



Rapid Watershed Assessment Manitowoc - Sheboygan River Watershed

Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help landowners and local leaders set priorities and determine the best actions to achieve their goals.

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INTRODUCTION¹

The Manitowoc-Sheboygan watershed encompasses over 1,000,000 acres in northeast Wisconsin, and includes 15 named and un-named streams, creeks and rivers, all of which empty into Lake Michigan at various points along the West Shore. The watershed is characterized by a flat to gently rolling topography on glacial till and glacial lake plains except in the west-central part of the watershed where ground moraines are more common.

The largest land use in the watershed is agriculture, at 77.6% with all other land uses less than 10% of the watershed. Urban and built up land uses combined make up 2.1% of the remaining land use. Farms consist of dairy, beef, cash grain, and smaller numbers of hog, sheep and poultry enterprises. A significant acreage of canning crops (over 16,000 acres) are harvested annually. Major crops include corn for grain and silage, soybeans, oats and wheat. Forage crops comprise 179,000 acres.

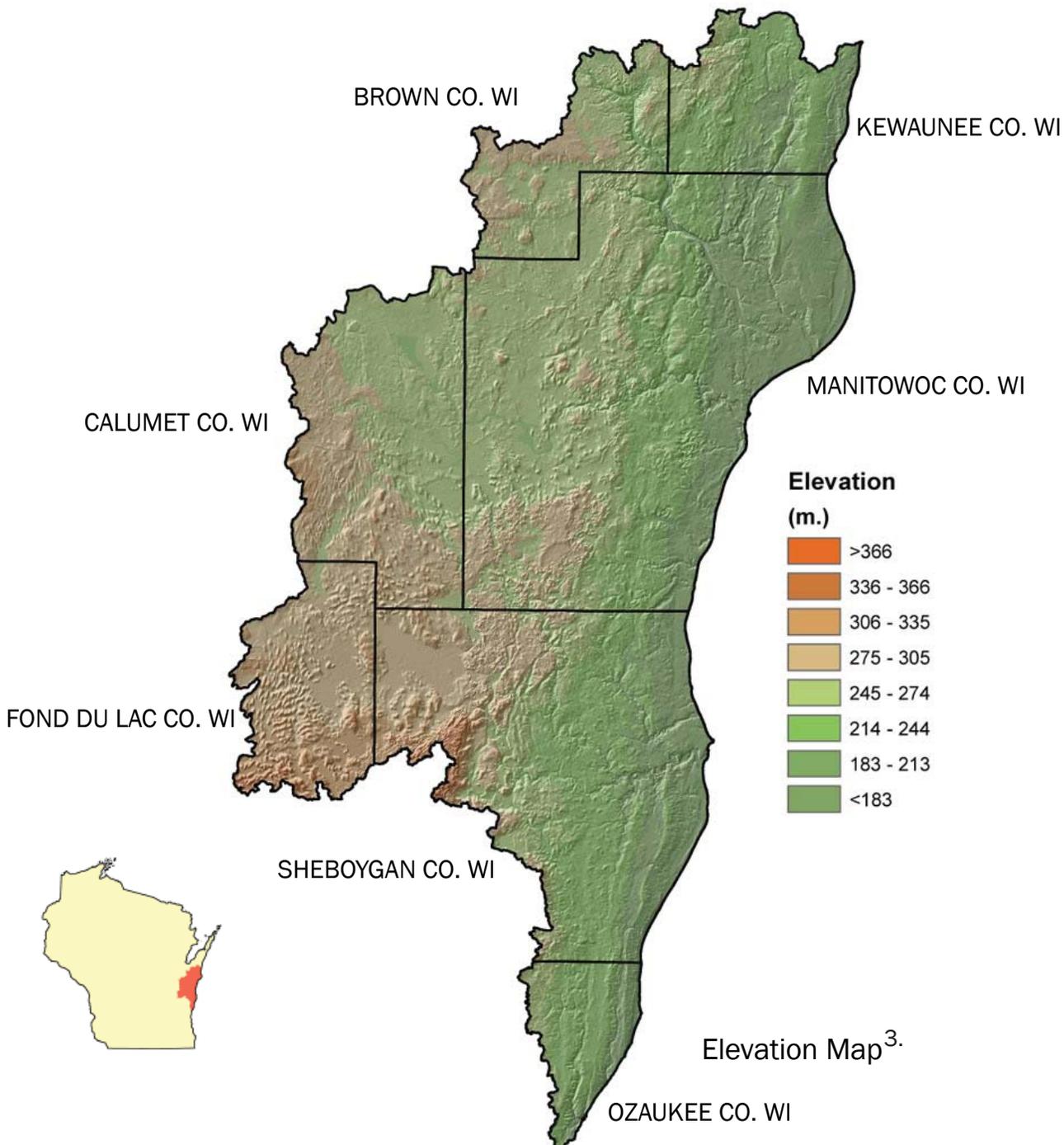
The major population centers of the watershed are the cities of Sheboygan and Manitowoc. The rest of the watershed is dotted with 34 smaller towns and villages. The total urban population in the watershed is more than 238,505. Agriculture, commercial fishing, manufacturing, outdoor recreation, and tourism make up the major economic activities within the watershed.

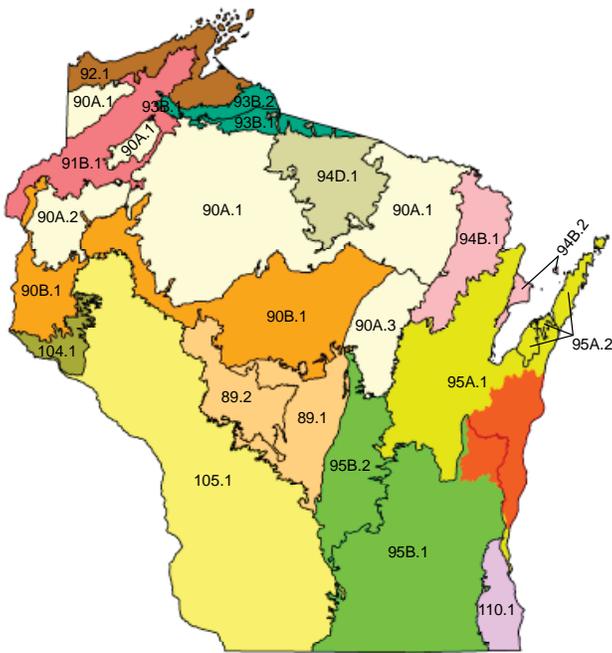


Wisconsin Watershed Map

Acreage in the Manitowoc- Sheboygan River Watershed

County	County Acres	Acres in HUC	% of HUC from County	% of County in HUC
Brown	342,266	71,901	7%	21%
Calumet	253,930	145,200	14%	57%
Fond du Lac	489,812	80,946	8%	17%
Kewaunee	220,149	72,620	7%	33%
Manitowoc	380,962	380,356	36%	100%
Ozaukee	150,688	41,936	4%	28%
Sheboygan	331,201	249,210	24%	75%





Common Resource Area Map

COMMON RESOURCE AREAS²

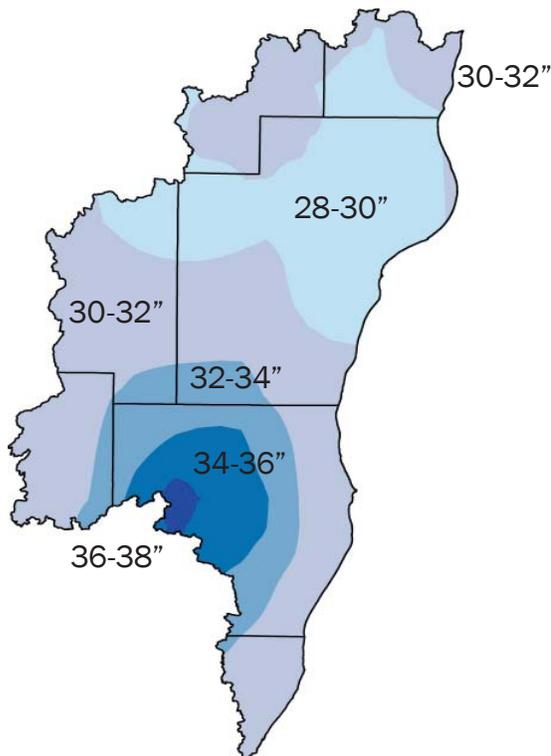
Common Resource Area delineations are defined as a geographical areas where resource concerns, problems and treatment needs are similar. Common Resource areas are a subdivision of an existing Major Land Resource Area (MLRA). Landscape conditions, soil, climate and human considerations are used to determine the boundary of Common Resource Areas.

