Minnesota Wetland Inventory:
User Guide and Summary Statistics

DEPARTMENT OF NATURAL RESOURCES

Purpose of this Guide and the Minnesota Wetland Inventory Data

This guide provides a brief overview of the potential uses, limitations, access, and technical aspects of the Minnesota Wetland Inventory. It serves as an introduction to wetland inventory data and a starting point to find additional detailed information.

The Minnesota Wetland Inventory is based on the framework for the National Wetland Inventory (NWI). These data meet or exceed the federal wetland-mapping standard. It is an important dataset for natural resource planning and management efforts within Minnesota. These wetland data are used across all levels of government, by private industry and non-profit organizations as an aid in wetland regulation and management, land use and conservation planning, environmental impact assessment, and natural resource inventories. Among other things, the NWI has been used to assess impacts of regulatory policy, identify flood storage, evaluate carbon storage potential and climate change impacts, and estimate waterfowl and amphibian population distribution.

History

The original NWI was completed for Minnesota in the early to mid-1980s under a program of the U.S. Fish and Wildlife Service (USFWS). Federal funding for the NWI has declined over time and the original NWI was not updated to reflect changes in land alterations or other changes that affected wetlands. The Minnesota Department of Natural Resources (DNR), with funding from the Environment and Natural Resources Trust Fund, began a statewide update of the NWI and completed the statewide update in 2019.

Cautions

There are various ways to define wetlands. Any effort to map or identify wetlands is affected by how wetlands are defined. The updated NWI for Minnesota used the same wetland definition as was used for the original NWI (adapted from Cowardin et al., 1979):

> *"Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. Wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season each year."*

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define wetlands in a different manner than this inventory. This wetland inventory does not attempt to define the limits of the jurisdiction of wetland regulatory programs for federal, state, or local government agencies. Anyone engaging in activities involving land alterations within or adjacent to potential wetland areas should seek the advice of appropriate federal, state, or local agencies concerning regulatory programs and the jurisdictions that may affect such activities.

The updated NWI for Minnesota was developed using the best available remote sensing data. Methods included high-resolution spring aerial imagery (acquired between 2009 and 2014), summer aerial imagery, and digital elevation models derived from light detection and ranging (lidar). Every reasonable effort has been made to follow industry standard practices for ensuring the accuracy of these data; however, there is an inherent uncertainty associated with mapping wetlands from remote sensing data.

Detailed ground-based analysis of specific sites may result in a different wetland representation and classification.

Wetland Permitting Programs

There are three main wetland permitting programs in Minnesota. These programs have different jurisdictions that sometimes overlap, and they are administered by different agencies.

Public Waters Work Permit Program - The Minnesota DNR oversees the Public Waters Work Permit Program. This program regulates water development activities below the ordinary high water level in waters that have been designated as public waters and public waters wetlands. The Public Waters Inventory map published by the DNR indicates which waters and wetlands are covered by this program. The basic rule is that a public waters work permit must be obtained from the DNR for work affecting the course, current, or cross-section of public waters, including public waters wetlands.

Minnesota Wetland Conservation Act - Most wetlands in Minnesota that are not covered by the Public Waters Work Permit Program are covered by the Minnesota Wetland Conservation Act (WCA). WCA was enacted to protect wetlands not protected under the DNR public waters permit program and to provide no net loss of Minnesota's remaining wetlands. This program is administered by a network of local units of government (LGUs) with oversight from the Minnesota Board of Water and Soil Resources (BWSR). The basic requirement is that wetlands must not be drained or filled unless replaced by restoring or creating a wetland area of equal public value under an approved replacement plan. BWSR maintains a list of the LGUs that act as the permitting authorities under WCA.

Federal Clean Water Act Section 404 Permit Program - A permit must be obtained from the United States Army Corps of Engineers for discharges of dredged or fill material into waters of the United States, including jurisdictional wetlands. Section 404 permits also require a water quality certification (or waiver) from the Minnesota Pollution Control Agency. Jurisdictional determinations for the 404 Permit Program can be complex.

Data Access

The NWI data are available electronically in two basic forms: Easy-to-use online wetland map applications, and a download for use with desktop GIS software. The DNR does not distribute paper maps of the NWI.

The Minnesota DNR and the U.S. Fish and Wildlife Service both maintain online wetland mapping applications as well as provide

The NWI has many uses including...

- assessing potential impacts from proposed development projects
- estimating flood storage capacity
- mapping waterfowl and amphibian habitat
- evaluating carbon storage potential

download access to the GIS data. The basic geometry and attributes are the same; however, there are some differences between the version of the NWI distributed by the Minnesota DNR and the federal version of the data.

For links to download data and online maps, see the DNR wetlands maps web page: https://www.dnr.state.mn.us/wetlands/maps.html

Technical Overview

Format

The NWI data are vector GIS polygons. The data are available as a file geodatabase, a proprietary data format developed by Environmental Systems Research Institute (ESRI) for their GIS software (e.g., ArcGIS). The data are also available in GeoPackage format, which is an open source GIS data format that works with most GIS software.

Differences between the State and Federal Versions

Minnesota provides the data using the Universal Transverse Mercator coordinate system (UTM Zone 15, North American Datum 1983). Knowing the coordinate system is generally required to ensure that the data align properly with other GIS data. The USFWS provides the data using the Albers Equal Area coordinate system. The version of the NWI provided by Minnesota has additional attribute fields that are not available in the federal version of the data because they go beyond the federal data standard. Users who want the full set of attributes should obtain the data through the Minnesota Geospatial Commons. In addition, the USFWS modifies all NWI data by adding more watercourse features from the National Hydrography Dataset (NHD). This involves buffering watercourse features

from the NHD, removing areas where they overlap with the NWI, and then merging the two feature classes together. This can provide some additional information on hydrologic connectivity, but because the NHD is based on watercourse mapping that was done in the 1960s and 1970s, it has frequent misalignments. As such, the DNR has chosen not to add watercourses in this manner.

Scale, Minimum Size, and Positional Accuracy

Wetland features and boundary lines were mapped with a level of detail that was appropriate for an approximate user-scale of 1:6,000. The scale for digitizing and quality control review varied; but was generally performed at zoom scales closer than the user-scale of 1:6,000. The goal of the NWI is to map all wetlands and deepwater habitats (lakes and rivers) larger than ½-acre in area. Wetlands smaller than ½-acre that are readily visible at 1:6,000-scale are also mapped, but there is no assurance that all wetlands smaller than ½-acre are included. Long, narrow features (e.g., swales, ditches, streams, and rivers) wider than 15-feet are also included in the NWI. Very small wetlands (<$\frac{1}{20}$-acre) and very narrow wetlands are not mapped.

The location of wetland boundaries are approximate. The imagery used as the mapping base for the updated NWI has a typical positional accuracy of about ±7.5 feet (root mean square error). In addition, some uncertainty is inherent in the process of mapping the wetland boundaries. Determining precise wetland boundaries can be difficult even in the field. In cases where there are clearly visible wetland boundaries, these are generally mapped within ±15 feet of their true position. More obscure wetland

3

ⓘNWISTORIES

Wetland Finder
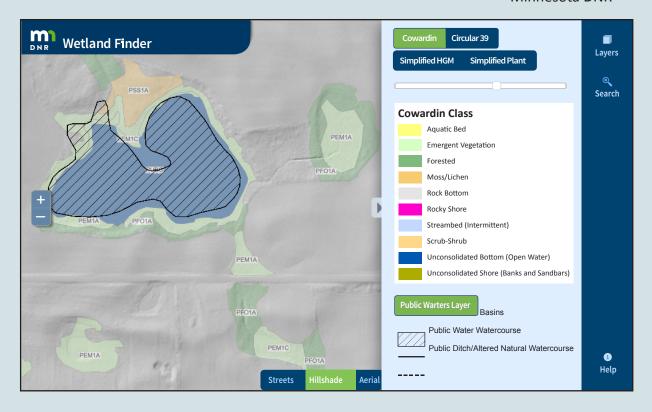
One of the most common wetland questions we get from landowners, developers, and real estate professionals is, "Are there wetlands on my property?" While the NWI isn't a regulatory wetland determination, it is usually the first place to turn to begin to answer this question. Unsurprisingly, most of the people that ask this question aren't GIS experts. For these folks, we developed the DNR Wetland Finder Application.

The Wetland Finder provides a simple method for the non-GIS user to view the updated National Wetland Inventory (NWI) data. People can use this application to get a quick initial view of the how many and what types of wetlands are present in a given area.

Users can search the map for a specific address and view the wetland data from the NWI as well as public waters from the DNR's Public Waters Inventory (PWI).

Users can choose to display the data according to any of four different wetland classifications or they can click on any wetland and get additional attribute information. The attribute pop-up window also provides links to wetland regulatory contacts including the local government unit (LGU) contact list for the Wetland Conservation Act as well as to DNR area hydrologists for questions about public waters.

-Steve Kloiber
Wetland Monitoring Coordinator
Minnesota DNR

Minnesota has 12.2 million acres of wetlands, the second most in the Lower 48 states behind Florida!

boundaries may have larger positional errors when compared to field based wetland delineations.

Data Structure

The basic data structure for the NWI is a GIS polygon data layer with an associated attribute table with one attribute record for every polygon (Table 1). Please note; the file geodatabase version provided through the MN Geospatial Commons also includes a series of extended attribute tables that can be joined to the primary attribute table based on a key field.

The principal classification attribute for the NWI uses a complex alphanumeric code to describe wetland types. These wetland types are described by supporting documentation such as "The Classification of Wetland and Deepwater Habitats" by Cowardin et al. (1979), which describes a hierarchy of wetland types. Wetland types at each level of this hierarchy are given coded values and linked into a single field. This system is further described later in this guide.

The uses of coded values makes for concise map labels, but it presents issues for the casual data user. Users who are unfamiliar with these codes will have difficulty understanding the data and will need to rely on outside references to look-up the full description of the various wetland types.

The state's version of the data provide associated look-up tables that split these codes into separate fields for each component. Full text description is provided for each part. These tables can be joined to the base table using the key field [ATTRIBUTE]. This structure makes querying the data simpler and more robust.
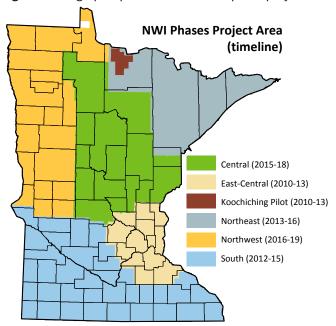
Overview of Input Data and Mapping Procedures

The update of the NWI was conducted in several geographic phases between 2008 and 2018 with funding from the Environment and Natural Resources Trust Fund. Project oversight, coordination, and quality control were provided by the Minnesota DNR, with the map production work handled through a series of five competitive bid contracts. Ducks Unlimited provided mapping services for east-central, northeast, and central Minnesota. St. Mary's University of Minnesota provided wetland mapping services for southern and northwestern Minnesota (Figure 1).

Table 1. Field names and definitions for the primary attribute table

FIELD NAME	Definition
OBJECTID	An internal number for each object that is assigned automatically
Shape	An internal database pointer to the object's geometry data
ATTRIBUTE	An alphanumeric code identifying the wetland classification of the polygon using the system described by Cowardin et al. (1979)
WETLAND_TYPE	General description of the wetland classification based on the Cowardin classification.
ACRES	The area of the polygon in acres.
HGM_CODE	The hydrogeomorphic classification code based on a simplified version of the system described by Tiner (2003)
HGM_DESC	The full text description of the hydrogeomorphic classification
SPCC_DESC	The simplified plant community classification based on a simplified version of the system described by Eggers and Reed (2011)
COW_CLASS1	The wetland class from the Cowardin system without the water regime and special modifiers
CIRC39_CLASS	The wetland classification based on the system described by USFWS Circular 39
HGM_SYMBOL	Simplified Landscape Position category based on the hydrogeomorphic classification
Shape_Length	The length of object perimeter in internal units (meters)
Shape_Area	The area of object in internal units squared (meters^2)

Figure 1. Geographic phases of the NWI update project

NWI Phases Project Area (timeline)

- Central (2015-18)
- East-Central (2010-13)
- Koochiching Pilot (2010-13)
- Northeast (2013-16)
- Northwest (2016-19)
- South (2012-15)

While the exact mapping methods may vary from region to region, each vendor relied on the same input data and each was required to meet the same performance-based mapping standards, which were based on the federal wetland mapping standard (FGDC 2009).

The standard input data used for the NWI update included:

- **High-resolution, spring, leaf-off aerial imagery**. The spring imagery data has four spectral bands including red, green, blue, and near-infrared bands. Spring infrared imagery is generally considered the preferred primary data source for wetland mapping. Spring, leaf-off conditions allow for mapping wetlands that might occur beneath tree canopy. Spring also provides a snapshot at a seasonally high water table, which makes wetland identification easier. The spatial resolution of this imagery was either 1-foot (30 centimeters) or ½-meter. This imagery was acquired between spring 2009 and spring 2014 by the DNR through competitive bid contracts.

- **High-resolution, summer aerial imagery** acquired by the Farm Service Agency

through the National Aerial Imagery Program (NAIP). Acquisition years for NAIP imagery included 2008, 2009, 2010, 2013, and 2015. NAIP imagery from 2008, 2013, and 2015 included both natural color (red, green, blue) bands as well as the near-infrared band. Imagery from 2009 and 2010 only included natural color bands. All of these imagery data have a spatial resolution of 1-meter. The summer imagery were primarily used to assign certain wetland classifications that depend on the appearance of certain vegetation conditions in summer (e.g., aquatic bed wetlands and farmed wetlands).

- **High-resolution elevation data** from lidar systems along with derived datasets from lidar. The primary elevation data used is a digital elevation model with a 3-meter spatial resolution, which is a regular grid-based elevation dataset (also known as a raster GIS dataset). Several derivatives were created from the lidar digital elevation model (DEM) including grids for slope, a topographic position index (TPI), and a compound topographic index (CTI). The TPI shows elevation differences based on a local neighborhood to highlight local high and low elevations. The CTI combines factors for slope and the catchment area. The CTI is sometimes referred to as the topographic wetness index.

- **Soil survey data** from the U.S. Department of Agriculture (USDA) was also a standard input for the NWI update for all areas of Minnesota where it existed at the time of the NWI update. It includes most of the state except portions of northeast Minnesota and Pine County. The primary soil attributes of interest for the NWI update include the soil drainage class and hydric soil class. Soils that are poorly drained, very poorly drained, or extremely poorly drained comprise the bulk of the class of soils that are considered hydric. Hydric soils are inundated or saturated at a

Wetland Restoration

Minnesota has lost about half of its original wetlands since 1850. Many of these wetlands were drained to support agricultural production, while others have been lost to other activities including urban development, mining, and road construction. Historically, wetlands were viewed as an impediment to development, but in recent decades, we have come to appreciate the many benefits they provide including flood reduction, water quality improvement, and wildlife habitat. Subsequently, federal, state, and local agencies as well as non-profit conservation organizations have expended considerable resources to restore wetlands. Careful planning is required to ensure that wetland restoration projects meet program objectives and that they are cost-effective.

