5.0 RESOURCE MANAGEMENT PLANNING RESULTS

5.1 Information on Resource Conditions

A series of reports, maps, and data sets have been compiled that summarize the condition of land, water, and associated natural resources in Chippewa County. Much of this information is contained in published management plans developed by county departments, the Department of Natural Resources (DNR), and the West Central Wisconsin Regional Planning Commission (WCWRPC).

A listing of resource-based management plans and studies that describe natural resource conditions in Chippewa County, is provided in Table 1.

Table 1

A LISTING OF RESOURCE-BASED MANAGEMENT PLANS FOR AREAS OF CHIPPEWA COUNTY PREPARED BY PUBLIC AGENCIES

Type of Plan	Responsible Agency	Date of Plan
Land Resource- Based Plans		
Chippewa County Farmland Preservation Plan	LCFM	1985
Chippewa County Erosion Control Plan	LCFM	1993
Chippewa County 10 Year Forest Plan	LCFM	2007
Chippewa County Outdoor Recreation Plan	LCFM	2008
Water Resource-Based Plans, Studies, Inventories		
Surface Water Inventory of Chippewa County	DNR	1963
Chippewa/Eau Claire Urban Area Sewer Service Plan	WCWRPC	1985
Duncan Creek Priority Watershed Plan	DNR/LCFM	1995
Lower Chippewa River Basin Water Quality Mgt Plan	DNR	1996
Yellow River Nonpoint Source Pollution Inventory	LCFM	1998
Hallie Water Quality Management Plan - Phase I	DNR	1999
Upper Chippewa River Basin Water Quality Mgt Plan	DNR	2000
Hallie Water Quality Management Plan - Phase II	DNR	2000
State of the Lower Chippewa River Basin Report	DNR	2001
Phosphorus Loading & Trophic Status of Lakes in the	DNR	2004
Yellow River Watershed		
Biotic Inventory of Native Plant Communities and	DNR/LCFM	2006
Threatened/Endangered Resources		
Chippewa County Forest 15-Year Plan 2006-2020	DNR	2007
Pleistocene Geology of Chippewa County, WI	WGNHS	2007
Chippewa Falls Urban Area Storm Water Mgt Plan	LCFM	2007
2007 Chippewa County Groundwater Inventory	LCFM	2008
Little Lake Wissota WQ Modeling Study & TMDL Plan	DNR	2008
Chippewa County Flood Plain Map & Report	FEMA	2008
Phosphorus Loading Model for Lake Eau Claire & Altoona	UWSP	2008
Current Resource Inventories		
Little Lake Wissota Watershed Soil Test Inventory	LCFM	2009
Chippewa Falls Urban Area Storm Water Facilities Cond Inv	LCFM	2009

This information is augmented by a number of detailed resource inventories that are systematically updated and maintained by county, state, and federal agencies. A listing of pertinent resource inventories, data sets, and computer maps routinely maintained by Chippewa County is provided in Table 2.

Table 2

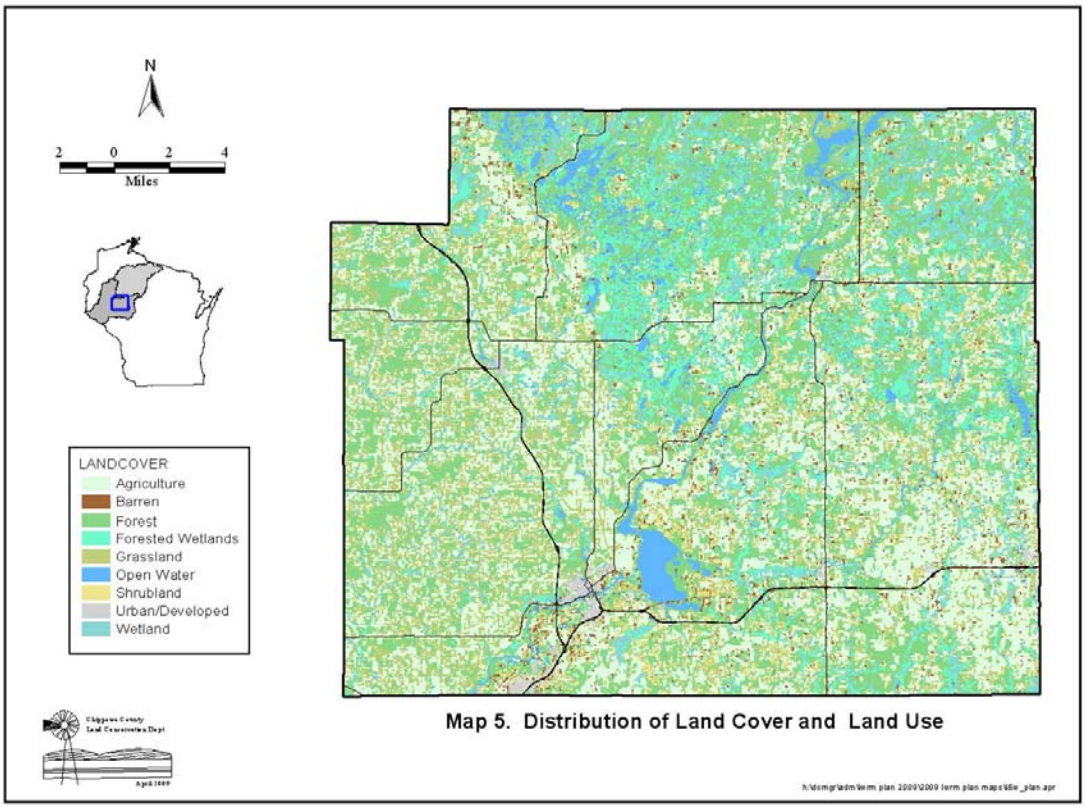
A PARTIAL LISTING OF DYNAMIC GIS-BASED RESOURCE INVENTORIES AND DATA SETS MAINTAINED BY CHIPPEWA COUNTY

