of Agricultural Products Sold
Waukesha County 1969 - 2007



Map II-5 Agricultural Land Use and Classification - Waukesha County: 2010



Legend

- NRCS Prime Agricultural Soils Group
- Soils of Statewide Importance
- Other Soils

Source: Waukesha County & NRCS

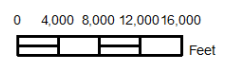
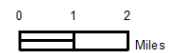
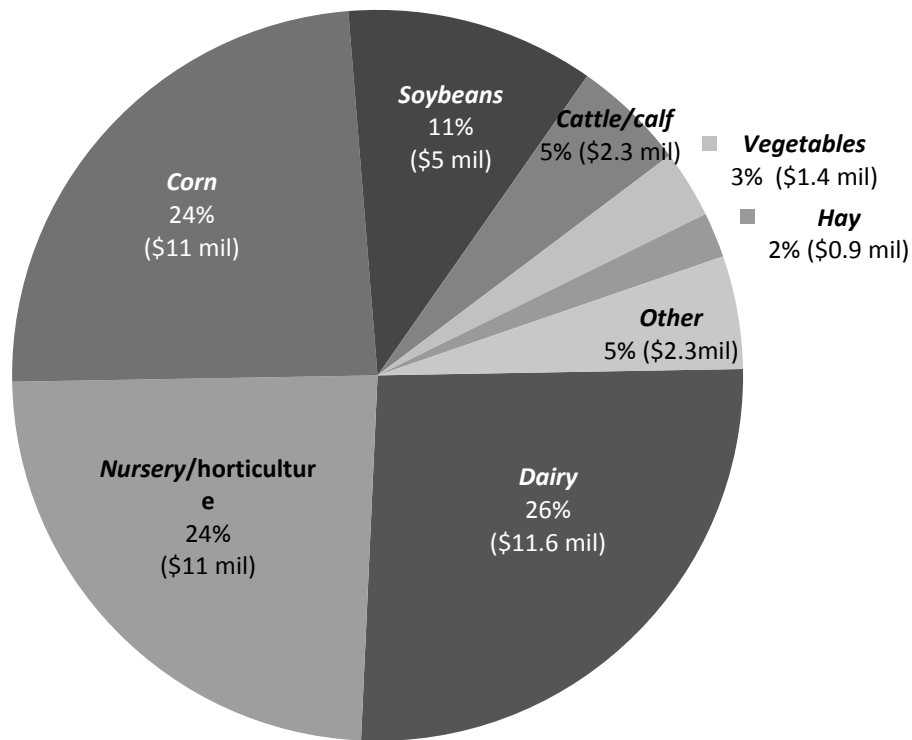


Figure II-6 shows how the 2007 agricultural products sold in the county breaks down into the main product categories. It shows almost a three way tie between corn, dairy and nursery/horticultural products – all in the \$11 million range. The next closest category is soybean at \$5 million, with the remainder groups all a fraction of this.

Figure II-6
Percentage and Market Value of Agricultural Products Sold
Waukesha County: 2007



Source: USDA, National Agricultural Statistics Service

Soil Erosion Rates

Soils also vary in their individual susceptibility to erosion depending on a number of factors including: parent material, vegetative cover, slope, and most all - management. Tolerable soil loss or “T” for a particular soil is the theoretical maximum rate of soil erosion that will permit a high level of crop production without depleting the soil profile. In Waukesha County, “T” values for the different soil types range from 2-5 tons per acre per year.

For decades, conservationists have used a mathematical formula to estimate the amount of soil lost annually from sheet and rill erosion on cropland. The Universal Soil Loss Equation (USLE) takes into consideration the following factors: rainfall, slope, slope length, soil erodibility, crop rotations and crop practices to arrive at an estimate of soil loss. The Revised Universal Soil Loss Equation – version 2 (RUSLE2)

is the current mathematical model also used for soil erosion calculations. It is a software model that incorporates additional years of research in to the soil loss predictions it calculates and is the model prescribed for conservation planning under Chapter ATCP 50 Wisconsin Administrative Code. To determine average soil erosion rates on county cropland, the Land Resources Division conducted its first Transect Survey in the spring of 1999. Normally, this type of survey collects soil loss information for individual cropland fields randomly selected in 0.5-mile intervals along a predetermined driving route in rural areas. However, due to the amount of development in Waukesha County, the interval needed to be shortened to every 0.3-miles in order to obtain the necessary number of sample points for a statistically valid survey. The methodology has been utilized in other states and has proven to be 90% accurate (+/- 5%) in estimating overall soil erosion rates from cropland. The Transect Survey was repeated in 2001. Both results indicated that nearly 90% of the cropland in Waukesha County is less than or equal to "T" or the tolerable soil loss rate. It should be noted however, that "T" is not a water quality standard. An additional 7% of the cropland was determined to be at 1-2 times the T value. The weighted average tolerable soil loss for Waukesha County was 4.2 tons per acre. The weighted average tolerable soil loss is based upon the percentage of sample points in the transect survey with different values for "T". For example, the 2001 Transect Survey conducted in Waukesha County indicated that 2% of the sample points had an average tolerable soil loss (T) of two tons per acre per year, 10% had a T of 3 tons/ac, 58% had a T of 4 tons/ac, and 30% had a T of 5 tons/ac. Survey results also indicated that the average soil loss from cropland was 1.5 tons/ac. This is calculated by examining the soil loss at each sample point in the survey. In 2001 there were 677 sample points examined. Due to the continuing loss of sample points to housing developments, it is uncertain if a Transect Survey can be repeated in future years. It does indicate however, that soil erosion from lands under development is an ongoing issue to be addressed. Studies have shown that an average construction site with no erosion control measures in place erodes 30 tons of sediment per acre. Much of this is delivered to nearby waterways through efficient delivery systems including road ditches and storm sewers.

Over the years, several programs at the state and federal level have been successful in getting agricultural landowners to do conservation planning for soil loss reduction. These programs include the Oconomowoc River, Upper Fox River, and Muskego-Wind Lakes Priority Watersheds, the Farmland Preservation Program, and the Federal Farm Bill with its conservation planning requirements for Highly Erodible Land (HEL) and the Conservation Reserve Program (CRP). It is believed that these program efforts have contributed to the high percentage of farmland currently within tolerable soil erosion rates.

Soil Limitations for Development

Map II-6 shows the primary soil features that present limitations for land development, including depth to water table and bedrock and steep slopes. Hydric soils generally have seasonal depth to water table of 1 foot or less and are capable of supporting wetland vegetation. A more detailed definition is provided in Appendix A. Poorly drained soils have seasonal depth to water table of 3 feet and are concentrated on the eastern part of the county where many of the soils have a high clay content, often causing a perched water table condition. Shallow water table conditions risk groundwater contamination from on-site septic systems and could cause wetness problems for dwellings with basements. Shallow bedrock conditions pose higher construction costs for basements and also risk groundwater contamination from on-site septic systems because of the lack of a filtering soil layer. Steep slopes represent possible increased grading costs and higher risks for soil erosion during land development activities. Note that steep slopes are concentrated near the Kettle Moraine area. Shallow bedrock is concentrated near the northeast part of the county, where a number of quarry operations are also located, as noted earlier.

Map II-6 Soil Limitations for Development: Waukesha County



Legend

- Hydic Soils (< 1 foot to water table)
- Poorly Drained Soils (< 3 feet to watertable)
- Bedrock < 6'
- Slopes > 12%

Source: Waukesha County & NRCS



Woodlands & Wetlands

Woodlands

Woodlands have both economic and ecological value and can serve a variety of uses providing multiple benefits. Located primarily on ridges and slopes and along streams and lakeshores, woodlands provide an attractive natural resource, accentuating the beauty of the lakes, streams, and the topography of the County. Under balanced use and sustained yield management, woodlands can, in many cases, serve scenic, wildlife, educational, recreational, environmental protection, and forest production benefits simultaneously. In addition to contributing to clean air and water, groundwater recharge and soil conservation, woodlands contribute to the maintenance of a diversity of plant and animal life and provide for important recreational opportunities.

According to the land use inventory prepared by SEWRPC in 2000, woodlands covered approximately 28,931 acres or about 7.7 percent of the County as shown in Table II-7. As indicated on Map II-7, these woodlands exist in large contiguous areas along the Kettle Moraine in the western half of the County and in scattered small areas throughout the remainder of the County. An update of this land use inventory from SEWRPC is scheduled to be completed at the end of 2012.

Wetlands

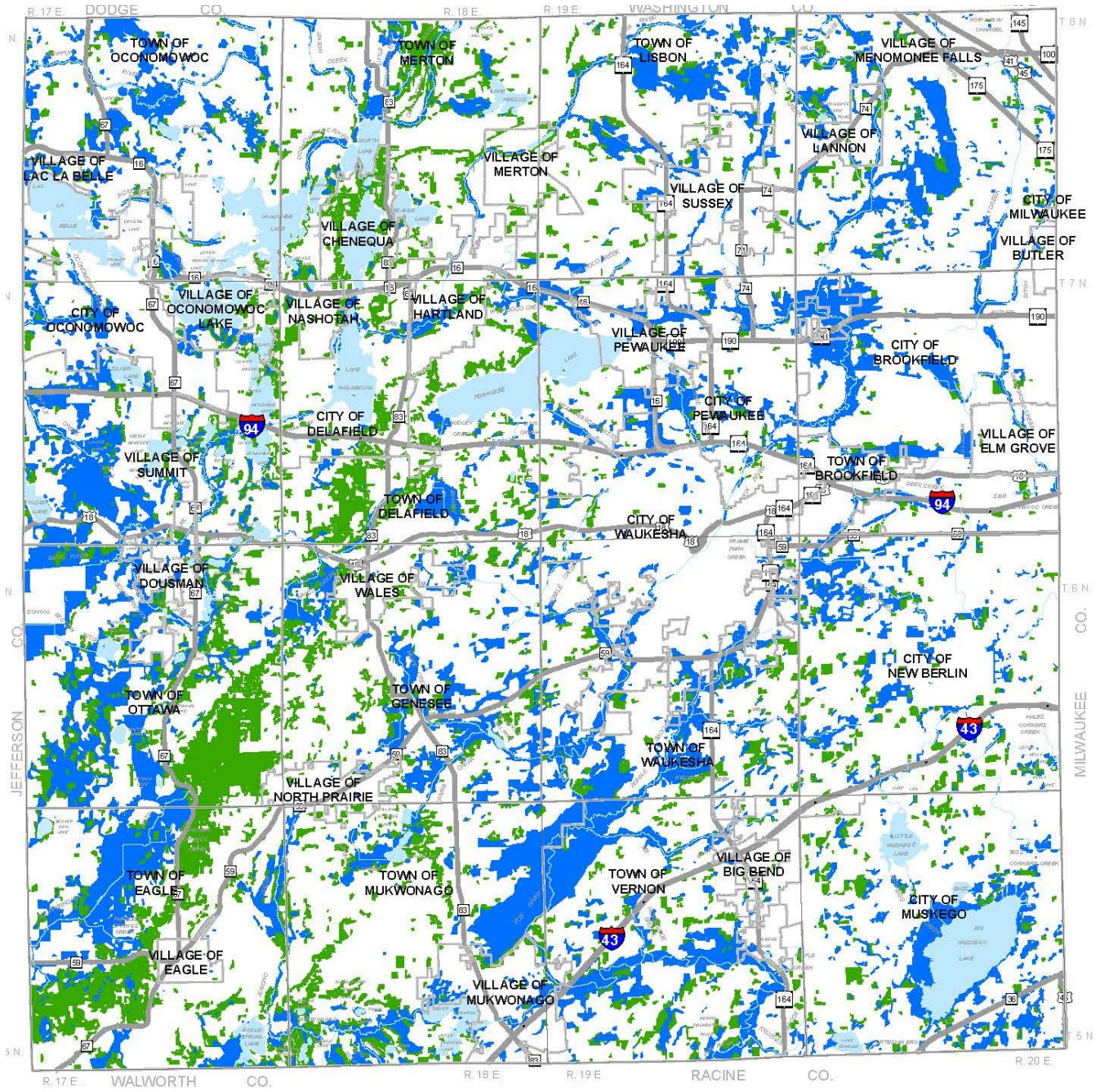
Wetlands perform an important set of natural functions, which make them particularly valuable resources lending to overall environmental health and diversity. Wetlands contribute to the maintenance of good water quality by serving as traps that retain nutrients and sediments, thereby preventing them from reaching streams and lakes. They act to retain water during dry periods and hold it during flooding events, thus keeping the water table high and relatively stable. Some wetlands provide seasonal groundwater recharge or discharge. Those wetlands that provide groundwater discharge often provide base flow to surface waters. They provide essential breeding, nesting, resting, and feeding grounds and predator escape cover for many forms of fish and wildlife. These attributes have the net effect of improving general environmental health; providing recreational, research, and educational opportunities; maintaining opportunities for hunting and fishing; and adding to the aesthetics of an area.

Wetlands pose severe limitations for urban development. In general, these limitations are related to the high water table, and the high compressibility and instability, low bearing capacity, and high shrink-swell potential of wetland soils. These limitations may result in flooding, wet basements, unstable foundations, failing pavements, and failing sewer and water lines. Moreover, there are significant and costly onsite preparation and maintenance costs associated with the development of wetland soils, particularly in connection with roads, foundations, and public utilities. As indicated on Map II-7, wetlands are scattered throughout the County and total approximately 52,661 acres or about 14 percent of the County. See Table II-7. Most of these areas are regulated under state and local codes that restrict development.

Environmental Corridors and Isolated Natural Resource Areas

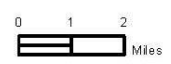
The most important elements of the natural resource base of the County, including the best remaining woodlands, wetlands, prairies, wildlife habitat, surface water and associated shorelands and floodlands, and related features, including existing park and open space sites, scenic views, and natural areas and critical species habitat sites, occur in linear patterns in the landscape, termed "environmental corridors." The most important of these have been identified as "primary environmental corridors," which are by definition at least two miles long, 200 feet wide, and 400 acres in area. Primary environmental corridors are generally located along river and major stream valleys, around major inland lakes, and in the Kettle Moraine. The preservation of these corridors is considered essential to the overall environmental quality of the County and the maintenance of its unique cultural and natural heritage and natural beauty. Because

Map II-7 Major Wetlands and Woodlands in Waukesha County



Legend

- WETLANDS
- WOODLANDS



Source: Waukesha County & SEWRPC

these corridors are generally poorly suited for urban development owing to soil limitations, steep slopes, or flooding potential, their preservation will also help to avoid the creation of new environmental and developmental problems.

In addition to primary environmental corridors, other concentrations of natural resources—referred to as “secondary environmental corridors” and “isolated natural resource areas”—have been identified as warranting strong consideration for preservation. Secondary environmental corridors contain a variety of resource features and are by definition at least one mile long and 100 acres in area. Isolated natural resource areas are concentrations of natural resources of at least five acres in size and 200 feet in width that have been separated from the environmental corridor network by urban or agricultural uses.

Groundwater Resources

Groundwater is a vital natural resource of Waukesha County, which not only sustains lake levels and wetlands and provides the perennial base flow of the streams, but also is a major source of water for local communities. In Waukesha County, any discussion of groundwater should be prefaced on which aquifer is being referenced since the issues with each are different. Below is a brief explanation of the local aquifers.

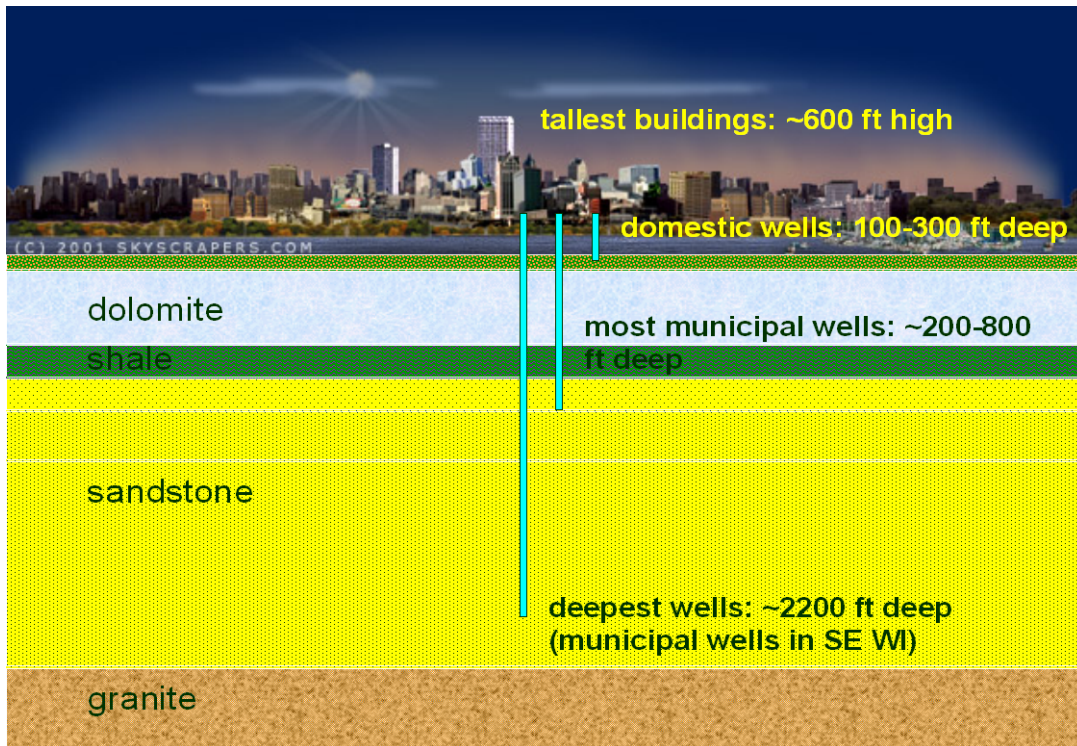
Groundwater Aquifers

Three major aquifers underlie Waukesha County. From the land’s surface downward, they are: 1) the sand and gravel deposits in the glacial drift; 2) the shallow dolomite strata in the underlying bedrock; and 3) the deeper sandstone, dolomite, siltstone, and shale strata. Because of their proximity to the land’s surface and hydraulic interconnection, the first two aquifers are commonly referred to collectively as the “shallow aquifer,” while the latter is referred to as the deep aquifer. The “water table” represents the upper limit of the shallow aquifer, or the beginning of the zone of saturation, and is generally responsible for maintaining stream base flows during dry weather periods and lake water levels in many area lakes. Within most of the County, the shallow and deep aquifers are separated by the Maquoketa shale, which forms a relatively impermeable barrier between the two aquifers (see Figure II-4). That shale layer is absent in the far western portion of the County, representing the recharge area for the deep aquifer. Map II-8 shows a generalized depiction of this recharge area. Figure II-7 depicts the typical well depths as they relate to the groundwater aquifers.

Groundwater Use

The importance of groundwater as a source of water supply in Waukesha County and Southeastern Wisconsin can be shown by analyzing water-use data. According to estimates by the U.S. Geological Survey, water use in Waukesha County in 2005 was approximately 37 million gallons per day (see Table II-2). About 32 mgd, or about 86 percent, was withdrawn from groundwater sources, and 5 mgd, or about 14 percent, from surface water, or Lake Michigan (see Table II-3). Until 2005, nearly all of the water supply in Waukesha County was obtained from the groundwater system. Due to over-pumping of the deep aquifer, the eastern portion of the Village of Menomonee Falls, the Village of Butler, and the eastern portion of the City of New Berlin switched to Lake Michigan water between 1999 and 2005. Table II-3 shows that total water use in the county rose about 19% between 1985 and 2005, from 31 mgd to almost 37 mgd. During this same time period, county population growth was about 29%.

**Figure II-7
Relative Well Depths for Waukesha County**



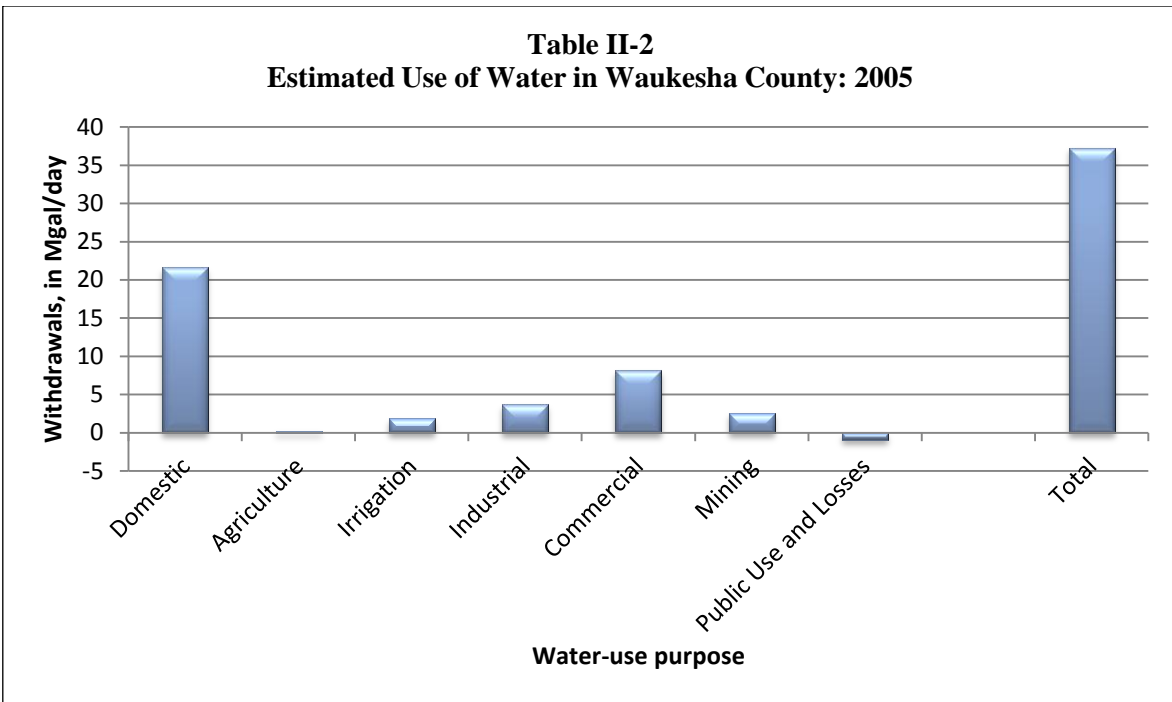
Source: SEWRPC

Groundwater Availability

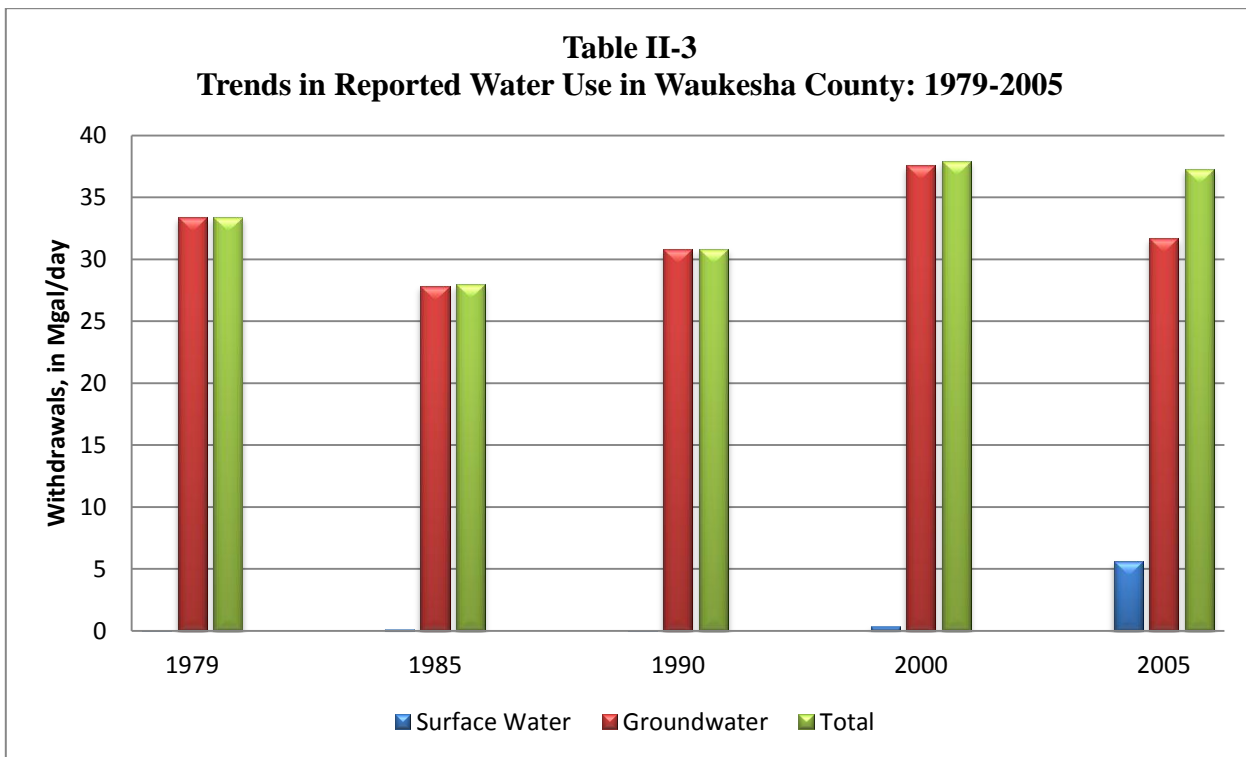
Recharge to groundwater is derived almost entirely from precipitation. Much of the groundwater in shallow aquifers originates from precipitation that has fallen and infiltrated within a radius of about 20 or more miles from where it is found. The deeper sandstone aquifers are recharged by downward leakage of water through the Maquoketa Formation from the overlying aquifers or by infiltration of precipitation beyond the western edge of the County where the sandstone aquifer is not overlain by the Maquoketa Formation and is unconfined (see Map II-8).

On the average, precipitation annually brings about 32 inches of water to the surface area of the County. It is estimated that approximately 80 percent of that total is lost by evapotranspiration. Of the remaining water, part runs off in streams and part becomes groundwater. It is likely that the average annual groundwater recharge to shallow aquifers is 10 to 15 percent of annual precipitation.

To document the utilization of the shallow aquifers in the County, it may be assumed for example that, on the average, 10 percent of the annual precipitation reaches groundwater. Then, the average groundwater recharge in the County would be about 88 mgd. As previously noted, the estimated daily use of groundwater in 2005 was about 32 mgd, which is about 36 percent of the total amount of groundwater assumed to be recharged in a given year. This indicates that there is an adequate annual groundwater recharge to satisfy water demands on the shallow aquifer system in Waukesha County on a countywide basis. However, the availability on a localized area basis will vary depending upon usage, pumping system configuration, and groundwater flow patterns.



Source: B.R. Ellefson, G.D. Mueller, and C.A. Buchwald, U.S. Geological Survey, "Water Use in Wisconsin, 2005."



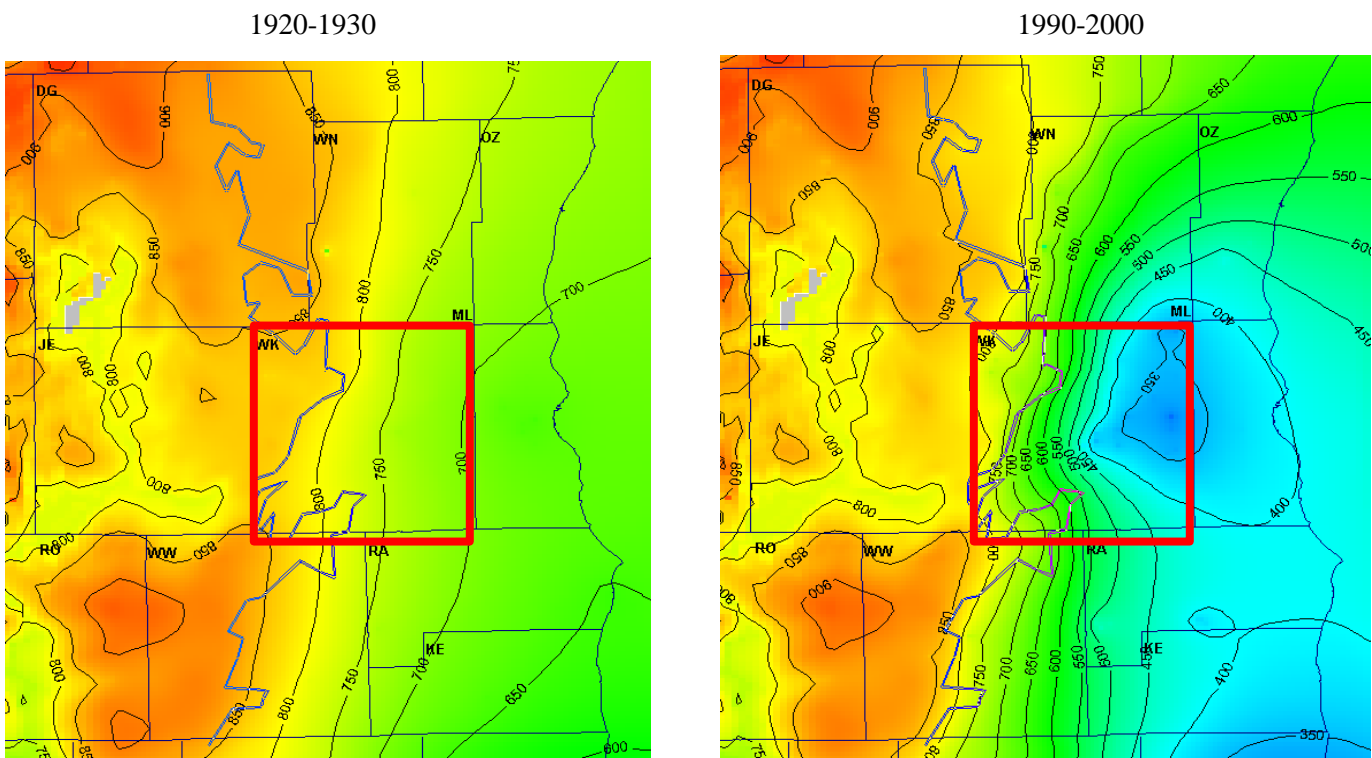
NOTES: The trends are based on currently available data, but the sources of information and accuracy of data may vary from one reporting period to another. The USGS obtains most of water-use data from files of state agencies, and makes estimates for categories for which data are not reported (private domestic and agricultural uses).

Source: SEWRPC, U.S. Geological Survey, 2005.

The situation is different for the deep aquifers where withdrawals of groundwater cause supply/demand imbalance in areas of concentrated use of groundwater, which has resulted in the declining potentiometric surface and mining of groundwater. Figure II-8 illustrates the cone of depression that has formed in the deep sandstone aquifer in southeast Wisconsin over the past 80 years due to water use in the region.

Figure II-8 shows that the water table elevation in the deep aquifer has dropped over 350 feet in 80 years and that the direction of groundwater flow has actually reversed, drawing water from Lake Michigan rather than draining toward it as it originally did in the early 1900's. The center of the cone of depression slowly progressed to the west and is now near the eastern border of Waukesha County (Brookfield area). Professor Douglas Cherkauer of the University of Wisconsin-Milwaukee, has estimated how much greater the demand is for groundwater from this aquifer than the available supply for Waukesha County, as shown in Table II-4.

Figure II-8
Water Levels in the Sandstone Aquifer in Southeast Wisconsin: 1920-2000
 (feet above mean sea level)



Source: SEWRPC

Table II-4
Estimates of Available Groundwater in Waukesha County: 1999

Aquifer	Recharge Area (square miles)	Estimated Recharge Rate (inches per year)	Average Daily Recharge (mgd)	Average Daily Demand (mgd)
Shallow	400	3.1	59	3.5
Deep	100	3.1	14.8	31.5

Source: D.S. Cherkauer, 1999

Radium Concentrations

Certain formations within the Cambrian sandstones in southeastern Wisconsin are known to produce relatively high concentrations of naturally occurring radium, a radioactive metallic element. This naturally occurring radium has been found to exceed U. S. EPA standards in approximately 50 of the 1,300 municipal water supplies in Wisconsin. Most of the water supplies which exceed the radium standard draw water from the deep sandstone aquifer and lie in a narrow band from the Illinois-Wisconsin border through Kenosha, Racine, and Waukesha Counties and north through Green Bay.

Systems serving the portions of the Cities of Brookfield, Delafield, Muskego, Pewaukee, and Waukesha; the Villages of Eagle, Mukwonago, Pewaukee, and Sussex; and a few private water systems have reported violations of the current radium standard. Currently, all water systems that exceed the radium standards in Waukesha County have a consent order agreement with the Department of Natural Resources that details how the water systems will come into compliance. A long legal battle over this issue has resulted in a court order for the City of Waukesha to reduce radium levels in their water supply to comply with EPA standards by 2018.