95A.1 EAST WISCONSIN TILL PLAIN

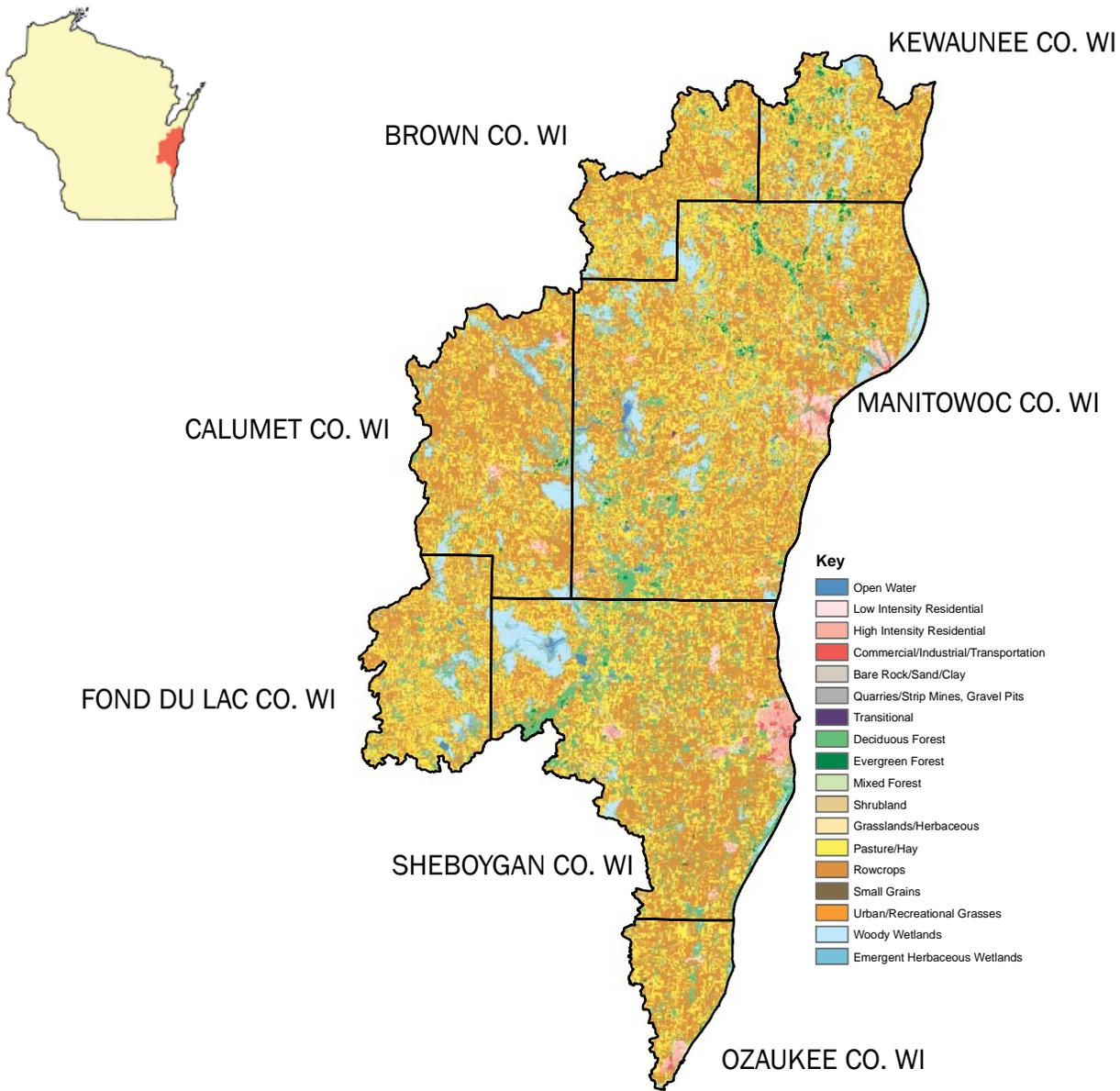
Gently sloping till plain. Loamy, clayey, and organic soils. Lake Winnebago, Lake Michigan shoreline. Mostly cropland, with scattered pasture and deciduous and coniferous forest. Urban development in the Fox Valley and along Lake Michigan.

95B.1 SOUTHERN WISCONSIN TILL PLAIN

Nearly level to strongly sloping, drumlinized till plain. Silty, loamy, and organic soils. Mostly cropland and pasture with scattered deciduous forest, lakes, and marshes. Kettle-Moraine, Horicon Marsh. Madison, Janesville, and Beloit urban areas.



Average Annual Precipitation Map (inches)⁴



Land Cover Map 5.

	Acres	Percent		Acres	Percent
Pasture Hay	301,848	29.0	Low Intensity Residential	11,665	1.1
Deciduous Forest	84,149	8.1	High Intensity Residential	8,297	0.8
Row Crops	506,988	48.6	Evergreen Forest	10,554	1.0
Open Water	6,671	0.6	Mixed Forest	14,576	1.7
Woody Wetlands	57,817	5.5	Transitional	55	0.0
Small Grains	467	0	Urban / Recreational Grasses	3,958	0.4
Emergent Herbaceous Wetlands	10,503	1.0	Quarries / Strip Mines, Gravel Pits	456	0.0
Commercial/Industrial / Transport	9,982	1.0	Bare Rock / Sand / Clay	905	0.1
Grasslands / Herbaceous	10,618	1.0			
			Total Acres	1,042,554.4	100

ASSESSMENT OF WATERS ⁶

Section 303(d) of the Clean Water Act states that water bodies that are not meeting their designated uses (fishing, swimming), due to pollutants, must be placed on this list. The 303(d) impaired Waters List is updated every two years. Wisconsin is required to develop TMDLs, Total Maximum Daily Loads, for water bodies on this list. Exceptional Resource Waters (ERW) provide valuable fisheries, hydrologically or geologically unique features, outstanding recreational opportunities, unique environmental settings, and which are not significantly impacted by human activities may be classified as exceptional resource waters. Outstanding Resource waters (ORW) and ERW differ in that ORW do not have an associated point source discharge, where ERWs do.