Dynamic GIS Layers	Maintenance Responsibility
Ownership Management Units	
Tax parcel boundaries	Land Records
Aerial Imagery	
1995 Landsat	
1998 Irslc	
02, 04, 05, 06, 08 Aerial Image	USDA
Farmland Management	
Farmland Preservation tracts and parcels	LCFM
USDA field and tract boundaries	USDA
Animal Waste Ordinance - manure storage sites	LCFM
Animal Waste Ordinance - nutrient mgt. fields	LCFM
NR151 Standard - evaluated parcels	LCFM
Erosion monitoring - individual fields	LCFM
Conservation Easements	
CREP	LCFM
Stewardship	LCFM
Non Point Source	LCFM
Chippewa County Groundwater Inventory	
New well and replacement permits	LCFM
Private well chemistry	LCFM
Private well geology	LCFM
County Ordinance Monitoring	
NR135 non-metallic mines	LCFM
CF urban area storm water mgt - BMP's	LCFM
Stormwater plan reviews	LCFM
Wetlands	
WDNR wetlands	WDNR
NRCS wetlands	USDA
Forestry Land Use	
County Forest Land Forest Management Units	LCFM
Natural Resource Features	
Perennial and intermittent streams	WGNHS
Drainageways	USDA
Lakes	WGNHS
Soils	USDA
Geology	WGNHS
Surface contours	WGNHS
Groundwater contours	WGNHS
Bedrock	WGNHS

Land cover	WDNR

5.11 Assessment of Land Cover and Land Use

The type and extent of current land cover and land use in the county has been established through satellite-based remote sensing techniques (1993 State LANDSAT, 1995 Chippewa County Land Use Project; 1998 WISCLAND). Land use changes are monitored through time using USDA aerial photography. The current distribution of land cover and land use is provided in Map 5.



Map 5. Distribution of Land Cover and Land Use

Ongoing development trends in unincorporated areas of the county are currently determined by monitoring land sales and the location of new domestic well permits.

The location, distribution, and rate of new residential development in unincorporated areas of the county is provided in Map 6. Table 3 documents the number of agricultural land sales from 1996-2012 and the percent of those sales converted to non-agricultural use. Figure 1 shows the rate at which agricultural land in Chippewa County is being converted to nonagricultural use.

Results of this monitoring show a trend where land historically used to support agricultural production is being converted to rural residential, commercial, and other nonfarm use.