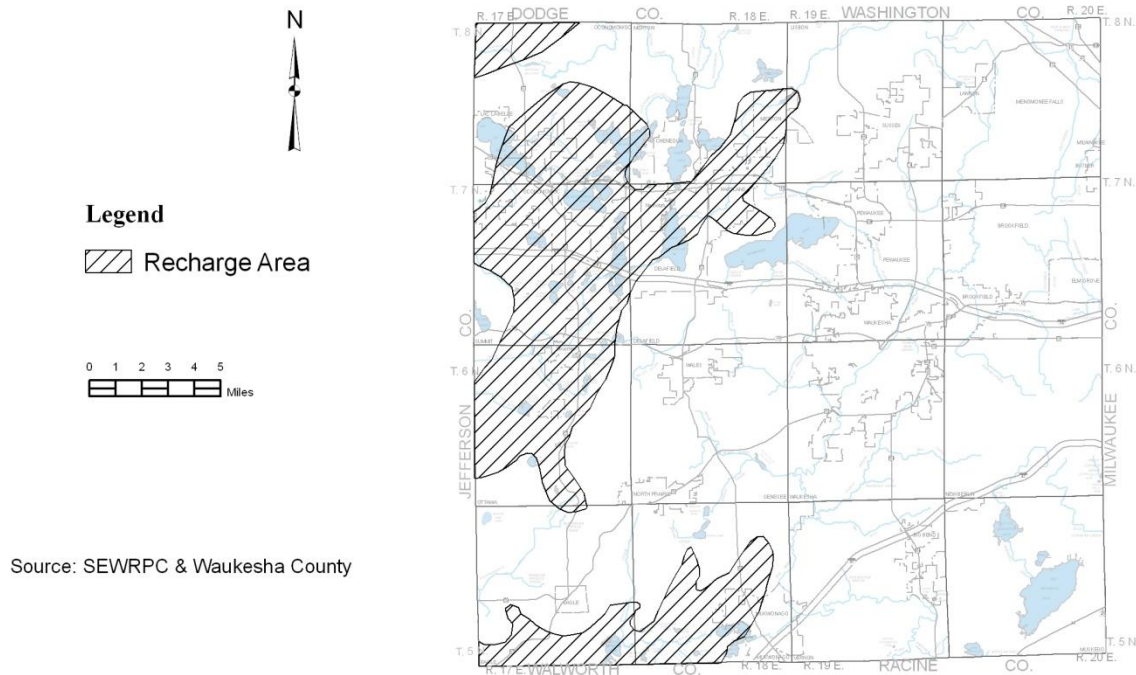
Vulnerability to Contamination

Groundwater quality conditions can through improper construction or management be impacted by such sources of pollution on the surface as infiltration of storm water runoff, landfills, agricultural fertilizer and pesticides (including storage, mixing and loading sites), animal feedlots, manure storage and field application sites, chemical spills, leaking surface or underground storage tanks, silage and crop residue piles, road and parking lot deicing, sumps and dry wells, onsite sewage disposal systems and other below ground waste disposal. The potential for groundwater pollution in the shallow aquifer is dependent on the depth to groundwater, the depth and type of soils through which precipitation must percolate, the location of groundwater recharge areas, and the subsurface geology. Most of Waukesha County exhibits moderate to high potential for contamination of groundwater in the shallow glacial drift and Niagara aquifers. Generally, the areas of the County most vulnerable to groundwater contamination are where both Niagara dolomite and the water table are near the surface.

Compared to the deep aquifer, the shallow aquifers are more susceptible to pollution from the surface because they are nearer to the source in terms of both distance and time, thus minimizing the potential for dilution, filtration, and other natural processes that tend to reduce the potential detrimental effects of pollutants. Isolated cases of contamination have been identified in portions of Waukesha County. Such problems can often be traced to runoff pollution sources, septic system discharges, and chemical spills or leakage.

In the far western portion of the County, there is no confining impermeable layer of rock between the glacial drift and the sandstone aquifer. This is cause for concern in planning for the future development of that area. Urban development adversely affects both the quantity and quality of recharge water, especially where the aquifer is overlaid by outwash, end moraine, or other highly permeable glacial material. An increase in the area of impervious surfaces such as pavement affects the recharge of the sandstone aquifer by diverting larger amounts of precipitation into surface drainage courses as runoff, rather than allowing it to percolate into the ground. Map II-8 shows the approximate area of the county where the impermeable shale layer does not exist and thus, where recharge of the deep sandstone aquifer occurs, feeding municipal water supplies in the eastern portion of the county.

Map II-8 Approximate Area of Recharge for the Sandstone Aquifer



Water Supply Planning

In response to the growing pressures on community water supplies in southeast Wisconsin, SEWRPC recently completed a three-phased multi-agency effort to inventory local groundwater resources, develop a regional groundwater model, and develop and publish a Regional Water Supply Plan for Southeast Wisconsin (2010). The plan is based upon an adopted regional comprehensive plan design year of 2035, recommends a sustainable water supply for every community in southeast Wisconsin, and can be found at: <http://www.sewrpc.org/SEWRPC/Environment/RegionalWaterSupplyPlan.htm>

For some communities, the Regional Water Supply Plan recommends switching from a deep aquifer groundwater supply to a shallow aquifer or surface water supply – namely Lake Michigan. This type of switch would not only provide a sustainable supply of water to the community, but would also allow the region’s deep aquifer to recover from decades of over-pumping. While switching to Lake Michigan for a community water supply may be supported by a tremendous amount of science, it does introduce a level of complexity in the administrative and political arenas due to the adoption of the Great Lakes - St. Lawrence River Basin Water Resources Compact (“Great Lakes Compact”) in 2008. Being enacted by the legislatures of all eight states bordering the Great Lakes, as well as the United States Congress and two Canadian provinces, this regional law trumps all other laws relating to the use and “diversion” of water from the Great Lakes basin. Under the Great Lakes Compact, any water diverted outside of the basin must be returned after use and only communities straddling the watershed boundary or located in a county that straddles the watershed are eligible for diverting Great Lakes water. The Compact also established a water diversion application process, requiring all applications to comply with strict technical criteria and be approved by all eight Great Lakes states. A diversion application for Lake Michigan water was submitted by the City of Waukesha in 2010 and is currently under review by the DNR.

Drainage Basins and Watersheds

As shown in Map II-9, Waukesha County river systems drain to three major basins, the Rock River Basin on the western side of the county, the Fox River Basin in the center and the Lake Michigan Basin on the eastern part of the county. The Fox River Basin covers the largest area of the county, encompassing about 58 percent of the total surface area. The Rock River Basin encompasses approximately 34 percent and the Lake Michigan Basin accounts for the remaining 8 percent of the county surface area. The Rock and Fox River Basins both lie west of the sub-continental divide and are part of the Mississippi River drainage area. Everything east of the sub-continental divide, including the Menomonee and Root River Watersheds, are part of the Great Lakes-St. Lawrence River drainage system. The sub-continental divide is critical to the water supply issue noted earlier and sanitary sewer planning. This is because water that is pumped from the Great Lakes system is generally required to be returned after use. For water resource planning purposes, each river basin is further divided into watersheds. There are 10 major watersheds in Waukesha County, as shown in Map II-9. The following sections provide additional detail on the watersheds within each basin. Most of the information presented has been compiled from DNR "State of the Basin" reports.

Rock River Basin

Ashippun River Watershed

The Ashippun River Watershed lies in Dodge, Washington, and Waukesha counties. It covers 69 square miles, of which approximately 16 square miles or 23 percent of the total watershed is located in northwestern Waukesha County. Agriculture is the primary land use and accounts for 66 percent of the land use in the Waukesha County portion of the watershed, according to the Year 2000 SEWRPC land use inventory.

From its headwaters in a small wetland and agricultural area, the Ashippun River flows at a low gradient (6 ft/mile) southwest through Druid Lake in Washington County to the Rock River in Dodge County. The water is stained light brown by tannic acid and the bottom is largely silt. Other than the Ashippun River, none of the major streams in the watershed are found in Waukesha County.

The Ashippun River is classified as a warm water sport fishery. However, little is known about the Ashippun River's water quality or whether the river is meeting its full potential.

Bark River Watershed

This 186-square mile watershed drains portions of Washington, Waukesha, and Jefferson counties and has many natural lakes, some of them large. About 47 percent of the area is in Waukesha County, 45 percent in Jefferson County and the remainder is in Washington County. Many of the watershed's lakes are experiencing heavy development pressure or have extensive development around them. While some wetlands have been drained or filled, a significant amount of wetland remains. The greatest threat to the basin's wetlands is rapid development in Waukesha County.

The watershed is about 44 percent agricultural, but significant rural subdivision development occurs in the Waukesha County portion of the watershed. Of the agricultural lands, about 7 percent have high soil erosion potential. Thus, agriculture use and rural development degrade local surface water quality.

Major streams in the Waukesha County portion of the Bark River watershed include the Bark River, Scuppernong Creek, and Wales Creek. Additional information on each of the streams is included in Table II-5. The Bark River is classified as a warm water sport fishery but is only partially meeting that use, primarily due to urban and rural polluted runoff entering the river and its tributaries. Most of the urban runoff pollution occurs in Waukesha County, where rapid development of urban and suburban "pockets" occurs

along and between its many lakes. There are currently two municipal sewage treatment plants that discharge to the Bark River within Waukesha County, the Village of Dousman and the Delafield-Hartland facility, which discharges just downstream from Nagawicka Lake. Both sites are shown in Map II-9.

Scuppernong Creek rises at the edge of the moraines in central Waukesha County. The creek passes through rural areas much of its length, but subdivisions are developing rapidly in the upstream reach near Wales. Numerous drainage ditch inlets carry agricultural runoff to the stream. There are two impoundments on Scuppernong Creek. Historical records suggest the reach from the headwaters to Waterville Lake supported a viable trout population in the early part of the 20th century. Excessive ditching of tributaries and wetlands and the construction of a dam at Waterville, altered stream habitat so it now supports a warm water sport fishery. From the Waterville dam downstream to Dutchman Lake the stream supports a Class I trout fishery due to a large spring that augments flow and lowers stream temperature. Water quality from Dutchman Lake to the old Dousman Millpond is good. There are many springs and the reach supports a warm water sport fishery. Below the Dousman Millpond water quality is poor due to the large sediment load and a much lower gradient. Wales Creek, a small tributary to Scuppernong Creek, is fed by an extensive system of springs; this stream may support a small population of trout.

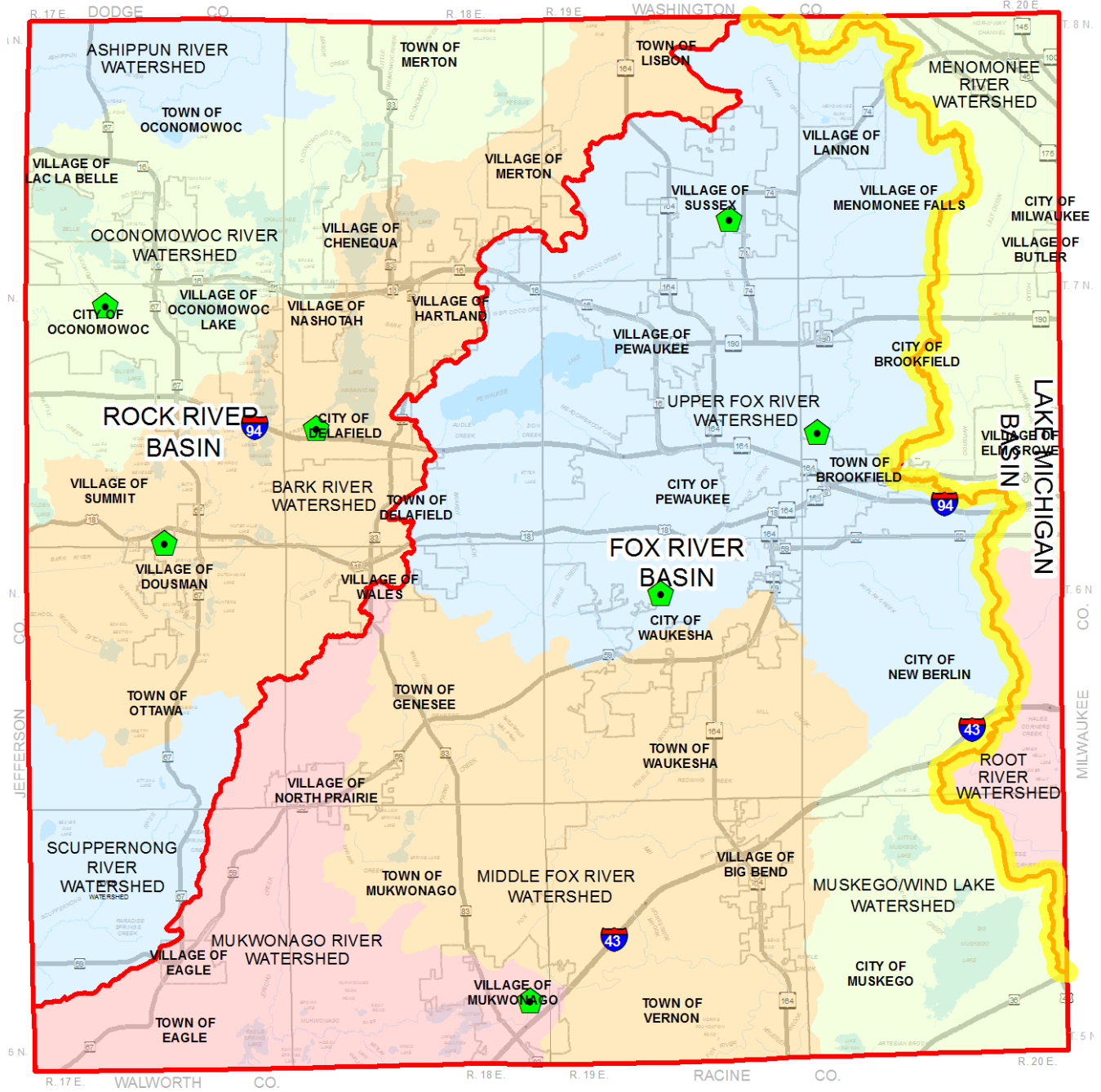
Oconomowoc River Watershed

The Oconomowoc River Watershed drains approximately 128 square miles encompassing portions of Dodge, Jefferson, Washington, and Waukesha counties. The Waukesha County portion of the watershed is approximately 63 square miles in size representing 49 percent of the watershed. According to the Year 2000 SEWRPC land use inventory, nearly 35 percent of the Waukesha County portion of the watershed is agricultural. Residential land use comprises another 16 percent in Waukesha County and open water from the many lakes and streams accounts for another 13 percent. From its origin in the Town of Richfield in Washington County, the Oconomowoc River flows in a southwesterly direction through six major lakes for approximately 49 miles before entering the Rock River in the Town of Ixonia, Jefferson County.

There is one sewage treatment plant discharge in the Oconomowoc River from the City of Oconomowoc, approximately 2 miles downstream of Lac Labelle. Major lakes in the Waukesha County portion of the watershed include Beaver, Fowler, Lac LaBelle, Keesus, Moose, North, Oconomowoc, Okauchee, Pine and Silver lakes. In addition to the Oconomowoc River, major streams in the Waukesha County portion of the watershed include Battle Creek, Little Oconomowoc River, Mason Creek, and Rosenow Creek. Rosenow Creek is a designated trout stream and the location of a recent stream restoration project. When the Wisconsin Department of Transportation initiated work on a highway bypass around the City of Oconomowoc, it necessitated moving approximately 1,000 feet of the existing reach of the tributary to Rosenow creek as part of the proposed new roadway. The channel was relocated west of the new roadway and restored to a length of 1,400 feet in the summer of 2004. The stream restoration project was designed and constructed to create a stable and more "natural" channel that is intended to reduce streambank erosion potential, enhance water quality, and improve habitat for wildlife.

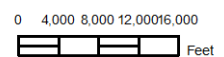
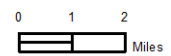
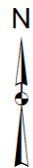
Rapid urbanization of the watershed is continuing, especially on and near lakes. The cumulative effect of this urbanization is threatening water quality and hastening the eutrophication of the lakes. The Oconomowoc River was selected as a priority watershed in 1983. A nonpoint source control plan for the Oconomowoc River was completed in 1986. Major objectives for the nonpoint source pollution control plan included protecting the recreational benefits and improving the fisheries of the water resources. In pursuit of those objectives, landowner contacts were made and conservation plans developed for approximately 3,000 acres of cropland in the Waukesha County portion of the watershed. This resulted in an estimated reduction of soil erosion of approximately 18,500 tons. When the watershed project officially closed in 1995, results seemed mixed on the success of the project. However, spin-off activities which are in part attributable to the watershed project, included formation of new lake districts and the reactivation of another, formation of an environmental foundation and sanitary districts, adoption of construction site erosion control ordinances and the formation of an environmental protection committee.

Map II-9 Major Watersheds in Waukesha County



Legend

- River Basin Boundaries
- Subcontinental Divide
- ◆ Sewage Treatment Plant



Source: Waukesha County & SEWRPC

Scuppernong River Watershed

The Scuppernong River is a tributary of the Bark River in Jefferson County. The watershed is bordered on the southeast by the Kettle Moraine State Forest and lies with in portions of three counties: Jefferson, Walworth, and Waukesha. The predominant land use is agricultural though there is significant public ownership in the state forest and two state wildlife areas with large forested tracts and wetland areas. Other wetland areas have been drained for agriculture. Substantial low-density residential and industrial development is occurring throughout the watershed. According to the Year 2000 SEWRPC land use inventory, approximately 5,723 acres or 38 percent of the Waukesha County portion of the watershed is agricultural. Another 4,416 acres or 29 percent is considered wetland and, 3,429 acres or 22 percent is classified as woodland.

Major streams found in the Waukesha County portion of the watershed include the Scuppernong River and Paradise Springs Creek. The Scuppernong River rises at the edge of the interlobate moraine in the Kettle Moraine State Forest. Reproducing populations of brown trout inhabit the upper reaches, but habitat is impaired by old hatchery ponds that discharge warmer water to the stream. From the area just below the hatchery pond to the Waukesha County line, the stream is a Class III trout stream.

Paradise Springs Creek is a Class II trout stream in Waukesha County. Trout rearing ponds were constructed at the headwaters of the stream several years ago, resulting in the degradation of water quality due to warming of the water. All but one pond have been removed. Segments of the stream are ditched and straightened. Recent habitat work has been done to counteract the effects of previous ditching.

Fox River Basin

Upper Fox River Watershed

The Upper Fox River Watershed is a 151 square mile drainage area located almost entirely in Waukesha County, with a very small portion (1%) located in Washington County. The Upper Fox River is the principal perennial stream in the watershed. Other significant perennial streams include Brandy Brook, Deer Creek, Pebble Creek, Pewaukee River, Poplar Creek and Sussex Creek. A priority watershed plan was completed in 1994 with stated goals of reducing sediment loading to streams in rural areas by 50-75 percent, reducing phosphorus loading from barnyards by 75 percent, reducing streambank erosion by 50 –75 percent, and reducing the suspended solids load of urban runoff by 40-90 percent. The watershed project officially ended in 2005 and has resulted in 82 cost-share agreements being signed for conservation practices such as reduced tillage, nutrient management and well decommissioning. On the urban front, a major accomplishment has been the adoption of erosion control and storm water management ordinances by the county and communities within the watershed.

According to the Year 2000 SEWRPC land use inventory, nearly 24 percent of the watershed is mapped as residential land use. Other land use categories include agricultural (23%), wetlands (13%), and transportation related (11%). Commercial and industrial land uses account for another 6 percent of the land area. There are many incorporated municipalities within the watershed including the Cities of Brookfield, Delafield, New Berlin, Pewaukee, and Waukesha. Also included are the Villages of Hartland, Lannon, Menomonee Falls, Pewaukee, Sussex, and Wales. There are three sewage treatment plant discharges into the Fox River in this watershed. Starting upstream, they are the Village of Sussex, the City of Brookfield and the City of Waukesha, as shown in Map II-9.

The Upper Fox River contains over 80 miles of perennial streams exhibiting a wide range of quality. The Fox River, Frame Park Creek and Zion Creek are listed as impaired waters on the state's 303(d) list. Coco Creek, which flows into Pewaukee Lake, has the potential to support a cold water community. The Pewaukee River contains a fairly decent forage and gamefish population. Sussex Creek has been impacted by development and mining in the area. This area is severely impacted by development and by increases in

the amount of impervious surfaces. This contributes to the “flashy” nature of the streams in this area. Impoundments contribute to decreased fish migration and degraded water quality.

Today, both the main stem and north branch of Frame Park Creek suffer from severe impairments. The majority of wetlands originally present have been drained and filled. The combined effects of stream modifications like channel manipulation, relocation, and enclosure have damaged water and habitat quality. These water bodies are included on WDNR’s statewide list of polluted and impaired waters for degraded habitat, chronic toxicity, temperature, and low dissolved oxygen due to point and non-point source discharges.

Another cold-water resource in the Upper Fox River watershed is Pebble Creek. Pebble Creek, and its major tributary Brandy Brook, drain approximately 18 square miles located in the extreme southwest corner of the Upper Fox River Basin before flowing into the Illinois Fox River just north of State Highway 59. Pebble Creek has the potential to support a coldwater Class I and II brook and brown trout fishery. Although Brook trout have never been recorded in this urbanizing watershed, healthy populations of mottled sculpin, a coldwater indicator species, have been recorded in the headwaters of this stream system. Since the mid 1990s, the WDNR has annually stocked brown trout at CTH TT and the trout have responded well to this effort. While the upper portions of the watershed contain coldwater species, the lower portions of Pebble Creek extending from CTH D to the confluence with the Fox River contain northern pike among several other high-quality warmwater species (Pebble Creek Watershed Protection Plan, Southeastern Wisconsin Regional Planning Commission, Community Assistance Report No. 284, 2008).

At nearly 2500 acres, Pewaukee Lake is the only lake of significant size in the watershed with a maximum depth of 45 feet and an average depth of 15 feet. It is also one of the largest lakes in southeastern Wisconsin and recognized as one of the top musky lakes in the state. The lake level was naturally controlled until 1838 when a dam was constructed at the lake outlet to power a mill. This resulted in lake levels rising about six feet and the surface area of the lake doubling. Present levels are artificially controlled by a dam at the outlet of the Lake to the Pewaukee River, which then flows about 4.4 miles to its confluence with the Fox River. Water quality data collected over the years indicates fair to very good water quality. However, continued development in the watershed and its subsequent increase in runoff have raised concerns about future pollutant loadings. Efforts to protect and improve the watershed include an active wetland acquisition program by the Lake Pewaukee Sanitary District. This program has resulted in the protection of hundreds of acres of wetlands, representing an investment nearing \$1 million. The Pewaukee River Watershed is also the subject of an on-going watershed protection planning effort led by SEWRPC. The Pewaukee River Partnership is also active in citizen water quality monitoring and other program efforts to improve the condition of these resources.

Mukwonago River Watershed

The Mukwonago River Watershed covers approximately 86 square miles in Jefferson, Waukesha and Walworth counties. It is the smallest watershed in the Fox River Basin. Approximately 52 square miles or 61 percent of the watershed area lies within Waukesha County. The Villages of Eagle, Mukwonago, North Prairie and Wales are found within the watershed boundary. The Village of Mukwonago has a wastewater treatment plant discharging into the Mukwonago River.

Rural uses cover most of the land area in the watershed. Agriculture is dominant even in the Waukesha County portion where, according to the Year 2000 SEWRPC land use inventory, agriculture accounts for approximately 36 percent of the land use. Residential land use accounts for another 19 percent of the watershed area in Waukesha County followed by woodlands (15%) and wetlands (9%).

There are nearly 50 miles of perennial streams in the watershed. Jericho Creek in the Village of Eagle and an unnamed ditch in the Village of Mukwonago are listed as supporting a cold water aquatic community. In addition, the Mukwonago River is listed as an exceptional resource water in the state. None of the streams in the watershed are listed as impaired on the 303(d) list.

This is perhaps the least disturbed watershed in the Fox River Basin. There are diverse and unique populations of warm water forage fish, game fish, mussels, amphibians and invertebrates. Development of this watershed has increased rapidly in the last few years. Impervious surfaces are becoming more abundant and storm water runoff is increasing. Many of the historic areas that supported agriculture are now supporting suburban housing development. Concern over the impact of development pressures in the watershed has led to the formation of the Friends of the Mukwonago River, a group dedicated to the protection of the river and its watershed.

In June of 2010 SEWRPC published the Mukwonago River Protection Plan (Community Assistance Planning Report No. 309). The watershed protection plan focuses on what can be done to prevent future water pollution or resource degradation from occurring. The plan presents recommendations for appropriate and feasible watershed management measures for enhancing and preserving the water quality of the Mukwonago River and for providing the public with opportunities for safe and enjoyable recreation within the Mukwonago River watershed.

Middle Fox River Watershed

The Middle Fox River Watershed is the largest of the Fox River Basin watersheds (248 square miles), encompassing portions of Racine and Waukesha Counties, along with small portions of Milwaukee and Walworth Counties. The Waukesha County portion of the watershed covers 86,175 acres or approximately 134 square miles. In Waukesha County, portions of the Cities of Muskego, New Berlin, and Waukesha lie within the watershed, along with the Villages of Big Bend, Mukwonago, North Prairie, and Wales.

Agriculture dominates the rural land use, accounting for over 40 percent of the area. Other rural uses include grasslands (18%), wetlands (14%), and forests (13%). Urban areas comprise nearly four percent of the land cover in the watershed.

There are about 40 miles of major perennial streams in this watershed within Waukesha County. Genesee Creek, Mill Brook, Spring Creek and White Creek are listed as cold-water communities. No streams in the watershed are listed on the 303(d) list. Portions of the watershed are subject to flooding due to the extremely low gradient, and severe flooding was experienced in 1997 and 1999. General threats to stream water quality in this watershed include: construction site erosion; habitat modification; ditching and channelization; temperature elevation and storm water runoff.

Concerns over water resource problems in the Fox River system including navigation, water use conflicts, water quality, flooding and drainage led to the formation of the Southeastern Wisconsin Fox River Commission in 1997 by Wisconsin Act 27 (1997-1999 Budget Bill). This Commission was directed by the enabling legislation to develop an implementation plan to address goals including: 1) Protection and rehabilitation of the water quality of the surface waters and groundwater of the Fox River Basin; 2) protection and enhancement of the recreational use of the navigable waters; and 3) increasing water and boating safety on the same navigable waters. Member of the Commission include city, town, and village officials from communities within the watershed, local residents, representatives from the DNR and SEWRPC, and representatives from Racine and Waukesha Counties. Using grant funds from various sources including Targeted Runoff Management grants, Community Development Block grants, and funds allocated to the Commission, several conservation practices have been installed. These include streambank stabilization projects, grassed waterways, and wetland restoration.

Muskego/Wind Lakes Watershed

The Muskego/Wind Lakes Watershed is actually a small portion (41 square miles) of the Middle Fox River Watershed located in Waukesha, Racine, and Milwaukee Counties. The Waukesha County portion of the watershed encompasses approximately 36 square miles and includes portions of the Cities of Muskego and New Berlin. It was designated a "priority watershed" in 1991 under the Wisconsin Nonpoint Source Water Pollution Abatement Program. Overall goals included the reduction of sediment loadings by 55 percent and reducing phosphorus loading by an average 67 percent. Maintenance of stream base flow conditions was also a stated objective of the plan. The watershed project officially closes at the end of 2005 and in the

Waukesha County portion of the watershed has resulted in the development of 36 cost-share agreements primarily for reduced tillage.

Big Muskego Lake is the largest lake in this watershed covering 2,260 acres, but averages only 2.5 feet deep. This lake is undergoing intensive management following the principles of “biomanipulation” to improve water quality not only within the lake, but further downstream to Wind Lake and the Fox River. This project included removing rough fish such as carp and bullheads and establishing desirable rooted and emergent aquatic plants. The plants use the nutrients for growth making them unavailable for excessive algae growth and transport to the water column and further downstream. In addition to the lake rehabilitation project, more than 800 acres of adjacent habitat is being managed cooperatively between the City of Muskego, Wind Lake Management District, the Department of Transportation and the Department of Natural Resources.

Little Muskego Lake appears on the 303(d) list of impaired waters.

Lake Michigan Basin

Menomonee River Watershed

The Menomonee River Watershed covers 136 square miles in portions of Washington, Waukesha, and Milwaukee Counties. The Waukesha County portion of the watershed covers about 37 square miles and includes portions of the Cities of Brookfield and Menomonee Falls as well as the Villages of Butler and Elm Grove. The Menomonee River originates in wetlands near the Village of Germantown in Washington County and runs southeasterly for 32 miles before meeting the Milwaukee and Kinnickinnic Rivers in the Milwaukee Harbor.

Nearly all of the land area in the watershed is within incorporated municipalities. According to the Year 2000 SEWRPC land use inventory, nearly 42 percent of the Waukesha County portion of the watershed is residential. Other land uses in Waukesha County include: transportation related (15%), wetlands (8%), and agriculture (7%). Commercial and industrial land uses each contribute another 6 percent of the total land uses respectively.

Stream and wetland modification, urban and rural runoff, construction site erosion and industrial point sources of pollution are the major contributors to degraded water and habitat quality within this watershed. Ninety-six miles of streams are found within the watershed. Over eight miles of stream are listed on the 303(d) list as impaired. Many streams in this watershed have been concrete lined or straightened to convey floodwaters off the land faster. Flooding continues to be a major concern in this watershed.

Following the recent removal of the Falk Corporation Dam and concrete drop structure on the Menomonee River, seasonal runs of Lake Michigan trout and salmon create fishing opportunities in publicly accessible areas up to the Lepper Dam in the Village of Menomonee Falls. Most fish species resident in the streams within this watershed are tolerant of pollution and habitat degradation. Some streams within this watershed are enclosed or diverted under roads for some length which further restricts aquatic habitat.

Root River Watershed

The Root River Watershed is located in portions of Waukesha, Milwaukee, and Racine counties and encompasses 197 square miles. Only about 13 square miles are within Waukesha County covering portions of the Cities of Muskego and New Berlin. According to the Year 2000 SEWRPC land use inventory, residential land use accounts for 46 percent of the land use in the Waukesha County portion of the watershed. Another 15 percent is agricultural and 14 percent is transportation related.

The headwaters begin in west central Milwaukee and eastern Waukesha counties. From there the river flows southeast ultimately emptying into Lake Michigan in the City of Racine. The watershed is heavily urbanized near the headwaters and mouth. However, the middle portion of the watershed has a large

percentage of agricultural land use. This watershed was one of the first Priority Watershed projects funded in the state, with the initial nonpoint source control plan prepared by SEWRPC in 1980 (Planning Report No. 37). Racine County was the Lead Designated Management Agency for the project, which ended in 1990.

Water quality of the 117 miles of rivers and streams in the Root River Watershed ranges from severely degraded to good. The streams in Waukesha County are classified as supporting only a Limited Forage Fish community or Limited Aquatic Life.

Rivers and Streams

Major streams are perennial streams, which maintain, at a minimum, a small contiguous flow throughout the year except under unusual drought conditions. The 50 major streams in Waukesha County are shown in Map II-10 and described in more detail in Table II-5 below. Waukesha County has approximately 306 miles of major perennial streams. The longest major streams in the county are the Fox (Illinois) and Bark Rivers, with 50.6 and 29.7 stream miles respectively, as measured using the county Land Information System. Twelve of these streams are listed as “impaired” by the Department of Natural Resources, meaning the stream is not meeting water quality standards. These streams have the label 303(d) in the classification code, named after the applicable section of the federal law. More information on each of these streams is contained in the following sections of this plan.

**Table II-5
Major Streams of Waukesha County**

Stream Name	Watershed	Township	Length (miles)	Classification Code(s)
1. Ashippun River	Ashippun	Oconomowoc	11.1	FAL, AQ-3 (RSH)
2. Bark River	Bark	Delafield	29.7	FAL, AQ-1 & AQ-2 (RSH)
3. School Section Ditch	Bark	Ottawa	5.7	FAL
4. Scuppernong Creek	Bark	Ottawa	12.8	FAL, AQ-2 (RSH)
5. Wales Creek	Bark	Genesee	2.1	FAL
6. Butler Ditch	Menomonee	Brookfield	3.9	FAL, 303(d)
7. Dousman Ditch	Menomonee	Brookfield	2	FAL
8. Lilly Creek	Menomonee	Menomonee Falls	5.1	FAL, 303(d)
9. Menomonee River	Menomonee	Menomonee Falls	7.8	FAL, AQ-3
10. Nor-X-Way Channel	Menomonee	Menomonee Falls	1.3	FAL, 303(d)
11. Underwood Creek	Menomonee	Brookfield	6.9	Special Variance, 303(d)
12. Willow Creek	Menomonee	Lisbon	2.3	FAL, 303(d)
13. Artesian Brook	Muskego-Wind	Vernon	1	FAL
14. Muskego Creek	Muskego-Wind	Muskego	6.6	FAL

Stream Name	Watershed	Township	Length (miles)	Classification Code(s)
15. Krueger Brook	Middle Fox	Vernon	2.1	FAL
16. Ripple Creek	Middle Fox	Vernon	1	FAL
17. Horseshoe Brook	Middle Fox	Vernon	1.5	FAL
18. Mill Brook	Middle Fox	Vernon	5.7	COLD, AQ-2 (RSH)
19. Pebble Brook	Middle Fox	Vernon	8.7	FAL, AQ-3
20. Redwing Creek	Middle Fox	Waukesha	1.4	FAL
21. Mill Creek	Middle Fox	Waukesha	5.1	FAL, AQ-3
22. Genesee Creek	Middle Fox	Waukesha	6.7	ERW, COLD, AQ-2 (RSH)
23. Spring Creek	Middle Fox	Mukwonago	6	COLD, 303(d)
24. White Creek	Middle Fox	Genesee	1.4	COLD
25. Beulah Lake Outlet	Mukwonago	Mukwonago	1.1	FAL
26. Mukwonago River	Mukwonago	Mukwonago	10.2	ERW, COLD, AQ-1 (RSH)
27. Jericho Creek	Mukwonago	Eagle	5.8	COLD, AQ-2 (RSH)
28. Battle Creek	Oconomowoc	Summit	2.8	FAL
29. Little Oconomowoc	Oconomowoc	Merton	3.5	FAL, AQ-3 (RSH)
30. Mason Creek	Oconomowoc	Merton	4.5	COLD, AQ-2 (RSH)
31. Oconomowoc River	Oconomowoc	Merton	14.3	ERW, FAL, AQ-3 (RSH)
32. Rosenow Creek	Oconomowoc	Oconomowoc	3.5	COLD, AQ-3
33. Hales Corners Creek	Root	New Berlin	1	LAL
34. Tess Corners Creek	Root	Muskego	5.5	LFF
35. Root River	Root	New Berlin	1.5	FAL, 303(d)
36. McKeawn Spring Creek	Scuppernong	Eagle	0.9	COLD
37. Paradise Springs Creek	Scuppernong	Eagle	1.6	COLD
38. Scuppernong River	Scuppernong	Eagle	7.4	COLD, AQ-2 (RSH)
39. Audley Creek	Upper Fox	Delafield	1.2	FAL
40. Brandy Brook	Upper Fox	Genesee	5	COLD, AQ-3
41. Deer Creek	Upper Fox	Brookfield	6.6	FAL, 303(d)

Stream Name	Watershed	Township	Length (miles)	Classification Code(s)
42. Fox (Ill River)	Upper Fox	Waukesha	50.6	FAL, 303(d), AQ-2 (RSH)
43. Frame Park Creek	Upper Fox	Waukesha	1	LFF, 303(d)
44. Lannon Creek	Upper Fox	Menomonee Falls	5.4	FAL
45. Pebble Creek	Upper Fox	Waukesha	6.9	COLD, AQ-3
46. Pewaukee River	Upper Fox	Pewaukee	6.4	FAL, AQ-3 (RSH)
47. Poplar Creek	Upper Fox	Brookfield	8	FAL, 303(d), AQ-3 (RSH)
48. Sussex Creek	Upper Fox	Brookfield	6.6	FAL, 303(d)
49. Coco Creek (East Br.)	Upper Fox	Pewaukee	2	COLD, AQ-3
50. Coco Creek (West Br.)	Upper Fox	Pewaukee	4.8	COLD, AQ-3
51. Zion Creek	Upper Fox	Delafield	1.6	FAL, 303(d)

Total Miles = 306.1

Classification Codes

COLD = Includes surface waters capable of supporting a community of cold water fish and other aquatic life.

