

## 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.

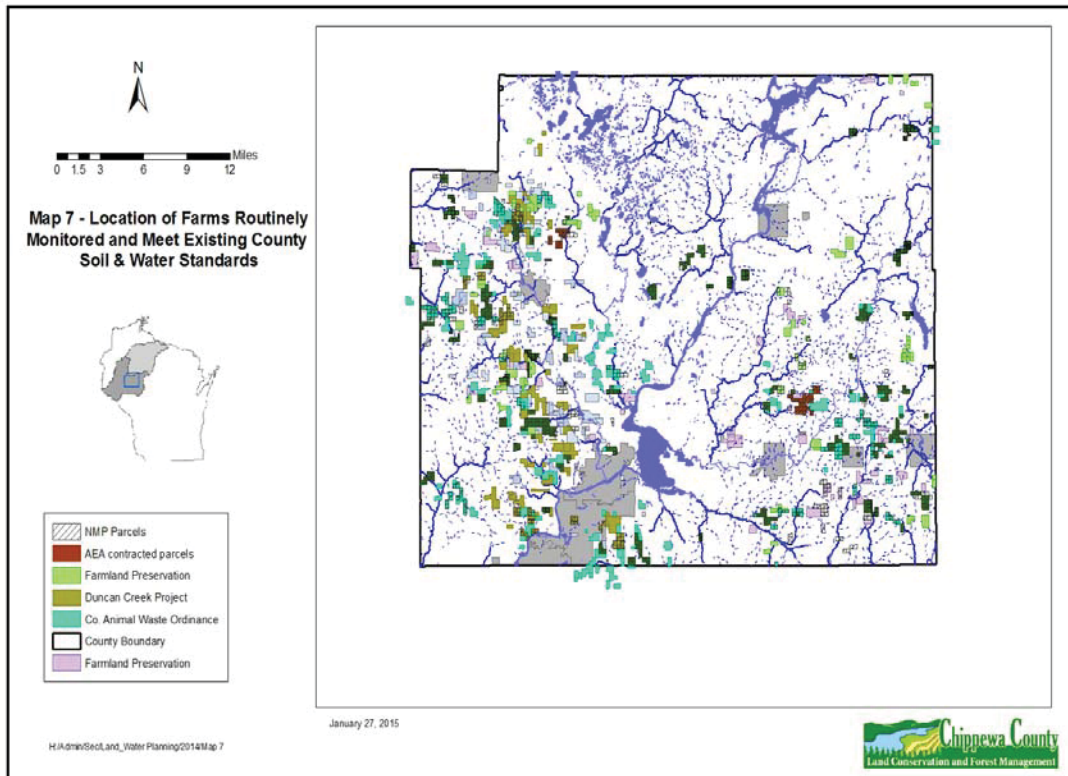
The current rate of agricultural soil erosion was first estimated in the Chippewa County Erosion Control Plan, (1985), based upon a representative sample of small watersheds and farm fields.

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.

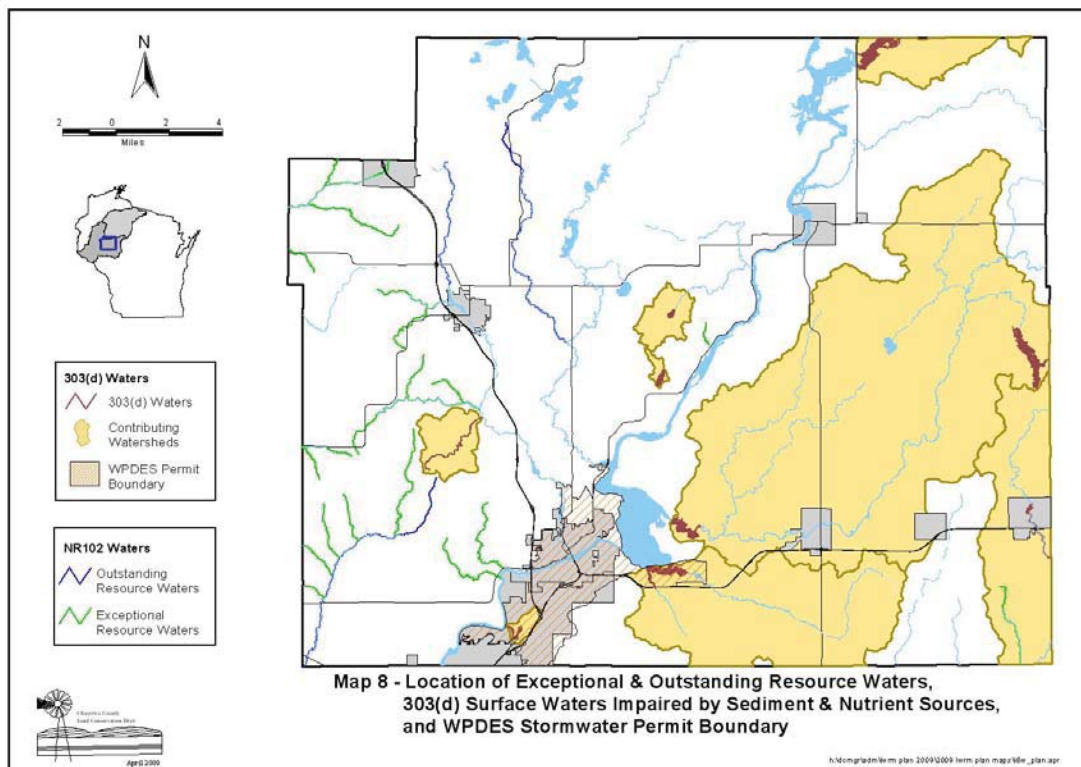
The DNR has established instream water quality standards that apply to select classes of water resources. These water quality standards are subsequently used by the DNR to develop and implement strategies to meet water quality goals, set effluent discharge limits, and as a basis for making other regulatory, 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.