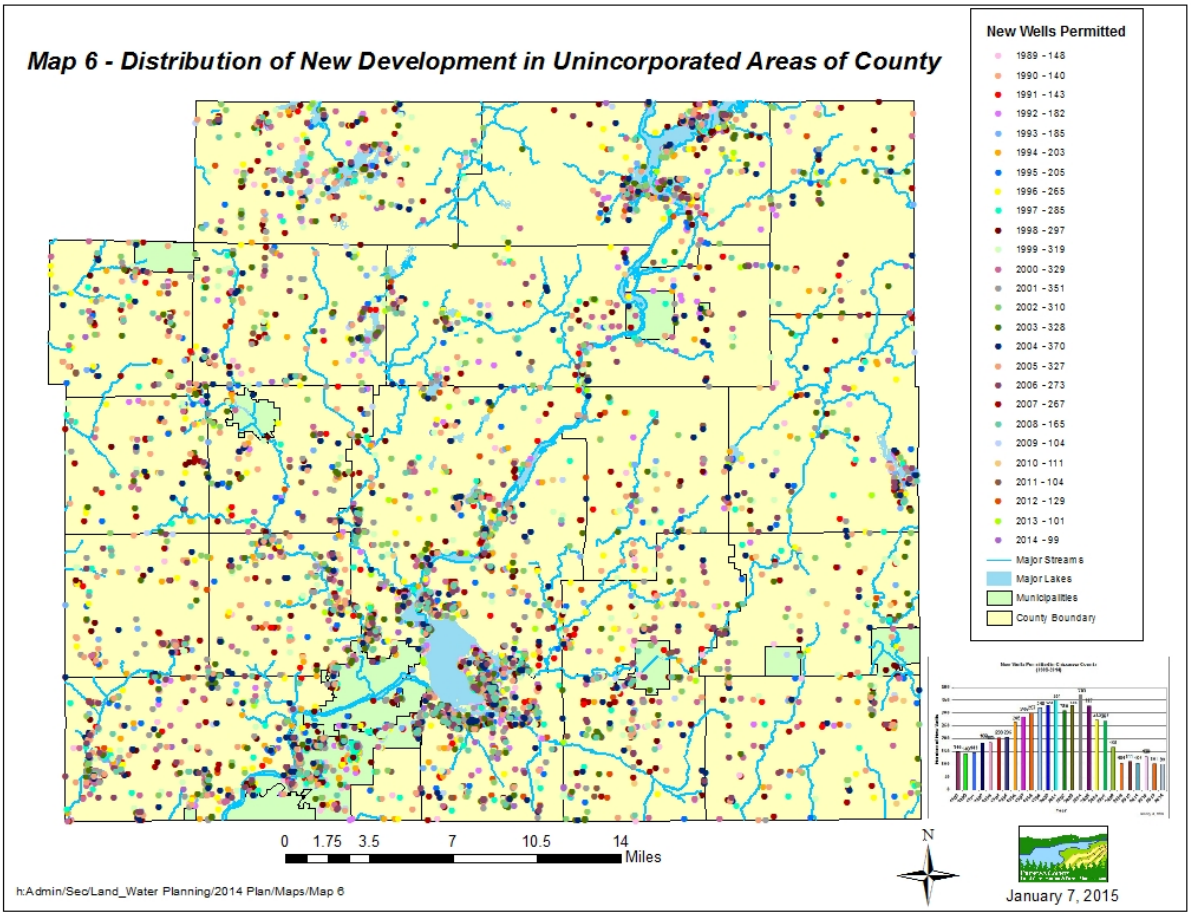


Table 3

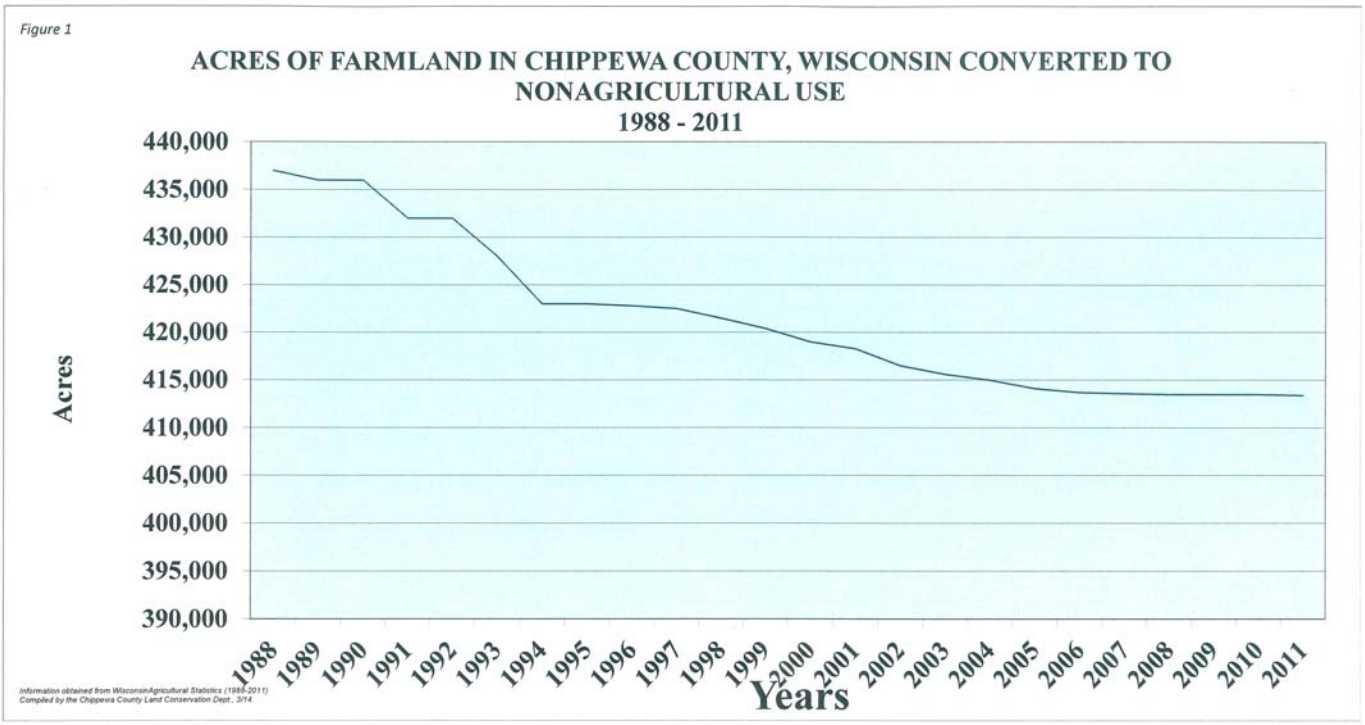
A Summary of Chippewa County Land Sales
Total Number of Annual Agricultural Land Sales and Percent Converted to Nonagricultural Use

