

Codes for the Identification of Watersheds (Hydrologic Units) in Minnesota

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Applicability:

Who cares about this standard?

This standard is important to any public organization that collects, uses or exchanges information about **watersheds** in Minnesota.

When does it apply? When does it not apply?

This standard has been developed to improve the sharing and exchange of information. Use of this standard is mandatory when a state agency is transferring data to another agency, local government, federal agency, the private sector or a public requestor.

Use of this standard is recommended when local governments exchange data, or when new public data bases are being designed that require identification codes for **watersheds**. Use by local government, the private sector and the public is encouraged. This standard only applies to data that are being transferred and does not apply to how data are internally stored in a data base. It should be noted, however, that it is a long-term goal for everyone to use the same **watershed** identification codes.

Purpose of this standard:

The purpose of this standard is to provide a common convention for identifying **watersheds** in Minnesota. This standard enables the transfer of data among agencies and external customers. This standard can also improve the sharing of data by avoiding duplication and incompatibilities in the collection, processing and dissemination of data relating to watersheds. This standard provides consistency between state practices and federal identification and naming conventions for watersheds (referred to as **hydrologic units**), as defined in the national Watershed Boundary Dataset. It promotes data integration across state lines and with national data sets.

Standard Requirements: Watershed Coding and Naming

This standard consists of three codes representing major watersheds (2-digit), minor watersheds (3-digit) and subdivisions of minor watersheds referred to as hydrologic units (2-digit). The concatenation of these three parts represents a fully formed Watershed code.

Hydrologic Unit Type	Example	Comments
DNR Major Watershed Code	05 (Nemadji River)	(xx) 2-digit number from 1 to 84 (the numbers 6, 45, and 64 are not used).
DNR Minor Watershed (minor5) Code	05019 (Net R)	(xx-yyy) 5-digit number where the first two digits represent the DNR major watershed and the last three digits represent sequential numbers assigned to the minor watershed units.
DNR Hydrologic Unit Code (hu_id)	0501901	(xx-yyy-zz) 7-digit number where the first two digits represent the DNR major watershed, the middle three digits represent the DNR minor watershed number, and the last two digits represent a further subdivision of the minor watershed.

Note: Dashes in the codes below are inserted in this text for clarity of explanation only. They are not stored in the actual watershed code.

The **DNR Major Watershed Code** is a two-digit number unique for each of the 81 major watersheds in the state. DNR Major Watershed boundaries are conterminous with the USGS Subbasin Boundaries. Official **DNR Major Watershed** names and numbers and USGS nomenclature can be viewed at http://www.mngeo.state.mn.us/committe/hydro/HUC_Names_official.html.

The **DNR Minor Watershed Code (minor5)** is a five-digit number consisting of the two-digit DNR major watershed code and a three-digit DNR minor watershed number. The numbers yyy are unique within each major watershed. The DNR 'Minnesota Watersheds' GIS file (last revised 99) contains **DNR minor watershed** delineations, numbers, and names.

The **DNR Hydrologic Unit Code (hu_id)** adds a 2-digit subdivision to the minor5 code, enabling a minor watershed to be further subdivided to account for lake watershed boundaries, stream gages, or other defining features. The DNR 'Minnesota Hydrologic Units' (polygons) GIS files currently under production contain the official DNR minor watershed and Minnesota hydrologic units delineations and numbers. They are not named. DNR's Minnesota Hydrologic Units file, once completed for the state, becomes the new state reference for watershed numbers.

Geospatial data files that contain Minor Watershed Codes and Hydrologic Unit Codes can both be referenced from <https://gisdata.mn.gov/dataset/geos-dnr-watersheds>.

Compliance:

What constitutes compliance?

Minnesota state agencies must be capable of translating their watershed codes into a form consistent with this standard for the purposes of exchanging data among other state agencies and local governments. Agencies may store and administer alternative watershed codes as long as the capability exists to readily convert them. Agencies may also distribute or publish alternative watershed codes as long as the standard codes are available as an option. It is recommended that state agencies integrate the watershed standard into new system designs, and where possible when redeveloping existing systems.

How will compliance be measured?

No direct monitoring of compliance will be conducted. Evidence of compliance will be based on reports of satisfactory data transfers among state agencies, federal and local agencies, the private sector and citizen customers; and the development of distribution strategies that incorporate the standard codes.

Exceptions:

Local entities may wish to delineate watersheds for very small areas. These might encompass small streams or ponds, or storm drain activity. Additional subwatersheds that a local unit of government may delineate will generally not be incorporated into the statewide watershed coverage.