303(d) Waters List

1. Big Elkhart Lake
2. Branch River
3. Bullhead Lake
4. Crystal Lake
5. East Twin River
6. Grandma Creek
7. Jordan Creek
8. Lake Michigan
9. Manitowoc River
10. N. Branch Manitowoc River
11. Otter Creek
12. Pigeon Lake
13. Pine Creek
14. S. Branch Manitowoc River
15. Sheboygan River
16. Two Rivers Harbor
17. Unnamed Trib. to S BR Manitowoc
18. Unnamed Trib. to Meeme River
19. Unnamed Trib. to Onion River
20. Unnamed Trib. to Onion River
21. West Twin River

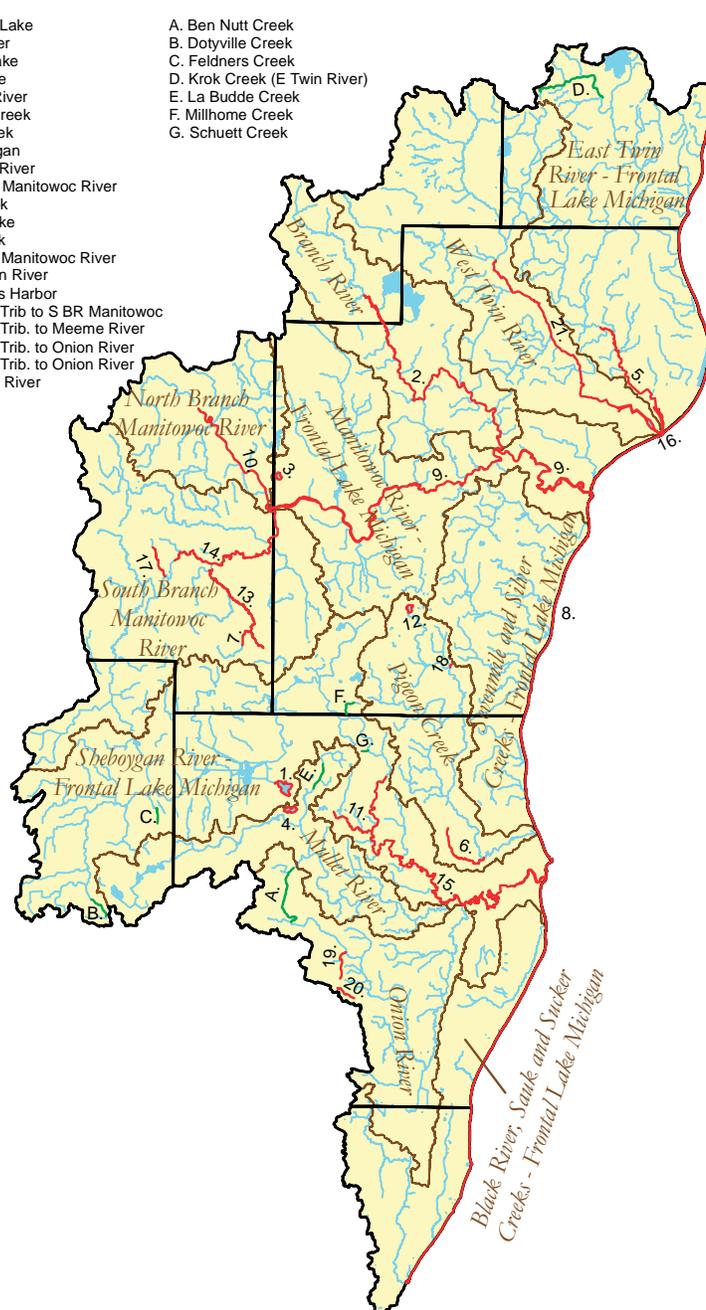
Exceptional Resource Waters List

- A. Ben Nutt Creek
- B. Dotyville Creek
- C. Feldners Creek
- D. Krok Creek (E Twin River)
- E. La Budde Creek
- F. Millhome Creek
- G. Schuett Creek

Listed Waters Map

Listed Waters

- 303(d) Listed
- Exceptional Resource Waters
- Outstanding Resource Waters
- Sub Watersheds
- Streams / Rivers



For more information on waters designated as Exceptional or Outstanding Resources waters, visit:
<http://dnr.wi.gov/org/water/wm/wqs/orwer/>

For information on specific subwatersheds, 303(d) or Exceptional/Outstanding Resource River Waters (ERW/ORW):
<http://dnr.wi.gov/org/water/wm/wqs/303d/faqs.html> and <http://dnr.wi.gov/org/gmu/gps/gbasin/>



303(d) Waters	Mercury	PCBs	AQUATIC TOXICITY	DEGRADED HABITAT	SEDIMENT	DISSOLVED OXYGEN	PHOSPHORUS	(BACTERIA) PATHOGENS	TOXIC ORGANICS
Big Elkhart Lake	x								
Branch River		x							
Bullhead Lake	x								
Crystal Lake	x								
East Twin River		x							
Grandma Creek				x	x	x	x		
Jordan Creek		x							
Lake Michigan	x	x						x	
Manitowoc River			x						x
N. Branch Manitowoc River				x	x	x	x		
Otter Creek								x	
Pigeon Lake	x								
Pine Creek		x							
S. Branch Manitowoc River		x							
Sheboygan River		x							
Two Rivers Harbor			x						
Unnamed Trib. to S BR Manitowoc				x	x				
Unnamed Trib. to Meeme River				x	x	x	x		
Unnamed Trib. to Onion River				x	x				
West Twin River						x	x		

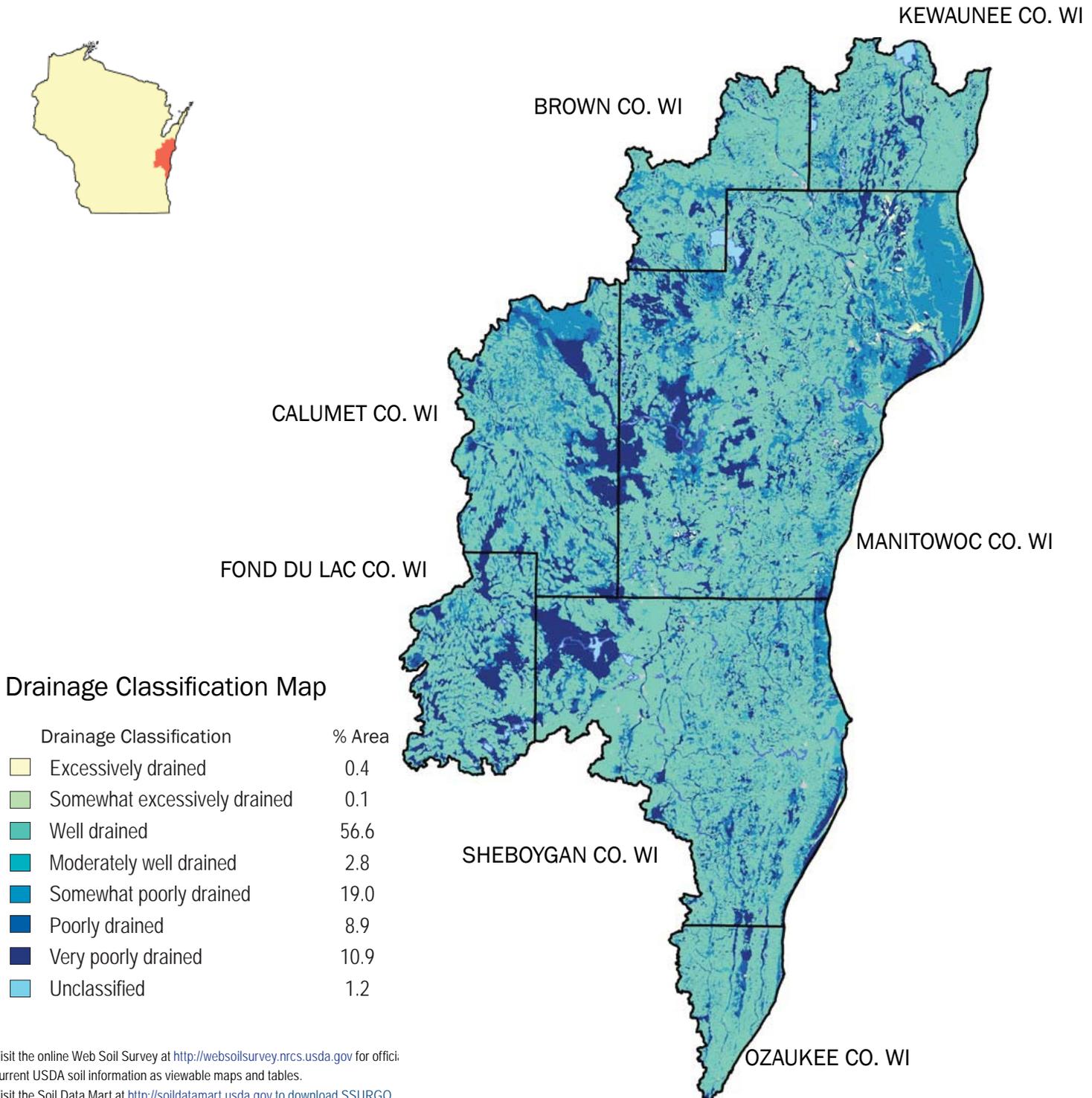
SOILS ⁷.