Year	Total of all agricultural land			Agricultural land continuing in agricultural use			Agricultural land being diverted to other uses			The percent of agricultural land sold and converted to nonagricultural use
	No. of transactions	Acres sold	Dollars per acre	No. of transactions	Acres sold	Dollars per acre	No. of transactions	Acres sold	Dollars per acre	
1996	38	1503	480	29	1300	487	9	203	433	14%
1997	39	1893	599	30	1615	539	9	278	946	15%
1998	89	5877	1067	68	4826	1030	21	1051	1235	18%
1999	86	5010	1274	62	3893	1138	24	1117	1748	22%
2000	100	6050	1297	66	4638	1226	34	1412	1533	23%
2001	74	3727	1398	50	3046	1307	24	681	1807	18%
2002	86	4446	1732	52	2676	1627	34	1770	1889	40%
2003	84	5492	1598	56	4573	1460	28	919	2284	17%
2004	81	4961	1854	60	4386	1886	21	575	1610	12%
2005	52	2687	2464	35	1794	2178	17	893	3038	33%
2006	33	2573	1983	26	2149	1838	7	424	2718	16%
2007	34	2297	1790	31	2204	1672	3	93	4590	4%
2008	30	2180	2738	28	2071	2283	2	109	11370	5%
2009	21	1247	2364	20	1235	2364	1	12	2353	1%
2010	57	3761	3214	*			*			
2011	34	2494	2334	32	2414	2357	2	80	1655	3%
2012	*			42	2401	2796	*			

Information obtained from Wisconsin Agricultural Statistics (1996-2013).
Compiled by the Chippewa County Land Conservation Dept., 2/13/14

**Information not available through Wisconsin Agricultural Statistics (2011) or (2013)*

Figure 1



The type and intensity of agricultural use in the county is monitored by tracking agricultural statistics. Results of these monitoring efforts indicates a trend in production agriculture whereby smaller-scale dairy operations are being replaced by cash grain operations and larger-scale livestock operations.

The trend toward more intensive agricultural use is substantiated through agricultural statistics that show an increase in row crop production, and a corresponding reduction in forage-based hay production. This trend is shown in Table 4 and Figure 2.