Restoration programs frequently seek to identify multiple restoration opportunities in a targeted area. The NWI is a useful resource to identify potential restoration sites and evaluate their feasibility. The Natural Resources Research Institute (NRRI) developed an online decision support system that uses the NWI and other GIS layers to evaluate ecological stresses and potential wetland restoration benefits (www.mnwetlandrestore.org). As a part of this effort, the NRRI developed a statewide wetland probability model to identify all lands that are likely to be or to have been wetlands. The new NWI data are used to separate out existing wetlands from potentially restorable wetlands.

- Lucinda Johnson
Associate Director
Natural Resources Research Institute

At 4 million acres in area, forested wetlands are the most common wetland type in Minnesota.

duration or frequency such that they typically support the growth of wetland vegetation (hydrophytes).

- Other data that were commonly used for the NWI update include the original NWI, various hydrography data (e.g., DNR Public Water Inventory, and the DNR watercourse data), and scanned USGS topographic quadrangle maps.

Quality Assurance and Quality Control

The Minnesota NWI update project used a rigorous quality assurance program that included measurable objectives and a framework that integrated quality assurance throughout the map production process. Quality assurance efforts included multiple levels of visual data review, field-checks, and crowd-source data review. The primary goal of the quality assurance reviews was to identify any potential systematic errors in either wetland delineation or classification, to correct these errors, and prevent future occurrences.

Mapping contractors conducted review of all (100%) of the photo-interpreter's work by a senior imagery analyst. After an internal review by the mapping contractors, the draft data were provided to the DNR. The DNR and other stakeholders reviewed these data using an online review tool. Comments from this process were reviewed by the NWI project manager and forwarded to the mapping contractor for revision as needed. In addition to manual review, a series of automated GIS checks were also performed. This included the use of the USFWS QAQC toolbox in ArcGIS.

Once the data passed all the manual and automated checks, the final data were submitted to the DNR. The DNR reviewed these data for completeness and repeated the automated checks. Finally, the DNR conducted a classification accuracy assessment by comparing the NWI data to an independent set of field validation data acquired by the University of Minnesota specifically for this project. Statewide there

were more than 7,000 field validation data points. The final NWI data were found to have an accuracy of 91% for identifying wetlands and an accuracy of 74% for assigning wetland classes.

Classification Systems

There are many types of wetlands in Minnesota. Likewise, there are numerous wetland classification systems. The Minnesota updated NWI data includes four different classification systems. The DNR created four layer files that symbolize the GIS data using these different classification systems. The data can be displayed based on (1) the Cowardin wetland classification, (2) the USFWS Circular 39 classification, (3) the simplified hydrogeomorphic classification system, and (4) the simplified plant community class.

Cowardin Classification

The principal classification system for the National Wetland Inventory and was originally described in detail by Cowardin et al. (1979). Minor revisions were published in 2013 by the Federal Geographic Data Commission (FGDC 2013).
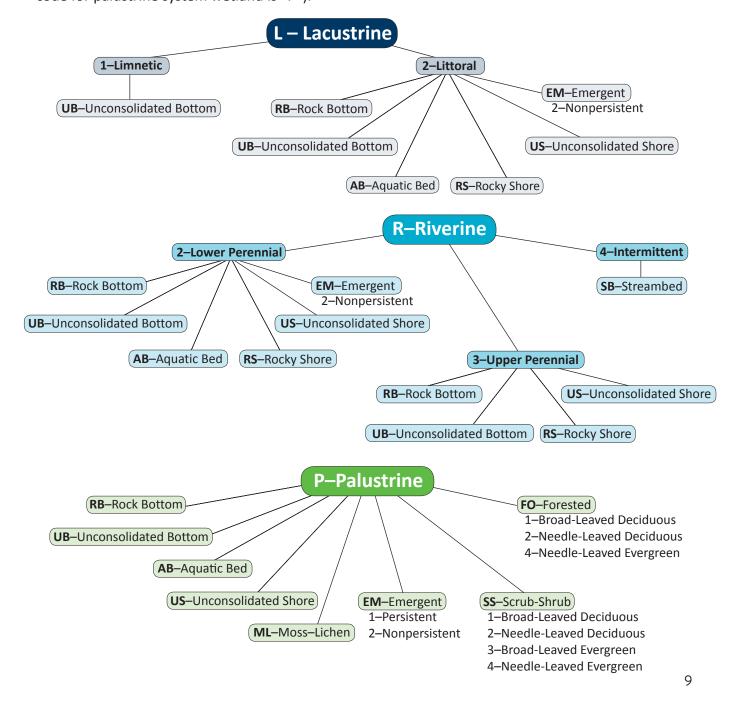
This classification system has multiple levels that nest within each other. The highest level is the ecological system. In Minnesota, this classification includes only three of these systems; riverine, lacustrine, and palustrine. Within the riverine and lacustrine systems there are also subsystems. For example, lacustrine (lake) systems are subdivided into littoral (shallow areas) and limnetic (deep areas). The next level includes classes based primarily on the plant community or the substrate if it lacks a plant community. The Cowardin classification system also provides information for the frequency, depth, and duration of flooding or saturation by water as well as potential modifier attributes to indicate a variety of special cases such as a wetland that is partially drained or ditched.

Because the NWI was originally a paper map, it was convenient to assign letter or number codes to represent each part of the classification system. They were appended into a single combined code, which could

be used as a concise label on a paper map. This was convenient and space saving; but, it makes the data hard to understand for those unfamiliar with these codes. The figure below shows the Cowardin classification system for wetland classes found in Minnesota, along with the letter and number codes (Figure 2).

Circular 39 Classification

The classification system known as Circular 39 is an older system developed primarily for the inventory and classification of waterfowl habitat (Shaw and Fredine, 1956). Wetlands are classified based on the frequency and depth of inundation as well as vegetation community. This classification system has 20 different wetland types, of

Figure 2. Schematic diagram showing a portion of the Cowardin classification system for wetlands and deepwater habitat. Coded values are given next to the descriptive classification (e.g., the code for palustrine system wetland is "P").

which eight are present in Minnesota (Table 2). The types are numbered and named.

Table 2. Circular 39 wetland types in Minnesota

Type Number	Type Name
1	Seasonally flooded basins or flats
2	Inland fresh meadows
3	Inland shallow fresh marshes
4	Inland deep fresh marshes
5	Inland open fresh water
6	Shrub swamp
7	Wooded swamp
8	Bogs
80	Municipal and industrial ponds
90	Rivers and streams

The use of this wetland classification system has declined in recent decades in favor of the other three classification systems incorporated in the Minnesota NWI. There are still some statutory references to the Circular 39 wetland types (e.g., Minnesota Statutes, Section 103G.005 – Public Water Inventory). Therefore, we have included it in the updated NWI. The Circular 39 wetland attributes were added using a standardized attribute crosswalk that matches the Cowardin classification attributes to one of the eight Circular 39 wetland types. Two additional codes were created for the NWI because the Circular 39 classification system doesn't include municipal and industrial ponds or rivers and streams.

Simplified Hydrogeomorphic Classification

The hydrogeomorphic (HGM) classification system is a wetland classification system developed by Mark Brinson (1993) for the U.S. Army Corps of Engineers. This system classifies wetlands not based on their plant communities, but rather based on their geomorphic setting (i.e., landscape position), water source, and hydrodynamics. Water flows and wetland landscape position are closely linked. This system defined seven broad wetland classes, six of which occur in Minnesota. These types include wetlands that are depressional, riverine, lacustrine fringe, mineral flats, organic flats, and slopes. These wetland classes are frequently divided further into subclasses that are correlated to key wetland functions.

Brinson's HGM system was adapted by Ralph Tiner for inclusion in remote sensing based wetland inventories like the NWI. This system classifies wetlands based on their landscape position, landform, waterbody type, and water flow path (LLWW). In Minnesota, we have incorporated a simplified version of Tiner's classification system (Table 3).

Table 3. Simplified hydrogeomorphic wetland classes in Minnesota

Landscape Position	Landform/Waterbody	Water Flow Path
Lentic (LE)	Basin (BA)	Inflow (IN)
Lotic (LO)	Flat (FL)	Outflow (OU)
Terrene (TE)	Floodplain (FP)	Throughflow (TH)
	Fringe (FR)	Bi-directional non-tidal (BI)
	Island (IL)	Vertical (VR)
	Peatlands (PT)	
	Slope (SL)	
	Lake (LK)	
	Pond (PD)	
	River (RV)	

Use of the HGM and LLWW classifications have increased in recent years due to the need to assess wetland functions. State and federal wetland policy aim to achieve no net-loss of quantity or quality of wetlands. For policy and regulatory purposes, the quality of wetlands is usually defined by the function or ecosystem services that they provide. Therefore, wetland protection and replacement efforts frequently require assessment of these functions. These classification methods provide a means to conduct these assessments.

NWISTORIES ⓘ

Flood Storage Analysis
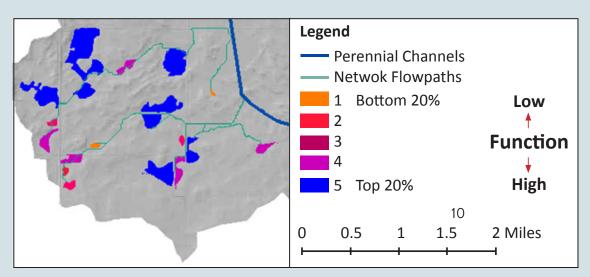
Floods are one of the most common types of disasters in Minnesota. Flooding from heavy rain or snowmelt events causes significant damage and the frequency of such events appears to be increasing. Wetlands can play a vital role in mitigating such damage. Depressional wetlands can temporarily store runoff and slowly release it over time, reducing flood peaks.

The St. Croix Watershed Research Station (SCWRS) has combined the NWI data with high-resolution elevation data from lidar to evaluate the runoff storage capacity of wetlands on a watershed wide basis. The overall effectiveness of flood storage for wetlands for a given watershed depends on not only wetland size (area, depth,

and volume), but also their hydrologic connections with each other. Researchers at SCWRS modeled wetland connectivity networks for a set of study watersheds comprising over 2 million acres in Southern Minnesota. They calculated available storage volume, direct drainage area for wetlands, and then simulated each wetland's fill-and-spill response to runoff for various design storms. The results from this can be used to estimate the existing flood storage capacity for wetlands as well as to help identify areas that could use additional flood storage capacity.

-Jason Ulrich,
Assistant Scientist
St. Croix Watershed Research Station

Legend

— Perennial Channels
— Netwok Flowpaths

■ (orange)	1	Bottom 20%
■ (red)	2	
■ (dark pink)	3	
■ (magenta)	4	
■ (blue)	5	Top 20%

Low
↑
Function
↓
High

0   0.5   1   1.5   2 Miles

Simplified Plant Community Classification

The fourth wetland classification system that has been incorporated into the updated NWI for Minnesota is based on the Wetland Plants and Plant Communities of Minnesota and Wisconsin (Eggers & Reed 2011). This system describes 15 different wetland plant communities and provides a dichotomous key to classify wetlands accordingly. Some of the distinctions between these plant community classes are difficult to assess reliably using remote sensing data. For the NWI, we have simplified this system to nine vegetated classes and one non-vegetated aquatic class (Table 4).

Eggers and Reed has found use in the wetland management community, particularly with regard to quantifying potential wetland impact and setting wetland replacement goals.

Table 4. simplified plant community classes in Minnesota

Simplified Plant Community Class
Seasonally flooded/saturated emergent wetland
Shallow marsh
Deep marsh
Shallow open water community
Non-vegetated aquatic community
Coniferous wetland
Hardwood wetland
Shrub wetland
Bog
Artificially flooded
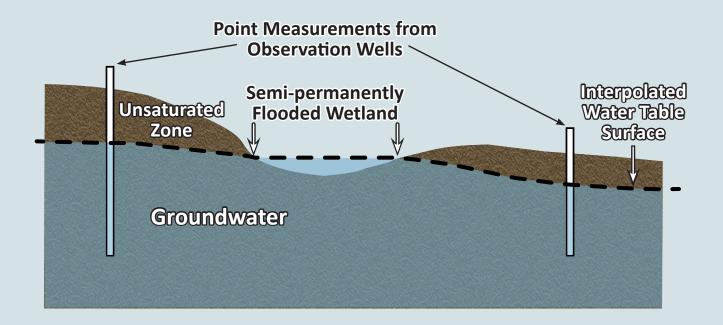
Mapping Groundwater

The water table is defined as the surface below which sediment is saturated with groundwater. Water-table elevation and depth to water table are important considerations in construction projects and land use programs. The groundwater portion of the County Geologic Atlas uses selected wetlands from the NWI as an input for water-table elevation maps. The wetlands extracted from the NWI are important for filling in data gaps from other sources. Wetlands that are flooded semi-permanently to permanently are usually closely connected to the water table. The

NWI provides information on the size and location of wetlands as well as information on water regime. The County Geologic Atlas extracts the shoreline for these wetland features and combines with other sources such as measured water-table elevations from the DNR's groundwater monitoring well network. Water-table elevations in between these input data are interpolated using GIS.

-Todd Petersen
Hydrogeologist, Minnesota DNR

Point Measurements from Observation Wells

Unsaturated Zone

Semi-permanently Flooded Wetland

Interpolated Water Table Surface

Groundwater

Three-fourths of all Minnesota's remaining wetlands are located in the northeast (roughly north of Interstate 94 and east of U.S. Highway 59).

More Information from the DNR

GIS metadata–provides an overview of the NWI dataset along with important technical information. Metadata for the National Wetlands Inventory Update for Minnesota can be found on the Minnesota Geospatial Commons - https://gisdata.mn.gov/dataset/water-nat-wetlands-inv-2009-2014

Technical procedures documents–Links to the detailed technical procedures used in each of five mapping phase are provided on the NWI project web page of the DNR's website - https://www.dnr.state.mn.us/eco/wetlands/nwi_proj.html

References

Brinson, M.M. 1993. A Hydrogeomorphic Classification for Wetlands. U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS Technical Report WRP-DE-4. https://wetlands.el.erdc.dren.mil/pdfs/wrpde4.pdf

Cowardin L.M., Carter V., Golet F.C. and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service Report No. FWS/OBS/-79/31, Washington. https://www.fws.gov/wetlands/Documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States.pdf

Eggers, S.D. and D.M. Reed. 2015. Wetland Plants and Plant Communities of Minnesota and Wisconsin (Version 3.2). US. Army Corps of Engineers, St. Paul District, St. Paul, MN. https://usace.contentdm.oclc.org/digital/collection/p266001coll1/id/2801/

FGDC. 2009. Wetlands mapping standard, Document number FGDCSTD-015-2009. US Geological Survey Federal Geographic Data Committee, Reston. https://www.fgdc.gov/standards/projects/wetlands-mapping/2009-08%20FGDC%20Wetlands%20Mapping%20Standard_final.pdf

FGDC. 2013. Classification of wetlands and deepwater habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC. https://www.fgdc.gov/standards/projects/wetlands/nwcs-2013

Shaw, S. P., and C. G. Fredine. 1956. Wetlands of the United States: Their extent and values to Waterfowl and other wildlife. Washington D. C. Department of the Interior, Fish and Wildlife Service, Office of River Basin Studies. Circular 39. https://archive.org/details/wetlandsofunited00shaw/page/n0

Tiner, R.W. 2014. Keys to Waterbody Type and Hydrogeomorphic-Type Wetland Descriptors for U.S. Waters and Wetlands: Version 3.0. U.S. Fish and Wildlife Service, Northeast Region, Hadley, MA. https://www.fws.gov/wetlands/Documents/Dichotomous-Keys-and-Mapping-Codes-for-Wetland-Landscape-Position-Landform-Water-Flow-Path-and-Waterbody-Type-Version-3.pdf.