The soils of this watershed formed in wind-laid silty and sandy material, water deposited material, residuum of bedrock, organic residue and glacial till and outwash. Throughout the watershed most soils have a thin veneer covering of wind deposited silts or loess. In large areas of this watershed topography is controlled by underlying dolomite bedrock. Many areas have dolomite outcrops and escarpments. In the western portion of this watershed soils are formed in Cary till. This till is high in calcium carbonates and is loam or sandy loam in texture. Soils formed in this till typically have silt loam surfaces, loam or clay loam subsoil and loam substratum's. The area is characterized by irregular hills and wet depressions. These soils have a moderate to slow permeability, moderate to high available water capacity, and range from well drained to somewhat poorly drained. On steeper slopes, erosion is a concern. The eastern portion of this watershed is made up of soils formed in loams and clay loams and underlain by silty clay and clayey and sometimes calcareous glacial till. Lacustrine sediments are often found under these soils as well. These soils have a slow or moderately slow permeability and moderate to high available water capacity. They range from well drained to somewhat poorly drained. Erosion is a concern. Throughout this watershed, low lying depressions may contain poorly and very poorly drained soils formed in organic matter over calcareous till or lacustrine sediments.



DRAINAGE CLASSIFICATION

Drainage class (natural) refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the “Soil Survey Manual.”

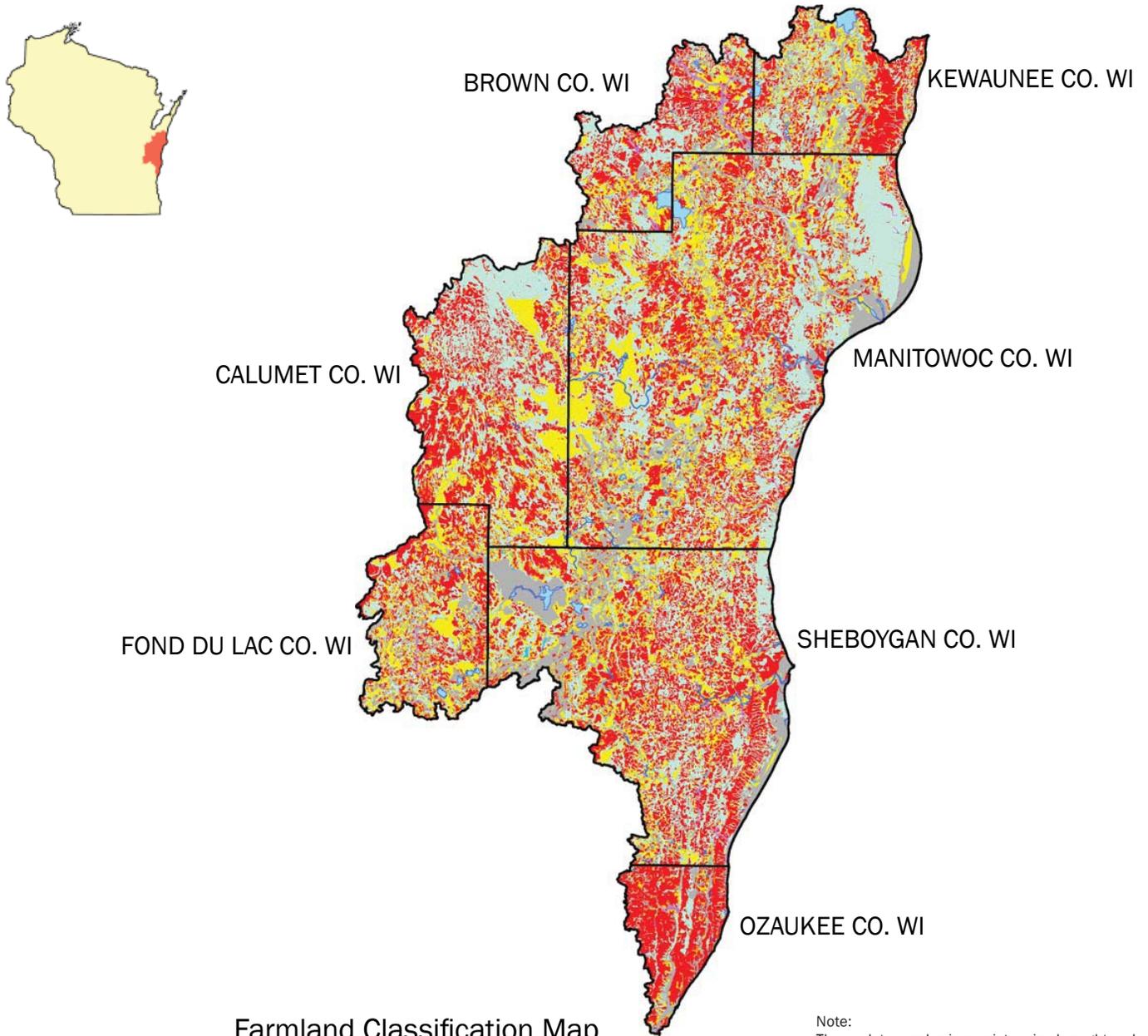


Visit the online Web Soil Survey at <http://websoilsurvey.nrcs.usda.gov> for official current USDA soil information as viewable maps and tables.

 Visit the Soil Data Mart at <http://soildatamart.usda.gov> to download SSURGO certified soil tabular and spatial data.

FARMLAND CLASSIFICATION

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. Farmland classification identifies the location and extent of the most suitable land for producing food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the Federal Register, Vol. 43, No 21, January 31, 1978.



Farmland Classification Map

	Farmland Classification	Percent	Acres
	All areas are prime farmland	40.6	422,933
	Prime farmland if drained	25.9	270,294
	Farmland of statewide importance	18.3	190,607
	Not prime farmland	14.7	153,599
	Prime farmland if protected from flooding or not frequently flooded during the growing season	0.4	4,099
	Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season	0.1	636

Note:
 The work to resolve inconsistencies brought on by the county based soil survey approach by implementing the Major Land Resource Area soil survey approach is currently underway. By typifying soil series and mapunit concepts across similar geographic areas instead of by political boundaries, the inconsistencies between counties that exist now will be resolved. Updated soil survey information will be continually made available and can be obtained through the Web Soil Survey at <http://websoilsurvey.nrcs.usda.gov> for official and current USDA soil information as viewable maps and tables. Visit the Soil Data Mart at <http://soildatamart.usda.gov> to download SSURGO certified soil tabular and spatial data.