FAL = Fish & Aquatic Life. Default classification equivalent to Warm Water Sport Fish Community.

LFF = Limited Forage Fishery. Surface waters capable of supporting only a limited community of forage fish.

LAL = Limited Aquatic Life. Marginal surface waters that support only a limited aquatic life community.

303(d) = Water body appears on the Wisconsin Impaired Waters list.

ERW = An Exceptional Resource Water as defined by Chapter NR102 of the WI Administrative Code.

AQ-1 = Identifies Aquatic Areas of statewide or greater significance.

AQ-2 = Identifies Aquatic Areas of countywide or regional significance.

AQ-3 = Identifies Aquatic Areas of local significance.

RSH = Rare Species Habitat. Aquatic areas which support endangered, threatened, or "special concern species" officially designated by the DNR.

Lakes

Major inland lakes are defined as those with a surface area of 50 acres or larger, a size capable of supporting reasonable recreational use with minimal degradation of the resource. Waukesha County contains all or portions of 33 major lakes with a combined surface area of approximately 14,000 acres, or 21.9 square miles, or about 3.8 percent of the total area of the County. This represents about 38 percent of the combined surface area of the 101 major lakes in the seven-county Southeastern Wisconsin Region, more than any other county in the Region. Thirty of the major lakes are located entirely within the County, while three major lakes, Lake Denoon, Golden Lake, and Lake Five, are located only partly within the County. In addition to the major lakes, there are 47 other named water bodies with lake characteristics referenced in the DNR publication, "Wisconsin Lakes", PUBL-FM-800 91. The 80 total named lakes in Waukesha County are presented in Map II-10 and described in Table II-6.

Because lake water quality is significantly affected by surrounding land use and cover, urban development and agricultural activity on land that drains into lakes and streams has led to a decline in water quality on many lakes in Waukesha County. Water quality often changes as a result of increasing levels of such nutrients as nitrogen and phosphorus entering a lake. Nitrogen is usually the limiting nutrient for rooted aquatic plants while phosphorus is considered the limiting nutrient for algae growth. Eutrophication is the

condition reached by lakes when the accumulation of nutrients produces increasing amounts of aquatic plants. As the resulting lush aquatic plant growth dies each year, organic deposits fill in the lake. This is a natural process that is generally more prevalent in warm, shallow lakes, such as Big Muskego Lake, than in colder, deep lakes, such as Oconomowoc Lake. However, the process can be greatly accelerated by additional nutrients from inadequate or failing onsite sewage disposal systems, lawn fertilizers, agricultural runoff containing fertilizer and animal wastes, construction site runoff, and street debris.

The trophic status of most major lakes in Waukesha County is also presented in Table II-6. The trophic state serves as an indicator of overall water quality, taking into consideration water clarity, phosphorus content, algae content and regional location in Wisconsin.

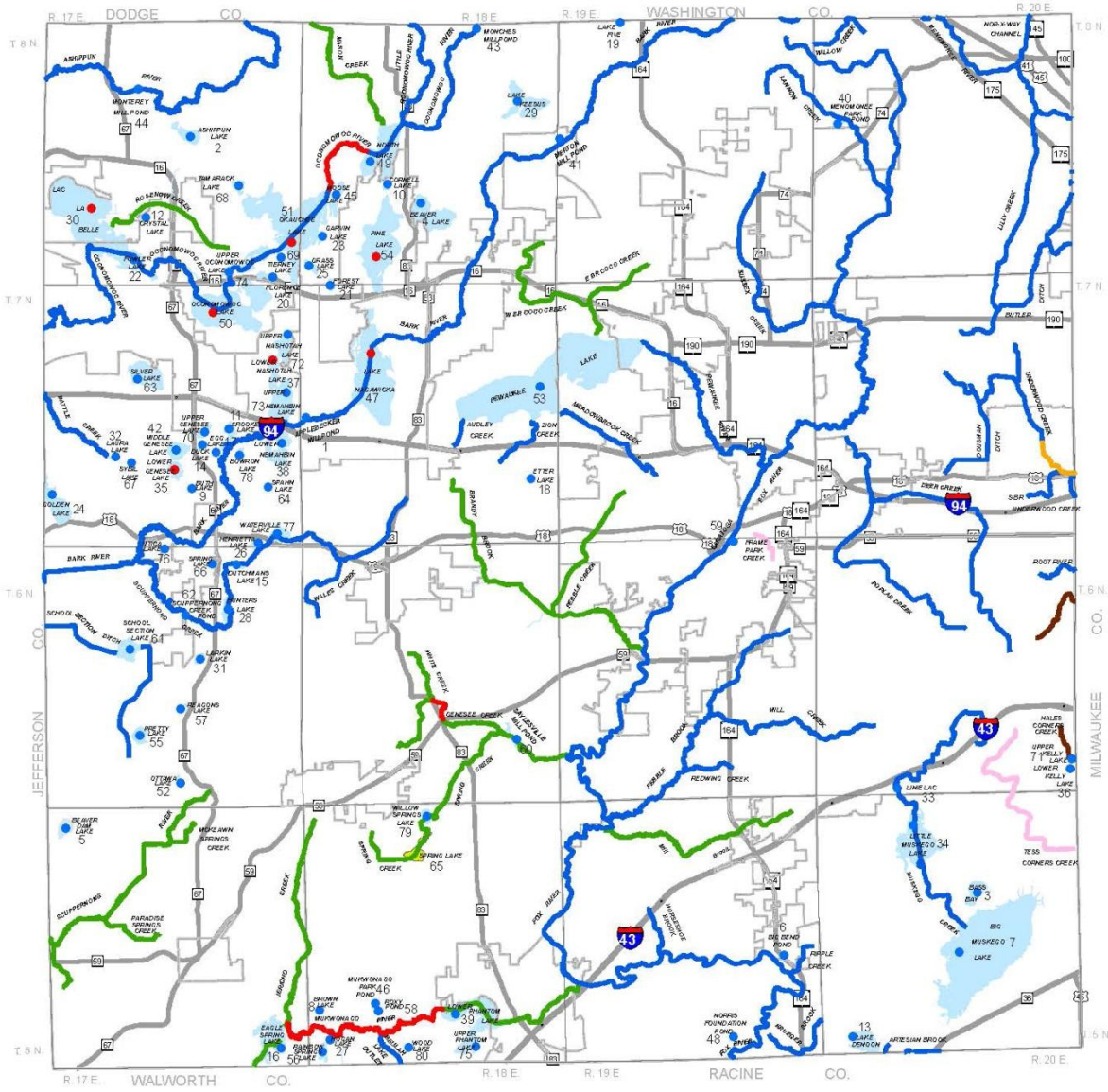
A mesotrophic lake shows some signs of eutrophication. The presence of a greater amount of nutrients than in an oligotrophic lake results in lowered clarity and the presence of aquatic plants. Swimming and boating can be enjoyed on this type of lake without limitations.

A eutrophic lake has relatively large amounts of aquatic plants because of higher nutrient levels. The water may be cloudy because of suspended algae cells, dying plants may produce unpleasant smells, and mats of plants may interfere with swimming and boating. These lakes are generally shallow, with mucky bottoms. Eutrophic lakes can be excellent warm-water fishing lakes for such fish as bass and bluegills.

All surface waters in the state of Wisconsin can be classified into one of several biological use objectives classification categories. The classification categories include:

- Cold Water Communities (COLD): Includes surface waters capable of supporting a community of cold water fish and other aquatic life or serving as a spawning area for cold water fish species.
- Warm Water Sport Fish Communities (WWSF): Includes surface waters capable of supporting a community of warm water sport fish or serving as a spawning area for warm water sport fish. This category is the default listing for all streams that have not been formally classified according to the process outlined in meeting the federal Clean Water Act goals. Is also the equivalent of full fish and aquatic waters (FAL) classification.
- Warm Water Forage Fish Communities (WWFF): Includes surface waters capable of supporting an abundant diverse community of forage fish and other aquatic life.
- Limited Forage Fishery (LFF): Includes surface waters of limited capacity because of low flow, naturally poor water quality or poor habitat. These surface waters are capable of supporting only a limited community of forage fish and aquatic life.
- Limited Aquatic Life (LAL): Includes surface waters severely limited because of very low or intermittent flow and naturally poor water quality or poor habitat. These surface waters are capable of supporting only a limited community of aquatic life.

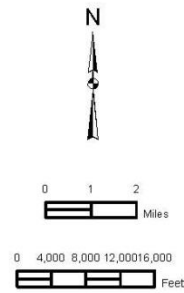
Map II-10 Surface Water Resources of Waukesha County



Water Resource Classification Codes

- Outstanding Resource Water (ORW)
- Exceptional Resource Water (ERW)
- Lake Supports Fish and Aquatic Life (FAL)
- Lake Supports Cold Water Species (Cold)
- Cold Water Streams (Cold)
- Fish and Aquatic Life (FAL)
- Special Variance Waters
- Limited Forage Fish (LFF)
- Limited Aquatic Life (LAL)

Source: Waukesha County, SEWRPC & WDNR



**Table II-6
Named Lakes in Waukesha County**

Lake	Watershed	Township	Surface Area (acres)	Max. Depth (feet)	Lake Type	Trophic State	Classification Code(s)
1. Applebecker Millpond	Bark	Delafield	12	5	DG	Eutrophic	FAL
2. Ashippun*	Ashippun	Oconomowoc	83	40	SP	Mesotrophic	FAL, AQ-2 (RSH)
3. Bass Bay	Muskego-Wind	Muskego	100	23		Eutrophic	FAL, AQ-3
4. Beaver	Oconomowoc	Merton	316	49	SP	Mesotrophic	FAL, AQ-3 (RSH)
5. Beaver Dam	Bark	Eagle	36		SE	Eutrophic	FAL
6. Big Bend Pond	Middle Fox	Vernon	7	10	SP	N/A	FAL
7. Big Muskego*	Muskego-Wind	Muskego	2,260	4	DG	Eutrophic	FAL, AQ-2 (RSH)
8. Brown	Mukwonago	Mukwonago	12	15	SP	Eutrophic	FAL
9. Buth	Bark	Summit	4	5	SE	N/A	FAL
10. Cornell	Oconomowoc	Merton	16	12	DG	Mesotrophic	FAL
11. Crooked	Bark	Summit	58	16	DG	Mesotrophic	FAL, AQ-2 (RSH)
12. Crystal	Oconomowoc	Oconomowoc	17	30		N/A	FAL
13. Denoon	Middle Fox	Muskego	162	55	SE	Mesotrophic	FAL, AQ-3 (RSH)
14. Duck	Bark	Summit	12	1	SE	N/A	FAL, AQ-3 (RSH)
15. Dutchman	Bark	Ottawa	33	43	SE	Eutrophic	FAL, AQ-2 (RSH)
16. Eagle Spring*	Mukwonago	Eagle	311	8	DG	Eutrophic	FAL, AQ-2 (RSH)
17. Egg	Bark	Summit	2	3	SE	N/A	FAL
18. Etter	Upper Fox	Delafield	11	5	SE	Eutrophic	FAL
19. Five	Oconomowoc	Merton	102	23	SE	Mesotrophic	FAL, AQ-3
20. Florence	Oconomowoc	Oconomowoc	21	48	SE	Mesotrophic	FAL
21. Forest	Oconomowoc	Merton	41	17	SE	Eutrophic	FAL, AQ-3 (RSH)
22. Fowler*	Oconomowoc	Oconomowoc	99	50	DG	Mesotrophic	COLD, AQ-3
23. Garvin	Oconomowoc	Merton	17	36	SE	Mesotrophic	FAL
24. Golden	Bark	Summit	250	46	SP	Mesotrophic	FAL, AQ-2 (RSH)
25. Grass (Mud)	Oconomowoc	Merton	33		SE	N/A	FAL
26. Henrietta	Bark	Summit	15	7	SE	Eutrophic	FAL, AQ-3 (RSH)
27. Hogan	Mukwonago	Mukwonago	8	3	SE	N/A	FAL
28. Hunters	Bark	Ottawa	57	46	SP	Mesotrophic	FAL, AQ-2 (RSH)
29. Keesus*	Oconomowoc	Merton	237	42	SP	Mesotrophic	FAL, AQ-3
30. Lac La Belle*	Oconomowoc	Oconomowoc	1,117	45	DG	Eutrophic	FAL, 303(d), AQ-3
31. Larkin	Bark	Ottawa	57	4	SP	N/A	FAL, AQ-3 (RSH)
32. Leota (Laura)	Oconomowoc	Summit	8	11	DG	N/A	FAL
33. Linnie Lac*	Muskego-Wind	New Berlin	6	6	DG	Eutrophic	FAL
34. Little Muskego*	Muskego-Wind	Muskego	506	65	DG	Mesotrophic	FAL, 303(d)
35. Lower Genesee	Bark	Summit	66	45	SP	Mesotrophic	Cold, AQ-3 (RSH)
36. Lower Kelly	Root	New Berlin	3	36	SE	Eutrophic	FAL
37. Lower Nashotah	Bark	Summit	90	43	SP	Oligotrophic	Cold, AQ-2 (RSH)
38. Lower Nemahbin	Bark	Summit	271	36	DG	Eutrophic	FAL, AQ-2 (RSH)
39. Lower Phantom*	Mukwonago	Mukwonago	433	12	DG	Oligotrophic	FAL, AQ-1 (RSH)
40. Menomonee Park Pond	Upper Fox	Menomonee Falls	15	50	SP	N/A	FAL
41. Merton Millpond	Bark	Lisbon	38	8	DG	Eutrophic	FAL, AQ-2 (RSH)
42. Middle Genesee*	Bark	Summit	109	40	SE	Mesotrophic	FAL, AQ-3 (RSH)
43. Monches Millpond	Oconomowoc	Merton	16	4	DG	Eutrophic	FAL
44. Monterey Millpond	Ashippun	Oconomowoc	30	8	DG	N/A	FAL
45. Moose	Oconomowoc	Merton	81	61	SP	Oligotrophic	FAL, AQ-3 (RSH)
46. Mukwonago Park Pond	Mukwonago	Mukwonago	1	5	SP	N/A	FAL, AQ-3 (RSH)
47. Nagawicka	Bark	Delafield	957	90	DG	Mesotrophic	FAL, AQ-1 (RSH)

Lake	Watershed	Township	Surface Area (acres)	Max. Depth (feet)	Lake Type	Trophic State	Classification Code(s)
48. Norris Foundation Pond	Middle Fox	Vernon	3	8	DG	N/A	FAL
49. North*	Oconomowoc	Merton	439	78	DG	Mesotrophic	FAL, AQ-2 (RSH)
50. Oconomowoc	Oconomowoc	Oconomowoc	804	62	DG	Mesotrophic	FAL, 303(d), AQ-2 (RSH)
51. Okauchee*	Oconomowoc	Oconomowoc	1,187	94	DG	Eutrophic	FAL, AQ-2 (RSH)
52. Ottawa	Scuppernong	Ottawa	28	16	SP	Mesotrophic	FAL, 303(d) AQ-2 (RSH)
53. Pewaukee	Upper Fox	Delafield	2,493	45	SP	Mesotrophic	FAL, AQ-2 (RSH)
54. Pine	Oconomowoc	Merton	703	85	SP	Oligotrophic	FAL, AQ-2 (RSH)
55. Pretty*	Bark	Ottawa	64	35	SE	Mesotrophic	FAL
56. Rainbow Springs	Mukwonago	Eagle	25	16	SE	Eutrophic	FAL, AQ-3 (RSH)
57. Reagon	Bark	Ottawa	16	10	SP	Eutrophic	FAL, AQ-3 (RSH)
58. Roxy Pond	Mukwonago	Mukwonago	17	3	SP	Hypereutrophic	FAL
59. Saratoga	Upper Fox	Waukesha	24	6	DG	N/A	FAL
60. Saylesville Millpond	Middle Fox	Genesee	45	4	DG	Eutrophic	FAL, AQ-3 (RSH)
61. School Section*	Bark	Ottawa	125	8	DG	Eutrophic	FAL, AQ-2 (RSH)
62. Scuppernong Creek Pond	Bark	Ottawa	20	5	DG	N/A	FAL
63. Silver	Oconomowoc	Summit	222	44	SE	Mesotrophic	FAL, AQ-2 (RSH)
64. Spahn	Bark	Summit	4	5	SE	N/A	FAL, AQ-3 (RSH)
65. Spring	Middle Fox	Mukwonago	105	22	SP	Eutrophic	ORW, AQ-2 (RSH)
66. Spring (Dousman)	Bark	Ottawa	14	8	SE	Eutrophic	FAL, AQ-3 (RSH)
67. Sybil	Bark	Summit	2		SE	N/A	FAL
68. Tamarack	Oconomowoc	Oconomowoc	30	15	SE	Eutrophic	FAL
69. Tierney	Oconomowoc	Oconomowoc	15	5	DG	Eutrophic	FAL
70. Upper Genesee	Bark	Summit	37	27	SP	Mesotrophic	FAL, AQ-3 (RSH)
71. Upper Kelly	Root	New Berlin	12	9	SP	Eutrophic	FAL
72. Upper Nashotah	Bark	Summit	133	53	SP	Oligotrophic	FAL, AQ-2 (RSH)
73. Upper Nemahbin*	Bark	Summit	283	61	DG	Mesotrophic	FAL, AQ-2 (RSH)
74. Upper Oconomowoc	Oconomowoc	Oconomowoc	43	11	DG	Eutrophic	FAL
75. Upper Phantom*	Mukwonago	Mukwonago	110	29	SP	Mesotrophic	FAL, AQ-1(RSH)
76. Utica	Bark	Summit	14	25	SP	Mesotrophic	FAL, AQ-3
77. Waterville	Bark	Summit	68	12	DG	Eutrophic	FAL, AQ-3 (RSH)
78. Widgeon/Bowron	Bark	Summit	25	25	SP	Eutrophic	FAL, AQ-3 (RSH)
79. Willow Spring*	Middle Fox	Mukwonago	46	13	DG	Eutrophic	FAL, AQ-3 (RSH)
80. Wood	Mukwonago	Mukwonago	20	22	SP	Mesotrophic	FAL, AQ-3 (RSH)

Classification Codes

Cold = Supports a cold water community either naturally occurring or artificially stocked.

FAL = Fish & Aquatic Life. Default classification equivalent to Warm Water Sport Fish Community.

303(d) = Water body appears on the Wisconsin Impaired Waters List

ORW = An Outstanding Resource Water as defined by Chapter NR102 of the WI Administrative Code.

AQ-1 = Identifies Aquatic Areas of statewide or greater significance.

AQ-2 = Identifies Aquatic Areas of countywide or regional significance.

AQ-3 = Identifies Aquatic Areas of local significance.

RSH = Rare Species Habitat. Aquatic areas that support endangered, threatened, or "special concern" species designated by DNR.

* = Lake has a Lake Management District formed under Chapter 33 Wisconsin Statutes.

Lake Type

Drainage lake (DG): Impoundments and natural lakes with the main water source from stream drainage.

Seepage lake (SE): Landlocked. Water level maintained by groundwater table and basin seal. May have intermittent outlet.

Spring lake (SP): Groundwater fed lakes always with an outlet of substantial flow.

Outstanding and Exceptional Resource Waters

Chapter NR 102 of the Wisconsin Administrative Code lists water quality standards for all surface waters in the state of Wisconsin. The two highest classification categories are Outstanding Resource Waters (ORW) and Exceptional Resource Waters (ERW).

An outstanding resource water (ORW) is defined as a lake or stream which has excellent water quality, high recreational and aesthetic value, high quality fishing, and is free from point source or nonpoint source pollution. The only outstanding resource water in Waukesha County is Spring Lake.

An exceptional resource water (ERW) is defined as surface waters which exhibits the same high quality resource values as outstanding resource waters, but which may be impacted by point source pollution or have the potential for future discharge from a small sewer community. Exceptional resource waters found in Waukesha County include specific portions of the following streams:

Genesee Creek	(Above STH 59)
Mukwonago River	(From Eagle Springs Lake to Upper Phantom Lake)
Oconomowoc River	(From below North Lake to Okauchee Lake)

Impaired Waters List (303d)

The Department of Natural Resources (DNR) is required every two years to submit a list to the Environmental Protection Agency (EPA) which identifies waters which are not meeting water quality standards, including both water quality criteria for specific substances or the designated biological and recreational uses. This list is known as the “impaired waters list” or simply the “303(d) list” in reference to the particular section of the Clean Water Act.

Table II-7 shows all the water resources in Waukesha County that were included on the Wisconsin 303(d) list as of 2012. The list includes 15 stream reaches and 3 lakes which suffer from a variety of pollutants and impairment indicators, as shown in Table II-7. Most of the pollutants are nonpoint sources, with the exception of PCBs, which come primarily from industrial sources and bioaccumulate in the environment.

Many of the water resources on the 303(d) list have been targeted by water pollution control programs, as discussed in previous sections of this plan. However, in urban areas, it is very difficult and often prohibitively expensive to control nonpoint pollution sources to a level that will bring the water resource into compliance with water quality standards. TMDL plans are currently being developed for some of the water resources to address this issue.

Land Use

SEWRPC conducts a regular land use inventory of southeast Wisconsin that is intended to serve as a relatively precise record of land use at selected points in time, using aerial photographs augmented by field surveys as appropriate. The first regional land use inventory was prepared by SEWRPC in 1963 and has been updated every five years following the preparation of new aerial photography. While aerial photography was completed in the spring 2010, this detailed level of land use data was not yet available for this planning effort. To fill the temporary data void from a decade of development in the county, the LRD conducted a generalized inventory of agricultural and urban lands as part of the Farmland Preservation Plan update completed in 2011.

**Table II-7
303(d) Listed Impaired Waters in Waukesha County: 2012**

Water Body	Start Mile	End Mile	Pollutant	Impairment Indicator
Fox River (Illinois)	151.34	171.45	PCBs	Contaminated Fish Tissue
Fox River (Below Barstow Impoundment)	171.45	175.32	PCBs, Total Phosphorus, Sediment/Total Suspended Solids	Contaminated Fish Tissue, Degraded Habitat, Low DO
Lower Barstow Impoundment	175.32	176.13	Mercury, Total Phosphorus, Sediment/Total Suspended Solids	Contaminated Fish Tissue, Low DO, Turbidity
Fox River, Upper Barstow Impoundment	176.13	180.1	PCBs, Total Phosphorus, Sediment/Total Suspended Solids	Contaminated Fish Tissue, Low DO
Fox River	180.1	187.16	PCBs, Total Phosphorus, Sediment/Total Suspended Solids	Contaminated Fish Tissue, Low DO
Fox River	187.16	196.64	PCBs	Contaminated Fish Tissue
Lannon Creek	0	5.48	Sediment/Total Suspended Solids	Degraded Habitat
Poplar Creek	0	8.06	Unknown Pollutant	Low DO
Spring Creek	0	6.57	Total Phosphorus	Low DO
Master Disposal Drainage Channel	0	0.99	Unknown Pollutant	Chronic Aquatic Toxicity
Frame Park Creek	0	1.26	PAHs, Total Phosphorus, Unspecified Metals	Contaminated Sediment, Low DO, Chronic Aquatic Toxicity
Butler Ditch	0	2.9	Fecal Coliform	Recreational Restrictions Pathogens
Lilly Creek	0	4.47	Fecal Coliform	Recreational Restrictions Pathogens
Deer Creek	0	8.09	Sediment/Total Suspended Solids, Elevated Water Temp, Total Phosphorus	Elevated Water Temps, Degraded Habitat, Excess Algal Growth
Zion Creek	0	1.65	Sediment/Total Suspended Solids, Elevated Water Temp, Total Phosphorus	Elevated Water Temps, Degraded Habitat, Low DO
Root River	20.48	43.95	Total Phosphorus, Sediment/Total Suspended Solids	Low DO, Degraded Biological Community
Little Muskego Lake			Total Phosphorus	Low DO
Oconomowoc Lake			Mercury	Contaminated Fish Tissue
Lac La Belle			PCBs	Contaminated Fish Tissue

Source: WDNR

Land Use Trends

There is no ambiguity regarding the land use trends in Waukesha County. The numbers and maps tell the story well. Table II-8 shows the changes in land use that occurred in Waukesha County from 1963 to 2000. It shows the rate of land conversion from rural to urban uses during the 1990s was about 3000 acres per year, or about 4.7 square miles per year – more than any other decade since SEWRPC has been collecting land use data. Figure II-9 shows the loss in dairy farms in the county from 1969 to 2007 according to USDA. The NET loss during this period was 92% of the dairy farms, with only 33 dairy still in operation in 2007.

The generalized land use inventory conducted by Waukesha County in 2010 shows the rate of land conversion increased to almost 6 square miles per year during the first decade of the new millennium. The 85,526 acres that remained in agricultural or rural land uses in 2010 represents a 46% loss of the agricultural lands since the first Farmland Preservation Plan was adopted by the Waukesha County Board in 1984 – a loss of 81,672 acres in three decades.

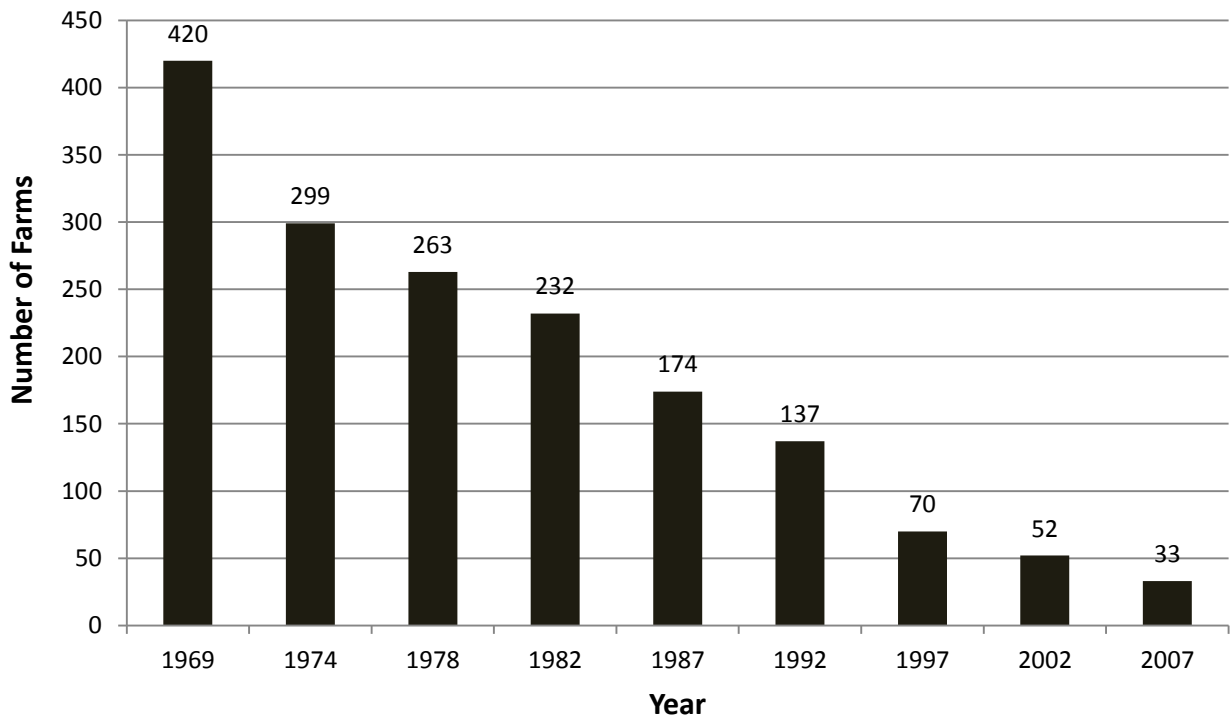
Table II-8
Change in Land Use in Waukesha County: 1963-2000
 (Acres)

Land Use Category ^a	1963	1970	1980	1990	2000
Urban					
Residential	28,148	35,476	50,745	59,247	75,221
Commercial	1,197	1,831	2,754	3,827	5,351
Industrial	924	1,758	2,747	3,802	5,525
Transportation, Communication, and Utilities	16,079	18,545	21,867	22,805	30,001
Governmental and Institutional	2,550	3,587	4,037	4,215	4,887
Recreational	3,311	4,605	5,756	6,465	8,253
Unused Urban Land	8,509	8,516	8,017	7,025	7,806
Subtotal Urban	60,718	74,318	95,923	107,386	137,044
Nonurban					
Natural Areas					
Surface Water	16,076	16,461	16,753	16,878	16,891
Wetlands	52,588	51,660	51,233	51,978	52,661
Woodlands	31,181	30,818	29,472	29,584	28,931
Subtotal Natural Areas	99,845	98,939	97,458	98,440	98,483
Agricultural	200,241	184,390	161,558	142,428	112,611
Unused Rural and Other Open Lands	10,786	13,943	16,651	23,336	23,397
Subtotal Nonurban	310,872	297,272	275,667	264,204	234,491
Total	371,590	371,590	371,590	371,590	371,535

^aOff-street parking is included with the associated land use.

Source: SEWRPC.

Figure II-9
Dairy Farms in Waukesha County
1969 - 2007

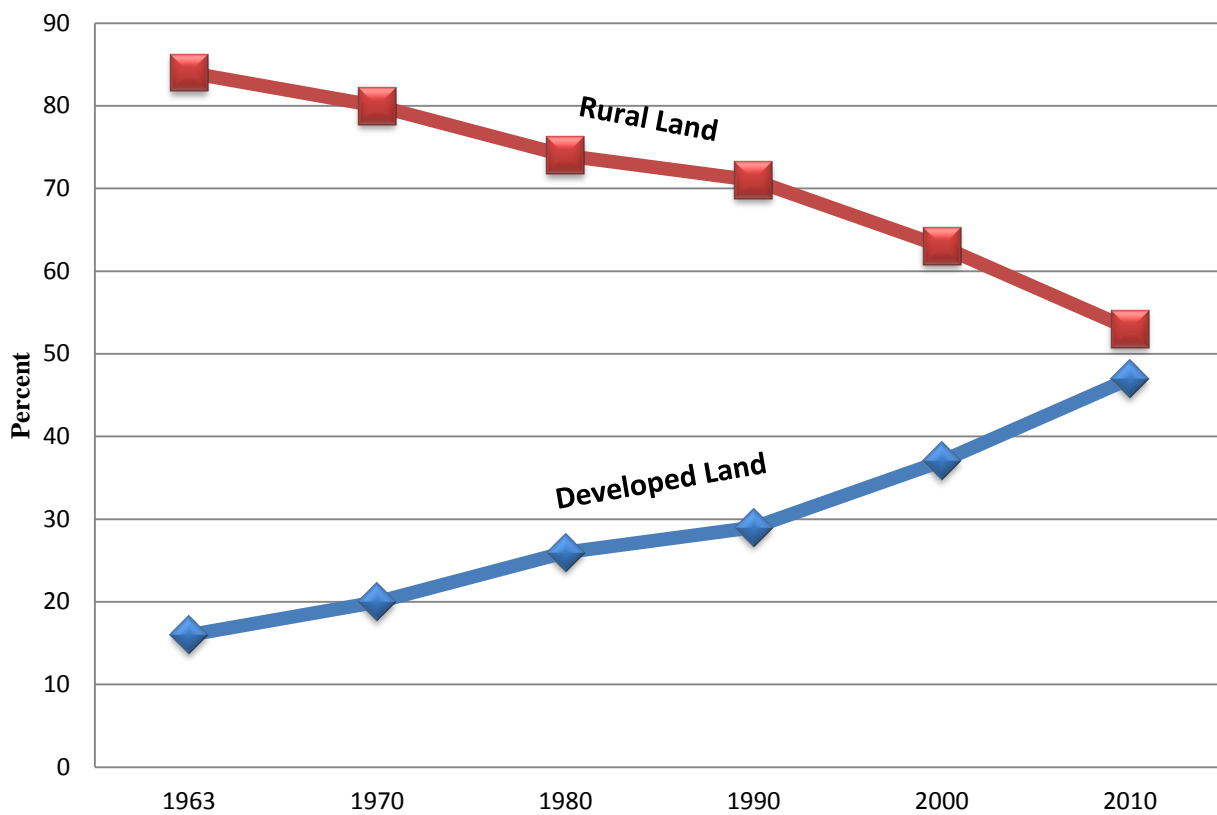


Source: USDA, National Agricultural Statistics Service

Map II-11 shows the pattern and area of land conversion from rural to urban uses from 1963-2010. In general, since 1963 the acres of land in urban categories have almost tripled from 60,718 acres in 1963 to 174,621 acres in 2010, an increase of about 290%. Much of the increase can be attributed to the amount of land used for residential purposes.