Wildlife Habitat Surveys

There are numerous state and federal programs, as well as non-profit conservation organizations, dedicated to protecting wildlife and wildlife habitat. The NWI data have been frequently used for assessing habitat and population health of wetland dependent species. One example of this type of use is in designing duck surveys. These surveys provide essential information for waterfowl managers.

Wildlife research biologists Hannah Specht and Todd Arnold from the University of Minnesota, in collaboration with Ducks Unlimited and the USFWS, have used the NWI to identify characteristics of wetlands that correspond to whether they're used by waterfowl. Their research relied on developing correlations between waterfowl observations and basin-specific habitat characteristics including wetland size, edge complexity, water regime, and adjacent land cover. The wetland variables were derived from the NWI. Wetland size is positively correlated to duck abundance. The degree of edge complexity (the ratio of the wetland perimeter to the perimeter of a circle with the same area) is correlated to the amount of shallow water habitat used by dabbling ducks. Dabbling ducks also show a preference for seasonally flooded wetlands during certain times. As a result, wetland management efforts for waterfowl can be focused on wetlands most likely to be occupied.

-Dr. Hannah Specht,
Postdoc, University of Montana
PhD in Conservation Sciences,
University of Minnesota

There are 2.9 million acres of lacustrine (lake) habitat in Minnesota.

Additional Tables

1 Crosswalk table from Cowardin classification codes to the simplified plant community classification

2 Crosswalk table from Tiner's LLWW codes to Brinson's hydrogeomorphic classification

3 Crosswalk table from Cowardin classification codes to Circular 39 wetland types

1 **Crosswalk table from Cowardin classification codes to the simplified plant community classification**

Simplified Plant Community Class	Cowardin Codes
Coniferous Bog	PFO2Dq, PFO4Dq
Coniferous Wetland	PFO2D, PFO4D
Deep Marsh	PEM2G, L2EM2G, L2EM2H, PEM2H, R2EM2G, R2EM2H
Hardwood Wetland	PFO1A, PFO1C, PFO1D
Non-Vegetated Aquatic Community	L1UBH, L2RSC, L2USA, L2USC, PUSA, PUSC, R2UBF, R2UBG, R2UBH, R2USA, R2USC, R3UBG, R4SBA, R4SBC, L2UBF, L2UBG, L2UBH, PUBF, PUBG, PUBH
Open Bog	PEM1Dq, PSS1Dq, PSS2Dq, PSS3Dq, PSS4Dq
Seasonally Flooded/Saturated Emergent Wetland	PEM1A, PEM1D
Shallow Marsh	L2EM2F, PEM1C, PEM1F, PEM2F, R2EM2F
Shallow Open Water Community	L1ABH, L2ABF, L2ABG, L2ABH, PABH, R2ABG, R2ABH, PABF, PABG
Shrub Wetland	PSS1A, PSS1C, PSS1D, PSS1F, PSS2D, PSS3D, PSS4D
Artificially Flooded Hardwood Wetland	PFO1K
Artificially Flooded Non-Vegetated Aquatic Community	L1UBK, PUSK, L2UBK, PUBK
Artificially Flooded Shallow Marsh	PEM1K
Artificially Flooded Shallow Open Water Community	L2ABK, PABK
Artificially Flooded Deep Marsh	L2EM2K, PEM2K
Artificially Flooded Shrub Wetland	PSS1K, PSS3K

The relationship between these two classification systems is an approximation. It is not possible to equate these two systems directly because the criteria used to establish these classification systems are different. Shaded values are for artificially flooded wetland systems.

2 **Crosswalk table from Tiner's LLWW codes to Brinson's hydrogeomorphic classification**

HGM	Landscape-Landform (LLWW)
Depression	TEBA, TEFR, TEIL, TEPD
Lentic	LEBA, LEFL, LEFR, LEIL, LELK, LEPD
Lotic	LOBA, LOFL, LOFP, LOFR, LOIL, LOLK, LOPD, LORV, LOST
Mineral Flat	TEFL
Peatland	TEPT
Slope	TESL

The relationship between these two classification systems is an approximation. It is not possible to equate these two systems directly because the criteria used to establish these classification systems are different. The crosswalk relationship between these two systems only depends on the landscape position and landform and not the water flow path.

3 **Crosswalk table from Cowardin classification codes to Circular 39 wetland types**

Circular 39 Type	Description	Cowardin Codes
1	Seasonally Flooded Basin or Flat	PEM1A, PFO1A
2	Wet Meadow	PEM1D
3	Shallow Marsh	PEM1C, PEM1F, PUSA, PUSC
4	Deep Marsh	PABF, PABG, PEM2F, PEM2G, PEM2H, PUBF, L2ABF, L2EM2F
5	Shallow Open Water	L1ABH, L1UBH, L2ABG, L2ABH, L2EM2G, L2EM2H, L2RSC, L2USA, L2USC, L2UBF, L2UBG, L2UBH, PABH, PUBG, PUBH
6	Shrub Swamp	PSS1A, PSS1C, PSS1D, PSS1F, PSS2D, PSS4D
7	Wooded Swamp	PFO1C, PFO1D, PFO2D, PFO4D
8	Bog	PEM1Dq, PFO2Dq, PFO4Dq, PSS1Dq, PSS2Dq, PSS3Dq, PSS4Dq
80	Artificially Flooded	L1UBK, L2ABK, L2EM2K, L2UBK, PABK, PEM1K, PEM2K, PFO1K, PSS1K, PSS3K, PUBK, PUSK
90	Riverine	R2ABG, R2ABH, R2EM2F, R2EM2G, R2EM2H, R2UBF, R2UBG, R2UBH, R2USA, R2USC, R3UBG, R3UBH, R4SBA, R4SBC

The relationship between these two classification systems is an approximation. It is not possible to equate these two systems directly because the criteria used to establish these classification systems are different. Shaded values are for systems that are not covered by the Circular 39 wetland classification system.

Minnesota Wetland Inventory:
Summary Statistics

Wetland Acreage by County—Cowardin Classification

County	Lacustrine		Palustrine			
	Limnetic (Deepwater)[1]	Littoral	Aquatic Bed	Emergent	Forested	Scrub-Shrub
Aitkin	85,585	21,054	1,402	103,385	250,909	198,823
Anoka	2,505	8,646	1,100	42,503	12,882	13,124
Becker	36,368	44,871	2,529	99,958	30,254	26,496
Beltrami	311,744	43,111	786	194,043	306,646	388,063
Benton	778	939	330	25,349	5,760	8,106
Big Stone	9,644	14,978	210	37,910	1,145	602
Blue Earth	2,142	6,611	370	18,613	11,506	2,197
Brown	263	4,100	157	14,164	5,566	1,695
Carlton	3,200	4,326	308	19,970	80,510	80,750
Carver	5,322	6,375	696	21,864	4,228	2,028
Cass	162,968	79,704	4,651	131,466	125,540	117,133
Chippewa	1,727	2,027	263	12,576	3,542	1,965
Chisago	6,184	7,937	567	29,198	14,856	11,450
Clay	711	5,653	651	40,596	6,474	4,433
Clearwater	5,004	12,702	786	93,077	39,454	66,911
Cook	49,651	38,214	762	16,677	106,981	39,065
Cottonwood	785	4,463	141	14,435	1,740	568
Crow Wing	61,480	35,279	1,093	59,296	36,126	52,719
Dakota	1,315	3,398	1,009	13,674	8,428	2,201
Dodge		24	42	5,479	3,468	1,263
Douglas	25,631	30,063	809	50,876	6,396	5,385
Faribault	142	4,090	140	15,011	5,462	823
Fillmore		45	25	10,648	8,222	1,061
Freeborn	58	10,781	196	20,185	2,097	736
Goodhue	570	3,647	254	8,226	10,316	2,021
Grant	4,446	17,818	167	22,241	1,186	339
Hennepin	16,921	11,247	2,143	33,120	7,774	2,414
Houston		1,668	644	14,748	11,213	1,956
Hubbard	25,951	18,652	702	34,397	22,953	27,482
Isanti	2,029	5,560	1,125	36,395	21,477	18,575
Itasca	112,242	57,895	4,056	87,788	323,139	172,848
Jackson	1,465	9,229	424	17,877	1,359	871
Kanabec	2,165	3,160	766	33,756	13,609	27,580
Kandiyohi	20,587	20,352	861	44,739	3,815	3,429
Kittson	217	477	4	68,491	15,574	34,302
Koochiching	13,108	13,041	661	90,629	782,128	435,001
Lac qui Parle	4,825	4,281	266	39,606	3,372	1,314

Palustrine		Riverine		Total for All NWI Features	Total for Wetland Features	Total for Deepwater Features
Unconsolidated Bottom	Unconsolidated Shore	Riverine	Riverine (Deepwater)[1]			
3,873		39	9,985	675,056	579,486	95,570
2,629		4	2,792	86,185	80,889	5,297
9,908	3	3	909	251,300	214,023	37,277
3,828		250	6,913	1,255,385	936,729	318,656
685		4	2,313	44,265	41,174	3,091
3,668	6	15	361	68,539	58,534	10,005
1,132	4	143	4,753	47,472	40,577	6,895
585	7	90	2,072	28,698	26,364	2,335
2,190		5	3,567	194,825	188,059	6,767
1,507		20	1,400	43,440	36,718	6,723
6,160		549	5,603	633,775	465,204	168,571
695	2	20	1,332	24,148	21,089	3,059
1,214		10	2,380	73,796	65,232	8,564
4,802	3	31	1,870	65,223	62,643	2,580
6,191	3	26	1,135	225,290	219,150	6,140
7,816		367	2,789	262,321	209,882	52,439
835	5	58	1,343	24,373	22,245	2,128
3,704		616	5,213	255,526	188,833	66,693
2,600		37	6,093	38,754	31,346	7,408
317	6	8	862	11,471	10,609	862
6,510	2		468	126,139	100,040	26,099
600	5	5	2,020	28,298	26,137	2,162
717	3	247	2,240	23,209	20,969	2,240
1,220	9	1	581	35,864	35,225	639
501		71	10,880	36,486	25,036	11,450
3,013	13		484	49,708	44,778	4,930
3,545	6	9	3,110	80,289	60,258	20,031
730	17	866	4,543	36,386	31,843	4,543
3,594		224	1,667	135,620	108,002	27,617
1,299	<1	13	1,429	87,902	84,445	3,458
9,375		641	8,908	776,892	655,742	121,150
1,018		26	1,376	33,644	30,804	2,841
1,352		20	2,213	84,623	80,245	4,378
3,853	12	33	454	98,135	77,093	21,041
1,301	1	25	1,975	122,367	120,174	2,193
6,323	<1	22	12,684	1,353,598	1,327,806	25,792
1,235	3	13	1,785	56,700	50,090	6,610

Wetland Acreage by County—Cowardin Classification (continued)

County	Lacustrine		Palustrine			
	Limnetic (Deepwater)[1]	Littoral	Aquatic Bed	Emergent	Forested	Scrub-Shrub
Lake	49,815	59,640	2,118	33,329	239,585	84,761
Lake of the Woods	271,640	34,297	81	79,980	242,666	325,965
Le Sueur	6,878	8,547	425	25,961	6,459	1,910
Lincoln	3,614	5,069	52	28,895	1,202	351
Lyon	1,025	4,585	93	22,231	3,342	679
Mahnomen	3,864	11,095	538	51,837	4,794	9,290
Marshall	23	9,822	86	103,132	46,190	81,307
Martin	2,800	10,483	188	11,500	3,009	664
McLeod	1,343	6,771	167	20,021	3,591	867
Meeker	8,844	13,697	442	37,411	7,121	3,105
Mille Lacs	60,834	6,726	475	45,020	21,508	38,175
Morrison	6,369	5,584	1,843	93,625	20,709	48,123
Mower	32	143	56	7,671	4,146	553
Murray	2,432	7,147	157	25,601	1,149	451
Nicollet	744	4,176	151	16,772	6,424	3,556
Nobles	739	4,030	110	19,682	329	234
Norman		443	71	18,456	8,694	3,422
Olmsted	274	768	44	11,175	8,679	966
Otter Tail	81,382	86,619	2,828	137,320	27,290	44,005
Pennington		448	27	24,177	9,731	8,027
Pine	6,727	4,600	841	82,217	73,113	110,344
Pipestone		111	6	18,295	118	112
Polk	2,996	13,939	1,109	84,779	18,807	22,153
Pope	12,068	21,236	353	49,291	4,150	3,612
Ramsey	4,122	3,846	512	4,983	1,595	1,149
Red Lake		371	4	8,686	6,973	3,962
Redwood	134	949	123	11,050	4,061	1,325
Renville	840	1,817	195	11,586	3,551	2,108
Rice	5,867	5,518	1,222	21,777	2,262	1,725
Rock		114	24	13,478	806	240
Roseau	117	2,159	64	131,706	96,207	160,301
Scott	2,513	5,042	988	23,029	6,820	2,514
Sherburne	2,365	5,380	1,137	29,770	12,359	10,008
Sibley	43	5,977	103	16,990	4,348	1,332
St. Louis	196,652	124,085	4,308	139,278	718,590	434,269
Stearns	14,038	12,706	3,352	81,906	17,808	17,090
Steele	94	1,051	101	11,439	2,440	1,086
Stevens	1,372	10,053	108	23,002	1,094	351