HYDRIC SOILS

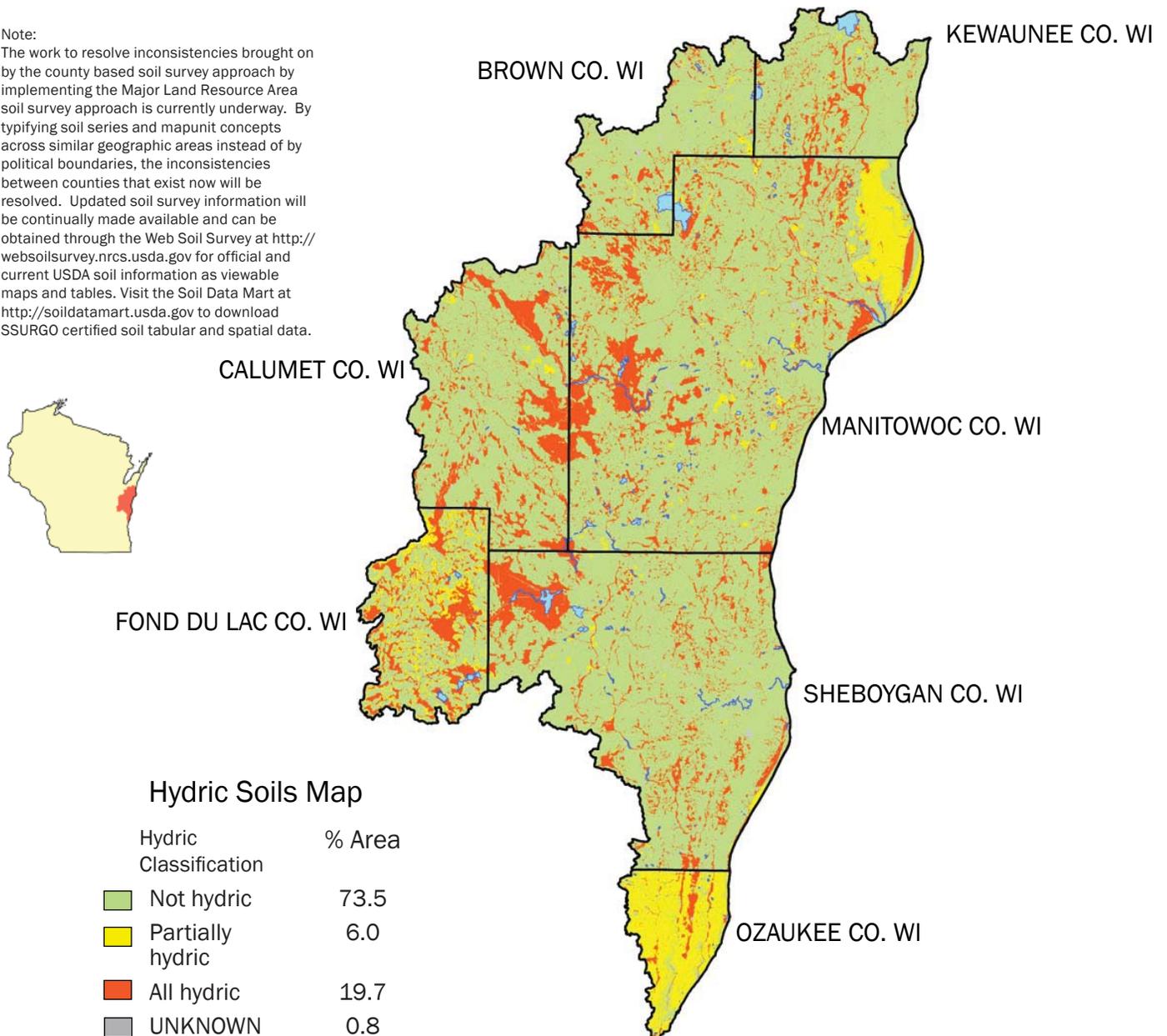
This rating provides an indication of the proportion of the map unit that meets criteria for hydric soils. Map units that are dominantly made up of hydric soils may have small areas, or inclusions of non-hydric soils in the higher positions on the landform, and map units dominantly made up of non-hydric soils may have inclusions of hydric soils in the lower positions on the landform.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make on site determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and others, 2002).

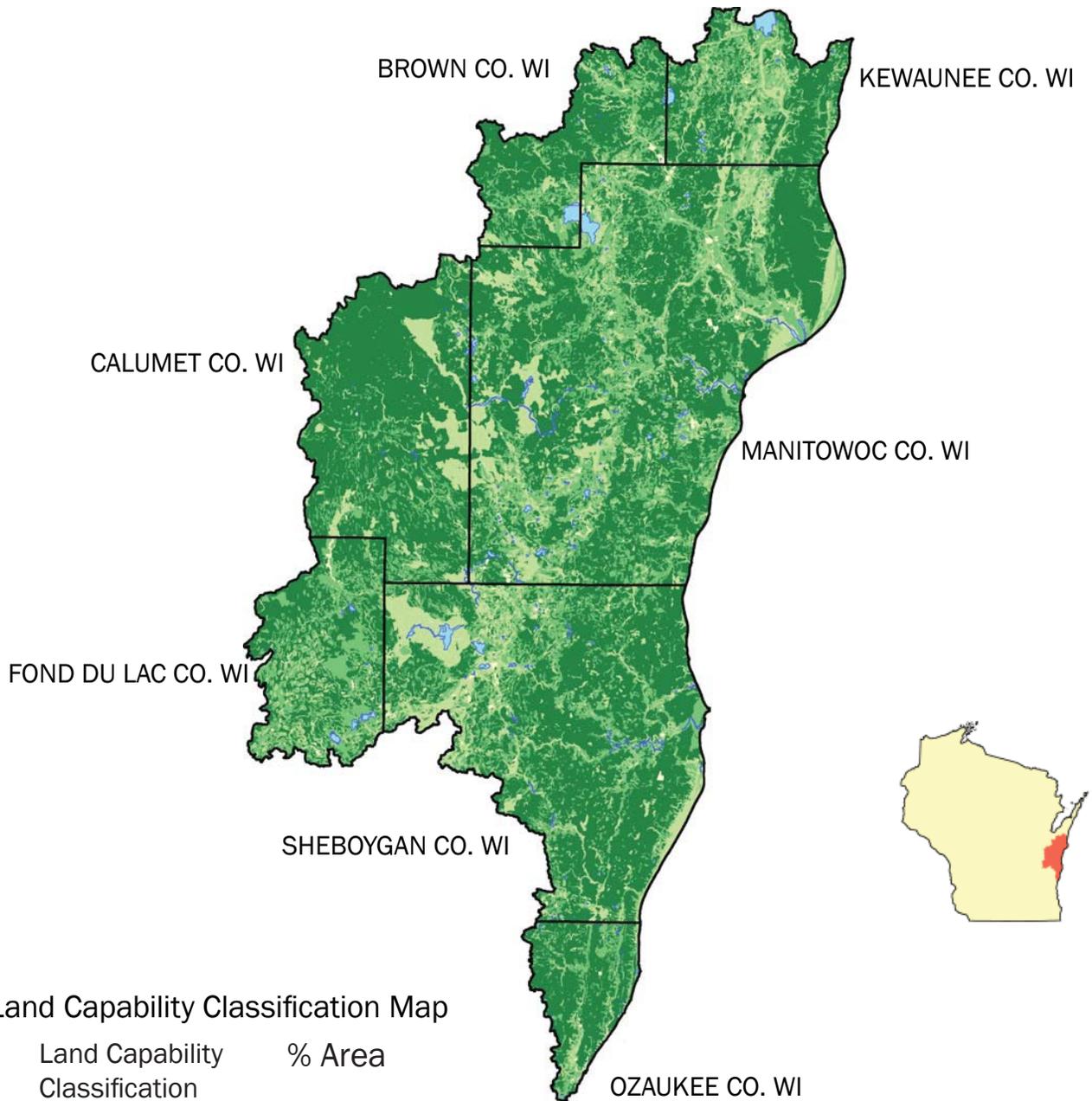
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LAND CAPABILITY CLASSIFICATION

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive land forming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.