Table 4 **ACRES PLANTED/HARVESTED FOR CROPS IN CHIPPEWA COUNTY, WISCONSIN**

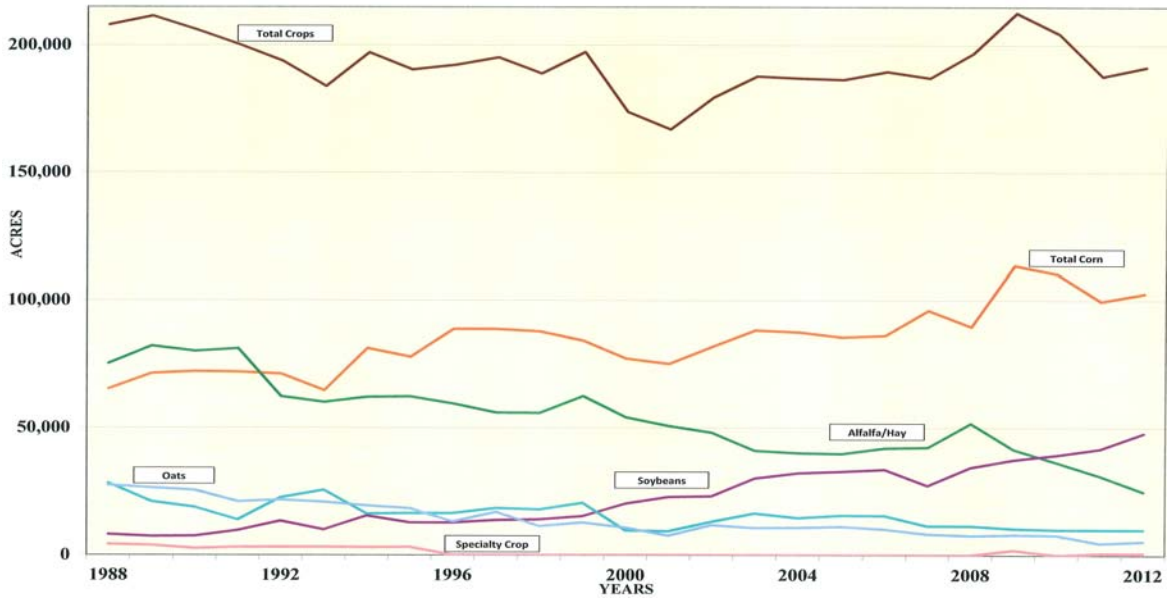
Year	Corn Harvested for Grain	Corn Harvested for Silage	Total Corn Harvested	Soybeans Planted	Oats Planted	Alfalfa Harvested as Dry Hay	Other Hay Harvested as Dry Hay	Specialty Crops Plants	Total Crops
1988	21,500	43,600	65,100	8,000	27,400	75,100	28,200	4,150	207,950
1989	49,300	21,900	71,200	7,250	26,300	82,000	20,900	3,770	211,420
1990	51,000	21,000	72,000	7,400	25,400	80,000	18,700	2,550	206,050
1991	54,400	17,400	71,800	9,600	20,900	81,000	13,800	3,050	200,150
1992	45,200	25,800	71,000	13,300	21,600	62,200	22,500	3,100	193,700
1993	37,700	26,800	64,500	9,900	20,800	60,000	25,500	3,100	183,800
1994	63,900	17,200	81,100	15,400	19,400	62,000	16,200	3,000	197,100
1995	61,800	15,900	77,700	12,700	18,300	62,200	16,400	3,100	190,400
1996	64,500	24,200	88,700	12,700	13,100	59,400	16,400	*1,900	192,200
1997	67,700	21,000	88,700	13,700	16,900	55,900	18,400	*1,600	195,200
1998	66,400	21,400	87,800	14,000	11,400	55,800	17,900	*2,000	188,900
1999	63,400	20,700	84,100	15,300	12,800	62,400	20,500	*2,200	197,300
2000	56,500	20,600	77,100	20,200	10,800	54,100	9,700	*1,900	173,800
2001	54,000	21,000	75,000	22,800	7,700	50,700	9,400	*1,300	166,900
2002	62,200	19,500	81,700	23,100	11,800	48,100	13,100	*1,700	179,500
2003	65,500	22,700	88,200	30,100	10,700	41,000	16,400	*1,400	187,800
2004	65,800	21,700	87,500	32,200	10,800	40,100	14,600	*1,800	187,000
2005	63,000	22,500	85,500	32,800	11,200	39,800	15,600	*1,600	186,500
2006	63,900	22,300	86,200	33,600	10,200	42,000	15,500	*2,100	189,600
2007	76,400	18,100	96,000	27,300	8,300	42,300	11,500	*1,700	187,100
2008	66,500	23,100	89,600	34,400	7,700	51,700	11,500	*1,900	196,800
2009	91,000	22,500	113,500	37,400	8,000	41,500	10,400	1,900	212,700
2010	92,000	18,200	110,200	39,300	7,800	36,400	10,000	♦700	204,400
2011	86,800	12,800	99,600	41,700	4,700	31,100	10,000	700	187,800
2012	78,000	24,600	102,600	47,800	5,400	24,900	10,000	700	191,400
2013									

Specialty crops include barley, winter wheat, snap beans, green peas, and sweet corn.

*Barley Only ♦Winter Wheat Only

Source: Wisconsin Agricultural Statistics, 1988 - 2013

Figure 2 **ACRES PLANTED/HARVESTED FOR CROPS IN CHIPPEWA COUNTY, WISCONSIN**



5.12 Assessment of Soil Condition

The Chippewa County Soil Survey (USDA, 1987) documents the distribution of soil types in Chippewa County. This soil survey provides a benchmark of soil conditions using measurements of soil depth, organic matter, and extent of topsoil loss.

The extent of soil erosion from nonagricultural sources has not been formally evaluated or qualified. Current land use trends and general observations suggest that there are accelerated rates of erosion on construction sites in urbanizing areas and accelerated rates of erosion associated with recreational use of county forest lands.