Palustrine		Riverine		Total for All NWI Features	Total for Wetland Features	Total for Deepwater Features
Unconsolidated Bottom	Unconsolidated Shore	Riverine	Riverine (Deepwater)[1]			
7,748		457	4,409	481,862	427,638	54,224
1,023	9	420	2,915	958,995	684,440	274,555
1,128	19	45	1,528	52,900	44,493	8,407
1,228	2	125	505	41,045	36,925	4,120
1,390	6	29	1,237	34,617	32,355	2,262
3,923		<1	824	86,164	81,476	4,688
2,145	24	6	3,231	245,967	242,712	3,255
751	3	8	1,118	30,525	26,607	3,918
1,479	4	1	992	35,235	32,900	2,335
1,846	18	8	870	73,362	63,647	9,715
1,232		10	2,215	176,196	113,147	63,049
2,467		316	6,236	185,272	172,666	12,606
523	1	5	1,182	14,313	13,098	1,214
1,336	4	51	957	39,285	35,896	3,389
705	4	68	1,865	34,463	31,855	2,609
783		83	837	26,827	25,251	1,576
809	6	53	2,075	34,031	31,955	2,075
859	34	123	1,350	24,273	22,649	1,624
19,280	18	30	1,967	400,738	317,389	83,348
440	7	5	1,210	44,072	42,862	1,210
3,991		237	7,265	289,334	275,343	13,992
577	3	133	618	19,973	19,355	618
4,638	7	92	3,588	152,108	145,524	6,584
5,755	2	5	876	97,347	84,403	12,944
1,061		7	1,283	18,558	13,153	5,405
311		21	1,770	22,099	20,328	1,770
861	13	16	1,930	20,463	18,399	2,065
964	28	31	1,830	22,949	20,279	2,670
1,050		21	1,288	40,730	33,575	7,155
532	4	177	1,114	16,490	15,375	1,114
1,449	2	138	1,866	394,008	392,025	1,983
1,773		45	1,716	44,440	40,212	4,229
1,528	1	14	3,196	65,758	60,198	5,561
779	22	92	1,585	31,271	29,643	1,628
21,354		2,405	21,639	1,662,579	1,444,288	218,291
3,147	1	41	6,316	156,405	136,051	20,354
790	17	4	494	17,516	16,928	587
2,106	<1		383	38,469	36,714	1,754

Wetland Acreage by County—Cowardin Classification (continued)

County	Lacustrine		Palustrine			
	Limnetic (Deepwater)[1]	Littoral	Aquatic Bed	Emergent	Forested	Scrub-Shrub
Swift	816	5,563	128	29,955	3,823	1,982
Todd	12,372	8,309	2,108	75,686	15,941	35,091
Traverse	4,889	5,079	107	12,270	1,022	139
Wabasha	261	2,777	515	8,015	9,661	1,301
Wadena	980	1,407	298	31,826	15,390	37,997
Waseca	2,706	2,742	117	14,783	2,956	759
Washington	5,547	6,936	1,612	15,013	3,428	3,107
Watonwan	197	2,582	53	6,265	2,920	224
Wilkin		215	100	24,975	1,459	758
Winona	98	1,354	401	8,573	9,076	1,079
Wright	18,459	15,531	2,247	48,060	10,554	3,850
Yellow Medicine	121	3,239	103	21,769	3,752	601
Total	**1,776,778**	**1,111,199**	**63,385**	**3,497,216**	**4,017,805**	**3,272,710**

[1] Deepwater habitats include all lacustrine limnetic features (L1) and riverine unconsolidated bottom features (R2UB and R3UB)

Note: The acreage summary data shown here include some features that are either not natural or do not fit traditional concepts of wetlands or deepwater habitats, such as mine pits, sewage lagoons, and rice farms. The acreage of these features is relatively insignificant on a statewide scale, and can be further identified by consulting the full NWI data available through the Geospatial Commons.

Palustrine		Riverine		Total for All NWI Features	Total for Wetland Features	Total for Deepwater Features
Unconsolidated Bottom	Unconsolidated Shore	Riverine	Riverine (Deepwater)[1]			
1,334	6	9	1,191	**44,806**	**42,799**	**2,007**
1,739			2,430	**153,677**	**138,875**	**14,802**
909	8	28	583	**25,033**	**19,561**	**5,472**
532	9	1,243	11,473	**35,787**	**24,053**	**11,734**
724		22	2,488	**91,132**	**87,664**	**3,468**
507	6	2	766	**25,345**	**21,873**	**3,472**
2,397	5	98	8,831	**46,974**	**32,596**	**14,378**
498		5	1,073	**13,818**	**12,547**	**1,271**
769	3	1	1,486	**29,766**	**28,281**	**1,486**
584	14	1,456	6,721	**29,355**	**22,535**	**6,819**
2,634		14	2,988	**104,337**	**82,891**	**21,447**
1,105	12	116	1,575	**32,394**	**30,697**	**1,697**
228,021	**431**	**12,828**	**258,390**	**14,238,764**	**12,203,596**	**2,035,168**

Wetland Acreage by Watershed—Cowardin Classification

Watershed	Lacustrine		Palustrine			
	Limnetic (Deepwater)[1]	Littoral	Aquatic Bed	Emergent	Forested	Scrub-Shrub
Lake Superior - North (1)	33,705	24,059	495	16,365	126,580	38,058
Lake Superior - South (2)	260	3,047	386	7,547	48,008	17,093
St. Louis River (3)	20,000	25,144	963	55,510	414,792	280,679
Cloquet River (4)	11,061	16,831	465	14,351	94,613	41,703
Nemadji River (5)	788	833	41	5,006	22,500	18,745
Mississippi Riv - Headwaters (7)	123,710	50,208	989	82,715	126,735	91,040
Leech Lake River (8)	110,952	54,822	1,181	66,302	77,666	54,554
Mississippi Riv - Grand Rapids (9)	44,296	33,289	2,518	77,733	232,659	184,769
Mississippi Riv - Brainerd (10)	34,114	21,288	2,521	109,603	94,104	102,899
Pine River (11)	35,195	22,582	1,894	36,050	31,293	37,983
Crow Wing River (12)	41,589	38,880	3,217	106,444	41,175	85,796
Redeye River (13)	2,617	5,445	727	64,440	25,284	48,420
Long Prairie River (14)	25,695	15,756	1,503	67,776	14,656	25,562
Mississippi Riv - Sartell (15)	5,564	7,091	1,541	78,026	18,417	30,708
Sauk River (16)	15,642	13,328	2,558	60,624	7,649	11,661
Mississippi Riv - St. Cloud (17)	9,840	12,168	2,622	74,355	21,294	20,309
North Fork Crow River (18)	33,662	27,544	2,310	103,044	18,593	11,431
South Fork Crow River (19)	9,922	19,402	792	50,575	7,658	2,439
Mississippi Riv - Twin Cities (20)	23,178	18,945	2,965	50,644	12,983	8,654
Rum River (21)	128,053	18,570	2,457	109,375	55,386	69,087
Minnesota Riv - Headwaters (22)	14,625	17,850	389	56,662	2,499	2,123
Pomme de Terre River (23)	11,985	35,328	577	41,505	2,998	1,521
Lac Qui Parle River (24)	620	2,953	178	34,920	3,115	660
Minn River - Yellow Med Riv (25)	4,518	10,595	454	52,455	9,735	3,133
Chippewa River (26)	21,886	48,368	1,118	106,273	10,271	5,085
Redwood River (27)	2,746	3,978	114	20,547	2,333	652
Minnesota River - Mankato (28)	2,973	10,136	440	36,361	16,084	7,890
Cottonwood River (29)	789	4,258	208	26,228	5,882	772
Blue Earth River (30)	2,576	8,279	292	20,245	10,124	1,617
Watonwan River (31)	823	6,187	118	14,175	4,620	524
Le Sueur River (32)	3,510	10,423	383	28,618	8,265	1,446
Lower Minnesota River (33)	6,910	21,638	2,636	75,599	21,252	7,322
Upper St. Croix River (34)	222	824	378	27,244	34,237	47,624
Kettle River (35)	6,321	4,469	596	44,175	71,525	90,338
Snake River (36)	3,685	3,875	886	67,077	48,933	67,497
Lower St. Croix River (37)	11,343	15,785	1,891	59,913	24,697	22,267

Palustrine		Riverine		Total for All NWI Features	Total for Wetland Features	Total for Deepwater Features
Unconsolidated Bottom	Unconsolidated Shore	Riverine	Riverine (Deepwater)[1]			
5,775		411	3,348	248,796	211,743	37,053
1,685		28	1,039	79,093	77,794	1,299
7,082		421	12,734	817,324	784,591	32,734
2,099		5	2,473	183,601	170,068	13,534
982		5	995	49,894	48,111	1,783
5,351		1,140	4,855	486,743	358,178	128,565
3,122		53	2,713	371,367	257,702	113,664
5,491		57	8,959	589,770	536,515	53,255
4,655		711	10,639	380,533	335,780	44,753
2,577		198	1,812	169,584	132,578	37,007
6,714	<1	278	4,932	329,025	282,504	46,521
2,443	6		1,250	150,632	146,765	3,867
3,460			1,866	156,273	128,712	27,561
2,215		151	5,669	149,384	138,150	11,233
2,245	1	12	3,541	117,260	98,077	19,183
3,321	13	38	6,250	150,210	134,119	16,091
5,090	12	46	3,525	205,258	168,071	37,187
2,820	5	10	2,047	95,669	83,700	11,969
6,433	11	111	12,649	136,572	100,746	35,827
4,016	<1	25	5,463	392,433	258,917	133,516
4,545	13	17	1,046	99,769	84,098	15,671
7,140	10	11	927	102,003	89,091	12,912
1,262	5	69	1,457	45,239	43,162	2,077
3,468	38	187	4,255	88,838	80,066	8,773
12,364	9	17	2,483	207,873	183,504	24,369
1,062	3	27	1,231	32,693	28,716	3,978
1,986	38	146	4,938	80,992	73,082	7,911
1,395	8	136	2,631	42,307	38,887	3,420
1,194	8	28	4,222	48,585	41,787	6,798
846	1	21	1,837	29,152	26,492	2,660
1,352	8	66	2,858	56,930	50,561	6,369
5,873	25	194	6,459	147,909	134,540	13,370
1,191			2,864	114,583	111,497	3,086
3,098		<1	4,123	224,646	214,202	10,444
2,294		257	4,068	198,573	190,819	7,754
3,151		38	8,167	147,253	127,742	19,510

Wetland Acreage by Watershed—Cowardin Classification (continued)

Watershed	Lacustrine		Palustrine			
	Limnetic (Deepwater)[1]	Littoral	Aquatic Bed	Emergent	Forested	Scrub-Shrub
Mississippi Riv - Lake Pepin (38)	256	4,540	645	9,969	10,434	2,177
Cannon River (39)	13,011	10,996	1,523	50,860	11,583	4,632
Mississippi Riv - Winona (40)	98	4,048	795	12,801	12,273	1,886
Zumbro River (41)	535	1,406	173	17,632	16,044	2,735
Mississippi Riv - La Crescent (42)		742	197	2,961	2,141	523
Root River (43)		77	99	22,794	16,186	2,275
Mississippi River - Reno (44)		894	434	6,398	5,115	656
Upper Iowa River (46)		23	10	2,927	722	268
Upper Wapsipinicon River (47)				17		1
Cedar River (48)	32	1,772	72	10,283	4,019	737
Shell Rock River (49)	58	5,218	148	10,120	1,137	325
Winnebago River (50)		1,619	16	1,890	206	37
Des Moines Riv - Headwaters (51)	2,785	16,842	486	42,706	2,495	1,495
Lower Des Moines River (52)		118	7	635	323	41
East Fork Des Moines Riv (53)	292	3,920	32	3,149	497	126
Bois de Sioux River (54)	4,866	5,066	187	12,522	898	128
Mustinka River (55)	1,256	14,091	225	25,900	1,038	229
Otter Tail River (56)	96,727	81,894	2,903	111,493	23,367	23,302
Upper Red Riv of the North (57)		489	45	11,524	1,334	442
Buffalo River (58)	4,464	18,354	1,269	66,338	7,179	5,679
Red Riv of the N - Marsh Riv (59)		294	19	4,800	3,608	1,077
Wild Rice River (60)	7,969	20,487	1,085	94,264	19,243	26,624
Red Riv of the N - Sandhill Riv (61)	860	5,482	376	21,361	5,085	4,459
Upper/Lower Red Lake (62)	277,933	25,694	422	73,534	294,611	170,011
Red Lake River (63)	336	2,317	244	106,571	44,386	58,760
Thief River (65)	166	9,328	69	97,331	52,034	143,390
Clearwater River (66)	4,680	12,482	1,093	96,410	32,929	48,578
Red Riv of the N - Gr Marais Crk (67)		739	1	10,704	1,680	613
Snake River (68)		112	14	28,974	8,986	13,385
Red Riv of the N - Tamarac Riv (69)	23	579	7	28,088	12,500	20,304
Two Rivers (70)	217	595	2	81,279	23,113	49,786
Roseau River (71)	302	1,436	65	98,504	76,705	132,359
Rainy River - Headwaters (72)	111,737	91,767	2,790	41,221	203,898	93,406
Vermilion River (73)	53,539	26,283	869	23,609	83,690	39,203
Rainy River - Rainy Lake (74)	73,998	20,485	651	23,838	93,565	32,127
Rainy River - Black River (75)		<1	10	24,562	124,479	108,037
Little Fork River (76)	6,765	25,166	1,341	40,489	290,909	136,283

Palustrine		Riverine		Total for All NWI Features	Total for Wetland Features	Total for Deepwater Features
Unconsolidated Bottom	Unconsolidated Shore	Riverine	Riverine (Deepwater)[1]			
1,592	2	102	15,570	45,286	29,461	15,826
2,456	19	74	3,379	98,534	82,143	16,390
625	5	1,919	9,483	43,934	34,353	9,581
1,438	47	524	3,708	44,240	39,998	4,242
130	7	144	2,554	9,398	6,844	2,554
1,393	14	521	4,090	47,451	43,360	4,090
242	7	765	2,685	17,196	14,511	2,685
176	2	17	203	4,349	4,145	203
2			2	22	20	2
625	1	2	1,036	18,580	17,511	1,069
660	8	<1	307	17,981	17,616	365
115			89	3,971	3,882	89
2,346	9	65	2,700	71,928	66,443	5,485
103		11	257	1,495	1,238	257
131		1	174	8,322	7,856	466
735	7		592	25,002	19,544	5,458
2,074	5	25	568	45,411	43,587	1,824
16,961	13	35	2,244	358,938	259,967	98,971
757	2		1,159	15,751	14,592	1,159
7,553	4		1,391	112,231	106,376	5,856
256	3	<1	1,003	11,060	10,057	1,003
6,983	1	85	2,144	178,883	168,771	10,113
1,810	3	37	1,305	40,779	38,614	2,165
2,736		18	3,781	848,740	567,026	281,714
1,693	11	79	4,309	218,707	214,062	4,646
1,692	1	1	2,369	306,382	303,846	2,535
4,576	<1	27	1,748	202,524	196,096	6,428
429	6		1,110	15,282	14,172	1,110
519	22	4	885	52,901	52,016	885
716	2	1	1,481	63,701	62,197	1,504
1,156	<1	24	1,080	157,253	155,955	1,298
961	1	97	1,637	312,067	310,127	1,940
11,909		723	4,375	561,826	445,714	116,112
3,707		1,629	2,996	235,525	178,989	56,535
3,128		13	2,047	249,851	173,807	76,044
292			2,864	260,244	257,380	2,864
6,358			6,434	513,745	500,547	13,198

Wetland Acreage by Watershed—Cowardin Classification (continued)

Watershed	Lacustrine		Palustrine			
	Limnetic (Deepwater)[1]	Littoral	Aquatic Bed	Emergent	Forested	Scrub-Shrub
Big Fork River (77)	35,006	20,526	1,914	56,559	434,801	193,393
Rapid River (78)		20	22	67,454	158,159	313,408
Rainy River - Baudette (79)		218	39	14,832	49,398	74,049
Lake of the Woods (80)	271,582	34,608	37	35,356	117,087	122,926
Upper Big Sioux River (81)			1	1,967	14	21
Lower Big Sioux River (82)		111	2	16,239	126	139
Rock River (83)		309	33	29,165	964	377
Little Sioux River (84)	1,703	5,553	208	8,698	192	244
Total	**1,776,575**	**1,110,878**	**63,385**	**3,497,216**	**4,017,768**	**3,272,709**

[1] Deepwater habitats include all lacustrine limnetic features (L1) and riverine unconsolidated bottom features (R2UB and R3UB)

Note: The acreage summary data shown here include some features that are either not natural or do not fit traditional concepts of wetlands or deepwater habitats, such as mine pits, sewage lagoons, and rice farms. The acreage of these features is relatively insignificant on a statewide scale, and can be further identified by consulting the full NWI data available through the Geospatial Commons.