Land Capability Classification Map

Land Capability Classification	% Area
Well Suited	64.1
Moderately well suited	21.5
Poorly suited	13.2
Unsuited includes	1.2
Water	

RESOURCE CONCERNS

The major resource concerns from production lands in the watershed center around surface and ground water quality. Excessive nutrients and organics in surface water and groundwater, and forest land and wetland habitat management and restoration are the major concerns for this watershed. Karst topography and a history of subsurface drainage activity contribute to groundwater quality concerns. The dominant soils in the watershed developed in glacial lake plain, till and outwash deposits. Sand dunes are common along the Lake Michigan shore line with loamy, clayey soils further inland. Areas along the Lake Michigan shoreline are less than 180 feet above sea level and the landscape in the western part of the watershed rises to over 350 feet above sea level in the Kettle Moraine State Forest. The Manitowoc-Sheboygan Watershed contains 41 townships that are located in the Southeast Focus Area of the Wisconsin Department of Natural Resources Upper Mississippi - Great Lakes Region Joint Venture for waterfowl production.

PRS AND OTHER DATA⁸.

The following table is a product of the NRCS Performance Results System (PRS) and reflects progress made over the past several years on several key areas of conservation. The PRS provides support for reporting the development and delivery of conservation programs, analyzing and reporting progress, and management applications by NRCS and conservation partners. The public can generate additional reports by visiting the following link: <http://ias.sc.egov.usda.gov/prsreport2006/>

PRS PERFORMANCE MEASURES

PRS Performance Measures	FY99	FY00	FY01	FY02	FY03	FY04	FY05	TOTAL
Total Conservation Systems Planned (acres)	5,514	20,358	16,537	30,251	24,641	N/A	23,438	120,739
Total Conservation Systems Applied (acres)	2,286	18,687	19,600	30,251	29,044	N/A	13,400	113,268
Conservation Practices								
Total Waste Management (313) (numbers)	0	17	27	12	8	2	1	67
Riparian Forest Buffers (391) (acres)	3	40	5	70	47	28	3	196
Erosion Control Total Soil Saved (tons/year)	433	26,222	19,120	22,271	29,135	N/A	N/A	97,181
Total Nutrient Management (590) (Acres)	370	11,342	17,113	16,288	17,508	10,958	6,820	80,399
Pest Management Systems Applied (595A) (Acres)	0	263	753	587	6,526	357	0	8,486
Prescribed Grazing 528a (acres)	0	0	240	333	701	713	31	2,018
Tree & Shrub Establishment (612) (acres)	99	721	683	682	703	159	7	3,054
Residue Management (329A-C) (acres)	0	5,806	2,448	5,849	6,235	12,129	3,093	35,560
Total Wildlife Habitat (644 - 645) (acres)	638	5,450	2,933	3,636	3,636	716	155	17,164
Total Wetlands Created, Restored, or Enhanced (acres)	39	134	93	158	145	53	66	688
Acres enrolled in Farmbill Programs								
Conservation Reserve Program	2,062	5,431	2,887	1,288	1,103	N/A	95	12,866
Wetlands Reserve Program	0	106	195	73	68	N/A	70	512
Environmental Quality Incentives Program	115	136	3,951	6,894	8,395	N/A	7,051	26,542
Wildlife Habitat Incentive Program	0	0	22	0	0	N/A	0	22
Farmland Protection Program	0	0	0	0	0	N/A	0	0

CENSUS AND SOCIAL DATA (RELEVANT) ⁹.

There are 3687 farms in the watershed, covering a total of 667,717 acres. Average farm size in the watershed is 181 acres compared to a statewide average of 201 acres in Wisconsin. Please refer to the tables below for more detailed information or visit the web site of the Wisconsin Office of the National Agricultural Statistics Service at: http://www.nass.usda.gov/Statistics_by_State/Wisconsin/index.asp

2002 Ag Census Data		Brown	Calumet	Fond du Lac	Kewaunee	Manitowoc	Ozaukee	Sheboygan	Total
	Farms (number)	235	418	278	302	1469	149	837	3,687
	Land in farms (acres)	41340	85680	58529	57490	257111	21131	146436	667,717
	Total cropland (acres)	35817	73895	49683	47034	209546	17667	124944	558,585
	Irrigated land (acres)	82	25	133	59	441	74	24	837
	Principal operator by primary occupation - Farming (number)	147	293	186	200	893	85	517	2,320
Farms by Size	Farms by size - 1 to 10 acres	30	31	18	9	62	17	88	254
	Farms by size - 11 to 49 acres	74	110	57	73	453	46	255	1068
	Farms by size - 50 to 179 acres	69	131	101	123	518	47	240	1230
	Farms by size - 180 to 499 acres	47	109	76	76	337	33	185	863
	Farms by size - 500 to 999 acres	8	24	16	15	72	5	50	191
	Farms by size - 1,000 acres or more	7	12	8	6	27	2	20	81
Livestock and Poultry	Livestock and poultry - Cattle and calves inventory (farms)	121	237	128	161	717	48	381	1,793
	Livestock and poultry - Cattle and calves inventory - Beef cows (farms)	27	48	18	34	156	11	89	383
	Livestock and poultry - Cattle and calves inventory - Milk cows (farms)	60	128	76	92	372	27	179	935
	Livestock and poultry - Hogs and pigs inventory (farms)	11	23	9	13	39	3	40	137
	Livestock and poultry - Sheep and lambs inventory (farms)	5	11	7	4	42	6	29	103
	Livestock and poultry - Layers 20 weeks old and older inventory (farms)	9	19	9	10	56	5	41	148
	Livestock and poultry - Broilers and other meat-type chickens sold (farms)	5	8	2	2	18	3	19	56
Selected Crops Harvested	Selected crops harvested - Corn for grain (acres)	6735	16820	14760	7925	37629	3191	27386	114,446
	Selected crops harvested - Corn for silage or greenchop (acres)	5102	8247	3698	7116	28267	1312	12669	66,410
	Selected crops harvested - Wheat for grain, all (acres)	2045	4921	2111	2596	12869	1187	8067	33,796
	Selected crops harvested - Wheat for grain, all - Winter wheat for grain (acres)	0	0	0	0	12700	1187	0	13,887
	Selected crops harvested - Wheat for grain, all - Spring wheat for grain (acres)	0	0	0	0	169	0	0	169
	Selected crops harvested - Oats for grain (acres)	1147	1557	1054	2227	8510	563	4123	19,181
	Selected crops harvested - Barley for grain (acres)	121	179	138	389	1216	88	617	2,748
	Selected crops harvested - Soybeans for beans (acres)	4426	14107	8130	4292	21041	2525	20024	74,545
	Selected crops harvested - Forage - land used for all hay and all haylage, grass silage, and greenchop (see text) (acres)	12569	21670	12033	17153	73184	4636	38045	179,289
	Selected crops harvested - Vegetables harvested for sale (see text) (acres)	181	2605	2904	754	4664	911	4457	16,477
Selected crops harvested - Land in orchards (acres)	38	38	18	50	15	96	92	346	