## 5.14 Assessment of Groundwater Condition

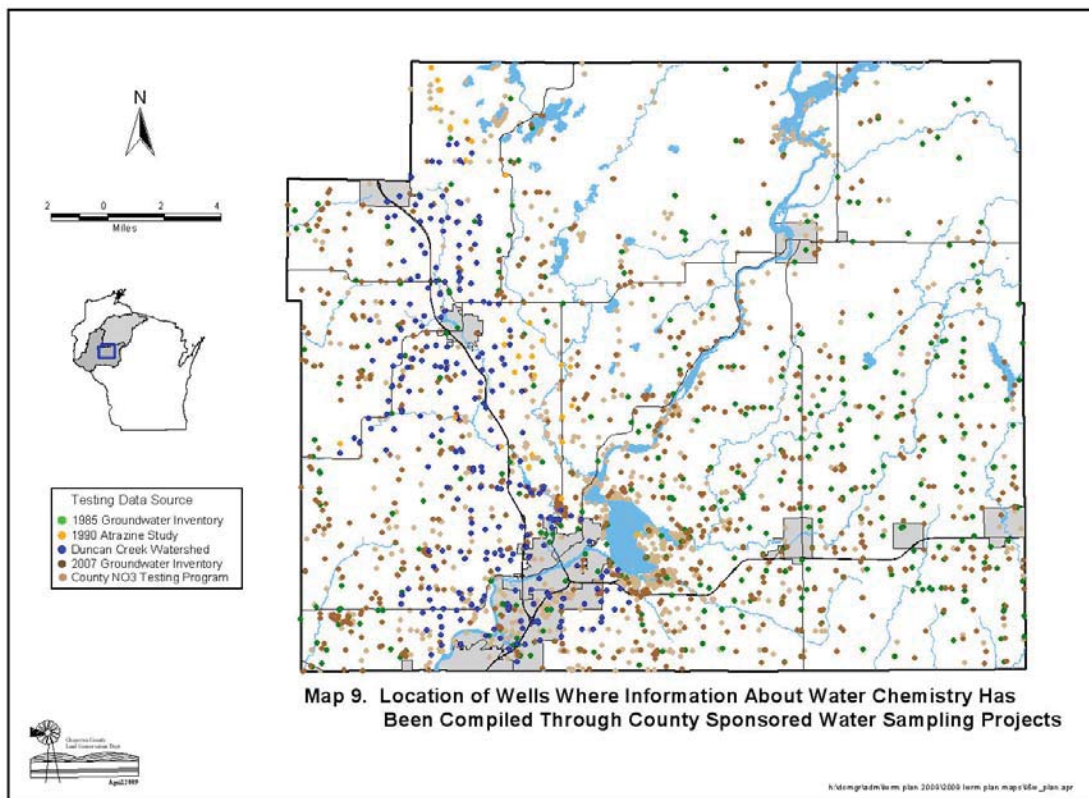
The condition of the groundwater resource in Chippewa County was initially established through the Chippewa County Groundwater Inventory, (WGNHS, 1985). The inventory was based upon information compiled from approximately 3,000 recorded well locations and documented aquifer characteristics, groundwater 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  $\text{NO}_3\text{-N}$  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.



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 ( $\text{NO}_3\text{-N}$ ) 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.