Palustrine		Riverine		Total for All NWI Features	Total for Wetland Features	Total for Deepwater Features
Unconsolidated Bottom	Unconsolidated Shore	Riverine	Riverine (Deepwater)[1]			
5,629	<1	89	7,100	**755,016**	**712,910**	**42,106**
462	<1		2,345	**541,873**	**539,527**	**2,345**
287	6	395	1,520	**140,745**	**139,225**	**1,520**
587	3	66	769	**583,022**	**310,671**	**272,351**
64		11	39	**2,116**	**2,077**	**39**
515	1	136	654	**17,922**	**17,268**	**654**
1,082	6	272	1,652	**33,861**	**32,208**	**1,652**
563		3	226	**17,389**	**15,460**	**1,929**
228,021	**431**	**12,829**	**258,390**	**14,238,203**	**12,203,238**	**2,034,964**

Wetland Acreage by County—Circular 39 Classification

County	1–Seasonally-Flooded Basin	2–Wet Meadow	3–Shallow Marsh	4–Deep Marsh	5–Shallow Open Water
Aitkin	19,673	46,370	36,866	823	111,756
Anoka	21,248	1,284	28,126	547	14,470
Becker	15,925	19,453	67,108	5,107	88,574
Beltrami	12,731	127,930	52,788	1,744	354,952
Benton	12,738	10,243	5,268	46	2,574
Big Stone	23,512	1,041	14,262	1,020	27,354
Blue Earth	17,939	732	7,065	644	9,503
Brown	13,138	1,041	3,453	462	4,484
Carlton	3,336	8,952	8,937	395	9,581
Carver	15,544	65	9,684	106	13,736
Cass	25,267	76,311	32,690	2,726	253,244
Chippewa	10,325	324	4,799	603	4,094
Chisago	24,177	2,865	11,419	237	15,586
Clay	14,545	11,394	17,877	2,604	8,889
Clearwater	7,000	51,088	28,501	2,891	21,930
Cook	556	7,117	9,172	775	95,737
Cottonwood	9,869	1,880	3,789	433	5,657
Crow Wing	9,594	31,391	20,233	2,053	101,340
Dakota	15,292	6	5,849	196	8,074
Dodge	5,476	1,930	236	146	227
Douglas	18,801	2,676	31,535	2,957	59,910
Faribault	14,496	402	4,039	256	4,453
Fillmore	10,370	4,756	472	507	275
Freeborn	14,699	1,311	5,757	600	11,582
Goodhue	12,059	3	3,769	66	4,863
Grant	9,877	714	11,726	879	24,210
Hennepin	19,807	225	20,340	224	33,616
Houston	8,026	2,110	7,524	547	2,489
Hubbard	6,561	15,878	11,183	2,067	48,746
Isanti	29,645	2,976	17,149	476	9,764
Itasca	13,276	20,329	58,117	2,335	176,706
Jackson	10,506	718	7,243	466	11,499
Kanabec	10,127	19,711	6,980	269	7,349
Kandiyohi	24,972	1,027	21,887	1,407	44,122
Kittson	15,699	33,565	23,174	788	1,082
Koochiching	8,354	43,660	44,433	1,242	31,591
Lac qui Parle	27,206	1,190	13,961	711	9,857

6–Shrub Swamp	7–Wooded Swamp	8–Bogs	Municipal-Industrial	Riverine	Total
134,349	89,540	215,572	10,082	10,024	**675,056**
12,723	2,728	2,162	102	2,796	**86,185**
21,526	13,105	19,495	94	912	**251,300**
241,807	105,547	343,701	7,023	7,163	**1,255,385**
7,997	2,660	298	123	2,317	**44,265**
602	246		127	376	**68,539**
2,197	4,387		109	4,896	**47,472**
1,695	2,105		160	2,161	**28,698**
61,135	33,975	64,813	129	3,572	**194,825**
2,021	752	48	64	1,420	**43,440**
82,360	34,591	120,221	215	6,152	**633,775**
1,965	672		14	1,352	**24,148**
10,793	2,902	3,266	161	2,390	**73,796**
4,419	3,254	17	323	1,901	**65,223**
59,277	18,497	27,635	7,309	1,162	**225,290**
26,468	16,659	102,666	16	3,155	**262,321**
568	643		133	1,401	**24,373**
39,399	16,834	28,476	377	5,829	**255,526**
2,201	912	26	70	6,129	**38,754**
1,263	1,310		12	870	**11,471**
5,087	3,826	730	150	468	**126,139**
823	1,541		263	2,024	**28,298**
1,061	3,275		6	2,488	**23,209**
736	524		74	582	**35,864**
2,020	2,698	14	43	10,951	**36,486**
337	710	2	770	484	**49,708**
2,373	376	171	39	3,119	**80,289**
1,956	8,318		6	5,409	**36,386**
23,231	5,829	20,111	124	1,891	**135,620**
17,756	3,274	5,398	22	1,443	**87,902**
124,315	97,409	267,628	7,229	9,549	**776,892**
871	769		171	1,401	**33,644**
25,422	7,933	4,556	42	2,233	**84,623**
3,429	680		125	487	**98,135**
34,302	11,627		129	2,000	**122,367**
158,744	136,519	915,537	813	12,706	**1,353,598**
1,314	625		38	1,798	**56,700**

Wetland Acreage by County—Circular 39 Classification (continued)

County	1–Seasonally-Flooded Basin	2–Wet Meadow	3–Shallow Marsh	4–Deep Marsh	5–Shallow Open Water
Lake	1,506	12,110	20,250	981	116,861
Lake of the Woods	2,266	65,427	13,494	854	306,124
Le Sueur	18,457	1,543	9,913	518	16,178
Lincoln	16,274	6,991	6,422	551	9,343
Lyon	14,490	3,253	6,907	542	6,407
Mahnomen	7,921	11,986	33,199	1,902	17,440
Marshall	13,994	53,908	38,035	1,533	10,324
Martin	9,255	342	3,368	279	13,852
McLeod	16,996	84	6,319	622	8,982
Meeker	25,288	936	17,059	1,004	23,778
Mille Lacs	12,501	27,293	9,231	440	68,992
Morrison	24,594	49,915	23,647	372	16,047
Mower	9,478	1,431	527	256	381
Murray	16,506	2,257	7,589	431	10,515
Nicollet	8,562	256	10,835	413	5,304
Nobles	14,099	2,528	3,223	238	5,221
Norman	8,789	5,752	7,434	553	666
Olmsted	8,573	7,064	633	374	1,559
Otter Tail	19,862	26,028	93,838	8,207	181,788
Pennington	8,259	11,822	4,581	385	153
Pine	27,049	45,655	19,422	1,115	15,505
Pipestone	8,999	7,750	1,573	316	238
Polk	29,264	23,677	34,761	2,515	19,078
Pope	16,122	3,745	30,706	2,709	36,539
Ramsey	2,242	109	3,627	40	9,452
Red Lake	7,147	3,642	1,304	208	164
Redwood	11,010	641	2,614	483	1,448
Renville	10,285	367	3,671	635	2,898
Rice	13,481	57	10,295	197	13,444
Rock	8,625	3,307	2,026	199	408
Roseau	11,971	96,815	26,242	1,454	2,443
Scott	17,841	89	10,380	233	9,921
Sherburne	21,702	956	16,671	479	10,058
Sibley	13,403	49	6,341	311	6,326
St. Louis	19,873	39,066	90,028	4,486	321,513
Stearns	57,970	5,192	29,730	231	32,508
Steele	10,674	686	2,053	320	1,695
Stevens	13,109	495	9,975	850	12,554

6–Shrub Swamp	7–Wooded Swamp	8–Bogs	Municipal-Industrial	Riverine	Total
49,595	38,944	235,080	1,668	4,866	**481,862**
192,305	97,919	276,729	542	3,335	**958,995**
1,910	2,524		284	1,573	**52,900**
351	412		69	631	**41,045**
679	928		145	1,266	**34,617**
7,608	2,241	2,965	78	824	**86,164**
78,463	38,693	7,179	601	3,237	**245,967**
664	1,546		92	1,126	**30,525**
867	217		156	993	**35,235**
3,100	1,235	30	54	878	**73,362**
34,278	12,574	8,443	220	2,225	**176,196**
43,583	10,483	9,937	142	6,552	**185,272**
553	382		117	1,187	**14,313**
451	403		126	1,009	**39,285**
3,556	3,547		58	1,933	**34,463**
234	161		203	920	**26,827**
3,422	5,177		110	2,129	**34,031**
966	3,617		13	1,474	**24,273**
42,049	19,211	7,491	268	1,997	**400,738**
8,027	8,758	1	872	1,214	**44,072**
92,144	26,351	54,297	295	7,501	**289,334**
112	94		139	751	**19,973**
21,771	12,098	1,159	4,104	3,680	**152,108**
3,511	2,654	251	229	881	**97,347**
1,145	580	18	54	1,291	**18,558**
3,962	3,566		314	1,791	**22,099**
1,325	856		139	1,946	**20,463**
2,108	842		283	1,861	**22,949**
1,725	187	18	17	1,310	**40,730**
240	330		63	1,291	**16,490**
136,259	63,801	52,824	194	2,004	**394,008**
2,507	1,528	8	174	1,761	**44,440**
9,860	1,979	759	83	3,210	**65,758**
1,332	1,567		265	1,677	**31,271**
280,624	151,095	709,175	22,675	24,044	**1,662,579**
16,700	4,144	2,995	578	6,357	**156,405**
1,086	483		22	498	**17,516**
349	518	2	234	383	**38,469**

Wetland Acreage by County—Circular 39 Classification (continued)

County	1–Seasonally-Flooded Basin	2–Wet Meadow	3–Shallow Marsh	4–Deep Marsh	5–Shallow Open Water
Swift	23,265	847	9,206	592	7,219
Todd	23,456	27,451	28,761	211	24,192
Traverse	7,014	351	5,387	400	10,548
Wabasha	8,993	981	3,813	533	3,537
Wadena	11,292	18,788	7,142	17	3,331
Waseca	12,631	288	4,494	344	5,727
Washington	8,093	465	8,477	245	16,269
Watonwan	5,772	59	2,137	146	3,092
Wilkin	12,008	7,854	6,085	309	634
Winona	7,016	2,264	2,844	476	1,947
Wright	32,297	438	24,802	305	38,521
Yellow Medicine	17,729	2,388	4,773	724	3,707
Total	**1,260,368**	**1,138,065**	**1,383,254**	**80,891**	**3,068,706**

6–Shrub Swamp	7–Wooded Swamp	8–Bogs	Municipal-Industrial	Riverine	Total
1,982	466		30	1,200	**44,806**
33,668	8,768	4,419	322	2,430	**153,677**
139	548		36	611	**25,033**
1,301	3,896		16	12,716	**35,787**
37,386	5,252	5,339	75	2,510	**91,132**
759	333		2	768	**25,345**
2,883	983	612	18	8,929	**46,974**
224	1,218		92	1,078	**13,818**
758	490		141	1,487	**29,766**
1,079	5,536		16	8,177	**29,355**
3,808	900	165	98	3,002	**104,337**
601	639		142	1,691	**32,394**
2,252,550	**1,187,926**	**3,522,434**	**73,351**	**271,218**	**14,238,764**

Wetland Acreage by Watershed—Circular 39 Classification

Watershed	1–Seasonally-Flooded Basin	2–Wet Meadow	3–Shallow Marsh	4–Deep Marsh	5–Shallow Open Water
Lake Superior - North (1)	728	7,450	8,485	795	63,309
Lake Superior - South (2)	900	3,134	3,902	279	3,426
St. Louis River (3)	11,654	18,168	32,690	1,187	48,186
Cloquet River (4)	1,443	3,938	9,739	357	30,120
Nemadji River (5)	641	1,686	2,951	358	2,286
Mississippi Riv - Headwaters (7)	12,640	31,017	38,492	2,782	179,324
Leech Lake River (8)	10,754	38,915	17,264	2,034	169,933
Mississippi Riv - Grand Rapids (9)	14,283	33,409	34,439	1,080	74,804
Mississippi Riv - Brainerd (10)	24,117	52,062	34,820	1,377	62,300
Pine River (11)	7,780	17,639	11,128	1,773	62,185
Crow Wing River (12)	21,139	56,534	33,751	2,370	89,264
Redeye River (13)	12,459	30,603	25,553	1,306	9,835
Long Prairie River (14)	17,377	22,070	31,235	1,575	44,687
Mississippi Riv - Sartell (15)	27,577	32,139	23,772	193	16,133
Sauk River (16)	37,105	2,398	26,565	282	33,288
Mississippi Riv - St. Cloud (17)	46,950	8,763	34,590	673	27,255
North Fork Crow River (18)	70,806	1,840	46,356	1,775	66,476
South Fork Crow River (19)	37,093	311	20,138	1,195	31,510
Mississippi Riv - Twin Cities (20)	28,117	575	32,344	454	50,983
Rum River (21)	53,847	40,032	35,465	1,174	152,393
Minnesota Riv - Headwaters (22)	33,701	1,901	23,008	1,525	35,772
Pomme de Terre River (23)	18,000	1,209	23,749	2,148	52,633
Lac Qui Parle River (24)	25,496	2,747	9,233	656	4,249
Minn River - Yellow Med Riv (25)	39,327	5,280	15,637	1,779	16,817
Chippewa River (26)	48,928	5,066	58,128	5,201	78,218
Redwood River (27)	13,466	2,728	5,951	555	7,274
Minnesota River - Mankato (28)	25,914	1,995	17,150	1,232	13,945
Cottonwood River (29)	21,023	3,111	6,862	641	5,693
Blue Earth River (30)	21,116	631	4,888	526	11,641
Watonwan River (31)	11,828	618	4,437	350	7,460
Le Sueur River (32)	23,706	747	10,264	728	14,661
Lower Minnesota River (33)	58,256	667	32,351	939	35,613
Upper St. Croix River (34)	8,504	13,137	9,259	347	2,496
Kettle River (35)	11,302	26,500	10,553	566	14,102
Snake River (36)	18,686	40,634	13,181	499	10,467
Lower St. Croix River (37)	39,555	6,420	28,407	736	31,636