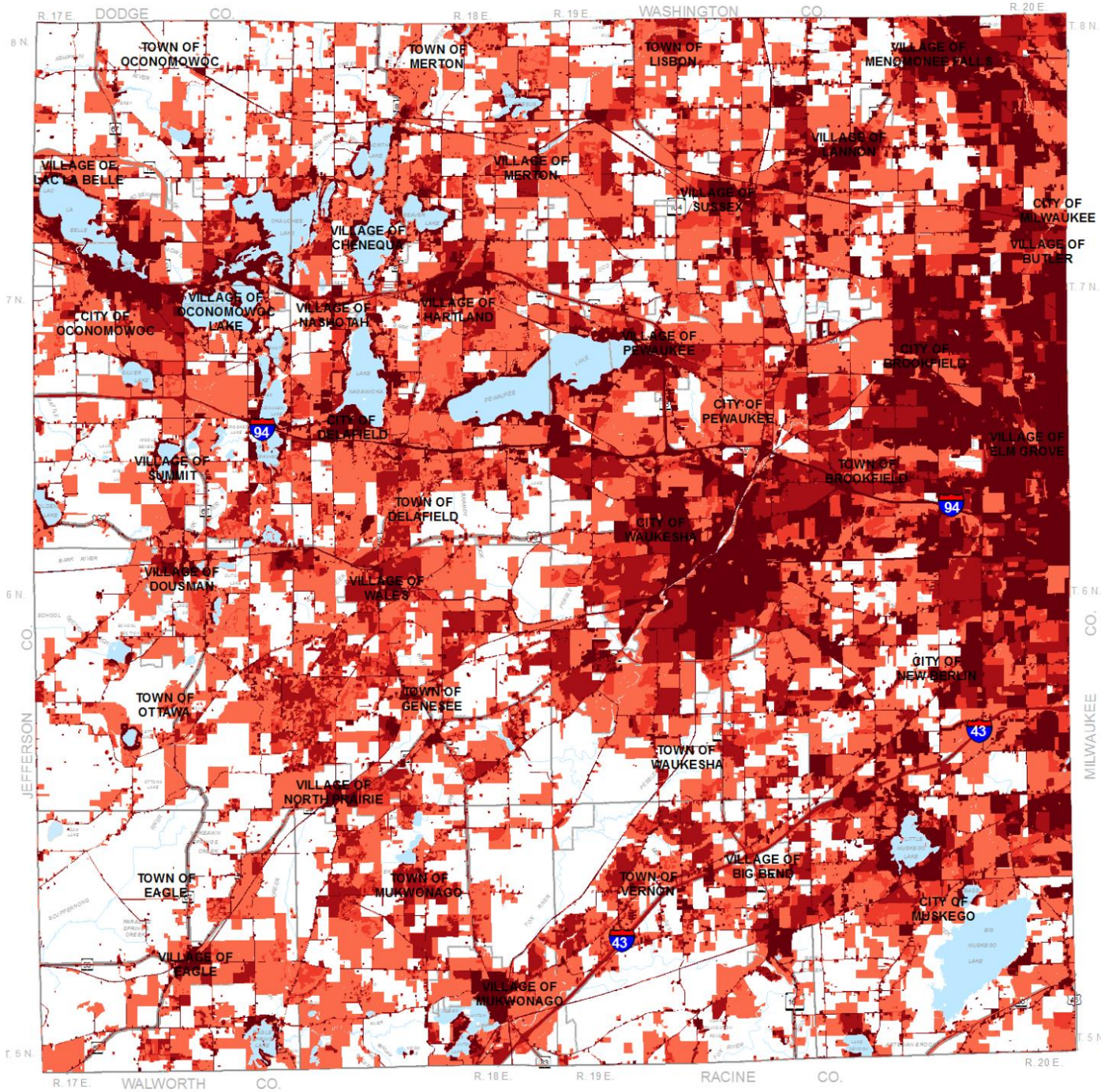
Figure II-10 charts the acres of developed lands against the rural lands from 1963-2010. It shows in 1963 the land use ratio was about 84% rural to 16% developed, while in 2010, it is very near 50/50 ratio with the rural portion closely split between natural areas and agricultural lands. Map II-12 shows how these three very general land use categories are distributed in the county as of 2010.

Figure II-10
Land Use Trends in Waukesha County: 1963-2010



Source: SEWRPC and Waukesha County

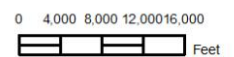
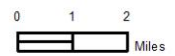
Map II-11
Rural to Urban Land Use Conversion in Waukesha County: 1963-2010



Legend

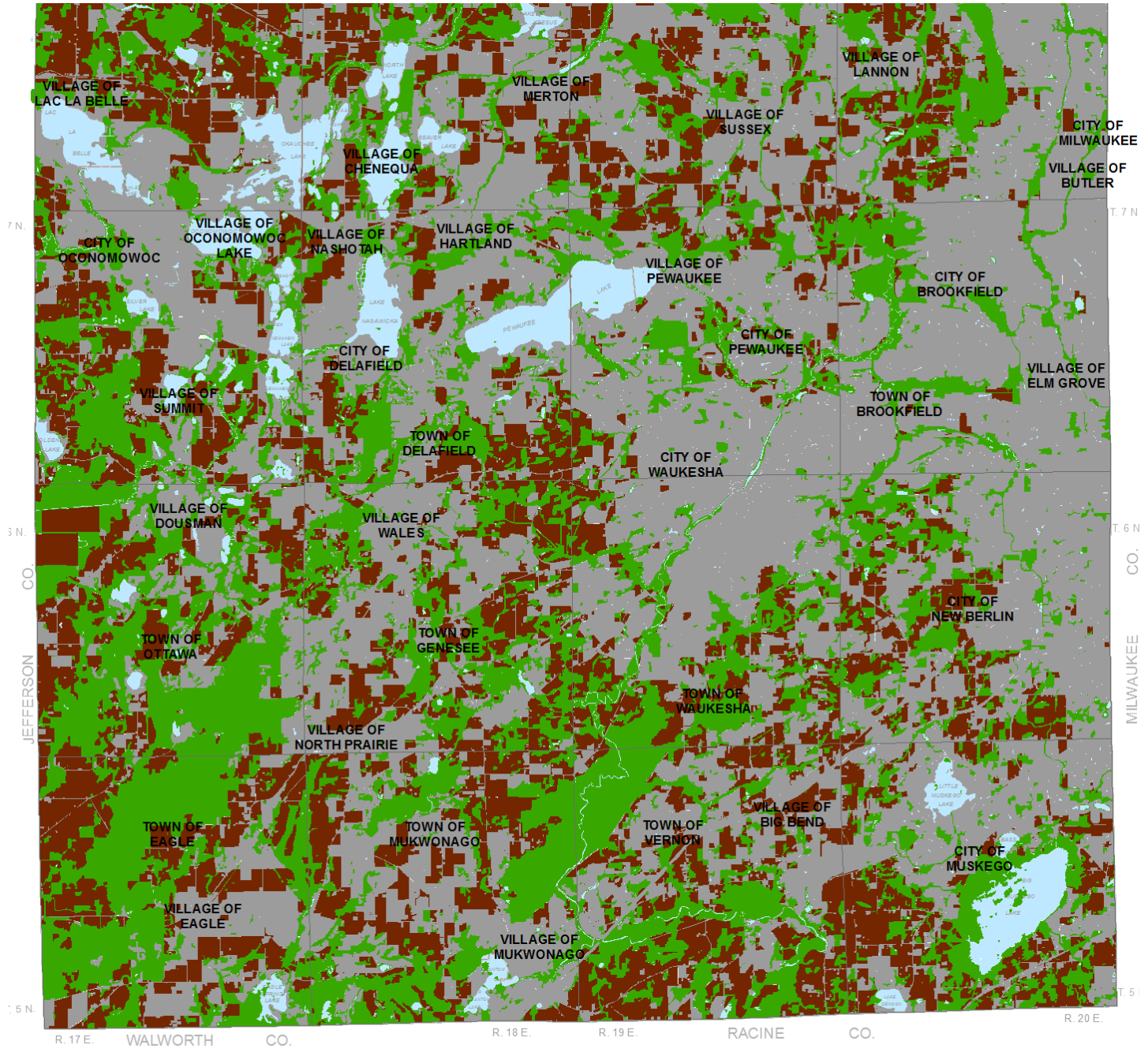
- 1963 Developed Lands
- 1985 Developed Lands
- 1995 Developed Lands
- 2010 Developed Lands

Source: Waukesha County & SEWRPC



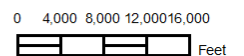
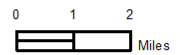
Map II-12

Agricultural Lands, Developed Lands and Natural Areas Waukesha County: 2010



Legend

- Natural Areas (27% of County)
- Agricultural Lands (23% of County)
- Developed Lands (47% of County)



Source: Waukesha County & SEWRPC

Exotic and Invasive Species

Waukesha County, like many other counties around the state of Wisconsin, has become home to a number of exotic and invasive species of plants and animals. These pests invade lakes, rivers, forests, wetlands and grasslands. They displace native species, disrupt ecosystems, and affect people's livelihoods and quality of life. They hamper boating, swimming, fishing, hunting, hiking, and other recreation and take an economic toll on commercial, agricultural, forestry, and aquacultural resources.

Invasive species found in Waukesha County include: Purple loosestrife, zebra mussels, Eurasian water milfoil, garlic mustard, rusty crayfish, gypsy moth, buckthorn, wild parsnip, and multiflora rose among many others. Humans have created conditions where plants and animals can aggressively invade and dominate natural areas and waterways in three ways:

1. Introducing exotic species that lack natural competitors and predators to keep them in check.
2. Disrupting native ecosystems by changing environmental conditions.
3. Spreading invasive species through various methods.

Controlling invasive species can be difficult and expensive. Learning how to prevent the introduction of new invasive species and controlling the spread of those already in Waukesha County will take education. One source of information is the Department of Natural Resources at <http://dnr.wi.gov/invasives/>.

Summary

While presenting a general overview of the local natural resource features, population growth and land use data, this chapter brings light to the urbanizing pressures faced in Waukesha County. The number one source of water pollution in most county watersheds is runoff from urban lands and construction sites. While the recession that began in 2008 has definitely slowed the land conversion process, history tells us it is only a matter of time before the urbanization pressures return. These pressures played a key role in the identification of resources issues and concerns and the formulation of the goals, objectives and activity plan presented in Chapter III.

Chapter III. Goals, Objectives and Planned Activities

In general terms, the overall goal of the Waukesha County land and water resource management program is to meet state water quality standards and water resource objectives while also addressing local resource issues of concern. This chapter describes more specific program goals, objectives, planned activities and estimated staff resources to be assigned to each goal over the next 10 years by the Land Resources Division. The LRD plans to achieve its goals and objectives through the use of a wide variety of program methods, including but not limited to: information and education, conservation planning and technical assistance, cost-sharing grants, geographic information system (GIS) technology, tax credits, partnerships with other agencies and organizations, and the enforcement of county ordinances and state conservation compliance rules. Many of these program methods are intended to facilitate the installation and maintenance of conservation practices to protect or improve water quality. Further details on all these methods are provided in the remainder of this chapter and in Chapter IV.

Water Resources Objectives

As noted above, a guiding principle for the development and implementation of this plan is to protect and improve the water resources of Waukesha County. Water quality is important for public health, recreation, local property values and many other reasons. Chapter II summarized the condition of local lakes and streams and their watersheds based on available data and reports from the Wisconsin Department of Natural Resources (DNR) and the Southeastern Wisconsin Regional Planning Commission (SEWRPC). In general, the data shows that many of the lakes and streams in the county are only partially meeting water quality standards or supporting their potential biological use classification. This is true regardless if they are classified as a warm water forage fish community, a warm water sport fish community, or a cold-water community. With the exception of those waters identified in Section NR 104.06 Wisconsin Administrative Code, all water resources in the County are expected to meet the water quality standards associated with the classifications shown in Tables II-5 and II-6 and be fully compliant with the fishable and swimmable goals established by the federal Clean Water Act.

The noted reports also describe the impairment factors that prevent these water resources from reaching their full potential. These factors include, but are not limited to: low dissolved oxygen, degraded habitat (i.e. streambank erosion, channelization, developed shores), contaminated fish tissue (i.e. mercury, PCBs), elevated water temperature, recreational restrictions due to pathogens (i.e. fecal coliform, e-coli), chronic aquatic toxicity, contaminated sediment (i.e. Polycyclic aromatic hydrocarbons or PAH's), and turbidity (i.e. suspended solids). The other most commonly listed pollutants are phosphorous and sediment, which can originate from both agricultural and urban landscapes. Sewage treatment plant discharges are also a significant source of phosphorous, although recently enacted state regulations address this concern. Invasive species are also widespread in the county, both in the aquatic and terrestrial environments.

Many of the goals for this plan are aimed at meeting water resource objectives or standards for surface or groundwater. However, given the development pressures in urbanizing watersheds in the county, and the resulting impacts on water quality and quantity, in some cases it may be a more realistic goal to maintain existing water resource conditions. Also, given the overall shortage of water quality monitoring data in the county, it is usually very difficult to measure program success in terms of measurable water quality improvements, especially within a 10-year planning horizon. This issue is discussed in more detail in Chapter IV.

Plan Goals

As noted in Chapter I, two advisory committees were assembled in 2005 to assist the LRD in updating the previous version of this Land and Water Resource Management Plan. One of the primary tasks of these advisory committees was to help identify the major resource issues of concern facing Waukesha County. Using a nominal group process, the two advisory committees were asked the following question:

What agricultural and non-agricultural conservation issue do you believe impacts the land and water resources of Waukesha County and should be addressed by the Land Resources Division?

Responding to this question, the advisory committees produced a list of 61 issues, which were grouped into more general goals, ranked in order of priority and incorporated into the 2006 LWRM Plan. With minor revisions, these overall program goals were carried over as the foundation for this 2012 plan update, as listed below:

1. Control Urban Runoff Pollution and Flooding
2. Protect the Quality and Quantity of Groundwater
3. Control Agricultural Runoff Pollution
4. Educate the Public on Conservation Issues
5. Preserve Targeted Farmland and Natural Areas
6. Support Water Monitoring and Improve Public Access to Water Resource Data
7. Reclaim Active Nonmetallic Mining Sites

It should be noted that, while all of the resource issues or goals identified by the advisory committee were determined to be important, fiscal constraints, state mandates and other local program commitments would limit the LRD's ability to commit to all the goals and objectives identified by the advisory committee. These facts also played a role in establishing the level of staff resources assigned to each goal.

Plan Objectives and Planned Activities

For each of the seven plan goals noted above, more specific objectives and planned activities were developed and are described in this section. Background information is first provided on each of the program goals, how they apply to Waukesha County, and the subsequent objectives that were derived from them. The background information often references the resource assessments provided in Chapter II. The objectives and planned activities were drafted by the LRD and reviewed by the plan advisory committee, as described in Chapter I.

A guiding principle behind the entire plan is to build partnerships with other conservation agencies and organizations whenever practical to help achieve program goals or objectives. To avoid unnecessary redundancy, all partnerships are not described in detail under each planned activity, but some key partnerships are noted either in the activity description or the program notes to the right. All agency, organization and program acronyms used in the following sections are defined in Appendix A.

After each goal is a projected level of staff and budget resources that will be assigned to that goal on an average annual basis. The staff projections are based on Land Resources Division 2012 staffing levels of approximately 5.8 full-time equivalents (FTE) available to work on land and water resource management programs. One FTE is equal to 2080 hours of work, but may actually be distributed to any number of employees, full or part time. As noted in Chapter IV, this assumed staffing level does not represent any commitment by Waukesha County, and is in fact subject to changing program and department demands, county budgets and level of state funding that is maintained during the planning period.

All activities listed are high priority unless there is an (M) listed after the activity description. High priority means that the activity represents a core function of the LRD or an existing commitment and will be completed unless significant funding shortfalls are encountered. The (M) designation is to represent a medium priority, which means the activity is considered important, but may experience delays in implementation depending on available funding, staff resources, and the amount of time required to complete high priority activities. No low priority items are listed in the activity plan since they would represent activities that are not likely to be accomplished due to limited resources. All references to the LRD web site can be found at: www.waukeshacounty.gov/landconservation. All references to the Waukesha County GIS-web site are at: www.waukeshacounty.gov/GIS

Program notes are included after each planned activity to provide some additional context for the activity and to reference progress made on the activity since the 2006 LWRM Plan. Since this is a long-range planning effort (10 years), the level of detail for planned activities was purposely kept to a minimum to allow for changing conditions, consistent with the statutory intent of LWRM plans. Some detail was added solely to satisfy DATCP planning requirements, but the majority of details are reserved for annual internal LRD work plans. At that point, measurable outcomes are assigned to specific staff members as much as possible and used for annual performance reviews. The LWRM plan provides the framework for this more detailed level of planning to occur later. Chapter IV includes more detail on how progress on implementing this plan will be reviewed annually and modified as needed to meet the constantly changing program demands, public policies and mandates.

Goal 1: Control Urban Runoff Pollution and Flooding

Background:

Urban runoff is the number one source of water pollution in most watersheds in Waukesha County. Until the 2008 recession, local development pressures remained very strong, resulting in over 5 square miles per year of new development over the last 2 decades. Previous modeling through the Priority Watershed Program revealed that construction sites and developed urban areas accounted for 85% of the sediment loads in the Upper Fox River Watershed – the largest watershed in the county. In addition, impervious surfaces from development increase runoff volumes, which lead to downstream flooding. In 2008 and 2010, a series of heavy rains caused severe flooding throughout the county. Combined with a heavy winter snowpack, the shallow groundwater aquifer reached record high levels in both 2008 and 2010, which was the primary cause of widespread basement flooding in the county.

To address these issues, local governments, including Waukesha County, have adopted construction site erosion control and storm water management ordinances, with similar cross-compliance requirements in local zoning codes. To help prevent basement flooding, many of these ordinances - including Waukesha County's - also include technical standards requiring new basements to be built well above the highest groundwater levels. Enforcing these ordinances currently represents the single largest workload for the LRD and the top priority in this plan. Improving these efforts make up some of the objectives stated below. Since many storm water management best management practices (BMPs) have now been in place for 10-20 years, BMP maintenance has also become a program priority.

Subsequent to the 2006 LWRM Plan, Waukesha County, along with 30 of 37 other communities within the county, was issued a Municipal Separate Storm Sewer System (MS4) storm water discharge permit by the DNR under NR 216. This permit contains a number of requirements designed to reduce nonpoint pollution from existing county-owned land, roads, buildings and other infrastructure. Some of these permit requirements are included in the objectives below, while a more detailed explanation of the MS4 permit program and how it affects Waukesha County is provided in the Chapter IV.

Other objectives under this goal reflect the need for a more proactive approach to urban runoff management, such as watershed protection planning and low impact development. Nationwide, studies have shown that increasing impervious surfaces in a watershed can have a dramatic impact on the water quality of a stream. The Center for Watershed Protection, in cooperation with the US EPA, has published summaries that show with as little as 10% of a watershed being covered by impervious surfaces, negative impacts are usually found in the receiving body of water. Some common examples include: poor water quality; sedimentation; reduced fish and aquatic insect populations; streambank erosion; expanding floodplains; and reduced baseflows. Historically, by the time a watershed is covered with 25% or more impervious surfaces, most streams are severely degraded and devoid of any significant aquatic life. The challenge is to prevent this from occurring through better planning.

Instead of only responding to development proposals one at a time, watershed protection planning takes a proactive approach to future land development and storm water management. It allows communities in a watershed to plan and work together toward a common goal of protecting a water resource through coordinated planning, educational efforts, land acquisitions, regulations, land and infrastructure management, and other institutional changes. For example, this type of planning can result in selecting sites for regional storm water facilities to be built before development occurs, or identifying areas that need to be preserved or even acquired for protection. In 2008, the LRD completed such a plan for the Pebble Creek Watershed, a cold water stream in a high growth area on the west side of the City of Waukesha. The LRD also assisted SEWRPC in completing a similar plan in 2010 for the Mukwonago River Watershed, which is a designated “exceptional resource water” in the state. The preparation and implementation of watershed protection plans will remain a high priority for the LRD.

Another type of watershed planning underway in portions of Waukesha County is called Total Maximum Daily Load (TMDL) planning. This federally mandated program under the Clean Water Act is designed to improve water quality in lakes and streams that are not meeting water quality standards. A list of these water resources is called the “impaired waters list” or 303(d) list, named after the applicable section of the federal law. This list is updated every two years by the DNR and reported to the EPA. Under the TMDL planning process, water quality of a specific stream is measured and modeled, and a plan is developed which establishes the maximum amount of pollution the stream can tolerate on a daily basis to meet water quality standards and water use objectives. Through extensive modeling, a TMDL plan “allocates” tolerable pollutant discharges between point and nonpoint sources throughout the watershed. During plan implementation, pollutant trading can occur between sources. The DNR encourages counties to act as “brokers” of the pollutant trading that can occur. An example is a sewage treatment plant paying for nutrient management planning or a manure storage facility on a farm upstream. A TMDL plan may affect the minimum state nonpoint pollution control standards for both urban and agricultural areas, and therefore may affect other goals in this plan.

Goal 1 - Control Urban Runoff Pollution and Flooding (2.4 FTE and 41% of annual budget)		
Objectives	Planned Activities	Program Context/Progress Notes
A. Enforce State Non-Agricultural Nonpoint Pollution Performance Standards through the County Storm Water Management & Erosion Control Ordinance		
	1. Review new land divisions, development and construction plans, issue permits, conduct inspections and carry out enforcement activities.	Depending on development activity, the LRD has averaged 50-100 Storm Water permits each year.
	2. Maintain “Authorized Local Program” status under s. NR 216.415 Wis. Adm. Code to streamline state and local storm water permitting.	County ALP status was approved by DNR starting 1/1/2011 – the first in Wisconsin. Applies to construction sites > 1 acre and allows county SW permit to also provide NR 216 coverage.
	3. Maintain intergovernmental agreements with local communities to coordinate ordinance enforcement efforts.	LRD currently has 25 agreements with local communities, executed 2006-2009. Seven town and two village versions include ordinance enforcement coordination provisions.

Goal 1 - Control Urban Runoff Pollution and Flooding (2.4 FTE and 41% of annual budget)		
Objectives	Planned Activities	Program Context/Progress Notes
	4. Use county Development Review Team meetings to coordinate project review comments with other county departments early in the site planning process.	Coordinates reviews with Planning & Zoning, Public Works and Towns. Avoids the ping-pong of projects between plan review authorities.
B. Update County Storm Water & Erosion Control Ordinance		
	1. Incorporate NR 151 and NR 216 updates to storm water performance standards, prohibitions and other applicable mandated program changes.	A copy of the county storm water ordinance is available on the LRD web page. Some revisions to infiltration standards and other areas are needed to reflect 2010 state code changes.
	2. Incorporate ordinance improvements based on LRD redline tracking of enforcement experiences and code clarifications.	The LRD maintains an internal red-lined version of the ordinance to track ordinance interpretations and possible future changes.
	3. Continue consulting with the Waukesha County Storm Water Advisory Committee on major code updates.	This advisory committee is prescribed in the county Storm Water Ordinance.
C. Maintain compliance with County MS4 Storm Water Discharge Permit issued by DNR for all existing county-owned land and infrastructure		
	1. Complete annual MS4 permit technical requirements relating to illicit discharge detection, BMP inspections and maintenance, pollution prevention, storm sewer system/outfall mapping, etc.	The requirement for a 40% Total Suspended Solids reduction was recently removed by the state legislature, and a comparable replacement needs to be developed.
	2. Complete annual DNR reporting requirements relating to storm water program accomplishments and ordinance administration efforts.	This report is combined with the annual ALP report required under A.2. above.
	3. Complete mandated urban nonpoint pollution educational program.	See Goal #4 below for details.
D. Facilitate storm water best management practice (BMP) maintenance		
	1. Update sample BMP maintenance agreement documents on LRD web page and provide to permit applicants.	Samples are now available in MS Word format so they can be easily adapted to each site.

Goal 1 - Control Urban Runoff Pollution and Flooding
(2.4 FTE and 41% of annual budget)

Objectives	Planned Activities	Program Context/Progress Notes
	2. Continue requiring all new BMP maintenance agreements to be scanned and recorded at the Register of Deeds during a new land division, and all BMP as-built documents to be recorded as an addendum.	This process was adopted by the LRD in 2006 and will be continued. By avoiding future LRD back scanning, it saves much time and money and shifts scanning costs to the permit holder.
	3. Continue collecting and loading BMP photos, as-built plans and maintenance data into the county storm water BMP database.	For permits issued prior to 2006, LRD back-scanning is on-going and nearly complete as of 2012.
	4. Optimize and promote public access to storm water BMP data and images through the county GIS web application.	As of 2/2012, data and images for over 600 BMPs are displayed on the county GIS-web site. Map IV-3 (draft) provides a recent snap shot of the data points. Future plans are discussed under Goal 6.
	5. Offer local community staff login access to the storm water database and GIS system to allow editing and uploading of BMP data and maintenance inspections.	One community has been trained to date. No charges are involved for using the system.
	6. Maintain model BMP maintenance ordinance language on the LRD web site and encourage local community adoption and enforcement.	The county developed this model ordinance in 2010. However, counties do not have the special assessment authority needed to enforce it.
	7. Publish sample BMP inspection forms and use them in BMP inspections conducted by the LRD on request, or in cooperation with a local government.	LRD recently completed sample BMP inspection forms. Existing intergovernmental agreements with towns also cover BMP inspections.
	8. Include BMP maintenance in educational workshops and presentations.	The LRD has covered BMP maintenance in workshops during 2010, 2011 and 2012, with the last two at UW-Milwaukee.

E. Provide storm water-related technical and cost-sharing services to other county departments and local organizations

	1. Coordinate storm water ordinance enforcement and MS4 permit compliance activities among county Parks and Public Works projects.	An interdepartmental agreement was executed in February 2012, as required under the county MS4 permit and ALP.
	2. Assist with storm water and erosion control planning, design and cost-sharing for county infrastructure and land management projects.	This includes county-owned parkland and existing and new county buildings, parking lots and roads.
	3. Provide Planning and Zoning staff with technical recommendations relating to storm water, erosion control, impervious surface mitigation under NR 115 and basement/groundwater separation.	These recommendations are incorporated into zoning permits, land division approvals, conditional use permits and other zoning actions.

Goal 1 - Control Urban Runoff Pollution and Flooding
(2.4 FTE and 41% of annual budget)

Objectives	Planned Activities	Program Context/Progress Notes
	4. Assist nonprofits, lake organizations, and other local governments with storm water and erosion control planning, design and cost-sharing upon request.	An example is the LRD working agreement executed with the Fox River Commission, which resulted in numerous BMPs being installed as shown on their web site: www.SEWFRC.org
	5. Provide local schools technical and cost-sharing assistance with rain garden, outdoor classroom designs, and other related services.	This is offered as part of the LRD Green Schools program and grants. See Goal 4 for more details.

F. Prevent flooding of homes and businesses from surface and groundwater

	1. Encourage communities to plan and zone hydric soils, internally drained and other flood-prone areas to protective categories.	Hydric soil thematic maps have been posted on the county GIS-web site.
	2. Enforce 1-foot basement/groundwater separation requirement in the county storm water ordinance. Encourage other communities to adopt similar requirements.	LRD policies require detailed soil profile evaluations using USDA classification system to identify highest groundwater levels by redoximorphic and other soil features.
	3. Assist with updating county zoning codes to be consistent with the storm water ordinance basement/groundwater separation requirements.	Drafts have been prepared for the general zoning code and need to be developed for the county shoreland and floodplain ordinances.
	4. Enforce 50-foot horizontal and 2-foot vertical flood setback requirements in the county storm water and floodplain zoning ordinances.	In response to past flooding problems, the LRD has published detailed procedures for un-mapped floodplains and internally drained areas.
	5. Assist with updating floodplain zoning maps for unstudied reaches or watersheds with outdated flood studies,	Example is the new floodplain prepared for Pebble Creek and Brandy Brook in cooperation with the Drainage District.
	6. Use Emergency Assistance Program grant funds when available to assist landowners and communities in flood remediation and prevention projects.	During 2011 and 2012, the LRD will administer \$1.6 million in EAP grants to over 32 low-moderate income home owners that suffered from flood damage in 2008.
	7. Continue cost-sharing the operation of stream flow gauges on the Fox, Menomonee, Mukwonago and the Bark Rivers, as well as funding other floodplain modeling efforts.	The county has been sponsoring flow gauges in Waukesha, Menomonee Falls, Mukwonago and Rome for many years, and finished many local floodplain map updates in 2008 in cooperation with DNR, SEWRPC and USACOE.

G. Promote and demonstrate watershed protection planning to guide and coordinate land use and storm water program efforts among communities in a watershed

Goal 1 - Control Urban Runoff Pollution and Flooding (2.4 FTE and 41% of annual budget)		
Objectives	Planned Activities	Program Context/Progress Notes
	1. Continue promoting and assisting local community groups and SEWRPC on developing watershed protection plans.	The LRD is currently working with SEWRPC on a plan for the Pewaukee River watershed. Mason Creek is being discussed.
	2. Post locally completed watershed protection plans on the LRD web site and link to GIS watershed maps.	Plans have been completed for Pebble Creek and Mukwonago River, but still need to be linked to GIS system.
	3. Promote and support implementation of completed watershed plans through educational efforts, community group activities, land acquisition and ordinance enforcement.	The Pebble Creek plan is currently being used to complete an environmental impact statement for the West Waukesha Bypass.
	4. Direct future development away from environmentally sensitive areas, such as environmental corridors, wetlands, steep slopes, or shallow water table or bedrock.	These areas are identified in the adopted 2009 County Development Plan and in a series of thematic maps on the county GIS-web system.
H. Promote and demonstrate low impact development techniques and innovative storm water BMPs		
	1. Support conservation designs in zoning and storm water ordinances and land division reviews.	County zoning code has lot density credits for preservation of natural areas.
	2. During storm water permit reviews, encourage developers to use rain gardens, native plantings, constructed wetlands, green roofs, compost, stream and wetland buffers, recycled/recyclable products, and other low impact BMPs.	On-going effort to treat storm water as an amenity to site landscaping and to reduce waste on construction sites.
	3. Use low impact development BMPs and techniques on county infrastructure and land management projects, as outlined in the County Sustainability Plan.	Examples include rain gardens and porous surfaces at the Retzer Nature Center and a green roof on the new county Health & Human Service building.
	4. Continue demonstrating the use of composted yard waste to reclaim the county gravel pit as mining is completed.	Six different erosion control demonstration plots were set up in 2008 and used for educational tours.
I. Ensure water protection efforts are based on the sensitivity of the resource		
	1. Develop and populate a water resource geodatabase on the county GIS-web so permit applicants have access to data.	See Goal #6 for details.
	2. Base storm water permit reviews on the sensitivity of the receiving water, providing extra protection to outstanding and exceptional water resources, cold water streams, lakes and other sensitive areas.	This is currently required in the county Storm Water ordinance. The more sensitive streams are also listed in the ordinance.

Goal 1 - Control Urban Runoff Pollution and Flooding (2.4 FTE and 41% of annual budget)		
Objectives	Planned Activities	Program Context/Progress Notes
	3. Ensure compliance with storm water and erosion control standards in adopted TMDL plans in target watersheds.	As of 2012, TMDL plans are being written for the Upper Rock River and Menomonee River watersheds.
	4. Encourage or require variable width buffers along water resources based on sensitivity, site conditions, code requirements (NR 115) & wildlife habitat.	County shoreland ordinance needs to be updated to meet state standards.

Goal 2: Protect the Quality and Quantity of Groundwater

Background:

Concern for the quality and quantity of groundwater in Waukesha County has taken the front stage over the past decade. As noted in Chapter II, the deep sandstone aquifer provides drinking water for many of the larger communities in the county, but over-pumping groundwater has caused the water table to drop over 600 feet from natural levels in the eastern part of the county. As the water table dropped, levels of naturally occurring pollutants such as radium began to rise in municipal water supplies, with some exceeding the U.S. EPA standards for drinking water. A long legal battle over this issue has resulted in a court order for the City of Waukesha to reduce radium levels in their water supply to comply with EPA standards by 2018.

The groundwater in the county's shallow aquifer is more easily accessed and is the primary water source for thousands of homes beyond the reach of municipal water supplies. However, the shallow aquifer is also more susceptible to contamination and any drawdown from over-pumping would drop water levels in local lakes and wetlands and reduce stream base flows. Legal battles have already occurred where high-capacity shallow municipal wells were proposed near lakes and groundwater recharge areas.

To avoid these types of issues and plan for future water supplies in SE Wisconsin, SEWRPC recently completed a three-phased multi-agency effort to inventory local groundwater resources, develop a regional groundwater model, and develop and publish a Regional Water Supply Plan for Southeast Wisconsin (2010). The plan is based upon an adopted regional comprehensive plan design year of 2035, recommends a sustainable water supply for every community in southeast Wisconsin, and can be found at: <http://www.sewrpc.org/SEWRPC/Environment/RegionalWaterSupplyPlan.htm>

For some communities, the Regional Water Supply Plan recommends switching from a deep aquifer groundwater supply to a shallow aquifer or surface water supply – namely Lake Michigan. This type of switch would not only provide a sustainable supply of water to the community, but would also allow the region's deep aquifer to recover from decades of over-pumping. While switching to Lake Michigan for a community water supply may be supported by a tremendous amount of science, it does introduce a level of complexity in the administrative and political arenas due to the adoption of the Great Lakes - St. Lawrence River Basin Water Resources Compact ("Great Lakes Compact") in 2008. Being enacted by the legislatures of all eight states bordering the Great Lakes, as well as the United States Congress and two Canadian provinces, this regional law trumps all other laws relating to the use and "diversion" of water from the Great Lakes basin. Under the Great Lakes Compact, any water diverted outside of the basin must be returned after use and only communities straddling the watershed boundary or located in a county that straddles the watershed are eligible for diverting Great Lakes water. The Compact also established a water

diversion application process, requiring all applications to comply with strict technical criteria and be approved by all eight Great Lakes states. A diversion application for Lake Michigan water was submitted by the City of Waukesha in 2010 and is currently under review by the DNR.