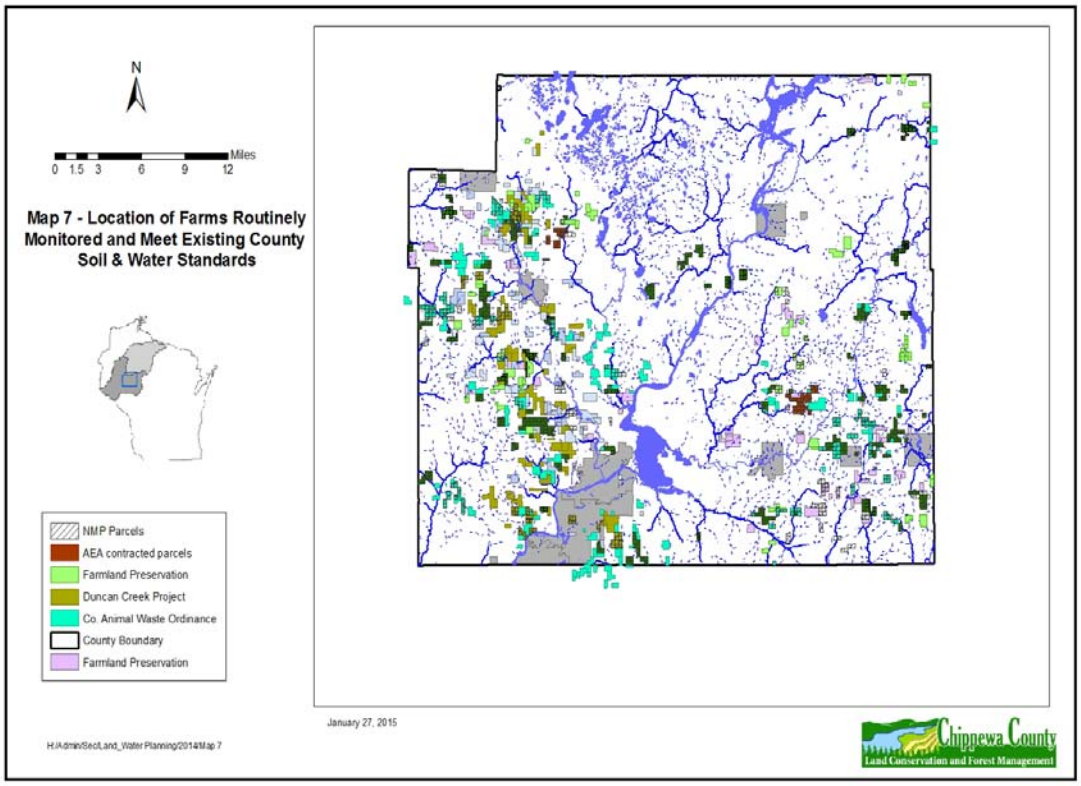
The current rate of agricultural soil erosion was first estimated in the Chippewa County Erosion Control Plan, (1985), based upon a representative sample of small watersheds and farm fields.

Efforts have since been made by the USDA Natural Resource Conservation Service to periodically monitor soil condition and erosion rates through use of a transect survey conducted as part of a nationwide Natural Resource Inventory (NRI). This survey was last conducted in 2002 to document cropping practices and land cover at predetermined sample locations.

Results of the year 1985 soil erosion inventory and the 2002 transect survey are similar and suggest that approximately 80% of farm fields are being managed within the erosion control standard for sustained production (T - value; USLE). The remaining 15% are farmed at a rate 1-2 times T-value, with 5% farmed at a rate greater than 2T. Results of these assessments indicate that higher rates of erosion occur on fields situated on sandstone uplands located in the western one-third of the county.

In 1987, the Chippewa County Land Conservation Committee instituted an annual crop reporting process to systematically monitor the management of farms subject to county soil and water conservation standards.

Map 7 shows the location of farm parcels that are now routinely monitored by the Land Conservation & Forest Management Department and are in compliance with county soil and water conservation standards. It also shows the location of farm parcels that have previously met county standards through state program contracts, that have since expired and are no longer monitored.



5.13 Assessment of Surface Water Resource Condition

As a result of location, geology, and land cover, there are many high value and high quality surface water resources in Chippewa County.

The location and physical characteristics of these water resources are documented in an extensive inventory titled: Surface Water Resources of Chippewa County, (Wis. Conservation Dept., 1963).

The condition of each lake, stream, and river in Chippewa County has been evaluated and characterized by the Wisconsin Department of Natural Resources (DNR) through use of a classification code assigned under the State of Wisconsin Surface Water Classification System. The code provides information regarding the current physical characteristics of the water resources, the degree and source of impairment, the potential optimal use, and the need for additional assessment, monitoring, and management.

This information has been compiled in a series of watershed tables that summarize water resource conditions, as contained in detailed basin reports. (The State of the Upper Chippewa River Basin, WDNR, 1996; and The State of the Lower Chippewa River Basin, DNR, 2002). An explanation of these tables and information available for watersheds in Chippewa County is provided in Appendix 2, Figure 2.1.