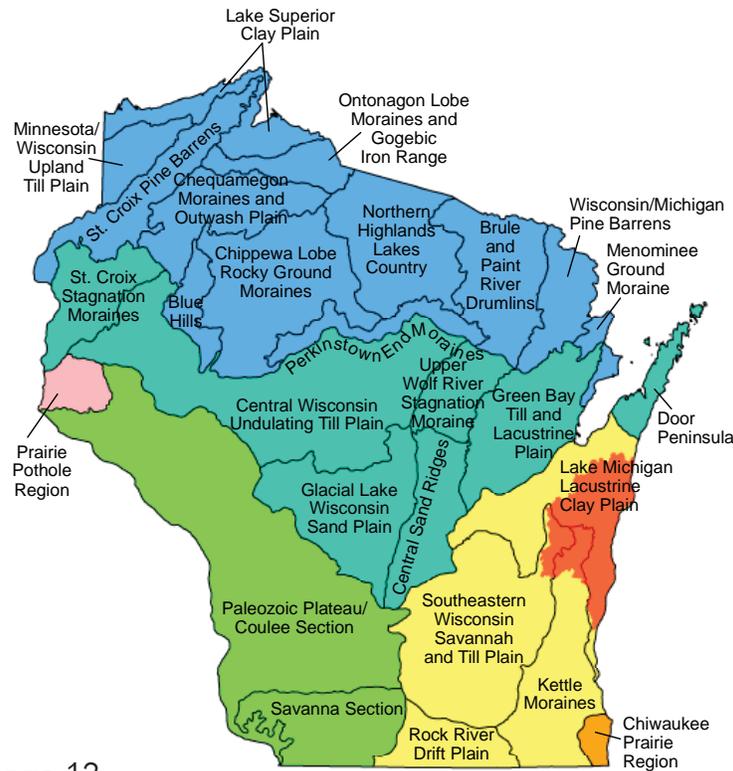
URBAN POPULATION^{11.}

POPULATION ETHNICITY^{10.}

Total Population = 238,505
 Rural Population = 89,837
 White alone = 225,977
 Hispanic or Latino = 5,404
 Two or more races = 2,400
 Black or African American alone = 1,421
 Some other race alone = 2,460
 American Indian and Alaska
 Native alone = 954
 Asian Alone = 5,264
 Native Hawaiian and Other
 Pacific Islander alone = 45



Name	1990	2000	2004	Median Income*
Belgium	928	1,678	2,008	53,523
Brillion	2,840	2,937	2,910	46,633
Cascade	620	666	696	47,232
Cedar Grove	1,521	1,887	2,012	49,674
Chilton	1,953	2,180	2,150	31,270
Cleveland	1,398	1,361	1,401	50,739
Denmark	1,612	1,958	1,990	38,894
Elkhart Lake	1,019	1,021	1,068	56,538
Francis Creek	562	681	682	43,542
Fredonia	1,558	1,934	2,192	53,173
Glenbeulah	386	378	423	42,656
Hilbert	1,211	1,089	1,087	42,938
Howards Grove	2,329	2,792	3,034	59,032
Kellnersville	350	374	361	32,167
Kewaunee	2,750	2,806	2,877	36,420
Kiel	2,910	3,450	3,507	44,239
Kohler	1,817	1,926	1,991	75,000
Manitowoc	32,520	34,053	33,917	38,203
Maribel	372	264	282	45,938
Mishicot	1,296	1,422	1,413	43,083
Mount Calvary	558	956	935	50,104
New Holstein	3,342	3,301	3,200	43,180
Oostburg	1,931	2,660	2,772	47,469
Plymouth	6,769	7,781	8,217	42,103
Port Washington	9,338	10,467	10,892	53,827
Potter	252	223	244	43,958
Reedsville	1,182	1,187	1,162	41,300
St. Cloud	494	497	500	51,964
St. Nazianz	693	749	806	40,139
Sheboygan	49,676	50,792	48,872	40,066
Sheboygan Falls	5,823	6,772	7,527	47,205
Sherwood	837	1,550	2,290	63,913
Two Rivers	13,030	12,639	12,144	39,701
Valders	905	948	995	45,167
Waldo	442	450	459	48,125
Whitelaw	700	730	732	51,029



ECOLOGICAL LANDSCAPES 12.

LAKE MICHIGAN LACUSTRINE CLAY PLAIN

The Lake Michigan Lacustrine Clay Plain ecoregion is characterized by red calcareous clay soil, lacustrine and till deposits, and a flat plain. The topography is flatter than ecoregions to the south, and there are fewer lakes, but the lakes have generally higher trophic states than in adjacent level IV ecoregions of the Northern Lakes and Forests and North Central Hardwood Forests. Soils are generally silty and loamy over calcareous loamy till, with muck and loamy lacustrine soils in low-lying areas. This ecoregion has prime farmland with a longer growing season and more fertile soils than surrounding ecoregions. Agriculture has a different mix of crops, with more fruits and vegetables, than that of the Southern Wisconsin Savannah and Till Plain ecoregion. The potential natural vegetation of this region is beech/sugar maple/basswood/red and white oak forests with a greater concentration of beech than other ecoregions in the Southeastern Wisconsin Till Plain.

SOUTHEASTERN WISCONSIN SAVANNAH AND TILL PLAIN

The till plains of the Southeastern Wisconsin Savannah and Till Plain ecoregion support a mix of agriculture (cropland and dairy operations) and woodland. Crops include forage crops to support the dairy operations and a wide range of truck and specialty crops. Most of the original vegetation has been cleared, with forested areas remaining only on steeper end moraines and poorly drained depressions. Irregular till plains, end moraines, kettles, and drumlins are common, and wetlands are found throughout the region, especially along end morainal ridges. Potential natural vegetation of this region is transitional with a mosaic of sugar maple, basswood, oak to the east, and an increasing amount of white, black, and bur oak, oak savanna, prairie, and sedge meadows toward the west.

KETTLE MORAINES

The Kettle Moraines ecoregion contains a higher concentration of lakes with lower trophic states than in the rest of the Southeastern Wisconsin Till Plains. The soils are clayey to the east, especially along the Lake Michigan shore, and more sandy to the west, but generally less clayey than the soils in Lake Michigan Lacustrine Clay Plains ecoregion to the north. The region also contains extensive ground and end moraines and pitted outwash with belts of hilly moraines. It generally has greater relief than the Lake Michigan Lacustrine Clay Plains ecoregion to the northeast.

WATERSHED ASSESSMENT

To assess a watershed's agricultural nonpoint pollution potential, a model was used to generate a watershed assessment score relative to other 8-digit watersheds in Wisconsin. Factors used in the model include acres of cropland, acres of highly erodible land (HEL), and the number of animal units in the watershed. Scores ranged from 0.0 (lowest conservation need) to 24.2 (highest conservation need). The scores may be useful in determining funding allocations on a watershed basis for agricultural nonpoint pollution control initiatives. The model does not attempt to measure pollution levels and does not reflect pollution potential from point sources of pollution or other nonpoint pollution sources beyond the above criteria.

The watershed assessment score for the Manitowoc-Sheboygan River Watershed is 13.1.