Given the importance of groundwater as a resource and vital asset to support many communities in the region, Waukesha County has been working cooperatively with the City of Waukesha and a number of local businesses and other groups since 2006 to promote local water conservation efforts. This organization started locally, but has grown to a statewide group called the Wisconsin Water Conservation Coalition.

Goal 2 - Protect the Quality and Quantity of Groundwater (0.4 FTE and 6% of the annual budget)		
Objectives	Planned Activities	Program Context/Progress Notes
A. Promote water conservation. *		
	1. Continue supporting the Wisconsin Water Conservation Coalition in developing and implementing water conservation programs in the county.	LRD staff currently serves on the WWCC Board of Directors.
	2. Include water conservation education on LRD web page and in presentations to schools, civic groups, and general public.	See Goal #4 for details.
	3. Continue to look for opportunities to partner with other agencies and organizations to develop and disseminate information and generate action.	In 2010, Waukesha County was awarded a Silver Water Star Community for the county's work on surface and groundwater issues.
B. Protect groundwater recharge areas and encourage storm water infiltration. *		
	1. Promote the use of county storm water infiltration potential maps to guide land use and storm water management concept planning.	Thematic maps are now available as a data layer on the county GIS-web site.
	2. Enforce groundwater recharge protection and infiltration standards in the county storm water ordinance – especially in the western recharge zone for the deep aquifer.	The county storm water ordinance defines these areas and the standards.
	3. Include explanations of county deep and shallow aquifers, their importance to community water supplies, and current trends and potential threats to the aquifers in public outreach activities.	See Goal #4 for details on outreach efforts.

C. Minimize the impacts on groundwater from nutrients, pesticides, road salt and other contaminants contained in urban and agricultural storm water runoff. *		
	1. Implement and periodically update MS4 pollution prevention plans for county facilities, including highway maintenance substations with salt storage areas.	The county has developed and implemented pollution prevention plans at highway substations and reduced road salt use through salt brine applicators.
	2. Enforce storm water pretreatment and groundwater/bedrock separation restrictions in storm water permits and demonstrate BMPs on county land.	A compacted 2-foot clay liner was recently installed in the storm water pond treating runoff from the Courthouse campus.
	3. Include pollution prevention and treatment information on the LRD web site and in educational workshops.	Pollution prevention planning has been a topic at the 2011 and 2012 annual county storm water workshops.
	4. Promote and provide technical and financial assistance in proper well abandonment (urban & rural).	SWRM cost-sharing funds were used to abandon 37 local wells since 2005. Benchmark: properly abandon 5 wells annually.
	5. Assist DNR with investigating and resolving well contamination cases upon request.	The LRD can help locate the source of the well contamination and make recommendations to prevent it.
D. Promote the implementation of the SE Wisconsin Regional Water Supply Plan to protect surface and groundwater resources.		
	1. Advocate for approval of the City of Waukesha's application for Lake Michigan water, and compliance with all applicable laws, including the Great Lakes Compact.	The LRD hosted the SE Area Land Conservation Tour in September 2011 with this topic as the tour theme.
	2. Track progress on plan implementation and impacts on local groundwater supplies and include in education and outreach efforts.	See Goal #4 for details on outreach efforts.

* This objective reflects a recommendation of the SE Wisconsin Regional Water Supply Plan, SEWRPC, 2010.

Goal 3: Control Agricultural Runoff Pollution

Background:

According to DNR and EPA reports, agricultural runoff is the largest source of water pollution in most watersheds in Wisconsin and nationally. This goal reflects a state mandate under Chapters NR 151 and ATCP 50 Wisconsin Administrative Code for all counties to ensure landowner compliance with state agricultural nonpoint pollution performance standards and prohibitions. The state nonpoint standards address soil erosion and nutrient runoff from cropland as well as barnyard runoff and manure handling

practices for livestock operations. Details on these standards are provided in Chapter IV. State administrative rules also prescribe specific cost-sharing requirements that must be met before a landowner can be required to comply with the state standards. The minimum cost-share rate is generally 70%, except in cases of economic hardship, whereby 90% cost-sharing is required. The cost-sharing requirement does not apply to landowners who receive the state Farmland Preservation income tax credit.

A 2010 agricultural land use inventory conducted by the LRD shows there were 92,196 acres in agricultural uses, or about 23% of the county landscape, not including woodlands, wetlands, lakes or rivers. Since the 1990's, conservation plans have been developed for a large percentage of county farmland due to the owner or operator participating in USDA programs, the state Farmland Preservation tax credit, or previous Priority Watershed projects. A transect survey conducted by LRD staff in 2001 showed that approximately 90% of county cropland was at or below "tolerable" (T) soil erosion rates, the state and federal standard that would maintain soil productivity indefinitely. In 2002, the "T" value was also adopted as one of the above noted state nonpoint pollution performance standards. While compliance with "T" value is mandatory under state law, the NRCS will not participate in enforcement efforts. In fact, conservation plans prepared for USDA programs cannot be used by LRD staff to determine landowner compliance with state standards without the written permission from the landowner.

The LRD has also inventoried livestock operations in the county and found very few significant threats to local water resources. Map IV-4 shows the general location of 98 livestock facilities with more than 40 animal units. Only 17 of these 98 are located within a water quality management zone (300 feet of a river or 1000 feet of a lakeshore). The LRD estimates that about half of the 17 may need some runoff control practices, such as clean water diversion to meet state nonpoint standards. Large pasture areas used on several farms make this unnecessary. Based on LRD landowner contacts to date, the majority of local farms do not currently comply with state requirements for a nutrient management plan. The state Nutrient Management technical standard (NRCS 590) includes Phosphorous Index limits for individual farm fields, but the local level of compliance is unknown.

As noted in Chapter II, development pressures are a daily fact of life for agricultural producers in Waukesha County. While there is still a considerable amount of agricultural production in the county, the LRD considers many of the remaining farms to be a temporary land use based on adopted community land use plans. Therefore, if problem fields or livestock facilities are located in an area planned for future development, it would seem questionable policy to invest a significant amount of limited public resources to address short-term agricultural runoff issues. Because of this, the total LRD resources allocated to this goal are much less than most other county land conservation departments in the state and agricultural nonpoint compliance activities are focused on the "priority farms" noted in A.2. below. Having said this, all farms in the county must meet the NR 151 performance standards and are therefore subject to enforcement action for noncompliance. Further details on agricultural nonpoint compliance efforts are provided in Chapter IV.

Goal 3: Control Agricultural Runoff Pollution (0.8 FTE and 13% of the annual budget)		
Objectives	Planned Activities	Program Context/Progress Notes
A. Implement state agricultural performance standards and prohibitions.		
	1. Update GIS tracking system to a web-based geodatabase to track nonpoint compliance evaluations of local farms.	This will simplify data entry for compliance evaluations.

Goal 3: Control Agricultural Runoff Pollution
(0.8 FTE and 13% of the annual budget)

Objectives	Planned Activities	Program Context/Progress Notes
	2. Target “priority farms”, including Farmland Preservation zoned areas, county-owned cropland, Water Quality Management Areas (WQMAs) and sensitive watersheds or subwatersheds.	See Chapter II for the location of sensitive watersheds or subwatersheds. See Chapter IV for further details on compliance activities.
	3. Perform LRD records inventory to help determine current conservation compliance status.	NRCS does not allow access to their conservation plan files without written permission from the landowner.
	4. Contact landowners to complete compliance evaluation process.	On-going. See Chapter IV for further details. Determine conservation compliance for 15 farms annually.
	5. Record/map compliance status of fields/farms in GIS geodatabase.	On-going. See Chapter IV for further details.
	6. Notify landowners of compliance status. Identify any BMPs needed to achieve compliance and deadlines that may apply.	12/31/15 compliance deadline applies for all FPP participants, regardless of cost-sharing availability.
	7. Offer landowner technical assistance and cost sharing, if available.	Ensure 2,500 acres of preserved farmland meets NR 151 requirements for tolerable soil loss and has a valid nutrient management plan.
	8. After landowner takes compliance steps, re-evaluate and update tracking system and landowner documentation.	Notify the landowner that they must maintain future compliance without cost-sharing.
	9. If a non-compliance issue poses a significant threat to water quality, refer to the DNR for possible enforcement. Pursue a DNR/LRD working agreement to handle ag runoff complaints/referrals.	To date, DNR has chosen not to enter into a working agreement with the LRD due to regional DNR staff shortages. However, DNR/LRD staff still work together on ag runoff issues and talks will continue on a future working agreement.
	10. Update county Animal Waste Management ordinance and issue permits for new waste storage units to assure compliance with state laws. (M)	Original ordinance was adopted in 1987 and has not been updated to current state standards. However, the need is very limited due to NR 151.
	11. Promote and implement BMPs in agricultural areas as needed to comply with adopted TMDL plans, including the brokering of nutrient trading if available.	TMDL plans in the Rock and Fox River watersheds are most likely to include agricultural needs in the county.
<p>B. Promote natural buffers between agricultural lands and water resources to protect water quality, wildlife habitat, and groundwater recharge.</p>		
	1. Promote available federal and state cropland set-aside programs (CRP, CREP, etc.) to eligible landowners.(M)	Waukesha County was in CREP, but there was very little landowner interest and the contract expired in 2008.

Goal 3: Control Agricultural Runoff Pollution (0.8 FTE and 13% of the annual budget)		
Objectives	Planned Activities	Program Context/Progress Notes
	2. Incorporate state tillage setback and/or buffer standard into the agricultural compliance evaluations under A above.	ATCP 50 may be updated to further define tillage setback requirements contained in NR 151 (5-20 foot setback).
	3. Assist Parks division with buffer planning and design as part of greenway land acquisitions and county-owned land management efforts.	The county has adopted a standard cross-section for greenway acquisition, which includes buffer areas. See Goal 5 for details.

Goal 4 – Educate the Public on Conservation Issues

Background:

Information and education efforts are an important part of any conservation program. Gaining public acceptance of the various program goals is a minimal step, but getting target audiences to take action such as adopting a conservation practice is much more difficult. Since 2006, one of the driving factors for the Waukesha County information and education program has been maintaining compliance with the MS4 storm water permits issued to 30 of the 37 local communities, including the county. One of the requirements of an MS4 permit is for the community to implement a storm water information and education program. To gain efficiencies and effectiveness of these program efforts, the LRD developed a comprehensive intergovernmental storm water education program, which was approved by DNR. The LRD then offered to lead program implementation for local communities through a dedicated staff position, in exchange for an annual fee. While four communities bordering Milwaukee County had already committed to an education program under an earlier Phase I permit, the other 25 communities accepted the county offer and executed intergovernmental agreements to carry out the approved program. Since the vast majority of activities listed below are tied to the MS4 education program, their implementation is contingent on the continuation of the intergovernmental agreements.

It should be noted that since 1990, the LRD has also served as the “Responsible Unit” for 25 local communities under state recycling law (Chapter 287 Wis. Stats.). As a component of this law, the LRD is also charged with implementing a comprehensive recycling and waste reduction information and education program. Since some of the recycling and storm water educational program efforts overlap and even complement each other, the LRD has been integrating these efforts as much as possible. Most of the recycling program education efforts are not listed below.

Goal 4 – Educate the Public on Conservation Issues
 (1.1 FTE and 19% of the annual budget)

Target Audience & Topics	Planned Education Activities	Program Context/Progress Notes
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A. Target Audience: Developers, engineers, and local government officials
Primary Topics: Nonpoint pollution, groundwater, storm water planning, construction site erosion control planning, plan implementation, regulations, soil investigations, BMP design, installation and maintenance, MS4 permit compliance, low impact development, flood control, natural area protection, pollution prevention, and invasive species control

	1. Continuously update and improve storm water ordinance forms, check lists, guidance documents, sample plans, etc.	Distribute them to permit applicants and use them in plan reviews.
	2. Host or co-host annual workshops with topics/theme selected by a community planning committee.	The LRD has hosted or co-hosted annual workshops for the past 11 years, with an average attendance of 100 people.
	3. Maintain LRD web page with up-to-date storm water program materials, workshop presentation archives, and special event announcements.	The past 5 years of workshop presentations are maintained on the LRD web page.
	4. Improve electronic communications with target audience for information exchange and program/event announcements.	Goal is to provide on-line sign-up for workshop and other program mailings.
	5. Coordinate field tours of available BMP demonstration sites.	Done in cooperation with local communities.
	6. Provide presentations upon request to other agencies or organizations.	Includes the Metropolitan Builders Association and UW-Milwaukee.

B. Target Audience: General public
Primary Topics: Nonpoint pollution, groundwater, water conservation, public health impacts of water pollution, rain gardens, rain barrels, home composting, shoreland management, volunteer stream monitoring, natural area preservation, invasive species control, BMP maintenance, and household hazardous waste management.

	1. Partner with other groups on I/E material and presentation development and marketing.	Work with UWEX and DNR on program materials with statewide application.
	2. Host/co-host targeted public workshops and presentations through a regular schedule or by request through the county speaker's bureau.	Workshops are scheduled annually at the Retzer Nature Center or other county facilities.
	3. Set up displays and tend booths at community events.	LRD displays are also provided for community halls.

Goal 4 – Educate the Public on Conservation Issues
(1.1 FTE and 19% of the annual budget)

Target Audience & Topics	Planned Education Activities	Program Context/Progress Notes
	4. Sponsor storm drain marking (“Dump No Waste – Drains to River/Lake”) for youth and community groups.	LRD purchases all supplies and trains volunteer groups. We are currently migrating to permanent metal markers.
	5. Write and distribute news releases on special events.	For local newspapers
	6. Write and distribute seasonal newsletter articles for community newsletters.	On-going through the MS4 program.
	7. Conduct target mailings of educational materials and event announcements.	LRD maintains a number of target mailing lists.
	8. Coordinate special sales of rain garden plants, rain barrels and compost bins through the Retzer Nature Center.	In 2011, over 900 home compost bins were sold in a special truckload sale sponsored by the LRD.
	9. Maintain robust LRD educational web pages and provide information and brochures on request.	On-going.
	10. Partner with local Chambers of Commerce to make recycling and storm water assessments and information available to local businesses.	LRD staff has been joining local Chambers to target the business audiences.
	11. Promote and support household and agricultural hazardous waste collection sites in the County.	The LRD maintains four permanent HHW sites and usually operates four additional temporary sites each year.
	12. Maintain data and maps on web-GIS system for home building limitations and BMP maintenance information.	Soil thematic maps are available on GIS-web for wet soils, shallow bedrock and steep slopes.
<p>C. Target Audience: Rural land owners and farm operators Primary Topics: Agricultural nonpoint performance standards, buffers, wetland restoration, farmland preservation, conservation programs and cost-sharing opportunities</p>		
	1. Conduct one-on-one contacts and distribute educational materials.	On-going as part of conservation compliance checks.
	2. Present information at local farm group meetings upon request.	Example is the local Farm Bureau chapter.
	3. Conduct target mailings for priority farms.	See Goal #3 for details.

Goal 4 – Educate the Public on Conservation Issues (1.1 FTE and 19% of the annual budget)		
Target Audience & Topics	Planned Education Activities	Program Context/Progress Notes
D. Target Audience: Teachers, students, school administrators and youth groups Primary Topics: Nonpoint pollution, groundwater, soil and water conservation, rain gardens, waste reduction and recycling, water quality monitoring, composting, invasive species control, outdoor classrooms and managing storm water on school grounds		
	1. Conduct annual teacher training workshops.	Includes Project Wet and Wisconsin Education Innovations training.
	2. Deliver classroom presentations to coincide with curriculum.	On-going by request.
	3. Promote participation in the Green Schools program, providing technical and financial assistance with green team storm water and recycling assessments, and environmental plan implementation.	As of 2012, 46 schools have participated in the county Green Schools program. LRD has provided each school a \$1,000 - \$3,000 grant to help with recycling programs.
	4. Sponsor storm drain stenciling and water quality monitoring events for school groups.	LRD provides all monitoring equipment and student training.
	5. Partner with area colleges to provide tours, activities, and training to students and prospective teachers.	This would be a new initiative.

Goal 5 – Preserve Targeted Farmland and Natural Areas

Background:

Preserving farmland and natural areas are quality of life issues that show up in public opinion surveys in many forms, such as a desire to: preserve the rural character of the county, recharge our local drinking water supplies, avoid land use conflicts, minimize flooding, provide food and fiber for local markets, attract quality employees, encourage business investment, or provide wildlife habitat. In 2011, the Waukesha County Board of Supervisors adopted Addendum D to the 2009 Waukesha County Comprehensive Plan, which serves as an update to the 1984 Waukesha County Agricultural Land Preservation Plan. This updated “Farmland Preservation Plan” contains specific preservation criteria for contiguous rural land areas and individual parcels within those areas, consistent with Wisconsin’s farmland preservation law revisions enacted in 2009. Under the revised state law, Farmland Preservation Plans must be consistent with locally adopted comprehensive plans and new tools were created, including “Agricultural Enterprise Areas” (AEA) and “Purchase of Agricultural Conservation Easements” (PACE) grants. More details on these programs are provided in Chapter I. Chapter IV contains an overview of the agricultural resources in Waukesha County and the areas designated for preservation under the county’s 2011 plan update. Map IV-5 shows the portions of Waukesha County that would be eligible to apply for AEA and PACE, assuming other program requirements are met. The county Farmland Preservation Plan includes 10,264 acres or 11% of county farmland in a farmland preservation category. An additional 24,738 acres or 27% of farmland is delineated

for possible future AEA designation, which would require a locally led process to revise land use plans. It should be noted that 2011 Act 32 (2011-2013 State Budget Bill) eliminated most state funding for PACE grants, but retained DATCP program authority for these permanent farmland preservation easements.

Also included in the 2009 Waukesha County Comprehensive Plan are a number of planning goals, objectives and standards relating to the preservation of environmental corridors, wetlands, floodplains and other environmentally sensitive natural areas. Associated county zoning codes are designed to prevent unnecessary loss of these lands through a number of tools such as residential lot density calculations, grading limitations, and conditional use permit criteria. The county storm water ordinance also contains restrictions on grading in environmentally sensitive areas. SEWRPC has done extensive mapping of natural areas and published a series of reports with specific recommendations on how they should be preserved. SEWRPC also uses these reports in requests for sanitary sewer extensions and amendments to regional water quality management plans. County ordinances often contain cross-references to these SEWRPC reports and maps.

Waukesha County also maintains a large nature-based park system, including eight developed parks with staff located at the facility year-round, four other major parks scheduled for future development, and a comprehensive system of recreational trails. The county Park and Open Space Plan was updated in 2009 and includes the identification of proposed land acquisitions for expansion of parks, greenways and trails. Historically, the majority of county parkland acquisitions have occurred as dedications of greenways during the development review process. However, since 2000 the county has also budgeted \$1 million each year for new land acquisitions through a dedicated revolving fund. As of 2008, the county parks system consists of 4,858 acres of parkland and 2,786 acres of greenways, totaling approximately 2% of the county area. An integral component to the Waukesha County Park and Open Space Plan is the acquisition of greenways. The vision is to create a system of corridors along the County’s major rivers and streams, which will protect and improve water quality as well as the natural resource land features along those water courses. In addition, the greenways will connect major state, county and local parkland providing recreational and educational opportunities.

Goal 5 – Preserve Targeted Farmland and Natural Areas (0.2 FTE and 4% of the annual budget)		
Objectives	Planned Activities	Program Context/Progress Notes
A. Assist Planning and Zoning Division and local governments with preserving prime farmland in accordance with the 2011 adopted county Farmland Preservation Plan		
	1. Assist with Farmland Preservation zoning outreach efforts in designated areas.(M)	State law requires Waukesha County and local communities to update their farmland preservation zoning ordinances by the end of 2012.
	2. Assist with GIS analysis of soils, land use, or other criteria as needed to evaluate proposed amendments to farmland preservation areas.	The 2009 WCCP contains specific procedures to consider plan revisions on an annual basis.
	3. Assist with processing applications for Agricultural Enterprise Areas and Purchase of Agricultural Conservation Easements or similar grants.	The county assisted the Town of Oconomowoc with their successful AEA application in 2010.

Goal 5 – Preserve Targeted Farmland and Natural Areas (0.2 FTE and 4% of the annual budget)		
Objectives	Planned Activities	Program Context/Progress Notes
	4. Enforce state conservation compliance requirements for landowners claiming the Farmland Preservation tax credit.	See Goal #3 for details.
B. Minimize negative agricultural impacts from growing communities and wildlife populations		
	1. Ensure county storm water permits prevent cropland damages from increased runoff volumes and peak flows from new impervious surfaces.	Cropland damage from urban storm water runoff is a common problem in the county. Preventive standards are included in the county SW ordinance.
	2. Develop recommendations for applying municipal storm water utility fees to farmland, giving credit for soil conservation practices and open space.	The local Farm Bureau chapter has requested LRD's assistance in this project.
	3. Continue participating in the Wildlife Damage Abatement and Claims Program, to allow local farmers to obtain financial relief from crop damage and abatement technical assistance.	The county has maintained a contract with USDA-WS to provide these services since 2002.
C. Enforce county ordinances to protect existing natural areas		
	1. Evaluate sensitivity of natural areas proposed for disturbance, requesting expert technical assistance when needed and referencing SEWRPC maps and publications.(www.sewrpc.org).	County ordinances require mapping these areas for development reviews and often reference SEWRPC data and reports for environmental corridors and other natural areas.
	2. Prevent unnecessary grading activity near natural areas and direct storm water BMP construction outside floodplains and environmental corridors.	This is included in the guiding principles of the storm water ordinance.
	3. Require invasive species control in all site restoration work and native plantings in storm water facilities.	The LRD has adopted BMP planting certification procedures, including a transect survey of plants.
	4. Require cleanup of solid waste disposal sites in natural areas as a condition of other permits.	This is a standard ordinance requirement for new developments.
D. Protect and restore wetlands and natural areas, using available cost-sharing programs.		
	1. Evaluate potential sites for wetland restoration, targeting farmed hydric soils. Use to prioritize landowner contacts.	The LRD has completed a county-wide GIS analysis of potential sites.

Goal 5 – Preserve Targeted Farmland and Natural Areas (0.2 FTE and 4% of the annual budget)		
Objectives	Planned Activities	Program Context/Progress Notes
	2. Assist with site assessments and wetland restoration project implementation on county-owned parkland. Create a wetland restoration bank for possible regulatory mitigation sites.	A large LRD wetland restoration design was completed on county greenway land in the Town of Vernon in 2006, using cost-sharing from Fox River Commission and Army Corp violation penalties.
	3. Contact private landowners and encourage wetland restoration efforts through partnerships with conservation organizations.	This is dependent on landowner interest and the availability of cost-sharing funds. NRCS Wetland Reserve Program and the US Fish & Wildlife Service are two potential funding sources.
	4. Assist other agencies and organizations with locating possible wetland mitigation sites on private lands to satisfy wetland fill regulatory requirements.	An example of this is the planned Waukesha West bypass, located in the Pebble Creek Watershed.
	5. Encourage wetland restoration through watershed protection planning efforts and county park/greenway acquisitions.	The planning effort underway for Pewaukee River Watershed will have some potential for this.
	6. Use wetland restoration as a potential nutrient trading BMP for TMDL plan implementation.	This is dependent on a TMDL nutrient trading funding source, such as a sewage district.

Goal 6 – Support Water Monitoring and Improve Public Access to Water Data

Background:

Monitoring water quality can be a powerful tool for tracking long-term trends and “ground-truthing” assumed impacts of land use changes and pollution control practices installed. Past citizen surveys conducted by the LRD show that an equal number of people think water quality is getting better versus getting worse or staying the same. In general, a shortage of water quality monitoring information makes it impossible to say who is right. While newer technologies offer great efficiencies, the competition for limited public funds remain an obstacle for implementation. One solution to this problem is to encourage volunteer citizen monitoring.

Since 2001, the LRD has been promoting, training and supporting citizen volunteer water quality monitoring of county streams in cooperation with groups such as the Rock River Coalition, Pewaukee River Partnership, and Water Action Volunteers (WAV). Through these partnerships, citizens are trained how to monitor streams for temperature, turbidity, dissolved oxygen, and stream flow and how to conduct biotic index and habitat assessments. The data collected is entered into the WAV Internet database for future reference. While filling a data gap, this program also serves as a powerful educational tool for program participants and their families. Further details on the program are provided in Chapter IV.

Improving public access to water data has been a long-term goal of the LRD for over 10 years. It would help developers, land managers and the general public to better understand and appreciate local water resources and comply with related regulations. While new GIS technologies now make this goal more achievable, it remains a challenging long-term project.

Goal 6 – Support Water Monitoring and Improve Public Access to Water Data
 (0.8 FTE and 14% of the annual budget)

Objectives	Planned Activities	Program Context/Progress Notes
A. Promote and sponsor water monitoring efforts		
	1. Promote stream gauges and agency monitoring of county lakes and streams to track water quality trends and provide data for floodplain regulations.	The county funds a couple USGS stream gauges on the Fox River.
	2. Conduct annual citizen stream monitoring training (level 1 & 2) and provide equipment and materials to volunteer monitoring teams. Assist with lake monitoring upon request.	As of 2012, the LRD is sponsoring 25 volunteer stream monitoring teams. More details on the program are provided in Chapter IV.
	3. Provide quality control of citizen monitoring through team site visits and checking data entry on WAV web site.	This is part of the support the LRD provides monitoring teams.
	4. Maintain LRD web site with current information about the monitoring program and links to available monitoring data.	On-going effort.
	5. Continue monitoring groundwater elevations on county land in the Town of Genesee.	This monitoring was started in 2004 as a Conditional Use permit requirement for the sand and gravel mining operation.
B. Improve accuracy, usability and public access to water resource data		
	1. Build and maintain a water resource geodatabase on the county GIS-web system to allow easy public access and use of water resource data.	Each year, the LRD will focus on incremental steps in the process.
	2. Link water graphics layers to DNR water resource classification data.	This will allow local access to the DNR data without a duplication of effort.
	3. Add detailed watershed maps and link them to associated data and approved watershed plans.	Watershed maps are completed for the county, but need to be matched to more accurate surface models.
	4. Add surface and groundwater water monitoring data points and links to associated monitoring and gauging data.	Links could be made to USGS and DNR monitoring data web sites.
	5. Add dam locations and link to DNR dam database.	May also add updated photos to the inventory.

Goal 6 – Support Water Monitoring and Improve Public Access to Water Data (0.8 FTE and 14% of the annual budget)		
Objectives	Planned Activities	Program Context/Progress Notes
	6. Work with GIS and zoning staff to improve the accuracy, currency and display of county floodplain maps and amendments, flood elevations and profiles, ordinary high water marks, wetland delineations and navigability determinations.	This is an on-going effort. Many floodplain map updates were completed in 2008, but significant work remains to make the data more publically available and understandable.
	7. Continue to update storm water BMP data, photos and maintenance inspection results.	On-going effort as part of the storm water permit termination process.
	8. Create interpretive maps of water resource data and allow the public to generate on-line reports.	This may be the last step in the data improvement process.

Goal 7 – Reclaim Active Nonmetallic Mining Sites

Background:

Mines can negatively impact lakes, streams and well water and cause land use conflicts, even after the mine is no longer active. In 2000, the Department of Natural Resources adopted statewide nonmetallic mine reclamation requirements through the promulgation of Chapter NR 135 Wisconsin Administrative Code. Under this rule, all counties in the state were required to adopt and enforce nonmetallic mining reclamation ordinances. All other municipalities had the option of adopting and enforcing these requirements. In response to this mandate, the Land Resources Division convened a workgroup to assist with drafting the Waukesha County Nonmetallic Mining Reclamation Ordinance. The workgroup completed the task in May of 2001 and the Waukesha County Board adopted the county Nonmetallic Mining Reclamation Ordinance in July 2001. Presently, the LRD regulates 16 mining sites in five different communities in the county, as shown on Map II-4. Each permit requires compliance with an approved reclamation plan, based on a locally approved post-mining land use plan. Because this program represents an ongoing workload for LRD staff, it is included here as a goal even though it was not identified as a resource issue of concern during the nominal group process with the Citizens Advisory Committees. It should be noted that in Waukesha County, high land values encourage mine reclamation as much as any state or local regulation.

In 2004, the LRD opened a county-wide yard waste composting facility in conjunction with sand and gravel mining on county-owned land in the Town of Genesee. Private contractors operate both facilities. The county is paid annually for the mining rights, while the contractor is paid for yard waste composting services. State recycling grants help support the composting operation. Thirteen local communities are currently delivering over 6,000 tons of yard waste to the site each year. The finished compost is being used as a topsoil substitute to reclaim the mine, following approved plans and permits. The site is currently permitted through 2013, but reduced demand for the sand and gravel during the recent economic downturn has resulted in the mining activity to be behind schedule.

Goal 7 – Reclaim Active Nonmetallic Mining Sites (0.2 FTE and 3% of the annual budget)		
Objectives	Planned Activities	Program Context/Progress Notes
A. Enforce the county nonmetallic mine reclamation ordinance.		
	1. Review plans, issue permits, inspect sites and enforce ordinance provisions. Make approved reclamation plans more accessible to the general public.	The LRD is in the process of building a GIS application to allow public access to the 16 approved reclamation plans under county jurisdiction.
B. Continue operating the county-wide yard waste composting and mine reclamation operations at the county gravel pit.		
	1. Complete landfill exhumation and mining phases per approved plans and permits.	An old 1-acre closed landfill is on top of a 40-foot high hill that needs to be removed to meet planned grades for the end land use of a business park.
	2. Continue the mining and composting operations and apply for permit extensions as needed to complete the approved plans.	As of 2012, mining is 50% complete and reclamation 10% complete. The county may also consider expanding the mining to include the CTH C right-of-way.
	3. Complete construction of storm water management basins and implementation of post-mining grading and storm water management plans.	An agreement was executed in 2004 with the owner of an adjacent mine to allow coordinated grading along 1500 feet of shared property lines.
	4. Maintain monitoring and reporting in accordance with permit requirements.	Since opening in 2004, a comprehensive annual report must be submitted to the Town of Genesee to comply with existing permits.
	5. Continue using the site for educational tours on yard waste composting and the use of compost in reclamation/erosion control	Several regional and state tours have been hosted on the site. The project has also received awards from the Wisconsin Counties Association and the Public Policy Forum for innovation and intergovernmental cooperation.

Chapter IV. Plan Implementation and Evaluation

As noted in Chapter I, one of the requirements for county LWRM plans is to describe procedures that will be used to implement the nonpoint pollution performance standards and prohibitions under NR 151. Another plan requirement is to estimate costs associated with LWRM plan implementation. This chapter is intended to satisfy both of these requirements.

Urban Nonpoint Pollution Performance Standards

As noted in Chapter III, urban runoff pollution is the leading cause of many county lakes and streams not meeting water quality standards or water use objectives. Chapter III also noted that Chapter NR 151 Wisconsin Administrative Code contains a number of urban nonpoint pollution performance standards for new construction, which are being implemented through the County Storm Water Management and Erosion Control Ordinance. A general summary of the standards, as of 2012 is provided below:

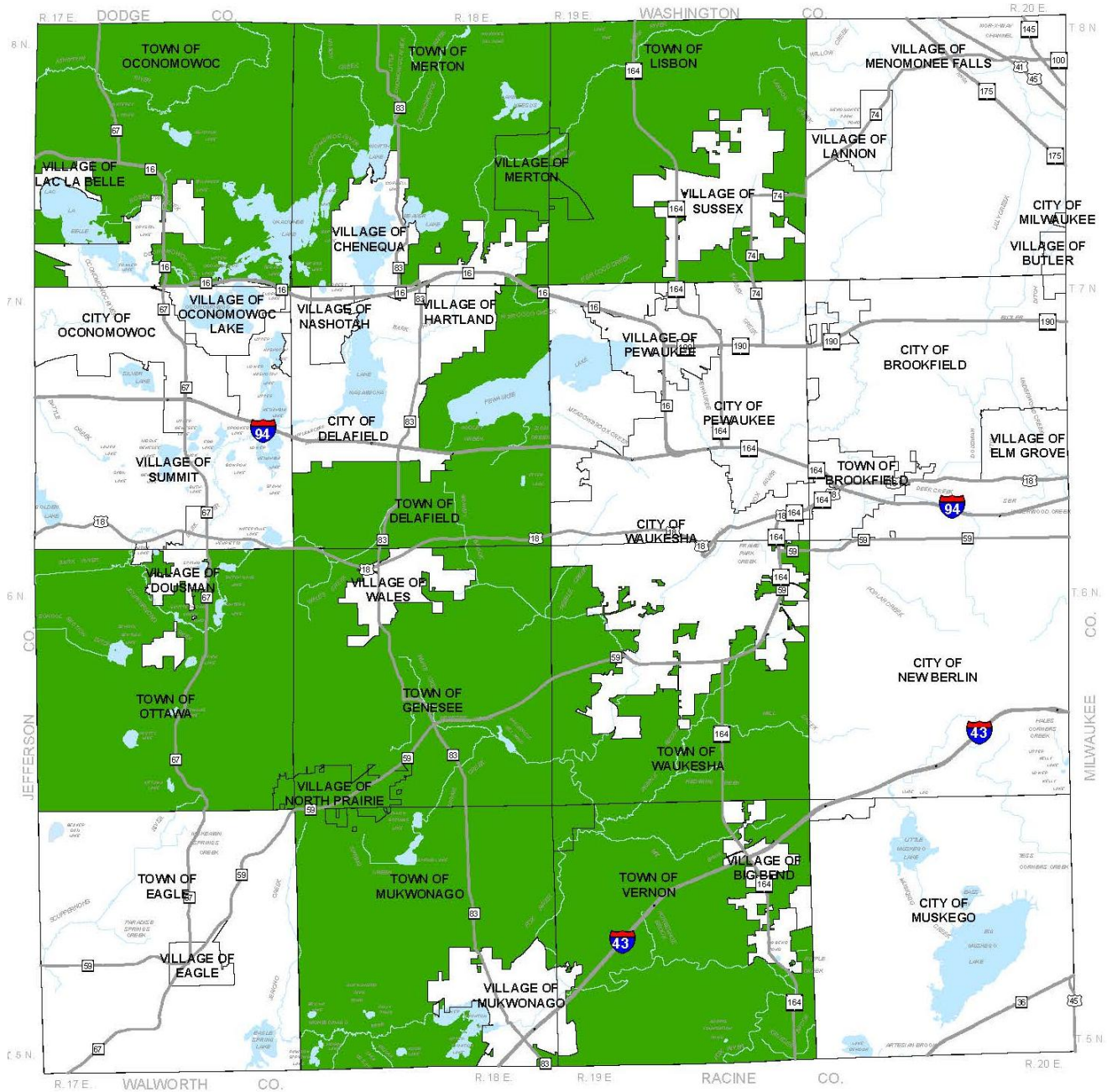
- Control 80% of sediment from construction sites.
- Control 80% of post-construction total suspended solids (TSS) from new developments and 40% from redevelopments.
- Maintain pre-development peak discharge rates for the 1-year and 2-year, 24 hour design storm for new developments.
- Infiltrate 90%, 75% or 60% of pre-development runoff volumes for new development with low, moderate or high imperviousness respectively.
- Maintain protective areas (10-75 feet) between new impervious surfaces and lakes, streams, and wetlands.
- Control petroleum runoff (visible sheen) from fueling and vehicle maintenance areas.