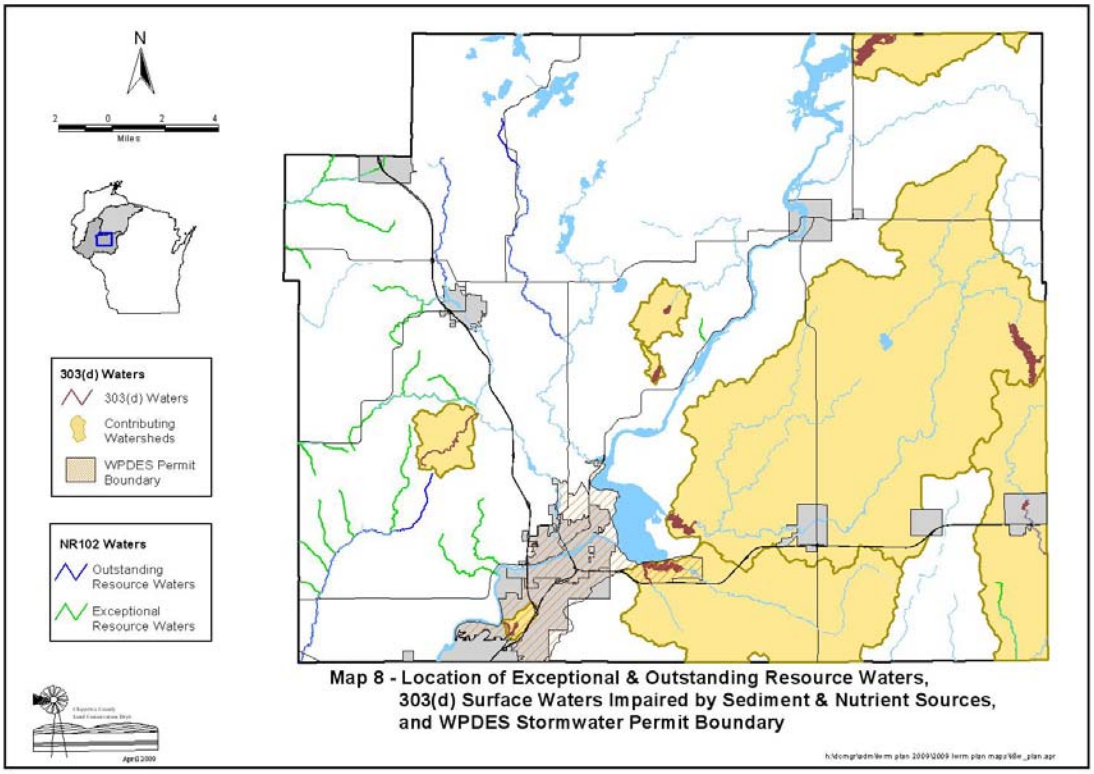
The DNR has established instream water quality standards that apply to select classes of water resources. These water quality standards are subsequently used by the DNR to develop and implement strategies to meet water quality goals, set effluent discharge limits, and as a basis for making other regulatory, permitting, or funding decisions. The categories of water quality standards, which exist for each class of water, are defined by State Administrative Code NR102. This information is provided in Appendix 2, 2.2.

In response to requirements of Section 303 of the Federal Clean Water Act, the DNR has prepared a list of impaired waters. Through this list, the state identifies water bodies that do not currently meet water quality standards and those where the potential use of the water body is restricted by pollution or physical degradation. The DNR has placed a number of water bodies in Chippewa County on the 303(d) list.

The DNR Bureau of Watershed Management is responsible for Wisconsin's 303(d) Impaired Waters Program and for the development of a Total Maximum Daily Load (TMDL) strategy to improve the condition of impaired waters. As part of current state program efforts, the DNR West Central Region has initiated the resource monitoring, data collection, and modeling phase of the TMDL planning process for three (3) impaired water bodies in the Lower Chippewa River Basin located in Chippewa County: Otter Lake, Little Lake Wissota and Moon Bay of Lake Wissota. Results of that effort have been summarized in a report titled: Phosphorus Loading and Trophic Status of Lakes in the Yellow River Watershed, West-Central Wisconsin, (February 2004).

The DNR West Central Region has now completed the TMDL planning process for Little Lake Wissota and has completed results in a report titled: Total Maximum Daily Load (TMDL) for the Little Lake Wissota Embayment of Lake Wissota Chippewa County, Wisconsin, (DNR Draft Report, 1/22/09).

Map 8 shows the location of exceptional and outstanding resource waters, the location of impaired surface waters included on the 303(d) list as a result of sediment or nutrients, and the location of urban storm water management areas subject to WPDES permit. Rivers and streams with 303(d) designation include those located in the Yellow River and Paint Creek Watersheds, as contributing to Otter Lake, Moon Bay of Lake Wissota, and Little Lake Wissota.



Map 8 - Location of Exceptional & Outstanding Resource Waters, 303(d) Surface Waters Impaired by Sediment & Nutrient Sources, and WPDES Stormwater Permit Boundary