WATERSHED PROJECTS, STUDIES, MONITORING, ETC.

Since 1979 there have been six Wisconsin Department of Natural Resources (WDNR) Priority Watershed projects in the Manitowoc-Sheboygan Watershed. The Lower Manitowoc River, Onion River, Sevenmile-Silver Creeks, Sheboygan River, Branch River and the Pigeon River, provided cost-sharing and technical assistance to landowners for the implementation of Best Management Practices (BMPs.) The watershed projects were carried out through county land/soil and water conservation departments and other partners.

The entire area of the watershed is within the eligible area of the Conservation Reserve Enhancement Program (CREP). CREP is a local, state, and federal partnership effort that builds upon the USDA Conservation Reserve Program (CRP). Practices such as filter strips, riparian buffers, and grassed waterways are available to landowners who agree to a fifteen year agreement that involves installation, practice, and annual payments with the option of a perpetual easement.



PARTNER GROUPS

- River Alliance of Wisconsin <http://www.wisconsinrivers.org/>
- Town and Country Resource Conservation and Development Council
- Glacierland Resource Conservation and Development Council <http://www.glacierlandrccd.org/>
- Trout Unlimited <http://www.wisconsintu.org/chapters.htm> Green Bay Chapter
- USDA Farm Service Agency <http://www.fsa.usda.gov/wi/news/default.asp>
- US Fish and Wildlife Service <http://www.fws.gov/midwest>
- USDA-Natural Resources Conservation Service <http://www.wi.nrcs.usda.gov>
- University of Wisconsin Cooperative Extension <http://www.uwex.edu/ces/> and <http://basineducation.uwex.edu>
- East Central Wisconsin Regional Planning Commission <http://www.eastcentralrpc.org/>
- Bay-Lake Regional Planning Commission <http://www.baylakerpc.org/>
- Wisconsin Department of Agriculture, Trade, and Consumer Protection <http://www.datcp.state.wi.us>
- Wisconsin Department of Natural Resources <http://dnr.wi.gov/>
- Wisconsin Land and Water Conservation Association (County Land Conservation Committee organization) www.wlwca.org
- Land and Water Conservation Directory <http://datcp.state.wi.us/arm/agriculture/land-water/conservation/pdf/ar-pub-119-2007.pdf>

FOOTNOTES/BIBLIOGRAPHY

Sources:

1. WDNR <http://www.dnr.state.wi.us/org/gmu/>

"All data is provided "as is." There are no warranties, express or implied, including the warranty of fitness for a particular purpose, accompanying this document. Use for general planning purposes only.

2. Common Resource Area (CRA) Map delineations are defined as geographical areas where resource concerns, problems, or treatment needs are similar. It is considered a subdivision of an existing Major Land Resource Area (MLRA) map delineation or polygon. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographic boundaries of a Common Resource Area. Online linkage: <http://soils.usda.gov/survey/geography/cra.html>.

3. The relief map was created using the National Elevation Dataset (NED) 1 arc second, approximately 30 meters, digital elevation model (DEM) raster product assembled by the U.S. Geological Survey (USGS). A hillshade grid was derived from the 30m DEM and draped over the DEM to symbolize the map and create a 3-D effect. The data was downloaded from the NRCS Geospatial Data Gateway <http://datagateway.nrcs.usda.gov/>. For more information about NED visit <http://ned.usgs.gov/>.

4. Average Annual Precipitation data was originated by Chris Daly of Oregon State University and George Taylor of the Oregon Climate Service at Oregon State University and published by the Water and Climate Center of the Natural Resources Conservation Service in 1998. Annual precipitation data was derived from the climatological period of 1961-1990. Parameter-elevation Regressions on Independent Slopes Model (PRISM) derived raster data is the underlying data set from which the polygons and vectors were created. For more information about PRISM visit http://www.ocs.orst.edu/prism/prism_new.html. Precipitation data was downloaded from the NRCS Geospatial Data Gateway <http://datagateway.nrcs.usda.gov/>.

5 The Land Use/Land Cover data was generated from the National Land Cover Dataset (NLCD) compiled from Landsat satellite TM imagery (circa 1992) with a spatial resolution of 30 meters and supplemented by various ancillary data (where available). The data was assembled by the USGS and published in June of 1999. The analysis and interpretation of the satellite imagery was conducted using very large, sometimes multi-state image mosaics. For more information about NLCD visit <http://edcwww.cr.usgs.gov/programs/lccp/nationallandcover.html>. The data was downloaded from the NRCS Geospatial Data Gateway <http://datagateway.nrcs.usda.gov/>.

6. 303(d) listed streams were derived from the Water Quality Standards Section of the Wisconsin Department of Natural Resources (WDNR) website: [http://dnr.wi.gov/org/water/wm/wqs/303d/Lists303d/Approved_2004_303\(d\)_list.pdf](http://dnr.wi.gov/org/water/wm/wqs/303d/Lists303d/Approved_2004_303(d)_list.pdf). For more information about the individual sub-watersheds visit <http://dnr.wi.gov/org/gmu/gpsp/gpbasin/index.htm>. For a list and explanation of Outstanding and Exceptional Resource Waters visit: <http://dnr.wi.gov/org/water/wm/wqs/orwerw/>.

7. Soil Survey Geographic Database (SSURGO) tabular and spatial data were downloaded for the following surveys:

- Brown Co. WI (WI009) Published 20071206
- Calumet Co., WI (WI600) Published 20070214
- Fond du Lac Co., WI (WI039) Published 20080501
- Kewaunee (WI061) Published 20070214
- Manitowoc Co., WI (WI071) Published 20070214
- Ozaukee Co., WI (WI087) Published 20070215
- Sheboygan Co. WI, (WI117) Published 20070214

Metadata and SSURGO data for the aforementioned surveys were downloaded from the NRCS Soil Data Mart at <http://soildatamart.nrcs.usda.gov>. Component and layer tables from the tabular data were linked to the spatial data to derive the soil classifications found in this section. Visit the online Web Soil Survey at <http://websoilsurvey.nrcs.usda.gov> for official and current USDA soil information as viewable maps and tables.

8. Performance Results System (PRS) data was extracted from the PRS homepage by year, conservation systems and practices and Hydrologic Unit Code (HUC) level. HUC level reporting was not available where N/A is listed. For more information on these and other performance reports visit <http://ias.sc.egov.usda.gov/prshome/>.

9. Ag Census data were downloaded from the National Agricultural Statistics Service (NASS) Website and the data were adjusted by percent of HUC in the county. For more information on individual census queries visit the NASS website at <http://www.nass.usda.gov/>.

10. Population ethnicity data were extracted from the Census 2000 Summary File 3 compiled by the U.S. Census Bureau. The data were adjusted by Block Group percentage in the HUC. Population items were selected from the SF30001 table. For more information on census data and definitions visit <http://www.census.gov/Press-Release/www/2002/sumfile3.html>.

11. Urban population and median household income data were derived from the American FactFinder assembled by the U.S. Census Bureau. American FactFinder is a quick source for population, housing, income and geographic data. For other census items and trends visit http://factfinder.census.gov/home/saff/main.html?_lan

12. Level III and IV Ecoregions Regions of Wisconsin map and descriptions were derived from electronic coverages available from Wisconsin DNR, Bureau of Integrated Science Services Branch in cooperation with the U.S Environmental Protection Agency.

For more information visit ftp://ftp.epa.gov/wed/ecoregions/wi/wi_eco_pg.pdf

http://www.epa.gov/wed/pages/ecoregions/moia_eco.htm

http://www.epa.gov/wed/pages/ecoregions/il_eco.htm