A list of urban best management practices to be utilized to meet state performance standards is contained in Appendix E.

Waukesha County Storm Water Management & Erosion Control Ordinance

As a condition of a Priority Watershed program grant, Waukesha County adopted a construction site erosion control ordinance in 1992. This ordinance was updated in 1998 to include post-construction storm water management requirements for new development, following standards agreed to by the Waukesha County Storm Water Advisory Committee. As a result of a redesign of the state's nonpoint program, urban nonpoint performance standards were subsequently promulgated in 2002 under Chapter NR 151 Wisconsin Administrative Code. New storm water discharge permit standards were also promulgated in 2004 under Chapter NR 216. The Waukesha County Storm Water Management and Erosion Control Ordinance was updated in 2005 to meet these new state standards. A copy of the county ordinance is available at www.waukeshacounty.gov/stormwater. Map IV-1 shows the jurisdiction of the county Storm Water Ordinance as of 2012. Enforcement of this ordinance remains the number one workload item for the LRD through the LWRM planning horizon. An overview of the Storm Water Permit program is presented in Figures IV-1. A simplified summary of the Storm Water Permit process is shown in flow chart form in Figure IV-2. It should be noted that Storm Water Permits are usually linked with other permit processes, and for larger projects, the review is often a cycle of submittals and responses, depending on the quality of plans submitted. Depending on the local economy, on average the LRD has issued 50-100 permits per year.

Map IV-1 Jurisdiction of the Waukesha County Storm Water Management & Erosion Control Ordinance: 2012



Legend

County Storm Water Permit Required

Source: Waukesha County



**Figure IV-1
Overview of Storm Water Permit Program**

WHEN: Proposed land development activity that will expose soil to erosion (grading or filling) or increase storm water runoff (add rooftops & pavement) and meets any of the following permit thresholds:

- | | | |
|--|------------|--|
| <ul style="list-style-type: none"> ➤ Disturbing 300 lineal feet of ground for new buried utility, pipe (unless plowed outside of ditch line) ➤ 3000 square feet land disturbing activity (bldgs./grading) ➤ All new "subdivisions" (as defined by local codes) ➤ All new local road construction ➤ All sites where at least ½ acre of impervious surface is added to the landscape (rooftops, pavement, etc.) ➤ Other sites that may cause off-site sediment or storm water runoff problems (as requested) | }

} | Erosion Control Plan Required |
| | }

} | Storm Water Mgt. Plan <u>also</u> Required |

WHY: To minimize water pollution, flooding, and other negative impacts of urbanization on downstream water resources (lakes, streams, wetlands & groundwater) and property owners. Aimed to control soil erosion and sedimentation during construction and manage the discharge of storm water after an urban development is complete. Pursuant to *Waukesha County Code Chapter 14, Article VIII – Storm water Management & Erosion Control*.

WHO: The Waukesha County Department of Parks and Land Use - Land Resources Division issues permits.

HOW: To obtain a permit, the applicant must prepare erosion control and/or storm water management plans, as noted above. The contents of these plans depend on the size and complexity of the site. For erosion control plans on sites one acre or less, a short checklist of plan requirements is on the application form. For all storm water management plans and erosion control plans for larger sites, published check lists and other technical guidelines are available. A submittal must include:

- Signed application, including list of project contacts
- Permit fee and financial assurance (see fee schedule)
- Site map (see checklist #!)
- Erosion control plan (preliminary or final – see checklist #2)
- Storm water management plan (preliminary or final – see checklist #3)
- Narrative/support materials on plan, soil test, BMP designs, construction sequence, etc.
- Other applicable items, such as a storm water BMP maintenance agreement

For new land divisions under county approval authority and certain zoning approvals, the LRD must issue a **Preliminary Review Letter** prior to approval of a Preliminary Plat. Obtaining conceptual/general review comments on these plans will facilitate other plan review processes. It also allows the applicant to proceed through those processes without committing the resources needed to complete final engineering designs and construction plans or line up contractors, which are all needed to obtain a permit. Prior to approval of a Final Plat, the LRD must issue a **Certification of Compliance** with the Storm Water Ordinance to verify that all deed restrictions, setbacks, BMP maintenance agreements and other recorded items are complete.

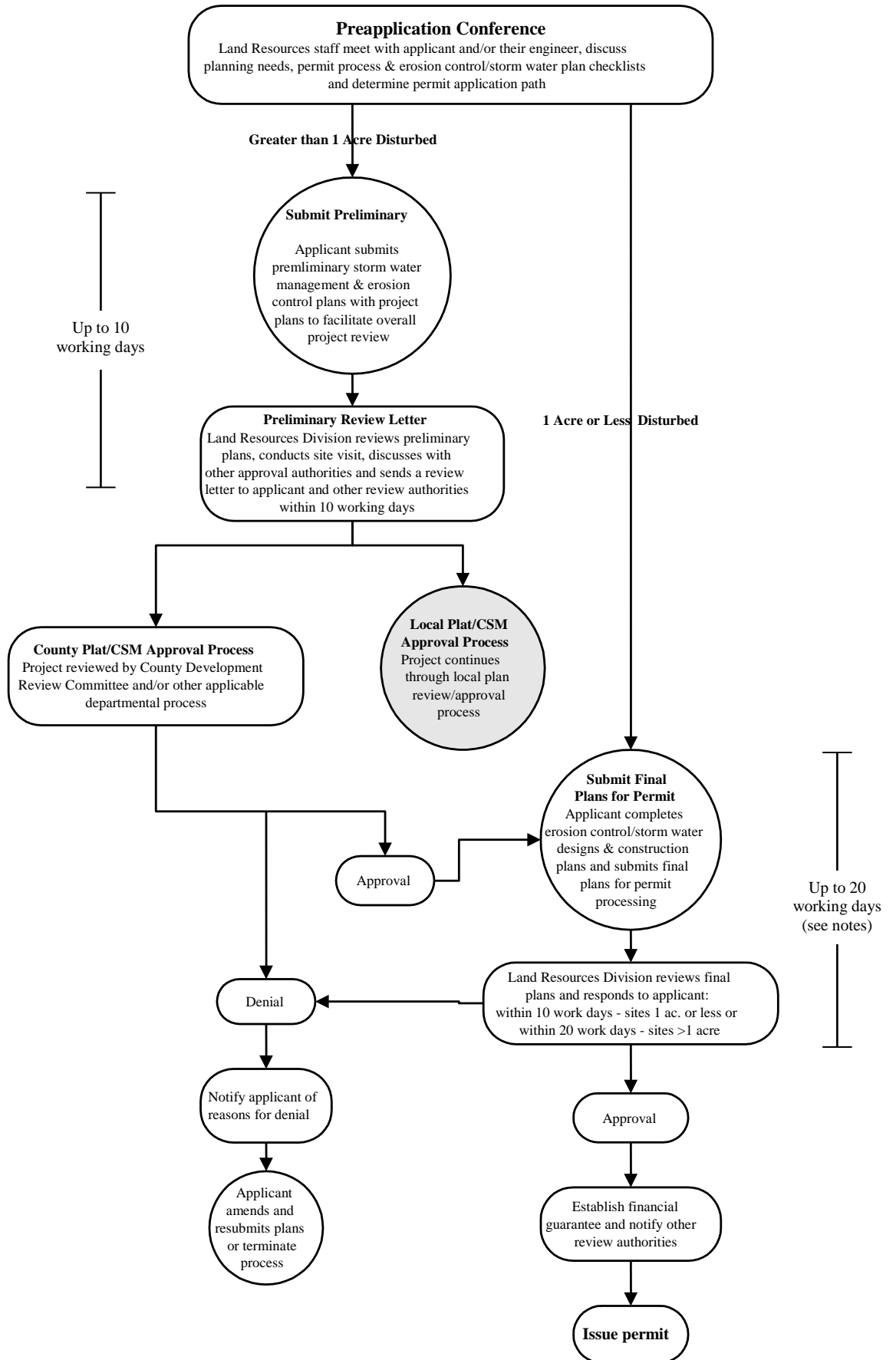
Variance or Appeal

- An appeal of a decision by Land Resources staff must be made in writing and submitted to the Board of Adjustment within 20 days of the date of decision. (Staff will assist you.)

TIME: Staff must approve or deny applications within:

- 10 working days of submittal/resubmittal for sites that disturb less than 1 acre; or
- 20 working days of submittal/resubmittal for sites that disturb 1 acre or greater.

**Figure IV-2
Storm Water Management Permit Process Flow Chart**



Municipal Separate Storm Sewer System (MS4) Storm Water Discharge Permits

Chapter NR 216 Wisconsin Administrative Code requires discharge permits for community storm sewer systems, which collect runoff from existing urban development in the community. The DNR issues general MS4 permits and requires communities to apply for coverage. In general, these permits apply to all communities with a contiguous population density of 1000 people per square mile. Phase 1 of these permit requirements was first applied in the early 2000's to five communities on the eastern edge of Waukesha County – Menomonee Falls, Brookfield, Elm Grove, Butler and New Berlin. These five communities were permitted along with other contiguous Milwaukee area communities draining to the Menomonee and Root River Watersheds. Eight more communities in the county were issued MS4 permit coverage under Phase 1 as the Upper Fox River Watershed Group (upstream from Waukesha). In 2006, Waukesha County and 17 other local communities obtained MS4 permit coverage under the Phase 2 of the program. Map IV-2 and Table IV-1 show which communities in Waukesha County were issued MS4 permits under both Phase 1 and 2.

MS4 Permit Requirements

The above noted general permits contain a long list of storm water program requirements that change somewhat between permit phases and permit renewal periods. Listed below is a general summary of the permit conditions as they apply to Waukesha County:

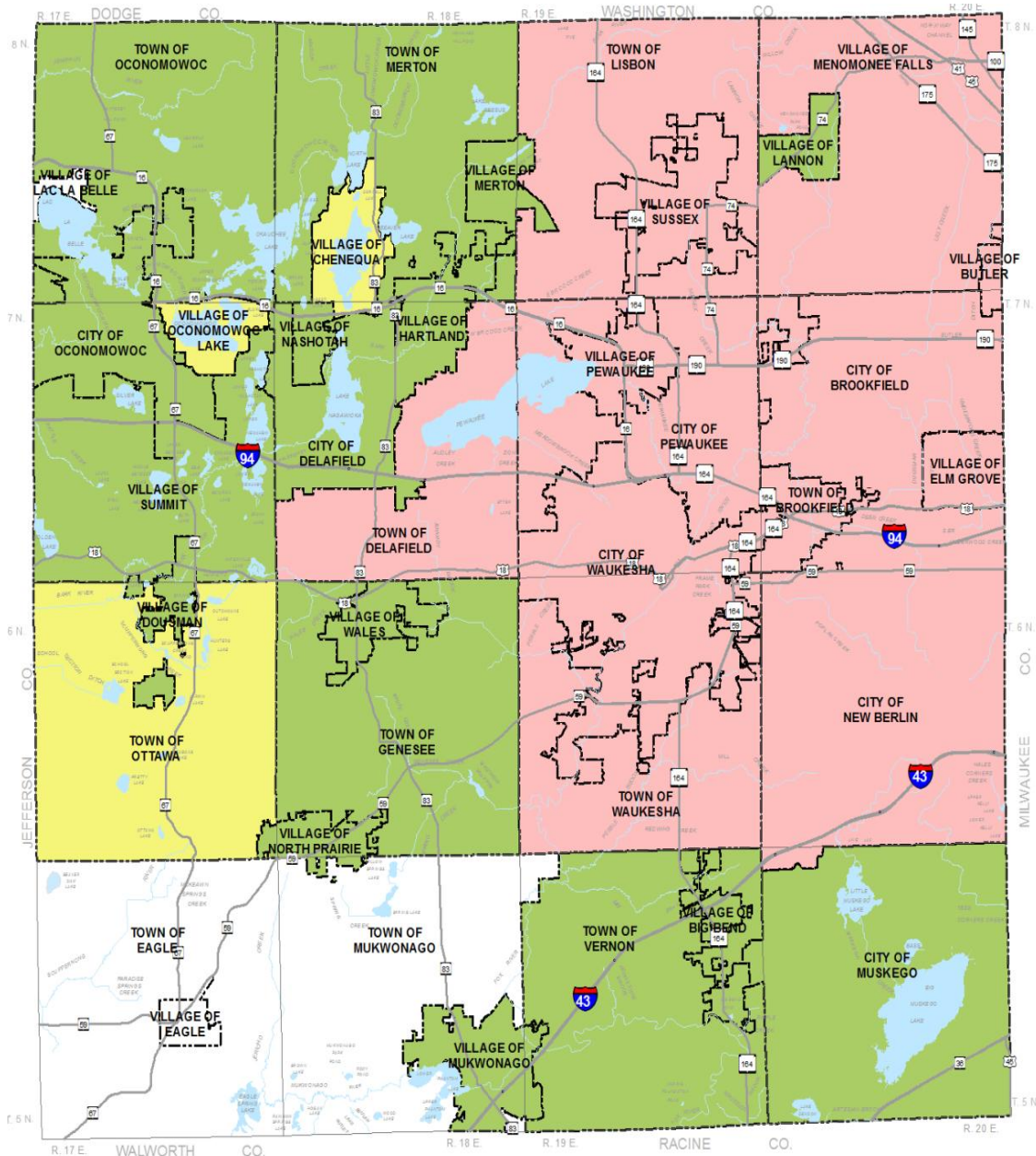
1. Update and enforce the county storm water and erosion control ordinance on new construction sites.
2. Prepare and implement a working agreement between the Waukesha County Public Works and the Parks and Land Use Departments to describe county ordinance enforcement procedures on county-owned lands.
3. Map all county-owned storm water management facilities and storm sewer outfalls.
4. Complete a storm water discharge pollutant-loading analysis (SLAMM model) to determine compliance with the urban area performance standards of 40% Total Suspended Solids (TSS) control by 2013. Implement new BMPs as needed to bring MS4 system into compliance.
5. Annually inspect all major county-owned storm sewer outfalls and implement an illicit discharge detection and elimination program.
6. Prepare and implement pollution prevention plans for all county-owned properties. This includes proper winter road salt / deicing management, nutrient management plans for fertilizer applications on larger county properties, and proper management of leaves and grass clippings
7. Implement internal staff training in pollution prevention for county public works and parks staff.
8. Annually inspect all county-owned storm water management practices and implement maintenance actions as needed.
9. Implement a public storm water education and outreach program. (Note: This is being done in cooperation with 25 partner communities.)
10. Annually report MS4 permit activity and progress on all these requirements and pay a \$500 permit fee.

The Land Resources Division serves as the MS4 permit contact for Waukesha County and is charged with leading all MS4 permit compliance activities among county departments.

Authorized Local Program (ALP)

To improve regulatory efficiencies, Waukesha County applied for Authorized Local Program status under Chapter NR 216, which was approved by DNR starting January 1, 2011. ALP status allows a Waukesha

Map IV-2 Municipal Separate Storm Sewer System (MS4) Discharge Permits Under Chapter NR 216 Waukesha County: 2012

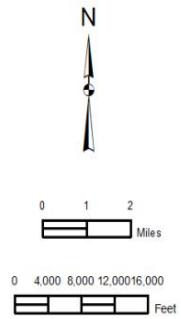


Legend

- Phase I Community (13)
- Phase II Community (18 including Waukesha County)
- Exempted Communities (3)
- MS4 Permit Not Required (4)

*Townships - Only portions meeting the Urbanized Area designation by the EPA

Source: Waukesha County & WDNR



County Storm Water Permit to also provide DNR permit coverage under NR 216 for a construction site that disturbs greater than one acre. This one-stop-shop for state and local storm water permit coverage is something the local development community supports because it simplifies and speeds up the permit process. To meet ALP requirements, the county must screen all NR 216 permit applications for the following:

- Potential wetland water quality impacts to ensure compliance with Chapter NR 103 Wis. Adm. Code or a county ordinance that is at least as restrictive;
- The presence of endangered or threatened resources protected under s. 29.604 Wis. Stats., and Chapter NR 27 Wis. Adm. Code;
- Impacts on historical properties that are listed properties or on the list of locally designated historic places under s. 44.45 Wis. Stats.

When potential impacts are found, the LRD contacts the designated regulatory authority and must withhold issuing a county Storm Water permit until the issue has been resolved. During the first year of ALP status, the LRD issued joint state/county permit coverage for 10 new construction projects. While this number is low due to the recession in 2011, the time saving merits of the program have been demonstrated, and the LRD plans to maintain ALP status. Some improvements are planned for posting Storm Water permit data on the county GIS-web site and possibly the pass-through of state and local administrative fees for the above noted screening processes.

Intergovernmental Agreements

From 2005-2009, Waukesha County executed intergovernmental agreements with 25 local units of government to carry out certain MS4 permit requirements. The driving factor in these agreements was the MS4 permit requirement for each community to implement a storm water information and education program. The LRD offered communities a DNR pre-approved information and education program and a designated staff person to coordinate program implementation efforts in exchange for an annual fee based on community population. For 2012, the community annual fees ranged from \$1,174 to \$4,700, but are subject to an annual fee increase based on actual program costs.

**Table IV-1
Communities in Waukesha County Issued Municipal Separate
Storm Sewer System (MS4) Permits Under Chapter NR 216 and that have
Executed an Intergovernmental Agreement with Waukesha County: 2012**

Phase 1 Communities			Phase 2 Communities		
Cities	Towns	Villages	Cities	Towns	Villages
Brookfield	Brookfield*	Butler	Delafield*	Genesee*	Big Bend*
New Berlin	Delafield*	Elm Grove	Muskego*	Merton*	Dousman*
Pewaukee*	Lisbon*	Menomonee Falls	Oconomowoc*	Oconomowoc*	Hartland*
Waukesha*	Waukesha*	Pewaukee*		Vernon*	Lannon*
		Sussex*			Merton*
					Nashotah*
					North Prairie*
			County		Mukwonago*
			Waukesha County		Summit*
					Wales*

* Communities that executed an intergovernmental agreement with Waukesha County

For seven towns where the county storm water ordinance applies (all except Brookfield), the intergovernmental agreements also contain provisions aimed to improve ordinance administration and enforcement, set erosion control policy for municipal road right-of-ways, and to improve tracking and maintenance of storm water best management practices. For two villages (Merton and North Prairie), the intergovernmental agreements also cover enforcement of the county storm water ordinance within the village, with one agreement (Merton) also covering 1-2 family home construction sites through the Wisconsin Uniform Dwelling Code (Chapter SPS 321). The LRD will continue to encourage intergovernmental cooperation on all MS4 permit requirements.

Storm Water Database

In 2005, using seed money from a DNR urban nonpoint grant, the LRD rolled out a robust database application that tracks storm water permits, project notes, financial assurances, and BMP installation and maintenance. The application runs on a web browser interface with the supporting database running on Microsoft SQL Server. The application is designed to automate and improve storm water permit record keeping and enforcement efforts, including a detailed tracking of contact notes for all active permits. The application is also designed to improve public access to storm water BMP design, installation and maintenance data. The system includes links to a county imaging system that stores copies of BMP maintenance agreements, photographs, and scans of BMP design and installation data or BMP inspection reports. Since 2006, most of these images are created when the storm water BMP maintenance agreement is recorded on the property through the Register of Deeds office – a county Storm Water permit requirement. For BMPs installed prior to 2006, the LRD is in the process of back-scanning available BMP data, which is scheduled to be completed in 2013.

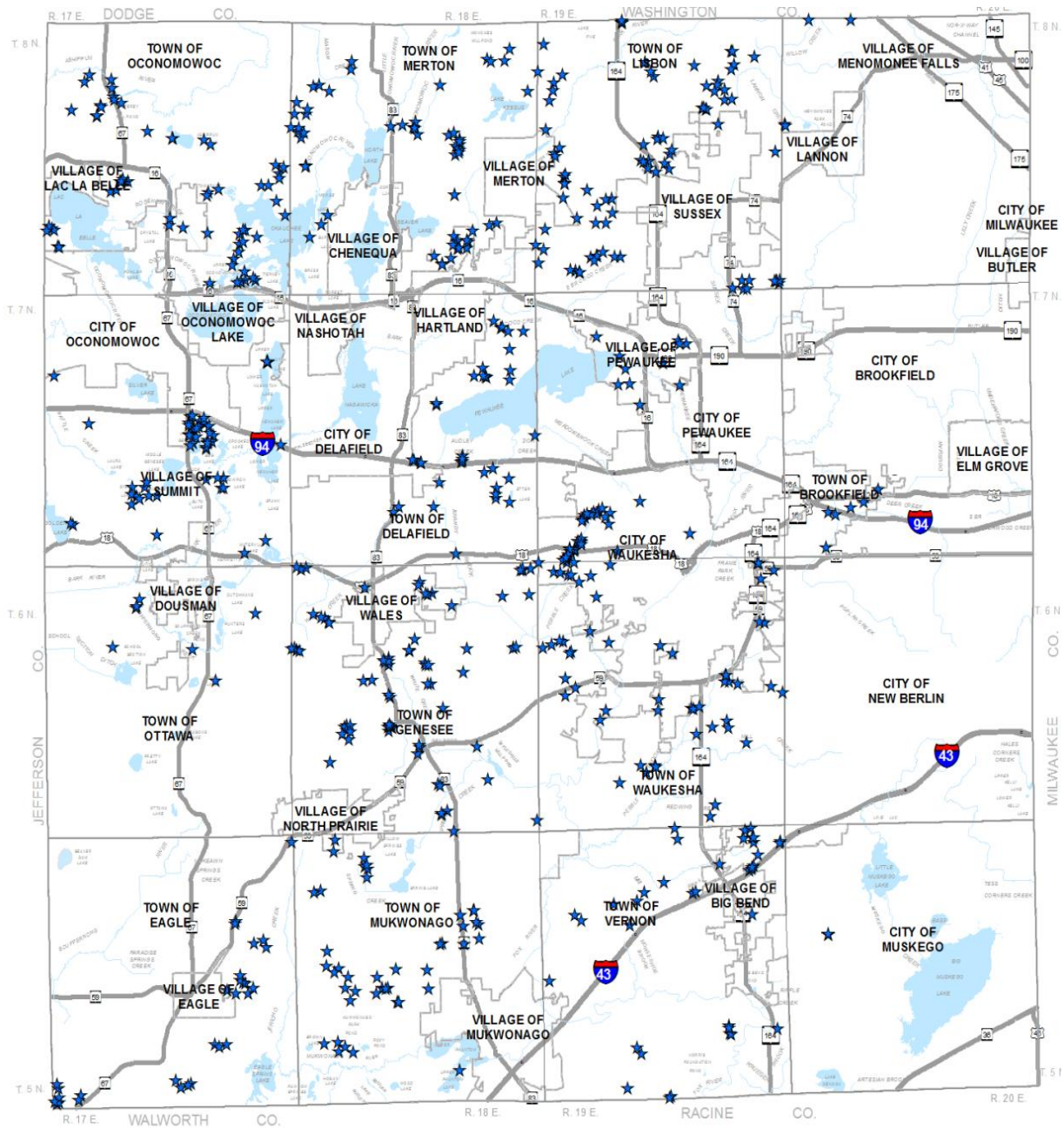
There are also two types of GIS links in the storm water database application – a point for locating installed BMPs, and a polygon for locating active construction site storm water permit boundaries. As of February 2012, the county GIS system contains records for over 600 installed storm water BMPs, as shown in Map IV-3. The public can click on any BMP point on the GIS map and view or download all available data and images. Authorized users can also log into the system and upload additional images to the system such as photographs, as-built documents or BMP inspection reports. The LRD will continue encouraging more communities to get trained in the use in this part of the system.

Storm water permit tracking on the GIS system is designed to coordinate regulatory efforts between the field and the office, and between the DNR and the LRD under the Authorized Local Program. When the LRD receives a permit application, the property boundary is digitized and linked to the permit number in the database. Authorized users can log in and view or enter permit information and find the current status of any permit. As of 2012, this part of the system is the least developed and is planned to be improved upon in the next year with the new GIS system that was recently installed.

Agricultural Nonpoint Pollution Performance Standards

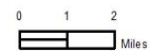
As noted in Chapter III, agricultural runoff pollution is a leading cause of water pollution in most of the watersheds in the state. Chapter III also noted that Chapter NR 151 Wisconsin Administrative Code contains a number of agricultural nonpoint pollution performance standards for cropland erosion and nutrient applications, barnyard runoff, and livestock waste management. A general summary of the statewide agricultural nonpoint pollution standards, as of 2012 is provided below:

Map IV-3 Storm Water Best Management Practices in the Waukesha County Database: 2012



Legend

- ★ Storm Water BMPs
Included in the Waukesha
County Database and GIS
System as of 2/2012



Source: Waukesha County

- Soil erosion rates on all cropland must be maintained at or below “T”. *[Note: “T” is the tolerable erosion rate for each soil type to maintain its productivity indefinitely. T-values generally range from 3-5 tons per acre per year and are documented in the NRCS Technical Guide.]*
- Application of manure or other nutrients to croplands must be done in accordance with a nutrient management plan, designed to meet state standards for limiting the entry of nutrients into groundwater or surface water resources.
- Clean water runoff must be diverted away from contacting feedlots, manure storage facilities, and barnyards in water quality management areas (areas within 300 feet of a stream, 1000 feet from a lake, or areas susceptible to groundwater contamination).
- All new or substantially altered manure storage facilities must meet current engineering design standards to prevent surface or groundwater pollution.
- All cropland tillage must be setback 5-20 feet from the ordinary high water mark of any lake or stream.

The following manure management prohibitions also apply statewide:

- No direct runoff from animal feedlots to “waters of the state”.
- No overflowing manure storage facilities.
- No unconfined manure piles in shoreland areas (areas within 300 of a stream, 1000 feet from lakes).
- No unlimited livestock access to “waters of the state” where the livestock prevent sustaining an adequate vegetative cover.

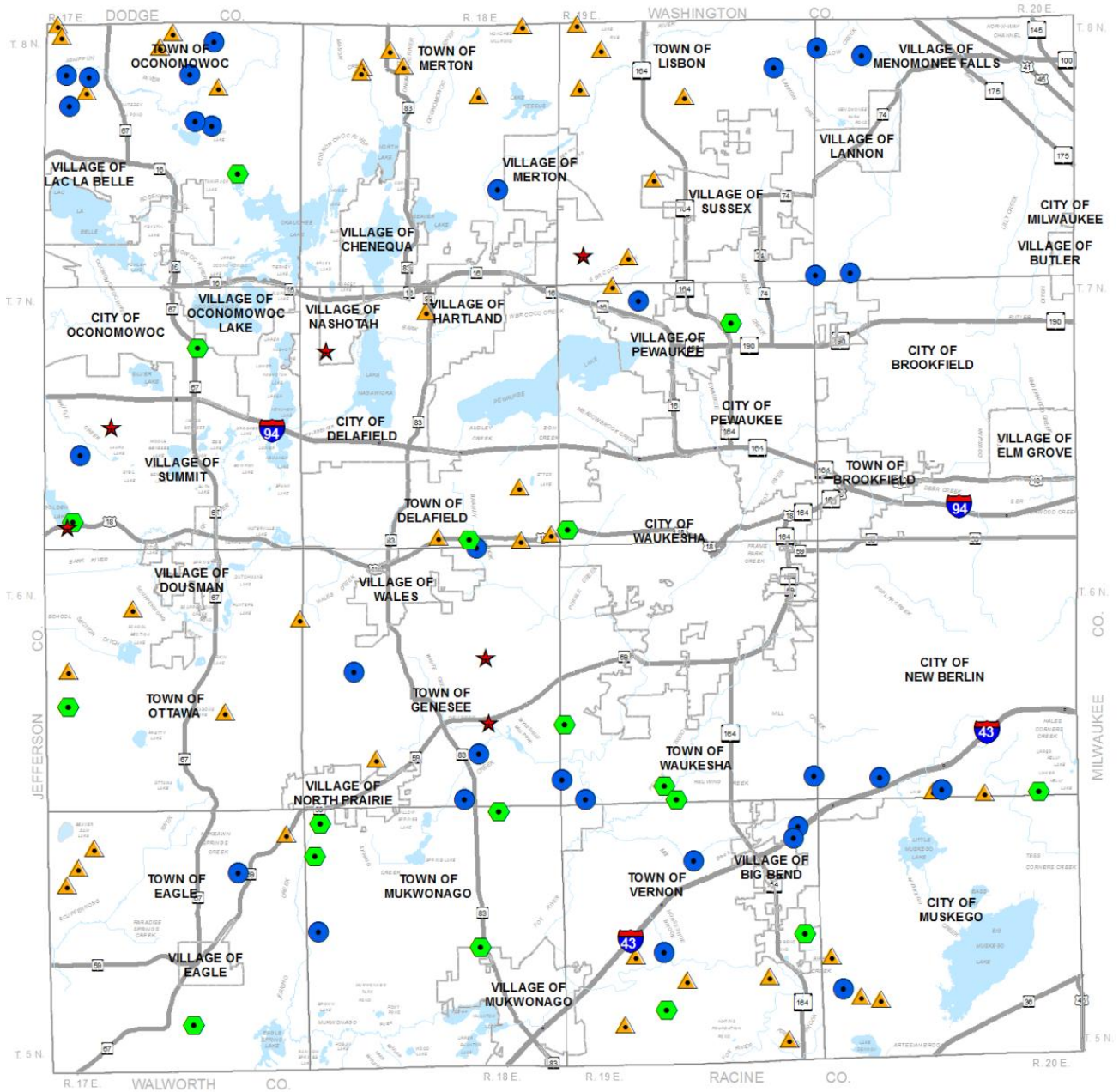
Agricultural Nonpoint Implementation Procedures

State administrative rules prescribe specific cost-sharing requirements that must be met before a landowner can be required to comply with the above noted agricultural nonpoint pollution performance standards. The minimum cost-share rate is generally 70%, except in cases of economic hardship, whereby 90% cost-sharing is required. The cost-sharing requirement does not apply to landowners who receive the state Farmland Preservation income tax credit.

A 2010 generalized agricultural land use inventory conducted by the LRD shows there were 85,526 acres in agricultural uses. Of this, 2007 USDA reports estimate cropland to be about 70,000 acres. Since the 1990’s, conservation plans have been developed for a large percentage of county farmland due to the owner or operator participating in USDA programs, the state Farmland Preservation tax credit, or previous Priority Watershed projects. A transect survey conducted by LRD staff in 2001 showed that approximately 90% of county cropland was at or below “tolerable” (T) soil erosion rates, the state and federal standard that would maintain soil productivity indefinitely. While compliance with “T” value is mandatory under state law, the NRCS will not participate in enforcement efforts. In fact, conservation plans prepared for USDA programs cannot be used by LRD staff to determine landowner compliance with state standards without the written permission from the landowner.

The LRD has also inventoried livestock operations in the county and found very few significant threats to local water resources. Map IV-4 shows the general location of 98 livestock facilities with more than 40 animal units. Only 17 of these 98 are located within a water quality management zone (300 feet of a river or 1000 feet of a lakeshore). The LRD estimates that about half of the 17 may need some runoff control practices, such as clean water diversion to meet state nonpoint standards. Large pasture areas used on several farms make this unnecessary. Based on LRD landowner contacts to date, the majority of local farms do not currently comply with state requirements for a nutrient management plan. The state

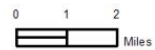
Map IV-4 Livestock Operations with Greater Than 40 Animal Units: Waukesha County 2011



Livestock Type

- Beef (18)
- ▲ Dairy (43)
- Horses (31)
- ★ Other (6)

Source: Waukesha County



Nutrient Management technical standard (NRCS 590) includes Phosphorous Index limits for individual farm fields, but the local level of compliance is unknown.

As noted in Chapter II, development pressures are a daily fact of life for agricultural producers in Waukesha County. While there is still a considerable amount of agricultural production in the county, the LRD considers many of the remaining farms to be a temporary land use based on adopted community land use plans. Therefore, if problem fields or livestock facilities are located in an area planned for future development, it would seem questionable policy to invest a significant amount of limited public resources to address short-term agricultural runoff issues. Because of this, the total LRD resources allocated to this goal are much less than most other county land conservation departments in the state and agricultural nonpoint compliance activities are focused on the “priority farms” described in step 2 below. Having said this, all farms in the county must meet the NR 151 performance standards and are therefore subject to enforcement action for noncompliance.