5.14 Assessment of Groundwater Condition

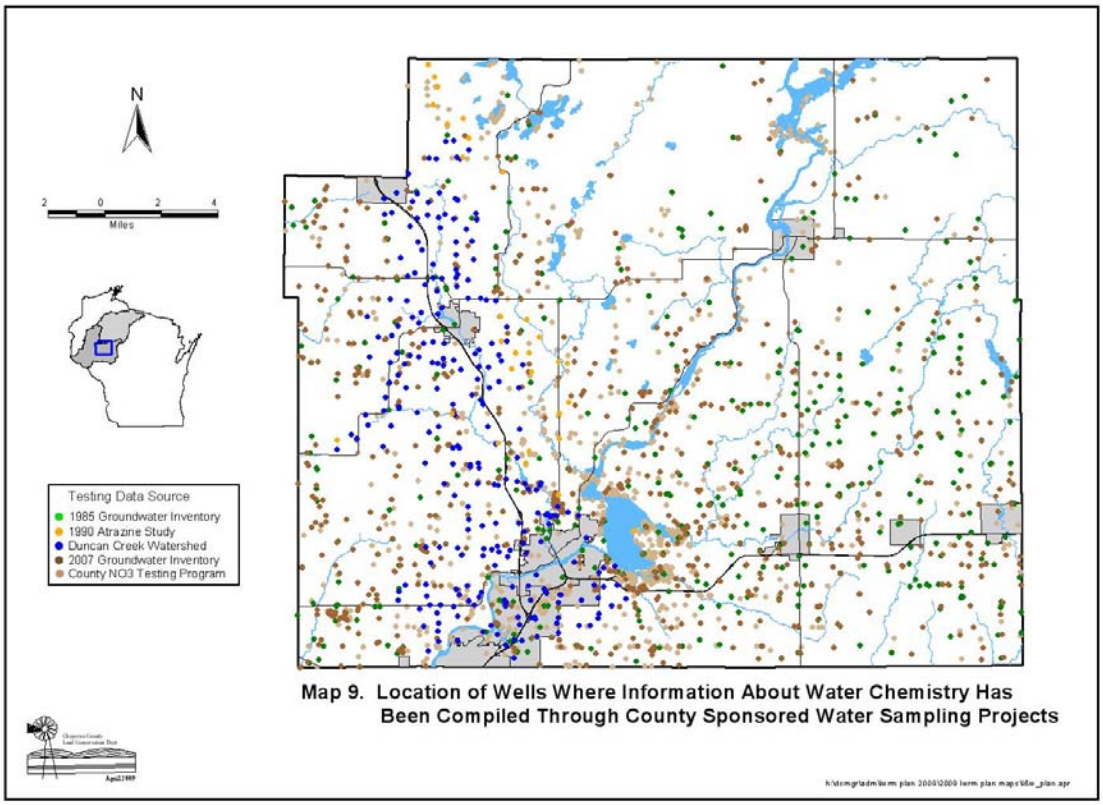
The condition of the groundwater resource in Chippewa County was initially established through the Chippewa County Groundwater Inventory, (WGNHS, 1985). The inventory was based upon information compiled from approximately 3,000 recorded well locations and documented aquifer characteristics, groundwater elevation, and groundwater chemistry throughout the county.

This groundwater inventory has been systematically expanded and is routinely maintained by the Dept. of Land Conservation & Forest Management and Planning & Zoning Department through the Chippewa County Groundwater Inventory and well permitting program.

The Chippewa County Groundwater Inventory was updated in 2007 through an extensive groundwater sampling effort to document current groundwater chemistry and the condition of the rural water supply. Results of this effort are documented in a report titled: 2007 Chippewa County Groundwater Inventory; A Benchmark Report of Groundwater Chemistry, (2008, LCD).

Chippewa County, through its rural well drinking water program, provides a $N0_3$-N sampling service.

Map 9 shows the location of wells where information about rural water chemistry has been compiled since 1985 through the state and county drinking water programs.



Map 9. Location of Wells Where Information About Water Chemistry Has Been Compiled Through County Sponsored Water Sampling Projects

Results of the combined groundwater inventories show that in the uncultivated and forested areas of the county, nitrate and chloride levels are at background concentrations.

Nitrate and chloride concentrations in agricultural production areas are elevated above background levels. In these areas, fifty percent (50%) of the wells tested had concentrations of nitrate-nitrogen (No_3-N) that reflected cultural influences, ranging from 3-9 mg/l. Approximately 25% of the wells tested in agricultural areas approached or exceeded the safe drinking standard of 10 mg/l, with 12% exceeding the standards. Areas of highest concentration occur in a band of coarse textured soils associated with glacial outwash deposits.

5.15 Assessment of Wetland Condition

The type, size, and location of wetlands in the county have been documented in the Chippewa County Wetland Inventory, (WDNR, 1983, 1996). A second, more detailed inventory of agricultural areas has documented the location of wetlands, farmed wetlands, and converted wetlands (NRCS, 1987, 1996).

As a result of the location, glacial geology, and land cover, there is a wide range of wetland hydrologic types and associated wetland plant communities.

The condition of these wetlands vary greatly based upon their location, extent of disturbance, and surrounding land use.

Results of recent biological surveys suggest that there are many diverse and high-quality wetland sites in undisturbed areas throughout the county. Surveys also suggest that there are many drained or highly degraded wetland sites that could be readily restored.

Activities that contribute to wetland degradation include agricultural drainage and drainage system maintenance, wetland fills associated with urban development, changes in wetland hydrology from increased urban runoff, and sediment from urban and agricultural sources.