6–Shrub Swamp	7–Wooded Swamp	8–Bogs	Municipal-Industrial	Riverine	Total
26,695	19,502	118,058	16	3,759	**248,796**
14,525	28,225	21,961	1,673	1,068	**79,093**
172,806	81,149	433,715	4,613	13,155	**817,324**
33,055	20,438	82,034		2,478	**183,601**
15,884	11,672	13,418		1,000	**49,894**
67,555	32,175	115,887	877	5,994	**486,743**
32,013	19,014	78,571	104	2,766	**371,367**
123,455	73,337	211,211	14,736	9,016	**589,770**
83,189	42,015	62,941	6,362	11,349	**380,533**
24,775	9,922	32,335	37	2,010	**169,584**
77,515	13,506	29,487	249	5,210	**329,025**
46,788	15,561	7,182	95	1,250	**150,632**
23,737	9,192	4,255	280	1,866	**156,273**
28,854	8,965	5,650	279	5,820	**149,384**
11,375	1,307	1,132	255	3,553	**117,260**
20,074	4,188	1,185	245	6,288	**150,210**
11,410	2,436	190	396	3,572	**205,258**
2,430	590	113	232	2,057	**95,669**
8,410	1,917	854	157	12,760	**136,572**
63,047	22,691	18,009	286	5,489	**392,433**
2,123	564		112	1,062	**99,769**
1,518	1,555	4	249	938	**102,003**
660	558		113	1,527	**45,239**
3,133	1,985		440	4,442	**88,838**
5,050	4,350	60	373	2,500	**207,873**
652	738		72	1,258	**32,693**
7,890	7,425		358	5,084	**80,992**
772	1,119		319	2,767	**42,307**
1,617	3,743		173	4,250	**48,585**
524	1,912		164	1,858	**29,152**
1,446	2,175		279	2,924	**56,930**
7,284	5,566	51	530	6,653	**147,909**
41,012	12,801	24,150	13	2,864	**114,583**
70,921	28,056	58,251	270	4,123	**224,646**
58,124	23,852	28,625	179	4,325	**198,573**
21,072	5,077	5,973	171	8,205	**147,253**

Wetland Acreage by Watershed—Circular 39 Classification (continued)

Watershed	1–Seasonally-Flooded Basin	2–Wet Meadow	3–Shallow Marsh	4–Deep Marsh	5–Shallow Open Water
Mississippi Riv - Lake Pepin (38)	12,831	136	4,756	165	6,806
Cannon River (39)	39,385	1,085	19,894	872	27,013
Mississippi Riv - Winona (40)	8,978	2,735	5,994	588	4,957
Zumbro River (41)	21,497	5,794	1,491	674	2,835
Mississippi Riv - La Crescent (42)	831	196	2,196	57	1,012
Root River (43)	20,435	10,009	1,602	981	566
Mississippi River - Reno (44)	1,719	559	4,592	228	1,339
Upper Iowa River (46)	2,565	844	75	109	80
Upper Wapsipinicon River (47)	16	1		1	
Cedar River (48)	11,348	588	1,974	308	2,095
Shell Rock River (49)	6,928	910	3,064	346	5,688
Winnebago River (50)	1,432	29	607	66	1,680
Des Moines Riv - Headwaters (51)	27,416	3,096	13,391	903	21,269
Lower Des Moines River (52)	686	60	93	14	97
East Fork Des Moines Riv (53)	2,361	39	986	37	4,318
Bois de Sioux River (54)	6,621	327	5,521	551	10,059
Mustinka River (55)	15,679	231	10,689	764	16,764
Otter Tail River (56)	14,980	13,949	85,338	7,537	190,928
Upper Red Riv of the North (57)	6,119	3,262	3,128	339	651
Buffalo River (58)	22,901	13,005	33,371	4,075	27,382
Red Riv of the N - Marsh Riv (59)	2,704	869	2,241	184	318
Wild Rice River (60)	18,253	25,888	54,275	3,425	32,945
Red Riv of the N - Sandhill Riv (61)	9,001	3,158	11,264	863	7,626
Upper/Lower Red Lake (62)	9,329	26,616	37,312	483	301,983
Red Lake River (63)	12,065	81,504	17,348	838	2,726
Thief River (65)	5,061	63,313	29,973	1,013	10,265
Clearwater River (66)	25,008	35,297	29,443	2,942	19,778
Red Riv of the N - Gr Marais Crk (67)	4,836	2,266	4,075	298	493
Snake River (68)	7,922	15,783	6,688	428	52
Red Riv of the N - Tamarac Riv (69)	8,940	13,843	7,095	423	824
Two Rivers (70)	12,144	51,579	20,564	877	1,007
Roseau River (71)	8,491	67,372	24,770	988	1,906
Rainy River - Headwaters (72)	1,687	11,921	28,010	1,646	216,995
Vermilion River (73)	1,258	4,798	17,635	1,005	81,995
Rainy River - Rainy Lake (74)	1,571	1,876	21,258	654	98,067
Rainy River - Black River (75)	459	19,457	5,021	161	140
Little Fork River (76)	6,354	12,927	24,125	907	27,120

6–Shrub Swamp	7–Wooded Swamp	8–Bogs	Municipal-Industrial	Riverine	Total
2,177	2,674	<1	70	15,672	**45,286**
4,632	2,065	30	105	3,453	**98,534**
1,886	7,370		24	11,401	**43,934**
2,733	4,939	2	45	4,232	**44,240**
523	1,887			2,697	**9,398**
2,275	6,949		22	4,611	**47,451**
656	4,651		3	3,450	**17,196**
268	168		21	220	**4,349**
1			1	2	**22**
737	392		99	1,038	**18,580**
325	362		49	307	**17,981**
37	28		3	89	**3,971**
1,495	1,306		287	2,765	**71,928**
41	119		116	269	**1,495**
126	259		20	174	**8,322**
128	544		658	592	**25,002**
229	344		118	593	**45,411**
21,327	13,305	9,068	228	2,279	**358,938**
442	351		301	1,159	**15,751**
5,443	3,545	925	193	1,391	**112,231**
1,077	2,596		67	1,004	**11,060**
22,210	8,005	11,491	163	2,229	**178,883**
4,424	3,026	36	40	1,342	**40,779**
94,469	68,819	298,159	7,771	3,799	**848,740**
56,868	34,304	7,641	1,026	4,389	**218,707**
132,697	43,222	18,454	13	2,370	**306,382**
46,437	18,342	12,318	11,184	1,775	**202,524**
613	1,193			397	1,110	**15,282**
13,098	6,884	632	526	889	**52,901**
20,283	10,539	193	78	1,482	**63,701**
49,736	19,289	866	86	1,104	**157,253**
107,694	43,179	55,774	158	1,734	**312,067**
47,692	18,774	229,904	101	5,097	**561,826**
26,820	22,824	72,676	1,889	4,626	**235,525**
19,245	29,829	75,272	20	2,059	**249,851**
25,782	27,003	179,356	1	2,864	**260,244**
78,203	54,698	291,103	11,875	6,434	**513,745**

Wetland Acreage by Watershed—Circular 39 Classification (continued)

Watershed	1–Seasonally-Flooded Basin	2–Wet Meadow	3–Shallow Marsh	4–Deep Marsh	5–Shallow Open Water
Big Fork River (77)	6,822	14,755	38,862	1,531	62,533
Rapid River (78)	1,648	57,027	9,504	348	157
Rainy River - Baudette (79)	1,135	12,198	2,377	244	250
Lake of the Woods (80)	1,880	27,147	7,591	569	306,250
Upper Big Sioux River (81)	898	1,043	29	61	4
Lower Big Sioux River (82)	7,575	7,508	1,191	272	211
Rock River (83)	18,995	6,751	3,956	408	881
Little Sioux River (84)	5,385	241	3,150	259	7,744
Total	**1,260,368**	**1,138,065**	**1,383,254**	**80,891**	**3,068,181**

6–Shrub Swamp	7–Wooded Swamp	8–Bogs	Municipal-Industrial	Riverine	Total
90,210	80,616	452,459	40	7,189	**755,016**
127,835	39,269	303,260	479	2,345	**541,873**
49,392	22,688	50,495	51	1,915	**140,745**
80,116	61,643	96,981	11	835	**583,022**
21	10			50	**2,116**
139	91		145	790	**17,922**
377	434		135	1,924	**33,861**
244	113		23	229	**17,389**
2,252,550	**1,187,924**	**3,522,399**	**73,351**	**271,219**	**14,238,203**

Wetland Acreage by County—Plant Community Classification

County	Artificially Flooded	Coniferous Bog	Deep Marsh	Hardwood Wetland	Non-Vegetated Aquatic Community
Aitkin	10,082	151,649	6,458	99,239	110,750
Anoka	102	1,761	1,933	11,120	12,102
Becker	94	14,525	1,135	15,728	85,793
Beltrami	7,023	197,551	12,095	109,095	348,782
Benton	123	189	35	5,572	4,553
Big Stone	127			1,145	28,454
Blue Earth	109			11,506	14,513
Brown	160			5,566	6,868
Carlton	129	45,199	1,504	35,311	11,585
Carver	64	41	235	4,187	13,312
Cass	215	85,448	28,827	40,093	220,609
Chippewa	14			3,542	5,548
Chisago	161	2,609	988	12,247	15,150
Clay	323	2	1	6,471	12,346
Clearwater	7,309	20,002	3,360	19,452	21,205
Cook	16	90,070	2,247	16,911	96,464
Cottonwood	133			1,740	7,143
Crow Wing	377	15,156	11,599	20,970	92,809
Dakota	70	26	113	8,403	12,379
Dodge	12			3,468	1,208
Douglas	150	432	3	5,965	61,540
Faribault	263			5,462	6,528
Fillmore	6			8,222	3,246
Freeborn	74			2,097	12,195
Goodhue	43	12	102	10,303	15,167
Grant	770			1,186	25,213
Hennepin	39	130	263	7,644	31,919
Houston	6			11,213	5,669
Hubbard	124	15,860	9,108	7,093	39,149
Isanti	22	4,578	1,690	16,899	7,639
Itasca	7,229	219,152	18,899	103,946	150,868
Jackson	171			1,359	12,816
Kanabec	42	2,398	987	11,211	7,533
Kandiyohi	125			3,815	43,737
Kittson	129			15,574	3,867
Koochiching	813	639,281	5,966	142,847	38,893
Lac qui Parle	38			3,372	11,841

Open Bog	Seasonally Flooded/Saturated Emergent Wetland	Shallow Marsh	Shallow Open Water Community	Shrub Wetland	Total
63,923	56,345	36,866	5,396	134,349	**675,056**
401	14,140	28,126	3,777	12,723	**86,185**
4,970	32,754	67,936	6,838	21,526	**251,300**
146,149	137,112	52,788	2,982	241,807	**1,255,385**
109	20,070	5,268	349	7,997	**44,265**
	23,654	14,256	300	602	**68,539**
	11,552	7,061	533	2,197	**47,472**
	10,718	3,446	245	1,695	**28,698**
19,614	10,952	8,937	460	61,135	**194,825**
7	12,175	9,684	1,716	2,021	**43,440**
34,774	96,075	32,690	12,684	82,360	**633,775**
	7,779	4,796	504	1,965	**24,148**
656	17,697	11,419	2,076	10,793	**73,796**
15	22,722	17,874	1,050	4,419	**65,223**
7,634	57,133	28,524	1,394	59,277	**225,290**
12,596	7,420	9,172	956	26,468	**262,321**
	10,652	3,784	353	568	**24,373**
13,320	36,849	20,233	4,815	39,399	**255,526**
	7,807	5,849	1,907	2,201	**38,754**
	5,248	230	42	1,263	**11,471**
298	19,338	31,533	1,793	5,087	**126,139**
	10,977	4,034	211	823	**28,298**
	10,179	469	26	1,061	**23,209**
	14,437	5,748	577	736	**35,864**
2	4,457	3,769	611	2,020	**36,486**
2	10,114	11,720	366	337	**49,708**
42	12,763	20,334	4,784	2,373	**80,289**
	7,241	7,507	2,793	1,956	**36,386**
4,251	21,174	11,183	4,447	23,231	**135,620**
819	18,997	17,149	2,354	17,756	**87,902**
48,477	27,068	58,117	18,822	124,315	**776,892**
	10,634	7,243	551	871	**33,644**
2,158	26,560	6,980	1,331	25,422	**84,623**
	22,863	21,876	2,290	3,429	**98,135**
	45,317	23,174	4	34,302	**122,367**
276,257	45,685	44,432	679	158,744	**1,353,598**
	25,649	13,957	528	1,314	**56,700**

Wetland Acreage by County—Plant Community Classification (continued)

County	Artificially Flooded	Coniferous Bog	Deep Marsh	Hardwood Wetland	Non-Vegetated Aquatic Community
Lake	1,668	199,914	5,117	39,671	114,026
Lake of the Woods	542	143,070	487	99,596	309,187
Le Sueur	284		88	6,459	17,144
Lincoln	69			1,202	10,322
Lyon	145			3,342	8,093
Mahnomen	78	1,283		3,510	19,543
Marshall	601	4,335		41,855	14,838
Martin	92			3,009	14,828
McLeod	156			3,591	10,246
Meeker	54	25	29	7,096	24,785
Mille Lacs	220	4,546	2,462	16,962	68,636
Morrison	142	5,398	2,314	15,311	17,649
Mower	117			4,146	1,770
Murray	126			1,149	11,629
Nicollet	58			6,424	7,298
Nobles	203			329	6,231
Norman	110			8,694	3,142
Olmsted	13			8,679	3,395
Otter Tail	268	5,535	280	21,755	184,121
Pennington	872	1		9,731	1,740
Pine	295	36,096	1,478	37,016	20,934
Pipestone	139			118	1,303
Polk	4,104	777	18	18,030	23,947
Pope	229	150	58	4,000	39,268
Ramsey	54	13	150	1,581	9,684
Red Lake	314			6,973	2,159
Redwood	139			4,061	3,752
Renville	283			3,551	5,169
Rice	17	18	665	2,244	12,481
Rock	63			806	1,881
Roseau	194	28,782	146	67,425	5,366
Scott	174	1	625	6,819	9,107
Sherburne	83	610	1,225	11,748	10,601
Sibley	265			4,348	8,052
St. Louis	22,675	555,595	21,222	162,993	323,486
Stearns	578	2,622	376	15,186	31,622
Steele	22			2,440	2,297
Stevens	234			1,094	13,597