Many counties are implementing the above noted agricultural nonpoint standards through a county ordinance or a working agreement with the DNR. A working agreement would document the procedures that will be followed by the LRD and DNR for a public complaint or an LRD referral of an agricultural nonpoint problem, as noted in step 6 of the procedures listed below. Since the 2006 LWRM plan was adopted, the LRD has requested a working agreement with DNR, but local storm water workload issues have prevented it from getting done. The LRD will continue to pursue such a working agreement in the future. Regardless, the implementation steps detailed below would likely evolve as program experience and fiscal demands may dictate. In the following sections, the term “landowner” is used generically to describe the person responsible for compliance with the above noted standards.

Step 1. Conduct information and education activities.

The LRD will distribute information and educational material prepared by the DNR, DATCP and LRD to relevant landowners through one-on-one contacts, the LRD web page or other methods that may become available. The educational materials will be designed to achieve the following objectives:

- Educate landowners about Wisconsin’s agricultural performance standards and prohibitions, applicable conservation practices, and cost share grant opportunities;
- Promote voluntary implementation of conservation practices necessary to meet the performance standards and prohibitions;
- Inform landowners of compliance procedures and agency roles to be used statewide and locally;
- Make landowners aware of expectations for compliance and consequences for noncompliance.

Step 2. Select and evaluate parcels for compliance with standards and prohibitions (Priority Farms Strategy).

The LRD will use the county GIS system and old Farmland Preservation Program participant lists to identify priority farms for compliance determinations. Farmland Preservation Program participants are the highest priority since they must comply with the nonpoint standards to be eligible for the state income tax credit. Map IV-5 shows where farms are eligible to claim the FPP credit under the 2011 revisions to the Waukesha County Farmland Preservation Plan. A GIS database is used to record the results of farm compliance checks, track progress on implementing performance standards, identify priority farms, and generate reports. More specifically, the GIS system is used to identify livestock operations within the Water Quality Management Areas (300 feet from a stream or 1000 feet from a lake). The latest available color digital

orthophotos and land ownership data are used as a base map for initial screening, combined with 2-foot contour maps and water resource layers. Digital land units from the USDA-Farm Service Agency may be used to delineate field boundaries. This information is supplemented with an LRD generated digital map of existing farm operations and water resource classification data. Information from the Soil Survey may also be used to identify potential groundwater problems. Other high priority landowners for compliance checks will include citizen complaints and targeted watersheds through other partnerships – but only if the lands are not slated for development in the adopted community comprehensive plan.

Once the list of landowners is created, LRD staff conducts a records inventory search for files related to conservation planning within the department. This is an initial review to determine potential compliance with the performance standards based on past or present program participation. If no records are found, or if the records are found to be out of date with existing farming operations, an on-site farm visit will be scheduled. It should be noted that as of 2009, NRCS conservation planning records cannot be used by the LRD to determine landowner compliance without the written permission of the landowner.

Step 3. Document and report compliance status.

Following completion of records review and on-site evaluations, a **NR 151 Status Report** will be prepared and issued to owners of the parcel evaluated. This report will convey at a minimum:

- Current status of compliance of individual parcels with each of the performance standards and prohibitions.
- Corrective measure options and rough cost estimates to comply with each of the performance standards and prohibitions for which a parcel is not in compliance.
- Eligibility for cost sharing.
- Grant funding sources and technical assistance available from federal, state, and local government, and third party service providers.
- An explanation of conditions that apply if public cost share funds are used.
- A timeline for completing corrective measures, if necessary.
- Process and procedures for contesting evaluation results to the county.
- A copy of performance standards, prohibitions and technical design standards.

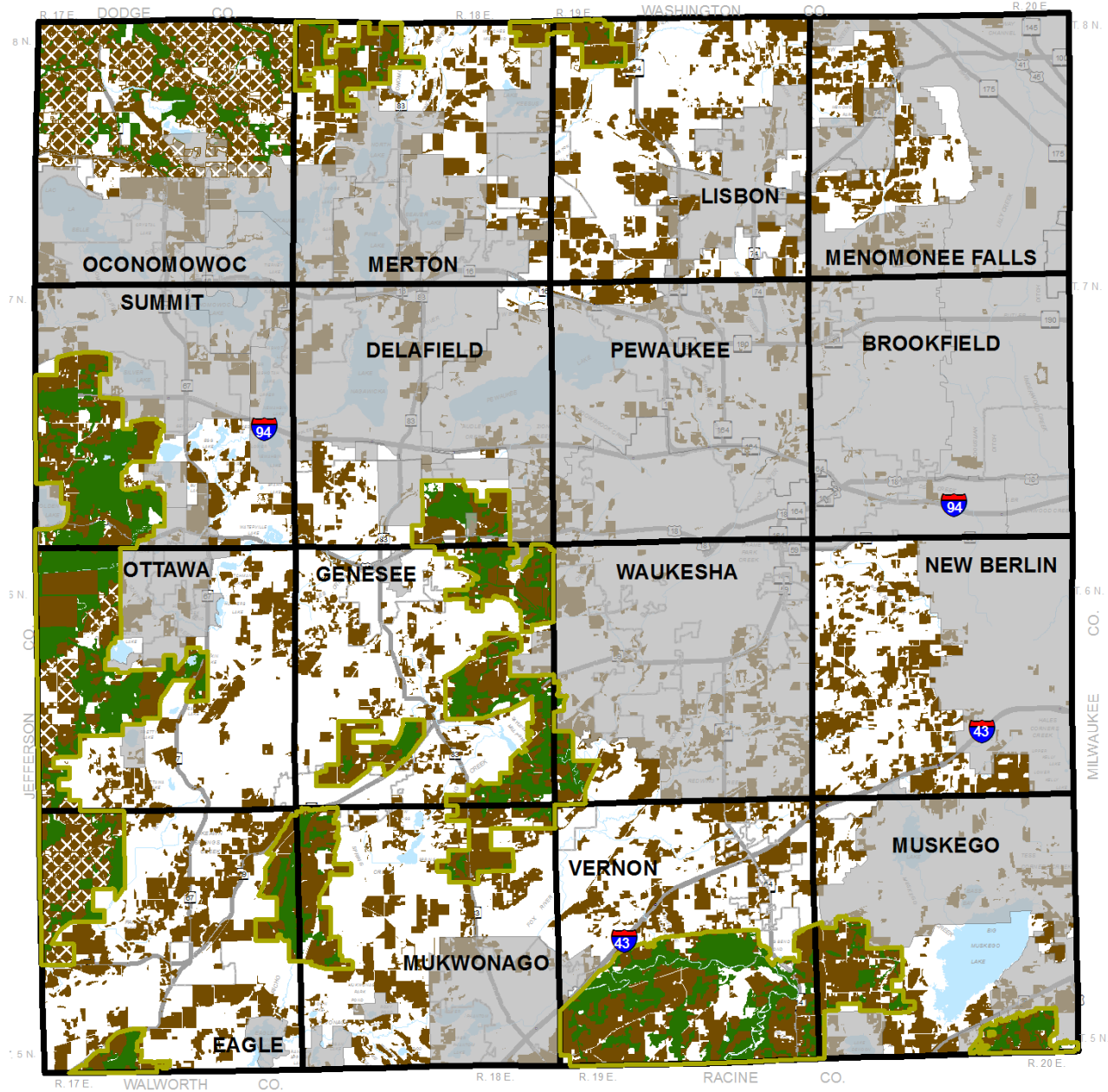
All evaluations and compliance information will be kept as public record in accordance with the procedures documented by the Waukesha County Department of Parks and Land Use.

If a landowner agrees with the initial compliance determination and no corrective actions are required, a **Letter of NR 151 Compliance** will be issued (See Step 5) and the site mapped and GIS database populated. If a landowner disagrees with the initial compliance determination, the landowner may meet and discuss concerns with the LRD regarding the compliance determination process and results. If, after discussing the NR 151 Status Report with the LRD, the landowner still disagrees with conclusions of the LRD, the landowner may choose to follow the appeals process to be detailed in the anticipated working agreement between the LRD and the DNR.

Step 4. Offer or arrange for technical assistance. Offer available cost sharing as needed to install or implement best management practices (BMPs).

If a site is determined to be out of compliance with the state standards, technical assistance and cost sharing will be offered to the landowner to upgrade the site(s) and bring them into compliance. A list of conservation practices likely to be utilized to meet state performance standards and potential sources of

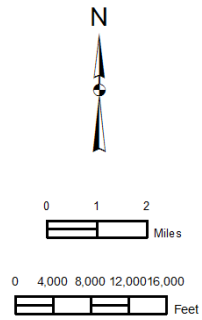
Map IV-5 Farmland Preservation Plan for Waukesha County: 2011



Legend

- Unrefined Future AEA Map Units (>1000 acres)
- Farmland Preservation Area (Towns of Oconomowoc, Ottawa & Eagle)
- Planned Sewer Service Area
- Environmental Corridor within Targeted FP/AEA Map Units
- Farmland

Source: Waukesha County



cost-share funding is found in Appendix E. If no cost sharing is available, a landowner is not required to comply until such time that cost sharing becomes available. However, if cost sharing is offered, and a landowner still refuses to make the corrective actions needed to bring the site into compliance, future cost sharing is not required.

Step 5. Administer funding and technical assistance. Re-evaluate parcel.

Once a landowner agrees to implement the corrective actions to bring the site into compliance with the state standards, and if cost sharing is involved, the cost share agreement and schedule for implementation will be executed. If technical assistance is required it will be arranged for through appropriate agencies/staff with the proper engineering job approval or conservation planning certifications.

After the corrective measures are applied, the site will be re-evaluated to determine if the parcel is now in compliance with the relevant performance standards or prohibitions. If the site is in compliance, the **NR 151 Status Report** will be updated to include a **Letter of NR 151 Compliance**. This would serve as official notification that the site has been determined to now be in compliance with applicable performance standards and prohibitions. Under NR 151, once a site is determined to be in compliance, it is required that the site remains in compliance for perpetuity without additional cost sharing being required.

Step 6. Issue required notices and enforcement activities.

Following compliance status notification, if appropriate action is not taken by the landowner/operator in a reasonable amount of time as detailed in the **NR 151 Status Report**, enforcement action may commence. Generally, a **NR 151 Violation Letter** would be sent via certified mail to notify the landowner of the violation and explain possible enforcement action that may follow. It is anticipated that the LRD would refer the case to the DNR for further enforcement, depending on the outcome of the working agreement described earlier.

Step 7. Monitor compliance with state standards and prohibitions

Monitoring progress on implementing the performance standards and prohibitions will be done using the Waukesha County GIS Ag Compliance Tracking database. This may be done as random spot checks or through operation and maintenance checks on sites previously cost shared. Results will be reported as needed to meet state grant requirements.

Agricultural Buffer Standard

When the administrative rules concerning the redesign of the state nonpoint pollution control program were being debated in 2000 and 2001, there was disagreement about what role vegetative buffers should have in the agricultural nonpoint performance standards. In order for the rest of the administrative rules to move forward, the DNR agreed to remove the buffer language from the draft rules and revisit the issue at a later date. As of 2012, no such standard has been adopted or proposed.

If and when a buffer standard is incorporated into NR 151, the LRD plans to incorporate it into local program efforts and revise annual work plans as necessary. At present, voluntary programs such as the Conservation Reserve Enhancement Program (CREP) have minimum buffer widths based on program goals and technical standards. However, participation in this program in Waukesha County has been very low and the CREP contract expired in 2008. DATCP has recently expressed an interest in executing

a new CREP contract with Waukesha County, but it would already expire in 2013, making implementation impractical.

Estimated Program Costs

Since this plan does not have the authority to establish fiscal policy for the county, the estimated costs provided below are solely intended to satisfy state LWRM planning requirements and do not in any way show anticipated LRD budgets. Due to the current fiscal constraints imposed by state and local policy makers, it is assumed that no additional staff resources will be made available to implement this plan beyond what is currently allocated to land and water conservation programs in the county (approximately 5.8 FTE in 2012). The 5-year cost estimates contained in Tables IV-2 and IV-3 are based on historical inflationary costs to maintain existing program efforts and staffing levels. Even though this plan is written with a 10-year planning horizon, cost projections are limited to 5 years because fiscal projections beyond that period have proven to have limited value. For example, the 2006 LWRM Plan estimated minimum state cost-share funding needed to support LRD staff in accordance with statutory cost-sharing rates. However, by 2012, the state was already approximately \$100,000 short of their statutory obligation in this funding category.

The landowner cost-sharing estimates in Table IV-2 and IV-3 are partially based on a statutory requirement of 70% cost-sharing and are dependent on landowner needs to comply with the state performance standards and other voluntary efforts such as wetland restorations, as described earlier in this chapter and Chapter III. Since 90% of cropland is estimated to already comply with the erosion control requirements, and there are few significant livestock operators in the county, these costs are estimated to be nominal compared to most other Wisconsin counties. However, if a standard is established for stream buffers, and nutrient management standards are enforced, these costs would be much higher than shown. Further details on this issue are provided in the last section of this chapter describing impediments to plan implementation.

Table IV-3 is provided to demonstrate the future state grant needs to continue supporting existing program efforts, based on current state statutory obligations. Under section 92.14 Wisconsin Statutes, the Department of Agriculture, Trade and Consumer Protection is directed to provide each county \$100,000 per year for landowner cost sharing grants, plus base staff funding for an average of three conservationists at a rate of 100% for the first position, 70% for the second position and 50% for the third position. Average salary increases and inflationary costs represent the increases shown each year. Cost-sharing is assumed to be available from federal and state sources at equal levels in Table IV-3.

The cost estimates outlined in this chapter represent the best estimates of the LRD at the time of plan preparation and are all subject to change. No attempt is made to identify the source of funding beyond the assumptions noted above. All of the estimated costs are subject to the annual budget processes at the county, state and federal levels. The LRD will make every attempt to take advantage of the wide array of grants and partnerships that may be available through public or private sources to implement this plan.

**Table IV – 2
Estimated Total Costs for Plan Implementation: 2012-2016**

Cost Category	2012	2013	2014	2015	2016
LRD Staff (S&B)	\$468,500	\$491,900	\$516,500	\$542,300	\$569,400
Operating Expenses	\$110,000	\$112,200	\$114,400	\$116,700	\$119,000
Landowner BMP Cost-Sharing	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000
Total Costs	\$728,500	\$754,100	\$780,900	\$809,000	\$838,400

**Table IV – 3
Estimated Minimum State Costs to Support Plan Implementation 2012-2016
Under Funding Formulas Contained in Section 92.14 Wisconsin Statutes**

State Cost-share Category	2012	2013	2014	2015	2016
LRD Staff (statutory obligation/s. 92.14)	\$210,000	\$220,500	\$231,500	\$243,100	\$255,300
Landowner BMPs - 70% Cost-Sharing	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000
Total State Costs	\$310,000	\$320,500	\$331,500	\$343,100	\$355,300

Monitoring and Evaluation

Monitoring and evaluating program efforts are important to ensure program effectiveness and accountability in the expenditure of public funds. Waukesha County currently uses a variety of methods to monitor and evaluate progress on program efforts, including land inventories, GIS/database maintenance, surveys, advisory committees, annual reviews and progress reports, and water quality monitoring.

Measuring progress for nonpoint pollution control programs has been identified as a serious challenge in several state legislative audits since the late 1980's. Past program efforts have focused on tracking best management practices installed to control nonpoint pollution and associated expenditures involved. Modeling has also been used to estimate pollution reduction accomplished by the installation of practices. Actually measuring changes in water quality is the best way to track progress, but it is very expensive. Also, due to the high number of variables involved in monitoring water quality, it is often difficult to interpret the data. Below is more detail on some of the methods Waukesha County uses to monitor and evaluate the success of implementing plan activities.

Advisory Committees

The county maintains several advisory committees that are periodically asked to review program efforts and plan future activities. One example is the LWRM Plan Advisory Committee, which was used to develop and update this plan. Another example is the Storm Water Advisory Committee, which is codified in the Storm Water Ordinance as the official group responsible for advising the LRD on ordinance updates and the development of technical guidelines related to ordinance administration. As noted in Chapter III, the Storm Water Education Advisory Committee meets twice each year to review progress on educational efforts and plan future events. A subcommittee of this group also helps plan the annual storm water workshop. The Mineral Extraction Advisory Committee is consulted when updates are made to the Nonmetallic Mine Reclamation ordinance or to resolve related conflicts that may arise during the regulation of local mines. A common theme to all these advisory committees is giving the affected industries and other interested parties an opportunity to evaluate county program efforts and offer suggestions for improvement or ideas for future program efforts.

Citizen Surveys

One way to measure progress in information and education efforts is through random citizen surveys. The LRD has sponsored two such surveys in the past, one in 1994 and another in 2003. Both surveys tried to measure the level of understanding of nonpoint pollution and the impacts of urban runoff in particular. The LRD has compared and documented the results of these two surveys. In general, we found that public knowledge of nonpoint pollution has increased, but there is still much misunderstanding about storm sewers and where they discharge (29% correct answer). It is encouraging that more people believe that individuals are a key to solving nonpoint pollution problems now (30%) than in 1994 (23%). Unfortunately, these types of surveys are expensive and if not carefully designed, the data collected can be difficult to compare or establish a long-term trend. It is unclear if this type of survey will be repeated within the timeframe of this plan update.

Another form of survey that is done more regularly is a brief questionnaire of participants in a particular workshop conducted by the LRD. This is done at the completion of the workshop to get immediate feedback and suggestions for improvement. This will continue to be a standard part of LRD information and education program efforts.

Water Quality Monitoring

Monitoring water quality can be a powerful tool for tracking long-term trends and “ground-truthing” assumed impacts of land use changes and pollution control practices installed. However, as noted above, it is very expensive and difficult to do. Citizen surveys show that over the past 10 years an equal number of people think water quality is getting better versus getting worse or staying the same. In general, there is such a shortage of water quality monitoring information available to the LRD that it is impossible to say who is right. One solution to this problem is to encourage volunteer citizen monitoring.

Citizen Stream Monitors

Since 2002, the LRD has been very active in encouraging citizen volunteer water quality monitoring of the streams in Waukesha County. The LRD, in cooperation with groups such as the Rock River Coalition, Pewaukee River Partnership, and Water Action Volunteers (WAV) have held annual training sessions to teach interested citizens how to monitor streams for temperature, turbidity, dissolved oxygen, stream

flow and how to conduct biotic index and habitat assessments. The data collected is entered into an Internet accessible database that will be useful for monitoring future trends in stream condition.

There are currently 20 teams of volunteer monitors around the county. The stream sites being monitored on a regular basis are listed in Table IV-4 and shown on Map IV-6. As staff time allows, the LRD will continue to help train volunteer teams and facilitate data collection.

**Table IV-4
Volunteer Stream Monitor Locations**

Stream Name	Location	Watershed	Years Monitored
1. Golf Course Creek	Lac La Belle Dr.	Oconomowoc River	3
2. Battle Creek	Golden Lake Rd.	Oconomowoc River	11
3. Oconomowoc River	Beach Rd.	Oconomowoc River	3
4. Oconomowoc River	West Shore Dr.	Oconomowoc River	3
5. Mason Creek	Petersen Rd.	Oconomowoc River	2
6. Little Oconomowoc River	Petersen Rd	Oconomowoc River	6
7. Bark River	Genesee Lake Rd.	Bark River	10
8. Bark River	Hillside Rd.	Bark River	2
9. Scuppernong Creek	Ice Age Trail	Bark River	10
10. Jericho Creek	Hwy LO	Mukwonago River	6
11. Genesee Creek	Carroll College property	Middle Fox River	6
12. Spring Brook	Holiday Rd.	Middle Fox River	2
13. Pebble Creek	Kame Terrace	Upper Fox River	11
14. Pebble Creek	Hwy TT	Upper Fox River	11
15. Brandy Brook	Hwy DT	Upper Fox River	11
16. Pewaukee River	Lindsay Rd.	Upper Fox River	8
17. Pewaukee River	Village Park near Capitol Dr.	Upper Fox River	8
18. Pewaukee Lake Outfall	Behind Main St.	Upper Fox River	8
19. Pewaukee River	Hwy M near Hammel Bldg.	Upper Fox River	8

Stream Name	Location	Watershed	Years Monitored
20. Pewaukee River	Hwy J & I-94	Upper Fox River	8
21. Pewaukee River	Hwy F	Upper Fox River	8
22. Coco Creek	Capitol Dr.	Upper Fox River	8
23. Coco Creek	Yench Rd.	Upper Fox River	8
24. Meadowbrook Creek	Hwy SS	Upper Fox River	8
25. Zion Creek	Oakton Rd.	Upper Fox River	8

Source: Waukesha Co. LRD

Wisconsin's Self-Help Lake Monitoring Program

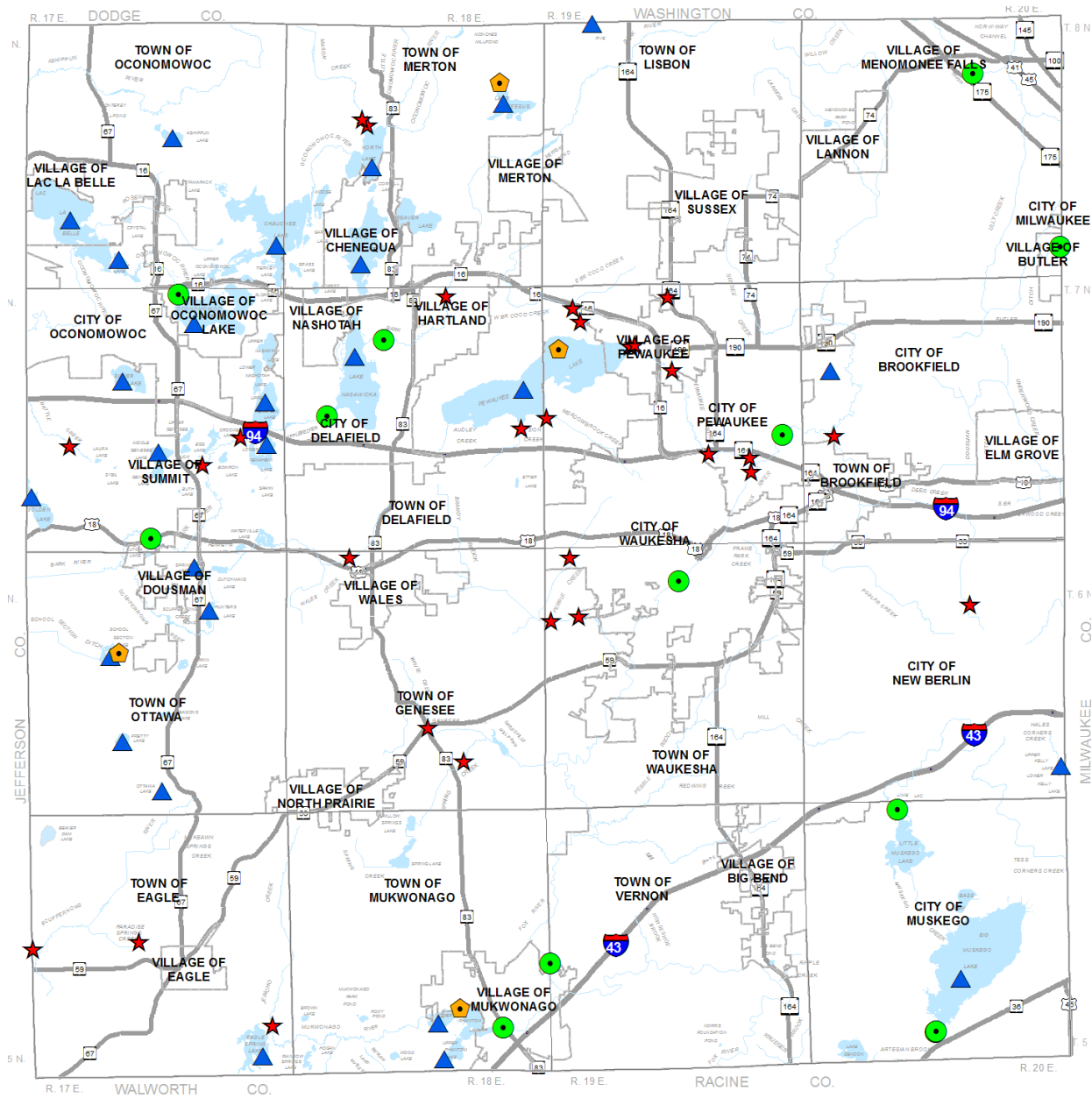
Wisconsin's Self-Help Lake Monitoring Program began in 1986 as one component of the Department of Natural Resources Lake Management program. The Program is designed as a data collection program on some of Wisconsin's 15,000 lakes and serves as a citizen education program about lakes in general. Each volunteer learns about his or her own lake by collecting the data and through a detailed report he or she receives at the end of the sampling season.

The Program was designed with six specific objectives in mind:

1. To teach citizen volunteers some concepts of basic limnology, how lakes "work" and to increase their understanding of the water quality of their lake in particular.
2. To teach citizens about basic lake sampling techniques, specifically how to use a Secchi disc carefully, regularly, and according to set procedures.
3. To document changes in lake clarity over time by tallying the data on a centralized computer system.
4. To differentiate between normal and seasonal variations in water clarity and long-term trends over time. In this way we can judge whether water clarity and, presumable water quality, is getting better, getting worse, or staying the same.
5. To compare the water clarity data for all of the lakes in the program on both a regional and statewide basis.
6. To collect data accurately over time in order to make sound lake management decisions.

Volunteer monitors may measure water clarity using a Secchi disk or may elect to do chemical analysis as well as water clarity readings. The 27 lakes in Waukesha County with Self-Help Lake Monitoring as of 2012 are shown in Map IV-6.

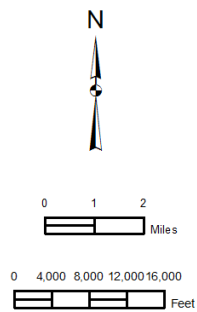
Map IV-6 Water Monitoring Sites in Waukesha County: 2012



Legend

- ★ Citizen Water Monitoring Sites (28)
- USGS Gaging Stations (13)
- ▲ DNR Self Help Monitoring Sites (27)
- ⬠ DNR Lake Baseline Monitoring (4)

Source: Waukesha County, WDNR & USGS



Agency Water Quality Monitoring

The Department of Natural Resources conducts baseline monitoring of streams in Waukesha County, which rotates annually in accordance with regional program planning. DNR also conducts fish surveys, examines macroinvertebrates, and conducts habitat assessments at a number of locations around the county. Public access to much of this data is available through the DNR's web site.

The United States Geological Survey (USGS) also collects water resources data on lakes and streams in Waukesha County and at numerous locations around Wisconsin. The type of data collected varies depending on program and project scope but includes historic and current stream flow on selected water bodies, water quality, and lake stage data. They regularly partner with other agencies and local interest groups to collect information on the condition of surface and groundwater resources.

Map IV-6 shows locations of USGS stream gage stations and lakes that have recently been monitored as part of an ongoing lake stage and water quality monitoring program. Water quality at each lake is monitored in February, April, June, July and August. Dissolved oxygen concentration, temperature, pH level, and specific conductance are determined in each lake. The objective of this long term monitoring program is to determine lake stage and water quality at these and other selected lakes in order to be able to detect chemical or biological changes that may take place over time.

More information on the variety of data collected by the USGS and the ability to view real-time stream gage data can be found at the USGS website: <http://wi.water.usgs.gov/>.

DNR Lake Baseline Monitoring

Department of Natural Resources staff also conducts baseline monitoring of four lakes in Waukesha County each year. These lakes are monitored for total phosphorus, chlorophyll A, secchi depth, temperature profiles, dissolved oxygen profiles, pH profiles and conductivity profiles. Once a year in late summer these lakes are also monitored for color, alkalinity, nitrate, nitrite, total Kjeldahl-N, calcium and magnesium. The lakes with baseline monitoring include: Lake Keesus, Pewaukee Lake, Lower Phantom Lake and School Section Lake. These lakes are shown on Map IV-6.

GIS/Database Tracking Systems

The LRD has developed a web-based database for tracking storm water permits and the long-term maintenance of storm water practices. This system will continue to be used to monitor compliance with the urban nonpoint performance standards and to generate annual reports of activity such as plans reviewed, permits issued, inspections conducted and enforcement action. In addition, a GIS link to this database allows mapping of the sites where permits have been issued or storm water BMPs have been installed. BMP inspection reports can be uploaded to track maintenance.

For the agricultural performance standards, a similar GIS database has been developed to track compliance status by land parcel. This system will be updated in the near future to be web-based and to track the installation of agricultural BMPs. As noted earlier, the LRD has conducted a Transect Survey to determine general cropland erosion rates throughout the county. While this methodology is good for an overview of compliance, the LRD has not repeated the survey since 2001 due to its limited use. Extensive land development in the county has also resulted in the loss of many of the cropland sampling points, making a statistical valid survey difficult to repeat.

Annual Reports/Performance Evaluations

As a condition of state grants or regulations, the LRD must submit annual reports on the progress of local program efforts. Examples include annual reports to demonstrate MS4 permit compliance (DNR), to maintain Authorized Local Program status (DNR) or to meet grant requirements for the Soil and Water Resource Management grant (DATCP). All of these provide an opportunity to evaluate the previous year's program efforts. As noted in Chapter III, the LRD also uses the planned activities in this document as a starting point to develop more detailed annual staff goals, which are then used for performance evaluations at the end of the year.

Taken together, the various monitoring, evaluation and reporting methods described above will be used to continuously evaluate the implementation of this plan and make future program changes, as needed to keep program efforts true to the goals described in Chapter III.

Impediments to Plan Implementation

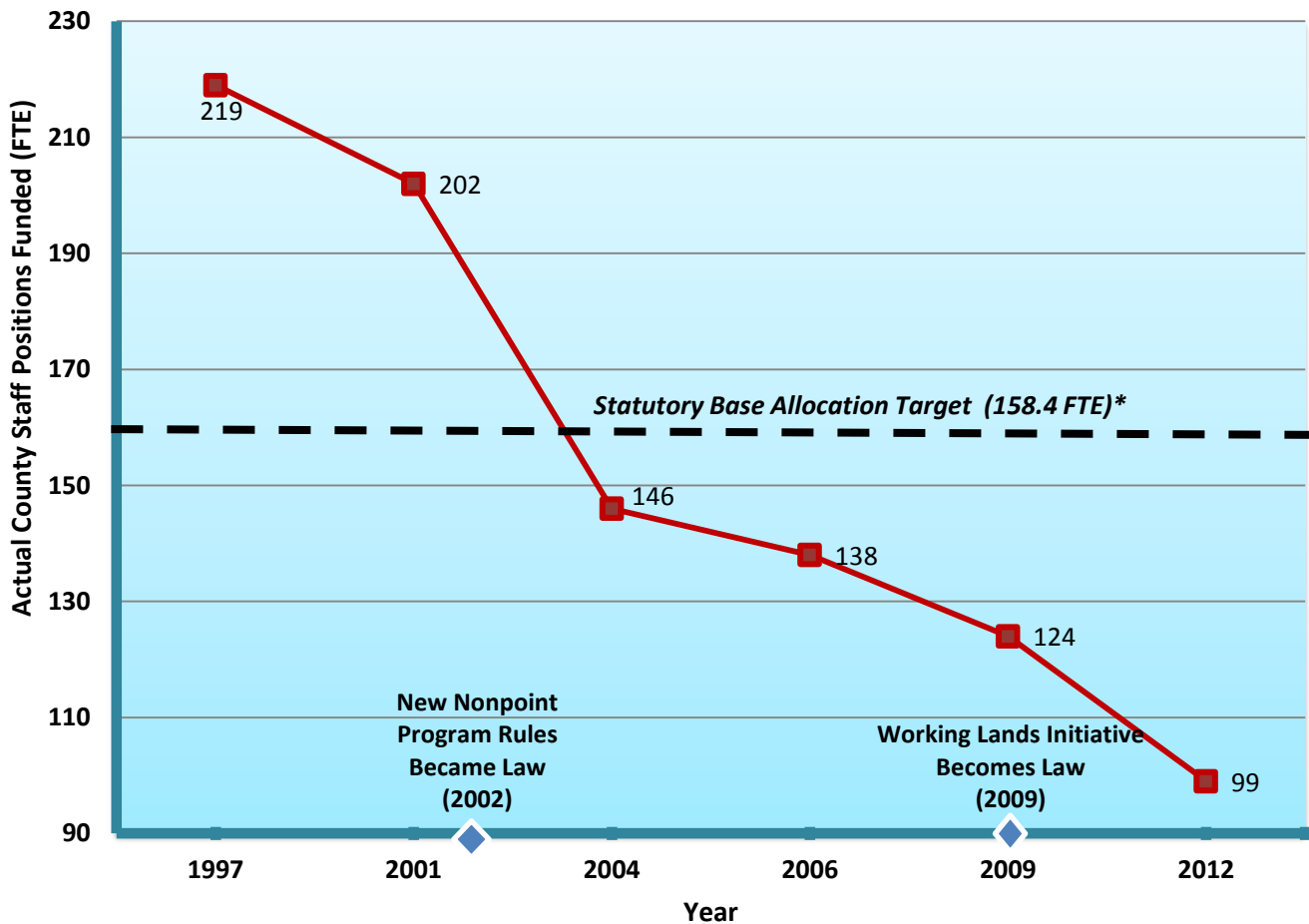
State Funding Cuts for County Program Delivery

As noted throughout this plan, counties are the primary local delivery system for state land and water conservation programs. In 1999, as part of a redesign of the state nonpoint pollution abatement programs, the Wisconsin Legislature committed to a base level of county funding to implement the new program. Section 92.14(6) Wisconsin Statutes directs DATCP to provide program grants to counties to support an average of three conservation staff per county at a cost-shared rate of 100/70/50%. When the new program rules were adopted a few years later, DATCP conservatively estimated that an *additional \$2-4 million per year* was needed to support county conservation program delivery services over the next 10 years. Since then, however, funding has trended in the opposite direction. As of 2012, the state was over \$4 million short of meeting even the base level of staff funding. Figure IV-3 shows the number of county conservation staff supported by state funding since the nonpoint program redesign began in 1997, compared to the noted statutory obligation. Figure IV-3 shows 2012 state funding supports 120 less conservation staff than it did in 1997 - which is 59 positions short of the statutory target of three per county. If the trend were to continue through the 10-year planning horizon of this document, the future sustainability of program efforts would be questionable, along with progress toward meeting state clean water goals.

State Agricultural Cost-sharing Mandates

Another significant plan impediment for implementing the agricultural nonpoint performance standards is the state mandated cost-sharing rates for agricultural conservation practices. For example, nutrient management plans are mandated for all cropland in the state, with a minimum cost-sharing rate of \$28 per acre. Even for the relatively small cropland acreage in Waukesha County (approximately 70,000 acres in 2007), this would require almost \$2 million in cost-share funds to implement. DATCP estimates that Statewide, \$280 million would be required to fund nutrient management plans on the 10 million acres of harvested cropland in the state. However, total statewide cost-share funding available for nutrient management in 2012 was approximately \$1.2 million. Clearly, this \$28/acre cost-sharing mandate is not a realistic strategy to get nutrient management plans implemented on all cropland within any reasonable program planning horizon. It is also arguable that this particular conservation practice pays for itself in saved fertilizer costs, and therefore should not be subject to any cost-sharing mandate at all.

**Figure IV-3
County Conservation Staff Positions Supported by State Funding: 1997-2012**



* Full time equivalent (FTE) target number is based on s.92.14(6)(b) Wis. Stats, which reads: "...the department shall attempt to provide funding under this section for an average of 3 staff persons per county ..." [at a 11/70/50 % cost-share rate]. For three staff, this adds up to 2.2 FTE per county X 72 counties = 158.4 FTE. Conservation staff numbers are derived from DATCP reports and historical county surveys. The 2012 number reflects a \$1.1 million lapse plus \$1million cut approved in the 2011-2013 state budget (\$0.5 million/yr.), and average county FTE salary & benefit cost reported by DATCP.

Source: Wisconsin Land and Water Conservation Association and DATCP

Summary

Unfortunately, the two impediments noted above are closely related, and taken together, present some critical issues regarding future program efforts. For example, the funding source for nutrient management – SEG funds generated from landfill tip fees - is also used to support county conservation program delivery services. During state budget shortfalls, this funding competition presents a no-win decision for policy makers as to which is more important - cost-sharing for landowners, or the local delivery system needed to design and install conservation practices, administer cost-sharing grants and ensure compliance with the state standards? Meanwhile, any shortage of cost-sharing funds means landowners cannot be required to comply with the agricultural nonpoint performance standards. One exception to this rule is landowners who claim the state Farmland Preservation income tax credit. Under current state law, cost-sharing for these landowners is not required to ensure compliance with

the performance standards. Yet, the limited cost-sharing that is currently available through DATCP is being targeted to these landowners.

Increasingly, counties are being held more accountable for the implementation of their Land and Water Resource Management Plans, including the nonpoint performance standards. Yet, as noted above, the incentives for agricultural landowners to comply are very limited and the mechanism to ensure compliance is hampered by state cost-share mandates and program funding shortfalls. Counties have a vested interest in protecting the local land and water resource base and will continue to adapt to the program rules and funding realities they face. However, to sustain a viable local program delivery system and meet clean water goals, some fundamental review of state program administrative rules and funding sources would seem to be in order.

Appendix A

Glossary of Terms Commonly Used in This Plan

303(d) Waters: A list submitted to the U.S. Environmental Protection Agency which identifies waters that do not meet water quality standards for specific substances or the designated use. Also referred to as the List of Impaired Waters. The list is required under the Clean Water Act and is prepared by the Wisconsin Department of Natural Resources.

Alluvium: Soil or rock material, such as gravel, sand, silt, or clay deposited by flowing water.

Animal Waste Management: A group of practices including barnyard runoff management, nutrient management, and manure storage facilities designed to minimize the effects of animal manure on surface and groundwater resources.

Aquifer: Underground water reservoirs found within layers of permeable rock, sand or gravel.

Basin: A large geographic area comprised of many small watersheds.

Basin Water Quality Management Plan (208 Plan): A plan to document water quality conditions in a drainage basin and make recommendations to protect and improve water quality. Each basin in Wisconsin must have a plan prepared for it, according to Section 208 of the Clean Water Act.

Best Management Practice (BMP): Structural and nonstructural measures, practices, techniques or devices employed to avoid or minimize sediment or other pollutants carried in runoff.

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

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

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

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

Conservation Reserve Enhancement Program (CREP): Program partnership between USDA, DATCP, and Waukesha County that enhances the conservation payments of the regular CRP.

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

Department of Natural Resources (DNR): The state agency responsible for managing and protecting land, water and air resources of the state. DNR also administers programs to regulate, guide, and assist Land Conservation Departments and individual land users in managing land, water, fish and wildlife. The DNR administers state cost-sharing funds for priority watershed projects, Targeted Runoff Management (TRM) grants, Lake Planning and Protection grants, and Urban Nonpoint Source Construction and Planning grants.

Environmental Corridor (Primary and Secondary): A composite of the best individual elements of the natural resource base including surface water, streams, and rivers and their associated floodlands and shorelands; woodlands, wetlands and wildlife habitat; areas of groundwater discharge and recharge; organic soils, rugged terrain and high relief topography; and significant geological formations and physiographic features.

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

Erosion: The process of detachment, transport and deposition of soil, sediment or rock fragments by action of water, wind, ice or gravity.

Eutrophication: The process by which lakes are enriched with nutrients, increasing the production of rooted aquatic plants and algae. The extent to which this has occurred is reflected in a lake's trophic classification: oligotrophic (nutrient poor), mesotrophic (moderately productive), and eutrophic (very productive and fertile).

Exotic Species: A non-native species introduced from another geographic area.

Farm Service Agency (FSA): Part of the United States Department of Agriculture, the FSA administers agricultural assistance programs including price supports, production controls and conservation cost-sharing.

Groundwater: Water that flows below the ground surface through saturated soil, glacial deposits or rocks.

Household: A household includes all persons who occupy a housing unit—defined by the Census Bureau as a house, an apartment, a mobile home, a group of rooms, or a single-room that is occupied, or intended for occupancy, as separate living quarters.

Hydric Soil: A soil that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part.

Impaired Waters: See 303(d) Waters.

Impervious Surface: An area that releases all or a large portion of the precipitation that falls on it, except for frozen soil. Conventional rooftops and asphalt or concrete sidewalks, driveways, parking lots and streets are typical examples of impervious surfaces.

Infiltration: The movement of precipitation or runoff into or through the soil.

Infiltration System(s): A device or practice such as a basin, trench, rain garden or swale designed specifically to encourage infiltration of precipitation or runoff.

Invasive Plants: Primarily non-native, aggressive plants that out compete and displace native plants in an ecosystem.

Land and Water Conservation Board (LWCB): The statutorily defined advisory body to the Department of Agriculture, Trade, and Consumer Protection. Consists of three local elected officials, four appointees of the Governor, and leaders from the DNR, DATCP, and DOA. Oversees the approval of county land and water resource management plans.

Land Resources Division (LRD): The Land Resources Division of the Waukesha County Department of Parks and Land Use.

Milligrams per Liter (mg/l): A measure of the concentration of a substance in water. For most pollution measurements this is the equivalent of “parts per million.”

Natural Resources Conservation Service (NRCS): Part of the United States Department of Agriculture, the NRCS provides soil survey, conservation planning and technical assistance to local land users.

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

Nutrient Management Plan: A guidance document that provides fertilizer and manure spreading recommendations for crop fields based on soil test results and crop needs.

ORW/ERW: DNR classifies streams and lakes as Outstanding Resource Waters (ORW) and Exceptional Resource Waters (ERW) as listed in NR102.10 and NR 102.11. ORW waters have excellent water quality and high-quality fisheries and do not receive wastewater discharges. ERW waters have excellent water quality and valued fisheries but may already receive wastewater discharges.

Phosphorus: A key plant nutrient that, when reaching lakes in excess amounts, can lead to over fertile conditions and algae blooms.

Point Source Pollution: Sources of pollution that can be traced back to a single point, such as a municipal or industrial wastewater treatment plant discharge pipe.

Priority Farms: Farms identified by the county for having excessive runoff from soil erosion and/or manure runoff resulting in existing or potential water quality problems.

Regional Storm Water Management Plan: A planning document, adopted by a local unit of government, which coordinates storm water management activities for an entire drainage area or watershed, including future land development activities within the watershed. The plan may prescribe the use of BMPs for individual development sites and for selected points within the watershed to meet the goals and objectives of the plan.

Revised Universal Soil Loss Equation-Version 2 (RUSLE2): An equation used to estimate the amount of soil lost annually per acre from crop fields. It takes into consideration the following factors: rainfall, slope, slope length, soil erodibility, crop rotations, and crop practices (NRCS Agricultural Handbook 537).

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

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

Runoff: Water from rain, snowmelt, irrigation or construction dewatering, not absorbed by the soil, that flows over the ground surface and returns to streams and lakes. Runoff can collect pollutants from air or land and carry them to receiving waters.

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

Storm Water BMP: Any best management practice that is designed to collect or manage the quantity or quality of storm water runoff for an indefinite time period. Examples include, but are not limited to: wet or dry detention basin, infiltration trench or basin, bio-retention basin, stilling basin, green roof, filter strip, artificial wetland, or any combination of these or other permanent storm water management practices.

Suspended Solids: A measure of the particulate matter in a water sample, usually expressed in milligrams per liter.

Technical Standard: A document that specifies design, predicted performance and operation and maintenance requirements for a material, device or method.

Tolerable Soil Loss (T-Value): The maximum average annual rate of soil erosion for each soil type, measured in tons per acre, per year, that will permit a high level of crop productivity to be sustained economically and indefinitely.

Total Maximum Daily Loads (TMDL): The maximum amount of a pollutant that can be discharged into a stream without causing a violation of water quality standards.

Trophic Status: The level of productivity of a lake as measured by phosphorus content, algae abundance, and depth of light penetration.

Turbidity: Having suspended or stirred up particles, referring to a lack of water clarity. Turbidity is usually closely related to the amount of suspended solids (sediment or algae) in water.

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

Watershed: The geographic area that drains to a particular river, stream or water body.

Water Quality Standards: The legal basis and determination of the use of a water body and the water quality criteria; (physical, chemical, or biological traits of a water body) that must be met to make it suitable for a specified use.

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

Wetlands: An area where water is at, near, or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation and which has soils indicative of wet conditions.

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

Wildlife Habitat Incentives Program (WHIP): Federal program to help improve wildlife habitat on private lands.

Appendix B

References Used to Develop This Plan

Southeastern Wisconsin Regional Planning Commission Memorandum Report No. 145 (draft), Lake and Stream Resources Classification Project for Waukesha County: 2000, May 2005.

Southeastern Wisconsin Regional Planning Commission Planning Report No. 42, A Regional Natural Areas and Critical Species Habitat Protection and Management Plan for Southeastern Wisconsin, September 1997.

Southeastern Wisconsin Regional Planning Commission Planning Report No. 48, A Regional Land Use Plan for Southeast Wisconsin, June 2006.

Southeastern Wisconsin Regional Planning Commission Technical Report No. 37, Groundwater Resources of Southeastern Wisconsin, June 2002.

Southeastern Wisconsin Regional Planning Commission Community Assistance Planning Report No. 58, 2nd Edition, A Lake Management Plan for Pewaukee Lake, May 2003.

United States Department of Agriculture, Census of Agriculture (1969-2007).

Waukesha County Departments of Parks and Land Use and UWEX, A Comprehensive Development Plan for Waukesha County, February 2009. Includes Appendix D, Waukesha County Farmland Preservation Plan Update, October 2011.

Wisconsin Agricultural Statistics Service, United States Department of Agriculture, Wisconsin Department of Agriculture, Trade and Consumer Protection, Wisconsin Agricultural Statistics, 2005.

Wisconsin Department of Natural Resources, The State of the Southeast Fox River Basin, February 2002.

Wisconsin Department of Natural Resources, The State of the Milwaukee River Basin, August 2001.

Wisconsin Department of Natural Resources, The State of the Rock River Basin, April 2002.

Wisconsin Department of Natural Resources, The State of the Root-Pike River Basin, May 2002.

Wisconsin Department of Natural Resources, Nonpoint Source Control Plan for the Muskego-Wind Lakes Priority Watershed Project, October 1993.

Wisconsin Department of Natural Resources, Nonpoint Source Control Plan for the Upper Fox River Priority Watershed Project, November 1993.

Wisconsin Department of Natural Resources, Nonpoint Source Control Plan for the Oconomowoc River Priority Watershed Project, 1986.

Wisconsin Department of Natural Resources, Nonpoint Source Control Plan for the Menomonee River Priority Watershed Project, March 1992.

Appendix C Invitation to the LWRM Plan Advisory Committee

Daniel P. Vrakas
County Executive

Dale R. Shaver
Director



Date: February 3, 2012

To: Planning Advisory Committee
Waukesha County Land & Water Resource Management Plan – 2012 Update

From: Perry Lindquist, Land Resources Manager

A handwritten signature in black ink, appearing to read "Perry Lindquist".

RE: Invite to Advisory Committee Meeting on Thursday, February 23, 2012
1:00 – 3:00 pm, Room 255 Waukesha County Administration Center
515 W. Moreland Blv., Waukesha WI 53188

Greetings Everyone,

Waukesha County is required by state law to update our Land and Water Resource Management Plan this year. This planning process establishes long-range plans for the county's conservation programs. This will be the third generation of the LWRM plan for the county. Many of you were involved in this planning effort during our last update in 2005. At that time we developed the goals and objectives through a nominal group process and two advisory committees – one rural and one urban. A copy of the [2005 LWRM Plan](#) (link) is on our web site, if you would like to review it.

After reviewing the 2005 plan, I believe we can use the same set of goals, and just update the specific objectives and planned activities. Since this will simplify the process considerably, I merged the two advisory committees into one and am only planning for one advisory committee meeting at this time. This can change if needed. My plan is to send a draft of the proposed 5-year workplan update for your review about a week before the above noted meeting date. I would greatly appreciate you taking the time to review the draft and providing me any comments you may have. If you would agree to participate in this process, you can provide comments by attending the Feb. 23 meeting, calling me, or sending them to me via email, etc.

Other chapters in the plan will be updated to include more recent resource inventory data and other information. However, due to limited staff resources and time constraints, this may not be completed until later in March sometime. The draft workplan needs to be submitted to DATCP by February 14th, so I should have their comments in-hand for our Feb 23 meeting to discuss.

The second page of this memo includes a list of the people invited to participate on the advisory committee. Please let me know if you accept this offer by replying to this email or calling me at 262-548-7867. If you would like to participate, but cannot make it to the February 23 meeting, you could also send me your comments or send someone else to represent you at the meeting. Please let me know either way. Thank you for your consideration of my request.

Land Resources Division • 1320 Pewaukee Road • Room 260 • Waukesha, Wisconsin 53188-3878
Phone: (262) 896-8300 • Fax: (262) 896-8298 • www.waukeshacounty.gov/landandparks

**Land and Water Resource Management Plan Advisory Committee
Waukesha County - 2012**

Tim Barbeau – R.A. Smith and Associates
Robert Bartholomew – Farmer, Town of Vernon
Jerry Braatz – University of Wisconsin - Extension
Lisa Conley – Town & Country RC&D, Lake resident
Paul Day – City of Waukesha Engineering Dept.
Jason Fruth – Waukesha Co. - Planning & Zoning
Sharon Gayan – WI Dept. of Natural Resources
Mike Hahn – Southeastern WI Regional Planning Commission
Jeff Herrmann – Town Planner/Administrator (Oconomowoc & Genesee)
Marlin Johnson – Waukesha County Land Conservancy
John Koepke – Farmer/Town Board, Town of Oconomowoc
Michelle Lehner – WI Dept. of Natural Resources
Tom Nelson – Village of Merton Administrator
Mark Mickelson – Yaggy Colby Associates
Joan Oberhaus – Farmer, Town of Delafield
Kurt Peot – Ruckert and Mielke
Frits Ruff – Waukesha County Board/LUPE
John Siepmann – Siepmann Realty Corporation
Maggie Wagner – City of Pewaukee Engineering
Ron Williams – Farmer, Town of Genesee
John White – USDA-Natural Resources Cons. Service

Committee Chair: Perry Lindquist, Land Resources Manager
262-548-7867

Appendix D
Notice of Public Hearing

AFFIDAVIT OF PUBLICATION

State of Wisconsin Circuit Court Waukesha County

PROOF OF PUBLICATION

Account Name: Waukesha Co. Parks & Land Us
Telephone Number: 262-896-8306/Legals
Address: Admin. Bldg Room 230
515 W Moreland Blvd.
Waukesha, WI 53188

ACCT Number: 192059

IN THE MATTER OF: Public Hearing
AD Number: 93684007
AD Cost: 58.72



Notice of Public Hearing Waukesha County Land and Water Resource Management Plan. Notice is hereby given that on Thursday, May 31, 2012 starting at 10:00 AM, the Waukesha County Department of Parks and Land Use - Land Resources Division will conduct an informational meeting followed by a public hearing on the 2012 update to the Waukesha County Land and Water Resource Management Plan. This third generation Land and Water Resource Management Plan is an update to the current plan adopted by the Waukesha County Board in 2005. The updated plan will guide county land and water conservation program efforts for the next 10 years. Adoption of the plan will also help the county qualify for future state and federal grants. The informational meeting and public hearing will be held: Thursday, May 31, 2012 at 10:00 AM Room 255/259, Waukesha County Administration Center 515 W. Moreland Blvd., Waukesha WI 53188. The Waukesha County Land and Water Resource Management Plan may be viewed online at www.waukesha-county.gov/landandwater. The plan may also be viewed in Room 260 of the Waukesha County Administration Center. For additional information regarding this hearing, please contact Perry Nordquist of the Waukesha County Land Resources Division at 262-896-8300. All interested parties will be heard. A quorum of the Waukesha County Land and Water Resource Management Committee may attend the above noted meeting for informational purposes only. No business will be conducted. Publish: May 17, 24 WNAXLP

I, Diane Heesen, being sworn, state:

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

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

5/17/12;5/24/12

Signed: _____

Diane Heesen, Billing Coordinator

STATE OF WISCONSIN SS.
WAUKESHA COUNTY

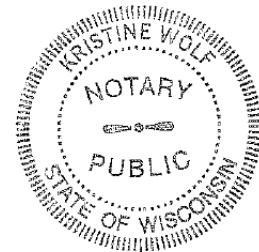
Personally came before me, this date of May 24, 2012

the above named Diane Heesen to me known to be the person who executed the foregoing instrument and acknowledged the same.

Signed: _____

Kristine Wolf
Notary Public, Wisconsin

My Commission expires: 1/13/13



Appendix E Conservation Practices Used for Plan Implementation

The following table lists the current technical standards and potential sources of cost-share funding for each of the conservation practices that may be used to comply with state agricultural and non-agricultural nonpoint pollution performance standards.

Conservation Practice or Activity	Technical Guide Practice Code	Potential Funding Sources (non-local)
Agricultural Conservation Practices		
Access road	560	LWRM, EQIP, WHIP
Animal trails and walkways	575	LWRM, EQIP
Barnyard runoff control systems	Various	LWRM, EQIP
Closure of waste impoundments	360	LWRM, EQIP
Contour farming	330	EQIP
Critical area planting	342	LWRM, EQIP
Diversion	362	LWRM, EQIP
Fence	382	LWRM, EQIP, WHIP
Filter strip	393	LWRM, EQIP, WHIP, CREP, CRP
Grassed waterway	412	LWRM, EQIP, CREP, CRP
Heavy use area protection	561	LWRM, EQIP
Lined waterway or outlet	468	LWRM, EQIP
Manure transfer	634	LWRM, EQIP
Milking center waste control systems	Various	LWRM, EQIP
Nutrient management	590	EQIP
Prescribed grazing	Various	EQIP
Riparian forest buffer	391	WHIP, CREP, CRP
Roof runoff structure	558	LWRM, EQIP
Sediment basin	350	LWRM, EQIP
Streambank and shoreline protection	580	LWRM, EQIP, WHIP, TRM
Subsurface drain	606	LWRM, EQIP
Tree/shrub establishment	612	EQIP, WHIP
Underground outlet	620	LWRM, EQIP
Waste storage facility	313	LWRM, EQIP, TRM
Wastewater treatment strip	635	LWRM, EQIP
Water and sediment control basin	638	LWRM, EQIP, TRM
Watering facility	614	LWRM, EQIP
Well decommissioning	351	LWRM, EQIP

Conservation Practice or Activity	Technical Guide Practice Code	Potential Funding Sources (non-local)
Urban Conservation Practices		
Bioretention for infiltration	1004	TRM*
Channel erosion mat	1053	-
Compost	S100	-
De-watering	1061	-
Ditch checks	1062	-
Construction site diversion	1066	-
Dust control	1068	-
Infiltration basin	1003	TRM*
Infiltration trench	(not assigned)	TRM*
Grading practices for erosion control	1067	-
Land application of anionic polyacrylamide	1050	-
Mulching for construction sites	1058	-
Non-channel erosion mat	1052	-
Proprietary storm water sedimentation devices	1006	TRM*
Rain Gardens	n/a	TRM*
Sediment bale barrier	1055	-
Sediment basin	1064	TRM*
Sediment trap	1063	-
Seeding	1059	-
Silt fence	1056	-
Silt curtain	1070	-
Stone tracking pad and tire washing	1057	-
Storm drain inlet protection for construction sites	1060	-
Turbidity barriers	1069	-
Vegetative buffer for construction sites	1054	-
Vegetated infiltration swales	1005	
Water application of polymers	1051	-
Wet detention pond	1001	TRM*

LWRM = Land and Water Resource Management Program

EQIP = Environmental Quality Incentives Program

WHIP = Wildlife Habitat Incentives Program

WRP = Wetland Reserve Program

CREP = Conservation Reserve Enhancement Program

CRP = Conservation Reserve Program

TRM = Targeted Runoff Management (*Grants not available to fund BMP's for new development projects.)

Appendix F

Waukesha County Board Approval of this Plan

ENROLLED RESOLUTION 167-1

APPROVE THE WAUKESHA COUNTY LAND AND WATER RESOURCE MANAGEMENT PLAN: 2012 UPDATE

WHEREAS, Section 92.10, Wisconsin Statutes requires every county in the state to prepare a long-range Land and Water Resource Management (LWRM) Plan as a condition of continuing to receive annual state grant funds to support county land and water conservation programs; and

WHEREAS, Chapter ATCP 50, Wisconsin Administrative Code contains detailed requirements for the LWRM preparation and approval by the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP); and

WHEREAS, the Department of Parks and Land Use – Land Resources Division worked with a citizen advisory committee in early 2012 to review draft plan materials and make recommendations for plan revisions; and

WHEREAS, a final draft of the Waukesha County LWRM Plan: 2012 Update (10 year plan) was posted on the county web page on April 30, 2012 at the following web address: www.waukeshacounty.gov/landandwaterplan and a public hearing was held on May 31, 2012, with no objections raised; and

WHEREAS, on May 15, 2012, the DATCP certified the final draft of the Waukesha County LWRM Plan: 2012 Update as compliant with the requirements of Chapter ATCP 50 Wis. Admin. Code and Section 92.10, Wis. Stats.; and

WHEREAS, on June 5, 2012, the final draft of the Waukesha County LWRM Plan: 2012 Update was reviewed and recommended for approval by the Wisconsin Land and Water Conservation Board; and

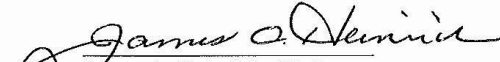
WHEREAS, on July 17, 2012, the Land Use, Parks and Environment Committee reviewed the Waukesha County LWRM Plan: 2012 Update and recommend approval by the County Board of Supervisors.

THE COUNTY BOARD OF SUPERVISORS OF THE COUNTY OF WAUKESHA
RESOLVES that the Waukesha County Land and Water Resource Management Plan: 2012 Update is hereby approved.

File Number: 167-R-001


APPROVE THE WAUKESHA COUNTY LAND AND WATER
RESOURCE MANAGEMENT PLAN: 2012 UPDATE

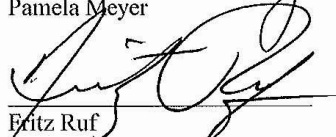
Presented by:
Land Use, Parks, and Environment Committee


James A. Heinrich, Chair



Jim Batzko


Walter L. Kolb

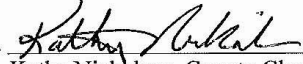

Pamela Meyer


Fritz Ruf

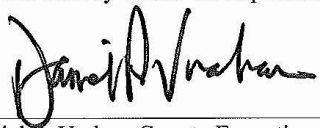

Thomas J. Schellinger


Peter M. Wolff

The foregoing legislation adopted by the County Board of Supervisors of Waukesha County, Wisconsin, was presented to the County Executive on:

Date: 7-27-12, 
Kathy Nickolaus, County Clerk

The foregoing legislation adopted by the County Board of Supervisors of Waukesha County, Wisconsin, is hereby:

Approved:
Vetoed:
Date: 7-30-12, 
Daniel P. Vrakas, County Executive

167-R-001

Amendment Delete Page 67(D)(1)

WAUKESHA COUNTY BOARD OF SUPERVISORS

V

DATE-07/24/12

(RES) NUMBER-1670001

- 1 C. SLATTERY.....NAY
- 3 R. MORRIS.....NAY
- 5 J. BRANDTJEN.....AYE
- 7 J. GRANT.....NAY
- 9 J. HEINRICH.....AYE
- 11 F. RUF.....NAY
- 13 P. DECKER.....NAY
- 15 W. KOLB.....NAY
- 17 D. PAULSON.....NAY
- 19 C. CUMMINGS.....NAY
- 21 W. ZABOROWSKI.....NAY
- 23 K. HAMMITT.....AYE
- 25 G. YERKE.....NAY

- 2 D. FALSTAD.....AYE
- 4 J. BATZKO.....NAY
- 6 J. JESKEWITZ.....
- 8 P. HAUKOHL.....AYE
- 10 D. SWAN.....NAY
- 12 P. WOLFF.....NAY
- 14 P. MEYER.....AYE
- 16 M. CROWLEY.....NAY
- 18 L. NELSON.....NAY
- 20 T. SCHELLINGER....NAY
- 22 P. JASKE.....AYE
- 24 D. DRAEGER.....NAY

TOTAL AYES-07

TOTAL NAYS-17

CARRIED _____

DEFEATED X

UNANIMOUS _____

TOTAL VOTES-24

WAUKESHA COUNTY BOARD OF SUPERVISORS

V

DATE-07/24/12

(RES) NUMBER-1670001

1 C. SLATTERY.....AYE
3 R. MORRIS.....AYE
5 J. BRANDTJEN.....NAY
7 J. GRANT.....AYE
9 J. HEINRICH.....AYE
11 F. RUF.....AYE
13 P. DECKER.....AYE
15 W. KOLB.....AYE
17 D. PAULSON.....AYE
19 C. CUMMINGS.....AYE
21 W. ZABOROWSKI.....AYE
23 K. HAMMITT.....AYE
25 G. YERKE.....AYE

2 D. FALSTAD.....AYE
4 J. BATZKO.....AYE
6 J. JESKEWITZ.....
8 P. HAUKOHL.....AYE
10 D. SWAN.....AYE
12 P. WOLFF.....AYE
14 P. MEYER.....AYE
16 M. CROWLEY.....AYE
18 L. NELSON.....AYE
20 T. SCHELLINGER....AYE
22 P. JASKE.....AYE
24 D. DRAEGER.....AYE

TOTAL AYES-23

TOTAL NAYS-01

CARRIED _____

DEFEATED X

UNANIMOUS _____

TOTAL VOTES-24

Appendix G DATCP Approval of this Plan

STATE OF WISCONSIN
DEPARTMENT OF AGRICULTURE, TRADE AND CONSUMER PROTECTION
2811 Agriculture Drive, P.O. Box 8911
Madison, WI 53708-8911

IN THE MATTER OF THE COUNTY
LAND AND WATER RESOURCE
MANAGEMENT PLAN FOR
WAUKESHA COUNTY

DATCP DOCKET NO. 12-M-12
LWCB DOCKET NO. 12-34-67-000-L-1
ORDER AMENDING DATCP DOCKET
NO. 10-M-09, CONDITIONS ON FUTURE
PLAN APPROVAL, AND APPROVING
THE REVISED PLAN THROUGH
DECEMBER 31, 2021, CONTINGENT ON
A REVIEW IN 2016 THAT MEETS LWCB
GUIDANCE PROVISIONS

INTRODUCTION

The State of Wisconsin Department of Agriculture, Trade and Consumer Protection ("department"), having consulted the State of Wisconsin Land and Water Conservation Board ("LWCB"), makes the following findings of fact and conclusions of law and enters the following order under s. 92.10(4), Wis. Stats.

FINDINGS OF FACT

- (1) Paragraphs (1) through (14) from the "Findings of Fact" in the December 20, 2010 Order extending the revised plan through December 31, 2011, *In the Matter of a Waiver of Soil and Water Rules (Sec. 50-12(5), Wis. Admin. Code) and the Waukesha County Land and Water Resource Management Plan*, DATCP Docket No. 10-M-09 and LWCB Docket No., 10-30-67-000-L-1, are incorporated by reference as if fully set forth herein. A copy of the Order is on file at the Land and Water Resource Bureau of the Wisconsin Department of Agriculture, Trade and Consumer Protection at 2811 Agriculture Drive, Madison, WI 53708-8911.
- (2) On December 20, 2010, the department granted a waiver of the five-year restriction on LWRM plan approval (in then-current ATCP 50.12(5)), and approved a one-year extension of the 2006 Waukesha County land and water resource management plan until

December 31, 2011, as more fully described in DATCP Docket No. 10-M-09/LWCB Docket No. 10-30-67-000-L-1.

- (3) The 2010 Order included the conditions, first, that Waukesha County submit an annual workplan for 2011, and second, that the new plan would be limited to a four year term.
- (4) On August 1, 2011, ATCP 50.12(5) was changed and plan approvals can now be a maximum of 10 years.
- (5) On May 15, 2012, Waukesha County submitted its revised (2012) land and water resource management plan to the LWCB and department for review.
- (6) The Waukesha County land and water resource management plan, as submitted to the LWCB, meets the requirements in s. 92.10(6), Wis. Stats., and ss. ATCP 50.12 and ATCP 50.30(3), Wis. Admin. Code, as set forth in the approved guidelines.
- (7) On June 5, 2012, the LWCB found that the revised (2012) Waukesha County land and water resource management plan met Sections I and II of its guidance criteria for a ten year plan approval. (The LWCB guidance, which became effective as of February 27, 2012, is available at http://datcp.wi.gov/Environment/Land_and_Water_Conservation/Land_and_Water_Conservation_Board/index.aspx).
- (8) The LWCB recommended approval of the plan for ten years, contingent on a five year review, notwithstanding Condition No. 4 in the 2010 Order limiting approval of this Waukesha County land and water resource management plan to four years, since the August 2011 rule change that allows ten year plan approvals went into effect after the 2010 Order limited this plan approval to four years.
- (9) On June 5, 2012, the LWCB recommended approval of the revised (2012) Waukesha County land and water resource management plan until December 31, 2021, contingent on Waukesha County submitting to a five-year review by the LWCB in 2016 and meeting the requirements in Section III of the LWCB guidance.

- (10) On July 24, 2012, the Waukesha County Board approved the revised (2012) Waukesha County land and water resource management plan with changes not in the version reviewed by the LWCB.
- (11) The changes to the plan approved by the Waukesha County Board meet the standards in s. 92.10, Wis. Stats., ss. ATCP 50.12 and 50.30(3), Wis. Admin. Code.
- (12) The department may approve this plan without further recommendations from the LWCB because the changes to the plan do not affect compliance with the standards in s. 92.10, Wis. Stats., the applicable rules and guidelines, and the plan still meets these requirements.
- (13) Notwithstanding the 2010 department Order, DATCP Docket No. 10-M-09, and LWCB Docket 10-30-67-000-L-1, the department may approve this plan for up to 10 years and may place conditions and contingencies on said approval, thus amending its previous 2010 Order.

CONCLUSIONS OF LAW

- (1) The department is responsible for approving county land and water resource management plans under s. 92.10, Wis. Stats. The LWCB is responsible for making recommendations to the department regarding approval or disapproval of the land and water resource management plans.
- (2) In order to be approved by the department, a county land and water resource management plan must comply with standards specified under s. 92.10, Wis. Stats.
- (3) The Waukesha County land and water resource management plan, including changes made by the Waukesha County Board, complies with s. 92.10(6), Wis. Stats., and ss. ATCP 50.12 and ATCP 50.30(3), Wis. Admin. Code and may be approved by the department.
- (4) Based on Findings of Fact (1) through (13) above, the department should issue an order approving the revised (2012) Waukesha County land and water resource management

plan for a term ending December 31, 2021, subject to the LWCB review specified in Finding of Fact (9) above.

ORDER

NOW, THEREFORE, IT IS ORDERED that:

- 1) Pursuant to s. 92.10, Wis. Stats., the revised (2012) Waukesha County land and water resource management plan is approved through December 31, 2021.
- 2) This order is contingent on a LWCB review in 2016, in which the county must meet the requirements referenced in Finding of Fact (9) above relating to the five-year review of a plan approved for ten years.
- 3) If the department receives a finding from the LWCB that Waukesha County has failed to meet the LWCB guidance, this order is automatically modified to approve the plan only through December 31, 2016. The county will be notified of this modification and is then responsible for submitting a revised land and water resource management plan for department approval to continue its eligibility for department grant funding.

Dated this 28th day of August, 2012.

STATE OF WISCONSIN
DEPARTMENT OF AGRICULTURE,
TRADE AND CONSUMER PROTECTION

By Ben Brancel
Ben Brancel, Secretary