Open Bog	Seasonally Flooded/Saturated Emergent Wetland	Shallow Marsh	Shallow Open Water Community	Shrub Wetland	Total
35,166	12,890	20,250	3,565	49,595	**481,862**
133,659	66,016	14,029	104	192,305	**958,995**
	16,066	9,894	1,057	1,910	**52,900**
	22,476	6,420	205	351	**41,045**
	15,330	6,902	128	679	**34,617**
1,682	18,638	33,199	623	7,608	**86,164**
2,844	64,740	38,033	259	78,463	**245,967**
	8,135	3,365	433	664	**30,525**
	13,706	6,315	355	867	**35,235**
5	20,363	17,042	863	3,100	**73,362**
3,897	35,405	9,231	559	34,278	**176,196**
4,540	69,680	23,647	3,008	43,583	**185,272**
	7,146	526	56	553	**14,313**
	18,017	7,585	330	451	**39,285**
	5,940	10,831	356	3,556	**34,463**
	16,459	3,223	148	234	**26,827**
	11,024	7,455	185	3,422	**34,031**
	10,575	600	45	966	**24,273**
1,956	43,345	94,168	7,261	42,049	**400,738**
	19,109	4,573	20	8,027	**44,072**
18,200	62,038	19,422	1,710	92,144	**289,334**
	16,726	1,570	6	112	**19,973**
382	47,010	34,756	1,312	21,771	**152,108**
101	18,521	30,704	804	3,511	**97,347**
4	1,351	3,627	948	1,145	**18,558**
	7,382	1,304	4	3,962	**22,099**
	8,447	2,601	139	1,325	**20,463**
	7,943	3,643	253	2,108	**22,949**
	11,481	10,295	1,805	1,725	**40,730**
	11,456	2,022	22	240	**16,490**
24,042	105,163	26,530	101	136,259	**394,008**
7	12,638	10,380	2,183	2,507	**44,440**
148	12,890	16,671	1,921	9,860	**65,758**
	10,671	6,319	284	1,332	**31,271**
153,579	47,040	90,028	5,335	280,624	**1,662,579**
373	52,120	29,729	7,100	16,700	**0.3125 in**
	9,403	2,036	232	1,086	**17,516**
2	13,028	9,980	184	349	**38,469**

Wetland Acreage by County—Plant Community Classification (continued)

County	Artificially Flooded	Coniferous Bog	Deep Marsh	Hardwood Wetland	Non-Vegetated Aquatic Community
Swift	30			3,823	8,885
Todd	322	2,996	2,155	12,945	20,232
Traverse	36			1,022	11,391
Wabasha	16			9,661	12,953
Wadena	75	4,728	978	10,662	4,407
Waseca	2			2,956	6,477
Washington	18	388	322	3,040	22,126
Watonwan	92			2,920	4,190
Wilkin	141			1,459	2,339
Winona	16			9,076	8,637
Wright	98	123	613	10,431	35,837
Yellow Medicine	142			3,752	5,738
Total	**73,351**	**2,503,073**	**148,358**	**1,514,668**	**3,115,934**

Open Bog	Seasonally Flooded/ Saturated Emergent Wetland	Shallow Marsh	Shallow Open Water Community	Shrub Wetland	Total
	20,754	9,201	131	1,982	**44,806**
1,423	46,729	28,761	4,446	33,668	**153,677**
	6,891	5,379	176	139	**25,033**
	4,209	3,805	3,842	1,301	**35,787**
612	24,670	7,142	472	37,386	**91,132**
	10,295	4,488	368	759	**25,345**
224	6,501	8,472	3,001	2,883	**46,974**
	4,128	2,137	126	224	**13,818**
	18,892	6,083	95	758	**29,766**
	5,741	2,831	1,976	1,079	**29,355**
42	23,204	24,802	5,379	3,808	**104,337**
	17,003	4,765	394	601	**32,394**
1,019,361	**2,071,691**	**1,384,929**	**154,850**	**2,252,550**	**14,238,764**

Wetland Acreage by Watershed—Plant Community Classification

Watershed	Artificially Flooded	Coniferous Bog	Deep Marsh	Hardwood Wetland	Non-Vegetated Aquatic Community
Lake Superior - North (1)	16	106,696	2,751	19,885	64,342
Lake Superior - South (2)	1,673	19,394	17	28,614	4,358
St. Louis River (3)	4,613	325,909	6,544	88,882	54,384
Cloquet River (4)		73,386	2,870	21,227	29,475
Nemadji River (5)		10,557		11,943	3,582
Mississippi Riv - Headwaters (7)	877	92,401	22,387	34,334	152,647
Leech Lake River (8)	104	56,030	16,477	21,637	154,310
Mississippi Riv - Grand Rapids (9)	14,736	149,991	8,452	82,625	67,098
Mississippi Riv - Brainerd (10)	6,362	43,746	9,817	50,338	58,601
Pine River (11)	37	19,127	9,066	12,166	53,153
Crow Wing River (12)	249	21,206	11,905	19,969	76,124
Redeye River (13)	95	5,550	31	19,734	10,197
Long Prairie River (14)	280	2,430	1,551	12,226	43,779
Mississippi Riv - Sartell (15)	279	3,814	2,142	14,603	17,208
Sauk River (16)	255	845	497	6,803	31,529
Mississippi Riv - St. Cloud (17)	245	950	1,298	20,344	27,538
North Fork Crow River (18)	396	169	462	18,424	65,250
South Fork Crow River (19)	232	105	89	7,553	33,191
Mississippi Riv - Twin Cities (20)	157	610	639	12,373	56,300
Rum River (21)	286	11,970	5,210	43,416	149,091
Minnesota Riv - Headwaters (22)	112			2,499	37,749
Pomme de Terre River (23)	249			2,998	55,022
Lac Qui Parle River (24)	113			3,115	6,154
Minn River - Yellow Med Riv (25)	440			9,735	21,921
Chippewa River (26)	373	25	58	10,246	83,503
Redwood River (27)	72			2,333	8,964
Minnesota River - Mankato (28)	358			16,084	19,210
Cottonwood River (29)	319			5,882	8,678
Blue Earth River (30)	173			10,124	16,059
Watonwan River (31)	164			4,620	9,354
Le Sueur River (32)	279			8,265	17,612
Lower Minnesota River (33)	530	13	1,136	21,240	35,725
Upper St. Croix River (34)	13	17,538	425	16,699	4,592
Kettle River (35)	270	38,834	1,330	32,691	16,354
Snake River (36)	179	19,252	1,352	29,681	12,268
Lower St. Croix River (37)	171	4,778	2,586	19,919	33,273

Open Bog	Seasonally Flooded/ Saturated Emergent Wetland	Shallow Marsh	Shallow Open Water Community	Shrub Wetland	Total
11,363	7,794	8,485	770	26,695	**248,796**
2,567	3,645	3,902	397	14,525	**79,093**
107,806	22,089	32,690	1,601	172,806	**817,324**
8,648	4,591	9,739	610	33,055	**183,601**
2,861	2,055	2,951	61	15,884	**49,894**
23,486	41,498	38,492	13,066	67,555	**486,743**
22,541	47,046	17,264	3,945	32,013	**371,367**
61,221	38,403	34,439	9,351	123,455	**589,770**
19,195	67,855	34,820	6,608	83,189	**380,533**
13,208	23,175	11,128	3,750	24,775	**169,584**
8,281	71,210	33,759	8,807	77,515	**329,025**
1,632	38,889	25,550	2,166	46,788	**150,632**
1,825	36,412	31,235	2,799	23,737	**156,273**
1,836	54,079	23,772	2,797	28,854	**149,384**
286	34,007	26,564	5,098	11,375	**117,260**
235	39,557	34,576	5,393	20,074	**150,210**
21	56,658	46,345	6,123	11,410	**205,258**
8	30,442	20,133	1,486	2,430	**95,669**
244	18,237	32,333	7,270	8,410	**136,572**
6,039	73,154	35,465	4,754	63,047	**392,433**
	33,667	22,995	623	2,123	**99,769**
4	17,766	23,746	699	1,518	**102,003**
	25,686	9,232	279	660	**45,239**
	36,857	15,599	1,155	3,133	**88,838**
35	48,098	58,119	2,367	5,050	**207,873**
	14,598	5,949	126	652	**32,693**
	19,249	17,112	1,090	7,890	**80,992**
	19,370	6,855	431	772	**42,307**
	15,366	4,880	366	1,617	**48,585**
	9,738	4,437	315	524	**29,152**
	18,363	10,255	710	1,446	**56,930**
39	43,250	32,326	6,368	7,284	**147,909**
6,612	17,743	9,259	691	41,012	**114,583**
19,417	33,167	10,553	1,107	70,921	**224,646**
9,373	53,491	13,181	1,671	58,124	**198,573**
1,195	31,133	28,407	4,719	21,072	**147,253**

Wetland Acreage by Watershed—Plant Community Classification (continued)

Watershed	Artificially Flooded	Coniferous Bog	Deep Marsh	Hardwood Wetland	Non-Vegetated Aquatic Community
Mississippi Riv - Lake Pepin (38)	70		198	10,434	21,330
Cannon River (39)	105	30	666	11,553	27,978
Mississippi Riv - Winona (40)	24			12,273	11,346
Zumbro River (41)	45			16,044	7,613
Mississippi Riv - La Crescent (42)				2,141	2,806
Root River (43)	22			16,186	6,041
Mississippi River - Reno (44)	3			5,115	3,154
Upper Iowa River (46)	21			722	401
Upper Wapsipinicon River (47)	1				3
Cedar River (48)	99			4,019	3,342
Shell Rock River (49)	49			1,137	5,946
Winnebago River (50)	3			206	1,805
Des Moines Riv - Headwaters (51)	287			2,495	24,242
Lower Des Moines River (52)	116			323	373
East Fork Des Moines Riv (53)	20			497	4,362
Bois de Sioux River (54)	658			898	10,824
Mustinka River (55)	118			1,038	17,719
Otter Tail River (56)	228	7,093	986	16,274	191,427
Upper Red Riv of the North (57)	301			1,334	2,084
Buffalo River (58)	193	689	18	6,490	29,034
Red Riv of the N - Marsh Riv (59)	67			3,608	1,353
Wild Rice River (60)	163	7,077	2,808	12,166	34,242
Red Riv of the N - Sandhill Riv (61)	40	1		5,085	9,392
Upper/Lower Red Lake (62)	7,771	222,724	2,018	71,887	302,922
Red Lake River (63)	1,026	5,749	44	38,637	7,674
Thief River (65)	13	7,761	117	44,273	13,290
Clearwater River (66)	11,184	10,178	843	22,751	22,076
Red Riv of the N - Gr Marais Crk (67)	397			1,680	1,906
Snake River (68)	526	345		8,641	1,355
Red Riv of the N - Tamarac Riv (69)	78	172		12,328	2,724
Two Rivers (70)	86	816		22,297	2,986
Roseau River (71)	158	31,110	88	45,595	4,150
Rainy River - Headwaters (72)	101	184,190	6,288	19,707	213,170
Vermilion River (73)	1,889	60,293	5,020	23,397	81,704
Rainy River - Rainy Lake (74)	20	62,389	1,998	31,176	97,995
Rainy River - Black River (75)	1	97,101		27,378	3,156
Little Fork River (76)	11,875	233,022	10,039	57,887	22,875

Open Bog	Seasonally Flooded/ Saturated Emergent Wetland	Shallow Marsh	Shallow Open Water Community	Shrub Wetland	Total
	5,207	4,754	1,117	2,177	**45,286**
	30,982	19,876	2,712	4,632	**98,534**
	6,809	5,990	5,606	1,886	**43,934**
2	16,185	1,445	175	2,733	**44,240**
	772	2,189	967	523	**9,398**
	21,207	1,587	132	2,275	**47,451**
	1,813	4,585	1,871	656	**17,196**
	2,855	72	10	268	**4,349**
	17			1	**22**
	8,310	1,973	100	737	**18,580**
	7,064	3,056	404	325	**17,981**
	1,283	607	29	37	**3,971**
	29,324	13,382	704	1,495	**71,928**
	542	93	7	41	**1,495**
	2,163	986	167	126	**8,322**
	6,595	5,513	386	128	**25,002**
	15,216	10,689	401	229	**45,411**
1,975	25,960	86,200	7,469	21,327	**358,938**
	8,398	3,126	67	442	**15,751**
236	32,961	33,652	3,514	5,443	**112,231**
	2,562	2,261	132	1,077	**11,060**
4,414	39,980	54,286	1,538	22,210	**178,883**
35	10,101	11,261	442	4,424	**40,779**
75,435	32,878	37,312	1,325	94,469	**848,740**
1,892	89,235	17,339	244	56,868	**218,707**
10,693	67,323	29,972	243	132,697	**306,382**
2,140	55,895	29,469	1,549	46,437	**202,524**
	6,614	4,070	1	613	**15,282**
287	21,947	6,688	14	13,098	**52,901**
21	20,994	7,093	7	20,283	**63,701**
50	60,715	20,564	2	49,736	**157,253**
24,665	73,447	25,057	103	107,694	**312,067**
45,714	12,674	28,010	4,280	47,692	**561,826**
12,383	5,483	17,635	901	26,820	**235,525**
12,883	2,101	21,258	787	19,245	**249,851**
82,254	19,541	5,021	10	25,782	**260,244**
58,081	16,092	24,125	1,547	78,203	**513,745**

Wetland Acreage by Watershed—Plant Community Classification (continued)

Watershed	Artificially Flooded	Coniferous Bog	Deep Marsh	Hardwood Wetland	Non-Vegetated Aquatic Community
Big Fork River (77)	40	349,277	7,587	85,524	57,755
Rapid River (78)	479	117,687		40,472	2,829
Rainy River - Baudette (79)	51	25,839		23,559	1,982
Lake of the Woods (80)	11	54,170	544	62,917	306,899
Upper Big Sioux River (81)				14	114
Lower Big Sioux River (82)	145			126	1,269
Rock River (83)	135			964	3,191
Little Sioux River (84)	23			192	7,979
Total	**73,351**	**2,503,038**	**148,358**	**1,514,667**	**3,115,409**

Open Bog	Seasonally Flooded/ Saturated Emergent Wetland	Shallow Marsh	Shallow Open Water Community	Shrub Wetland	Total
103,183	16,668	38,862	5,910	90,210	**755,016**
185,572	57,472	9,503	22	127,835	**541,873**
24,657	12,461	2,766	38	49,392	**140,745**
42,810	27,753	7,739	63	80,116	**583,022**
	1,938	29	1	21	**2,116**
	15,049	1,190	4	139	**17,922**
	25,215	3,950	29	377	**33,861**
	5,548	3,150	253	244	**17,389**
1,019,361	**2,071,691**	**1,384,929**	**154,850**	**2,252,550**	**14,238,203**

Wetland Acreage by County—Hydrogeomorphic Classification

County	Depression	Lentic	Lotic	Mineral Flat	Peatland	Slope	Total
Aitkin	43,856	113,776	47,388	250,777	215,783	3,477	**675,056**
Anoka	28,335	23,485	8,570	22,436	1,213	2,147	**86,185**
Becker	67,827	97,214	10,029	53,732	19,495	3,002	**251,300**
Beltrami	46,762	382,348	29,313	446,574	346,097	4,290	**1,255,385**
Benton	5,805	1,761	13,225	23,072	298	105	**44,265**
Big Stone	11,457	19,037	16,672	20,198		1,175	**68,539**
Blue Earth	6,432	10,950	18,181	10,546		1,362	**47,472**
Brown	2,881	5,258	12,553	6,581		1,425	**28,698**
Carlton	17,409	8,984	17,847	82,158	64,788	3,640	**194,825**
Carver	10,334	14,653	10,853	6,591	36	974	**43,440**
Cass	34,875	268,271	40,240	163,923	119,489	6,978	**633,775**
Chippewa	3,657	812	11,840	7,395		444	**24,148**
Chisago	17,302	18,130	13,836	20,727	1,570	2,230	**73,796**
Clay	22,153	7,542	8,727	25,507	17	1,277	**65,223**
Clearwater	30,017	36,235	7,855	116,502	27,721	6,959	**225,290**
Cook	19,590	88,504	8,888	31,709	102,574	11,057	**262,321**
Cottonwood	2,562	6,362	8,880	4,471		2,098	**24,373**
Crow Wing	20,596	107,030	24,186	56,609	28,423	18,684	**255,526**
Dakota	7,947	3,568	19,844	5,738	14	1,644	**38,754**
Dodge	589	118	5,530	1,666		3,567	**11,471**
Douglas	33,393	62,718	3,919	24,577	730	801	**126,139**
Faribault	2,577	5,576	10,973	8,666		506	**28,298**
Fillmore	993	45	12,557	1,419		8,195	**23,209**
Freeborn	4,337	13,659	4,546	11,648		1,673	**35,864**
Goodhue	2,379	917	29,569	1,605	3	2,013	**36,486**
Grant	9,510	26,137	4,924	8,701	2	436	**49,708**
Hennepin	19,482	31,839	14,180	12,138	139	2,511	**80,289**
Houston	1,357	69	27,678	2,471		4,810	**36,386**
Hubbard	16,179	49,289	12,473	34,455	19,745	3,479	**135,620**
Isanti	20,811	11,330	12,306	36,318	3,127	4,011	**87,902**
Itasca	63,931	189,055	53,264	201,192	267,159	2,291	**776,892**
Jackson	4,078	13,815	9,056	5,774		921	**33,644**
Kanabec	10,003	6,218	13,382	49,536	4,556	928	**84,623**
Kandiyohi	18,883	48,241	5,781	23,582		1,647	**98,135**
Kittson	24,586	2,964	8,225	85,448		1,144	**122,367**
Koochiching	61,225	30,223	36,095	305,417	915,592	5,047	**1,353,598**
Lac qui Parle	7,263	3,479	25,825	18,764		1,369	**56,700**

Wetland Acreage by County—Hydrogeomorphic Classification (continued)

County	Depression	Lentic	Lotic	Mineral Flat	Peatland	Slope	Total
Lake	31,281	113,707	15,263	75,745	234,820	11,045	481,862
Lake of the Woods	7,850	308,311	12,167	349,196	276,733	4,738	958,995
Le Sueur	8,583	18,380	11,727	11,459		2,752	52,900
Lincoln	6,091	9,851	6,083	11,670		7,350	41,045
Lyon	6,411	6,791	9,633	8,050		3,731	34,617
Mahnomen	30,044	22,617	6,848	20,501	2,965	3,190	86,164
Marshall	20,267	38,253	8,255	170,805	7,179	1,208	245,967
Martin	3,477	13,974	7,540	5,103		430	30,525
McLeod	5,130	11,393	7,344	11,045		323	35,235
Meeker	10,349	29,600	12,649	18,317	18	2,429	73,362
Mille Lacs	9,590	70,298	14,994	72,300	8,426	588	176,196
Morrison	28,604	13,775	27,645	104,892	9,927	429	185,272
Mower	986	273	9,363	2,032		1,658	14,313
Murray	5,857	11,087	12,030	7,980		2,332	39,285
Nicollet	2,684	14,339	11,391	5,313		737	34,463
Nobles	2,664	5,273	9,609	6,711		2,571	26,827
Norman	8,368	679	7,484	16,860		640	34,031
Olmsted	1,183	1,248	9,424	1,225		11,193	24,273
Otter Tail	99,559	186,354	15,226	89,332	7,491	2,775	400,738
Pennington	5,251	451	2,370	35,118	1	881	44,072
Pine	24,333	12,139	49,981	144,906	54,319	3,656	289,334
Pipestone	1,365	136	8,787	1,800		7,886	19,973
Polk	38,477	20,856	15,483	73,768	1,159	2,364	152,108
Pope	27,838	40,905	8,712	15,494	251	4,148	97,347
Ramsey	4,960	8,243	3,860	1,282	16	197	18,558
Red Lake	1,962	374	5,470	13,955		338	22,099
Redwood	3,201	1,466	8,287	6,511		998	20,463
Renville	3,746	2,773	9,230	6,577		623	22,949
Rice	13,587	13,727	5,210	6,128	3	2,076	40,730
Rock	1,296	114	9,397	2,300		3,383	16,490
Roseau	16,532	19,956	10,956	290,176	52,824	3,565	394,008
Scott	10,157	9,679	15,057	7,517	8	2,022	44,440
Sherburne	19,080	11,743	12,837	19,913	502	1,684	65,758
Sibley	2,493	9,680	10,592	8,237		270	31,271
St. Louis	124,112	330,048	92,313	391,701	709,276	15,129	1,662,579
Stearns	28,203	33,357	41,836	48,035	2,983	1,990	156,405
Steele	2,304	1,647	5,803	6,653		1,109	17,516
Stevens	8,791	13,315	3,718	12,125	2	518	38,469

Wetland Acreage by County—Hydrogeomorphic Classification (continued)

County	Depression	Lentic	Lotic	Mineral Flat	Peatland	Slope	Total
Swift	6,757	7,265	12,483	17,129		1,172	**44,806**
Todd	28,905	25,763	25,572	68,662	4,409	366	**153,677**
Traverse	4,185	4,794	10,164	5,551		338	**25,033**
Wabasha	3,199	355	27,798	1,640		2,795	**35,787**
Wadena	8,065	3,228	16,680	57,484	5,339	336	**91,132**
Waseca	2,626	7,719	6,474	8,082		443	**25,345**
Washington	12,945	14,810	11,587	5,834	391	1,407	**46,974**
Watonwan	1,748	3,452	5,707	2,830		81	**13,818**
Wilkin	5,553	223	6,098	17,638		253	**29,766**
Winona	980	130	22,496	890		4,859	**29,355**
Wright	25,720	40,576	12,683	21,102	160	4,096	**104,337**
Yellow Medicine	3,522	3,752	11,394	11,056		2,669	**32,394**
Total	**1,432,244**	**3,228,490**	**1,322,919**	**4,487,252**	**3,517,770**	**250,089**	**14,238,764**

[this page intentionally left blank]

Wetland Acreage by Watershed—Hydrogeomorphic Classification

Watershed	Depression	Lentic	Lotic
Lake Superior - North (1)	16,557	58,233	10,589
Lake Superior - South (2)	7,384	3,397	4,767
St. Louis River (3)	49,503	47,676	47,059
Cloquet River (4)	13,354	29,708	11,257
Nemadji River (5)	9,596	1,818	5,794
Mississippi Riv - Headwaters (7)	33,723	192,965	31,253
Leech Lake River (8)	19,359	185,897	14,492
Mississippi Riv - Grand Rapids (9)	44,377	85,430	48,813
Mississippi Riv - Brainerd (10)	37,708	65,880	41,439
Pine River (11)	13,345	61,582	13,715
Crow Wing River (12)	37,449	90,023	35,162
Redeye River (13)	27,647	10,443	15,525
Long Prairie River (14)	32,749	46,715	16,677
Mississippi Riv - Sartell (15)	26,865	15,710	29,742
Sauk River (16)	23,907	34,823	26,647
Mississippi Riv - St. Cloud (17)	37,473	28,827	30,510
North Fork Crow River (18)	38,219	75,503	32,543
South Fork Crow River (19)	16,367	38,704	13,897
Mississippi Riv - Twin Cities (20)	34,562	53,152	24,178
Rum River (21)	40,980	155,516	34,110
Minnesota Riv - Headwaters (22)	16,177	17,208	37,213
Pomme de Terre River (23)	23,918	53,079	7,658
Lac Qui Parle River (24)	6,297	4,765	14,596
Minn River - Yellow Med Riv (25)	14,447	16,055	24,402
Chippewa River (26)	53,275	84,290	21,513
Redwood River (27)	5,325	7,920	7,732
Minnesota River - Mankato (28)	8,015	24,242	30,529
Cottonwood River (29)	6,184	6,532	15,361
Blue Earth River (30)	4,715	11,642	20,200
Watonwan River (31)	3,379	8,767	9,850
Le Sueur River (32)	6,815	18,804	15,643
Lower Minnesota River (33)	29,510	34,742	51,501
Upper St. Croix River (34)	10,147	1,174	22,749
Kettle River (35)	13,570	11,551	26,132
Snake River (36)	17,282	9,076	26,190
Lower St. Croix River (37)	39,470	37,147	24,040

Mineral Flat	Peatland	Slope	Total
35,265	117,931	10,221	**248,796**
35,805	21,964	5,775	**79,093**
232,602	433,873	6,611	**817,324**
45,926	82,023	1,334	**183,601**
18,660	13,422	604	**49,894**
108,020	115,251	5,529	**486,743**
70,174	77,960	3,485	**371,367**
197,526	211,263	2,361	**589,770**
160,739	63,060	11,707	**380,533**
40,376	32,252	8,314	**169,584**
131,934	29,107	5,350	**329,025**
88,659	7,182	1,176	**150,632**
55,029	4,256	848	**156,273**
69,878	5,645	1,543	**149,384**
30,194	1,121	567	**117,260**
49,189	952	3,260	**150,210**
52,191	186	6,616	**205,258**
24,985	111	1,607	**95,669**
21,459	460	2,760	**136,572**
138,402	16,307	7,117	**392,433**
27,074		2,097	**99,769**
16,190	4	1,154	**102,003**
16,531		3,052	**45,239**
27,736		6,198	**88,838**
42,675	60	6,060	**207,873**
8,731		2,986	**32,693**
14,841		3,365	**80,992**
10,563		3,667	**42,307**
11,145		882	**48,585**
6,405		751	**29,152**
14,572		1,096	**56,930**
27,893	45	4,219	**147,909**
55,272	24,165	1,076	**114,583**
111,335	58,259	3,799	**224,646**
115,443	28,582	1,999	**198,573**
39,708	2,879	4,009	**147,253**

Wetland Acreage by Watershed—Hydrogeomorphic Classification (continued)

County	Depression	Lentic	Lotic
Zumbro River (41)	3,683	2,358	21,267
Mississippi Riv - La Crescent (42)	95		8,771
Root River (43)	2,485	77	23,983
Mississippi River - Reno (44)	250	37	15,393
Upper Iowa River (46)	218	47	2,470
Upper Wapsipinicon River (47)	2		15
Cedar River (48)	1,756	2,585	8,347
Shell Rock River (49)	2,684	6,591	1,865
Winnebago River (50)	299	2,172	541
Des Moines Riv - Headwaters (51)	9,546	23,795	20,431
Lower Des Moines River (52)	221	118	719
East Fork Des Moines Riv (53)	936	4,509	1,358
Bois de Sioux River (54)	4,038	4,423	9,919
Mustinka River (55)	8,556	18,714	4,816
Otter Tail River (56)	89,439	197,897	12,412
Upper Red Riv of the North (57)	3,462	575	3,398
Buffalo River (58)	38,162	28,290	9,081
Red Riv of the N - Marsh Riv (59)	2,580	500	2,178
Wild Rice River (60)	51,756	39,082	14,843
Red Riv of the N - Sandhill Riv (61)	12,145	7,701	6,478
Upper/Lower Red Lake (62)	36,565	307,888	21,147
Red Lake River (63)	17,117	20,930	9,211
Thief River (65)	12,965	43,924	3,134
Clearwater River (66)	32,131	29,136	12,787
Red Riv of the N - Gr Marais Crk (67)	3,680	585	3,189
Snake River (68)	6,882	621	3,616
Red Riv of the N - Tamarac Riv (69)	6,922	1,877	5,016
Two Rivers (70)	21,333	3,677	4,983
Roseau River (71)	15,063	18,939	9,197
Rainy River - Headwaters (72)	41,066	209,021	15,644
Vermilion River (73)	22,337	81,298	15,150
Rainy River - Rainy Lake (74)	24,886	100,574	9,838
Rainy River - Black River (75)	2,635	<1	5,258
Little Fork River (76)	40,635	32,753	22,847

Mineral Flat	Peatland	Slope	Total
4,305	2	12,626	**44,240**
58		474	**9,398**
3,900		17,006	**47,451**
357		1,158	**17,196**
522		1,092	**4,349**
4		1	**22**
5,141		750	**18,580**
5,673		1,167	**17,981**
911		47	**3,971**
14,788		3,369	**71,928**
353		85	**1,495**
1,476		43	**8,322**
6,355		268	**25,002**
13,097		228	**45,411**
47,443	9,068	2,679	**358,938**
8,197		119	**15,751**
34,310	925	1,464	**112,231**
5,585		218	**11,060**
56,062	11,491	5,649	**178,883**
13,578	36	841	**40,779**
182,295	298,239	2,606	**848,740**
162,019	7,741	1,689	**218,707**
225,998	20,096	266	**306,382**
111,742	12,315	4,414	**202,524**
7,649		180	**15,282**
40,538	632	611	**52,901**
48,972	193	722	**63,701**
125,400	866	994	**157,253**
209,972	55,774	3,121	**312,067**
56,375	229,666	10,053	**561,826**
41,742	72,663	2,335	**235,525**
37,486	75,283	1,784	**249,851**
70,009	179,356	2,986	**260,244**
125,017	291,106	1,388	**513,745**

Wetland Acreage by Watershed—Hydrogeomorphic Classification (continued)

County	Depression	Lentic	Lotic
Big Fork River (77)	48,417	61,171	30,821
Rapid River (78)	6,949	20	8,386
Rainy River - Baudette (79)	1,159	300	4,359
Lake of the Woods (80)	5,380	308,573	4,116
Upper Big Sioux River (81)	94		854
Lower Big Sioux River (82)	960	136	7,170
Rock River (83)	2,733	477	19,292
Little Sioux River (84)	2,206	8,219	3,411
Total	**1,432,244**	**3,227,966**	**1,322,919**

Mineral Flat	Peatland	Slope	Total
160,530	452,443	1,635	**755,016**
221,488	304,040	988	**541,873**
83,427	50,495	1,004	**140,745**
164,766	96,981	3,206	**583,022**
98		1,071	**2,116**
1,993		7,663	**17,922**
4,522		6,838	**33,861**
3,290		264	**17,389**
4,487,250	**3,517,734**	**250,089**	**14,238,203**

CALL US

M-F 8 a.m.-8 p.m., Sat. 9 a.m.-1 p.m.

888-MINNDNR

MinnesotaDNR

@mndnr

DEPARTMENT OF NATURAL RESOURCES

Ecological and Water Resources
500 Lafayette Road
St. Paul, MN 55155-4025
651-296-6157 or 888 -MINNDNR (646-6367)
www.mndnr.gov

This information can be made available in alternative formats such as large print,
braille or audio tape by emailing info.dnr@state.mn.us or by calling 651-296-6157.

Printed on Minnesota-manufactured, recycled paper containing 10 percent
post-consumer waste and with vegetable-based inks.