Supplemental Information:

Definitions

Definitions in this section are derived from the Watershed Boundary Dataset Standard: Federal Standards for Delineation of Hydrologic Unit Boundaries; Version 2.0 (Federal Geographic Data Committee, 10/01/2004). '

Classic Watershed: A 'classic watershed' is a land and water area that has all the surface drainage within its boundary converging to a single point.

Remnant Watershed: Areas typically formed as residual areas after delineation of classic watersheds. When classic watersheds are defined of a given general size range, there will always be small areas left over that do not conform to the 'classic watershed' definition. These are 'remnant watershed areas' or 'remnant watersheds'.

Hydrologic Unit: A hydrologic unit is a drainage area delineated to nest in a multi-level, hierarchical drainage system. Its boundaries are defined by hydrographic and topographic

criteria that delineate an area of land upstream from a specific point on a river, stream, or similar surface waters. A hydrologic unit can accept surface water directly from upstream drainage areas, and indirectly from associated surface areas such as remnant, non-contributing, and diversions to form a drainage area with single or multiple outlet points. Hydrologic units are only synonymous with classic watersheds when their boundaries include all the source data contributing surface water to a single defined outlet point. Any attempt to subdivide the entire country at any level will of necessity include a combination of classic watersheds and other remnant watershed areas.

Historic state and federal watershed mapping practices

State activities: DNR Major/Minor Watersheds:

Minnesota Statutes define watersheds in terms of the 'State of Minnesota Watershed Boundaries - 1979 Mapping Project.' This project by the Department of Natural Resources represented a major effort to develop an official, systematic, detailed height-of-land boundary map for all watersheds of the state. The Watershed Mapping Project identified and delineated what has become known as the 81 **DNR Major Watersheds** and approximately 5600 **DNR Minor Watersheds**.

The **DNR Major Watersheds** as mapped in 1979 were consistent with the federal watershed identification standards of that time. This basic framework of the DNR watershed mapping project has been maintained over several boundary updates (1985, 1993, 1995, 1999). The current update of the watershed boundaries, now underway by the DNR as part of its Lakeshed Delineation Project, also retains the intent of the original DNR watershed mapping project, while making modifications to the delineation procedures which will make Minnesota watersheds more consistent with the federal Watershed Boundary Dataset standard.

The **DNR Major Watersheds** were designed to be coincident with the USGS Level-4 or 8-digit Hydrologic Unit. The DNR mapping efforts identify smaller hydrologic units (minor watersheds and lakesheds) that can be aggregated to the current national Watershed Boundary Dataset hydrologic units.

Federal Activities: Hydrologic Unit Mapping:

Hydrologic Units (USGS): In the 1970's the United States Geological Survey and the Water Resources Council created a mapping and classification system that divides and subdivides the United States into successively smaller river basin units. These levels of subdivision, used for collection and organization of water resources data, are called Hydrologic Units. The units represent natural and altered stream-drainage areas. The USGS, in cooperation with the Natural Resources Conservation Service (NRCS), has expanded the system of delineation and numbering of the nation into six levels of hydrologic units. This expanded delineation system is referred to as the national Watershed Boundary Dataset. Delineation, naming, and numbering

of these hydrologic units is described in Federal Standards for Delineation of Hydrologic Unit Boundaries; Version 2.0 (Federal Geographic Data Committee 10/01/2004).

State/Federal Watershed Mapping Synthesis:

This standard reconciles the current state and federal watershed delineation and identification conventions. The DNR Lakeshed Delineation project synthesizes the DNR state watershed mapping conventions with the federal standards as outlined in the Watershed Boundary Dataset. The state system uses the Hydrologic Unit delineation rules as defined in the Watershed Boundary Dataset, and incorporates historic DNR mapping and naming practice into the national framework. Specifically:

- DNR is the responsible agency for delineating, naming, and numbering watersheds in Minnesota.
- DNR, in cooperation with Minnesota partners, continues to delineate hydrologic units of smaller areas than specified by the rules of the Watershed Boundary Dataset.
- These smaller hydrologic units (minor watersheds and hydrologic units) are numbered by DNR and are capable of being aggregated into the larger Hydrologic Units defined in the Watershed Boundary Dataset, consistent with the WBD delineation rules.
- Minnesota, through the DNR Lakeshed Delineation Project, is creating the levels 5 and 6 of the Watershed Boundary Dataset, by numbering and naming consistently with WBD and aggregating up from the smaller delineated state hydrologic units.
- DNR maintains the current state major and minor watershed codes in addition to codes required by the federal identification standard.
- By following the Watershed Boundary Dataset naming and identification conventions, DNR continues to have feature administrative authority over hydrologic units at all levels.
- There are a few areas of inconsistency between Minnesota watershed delineations and the Watershed Boundary Dataset guidelines, especially delineations in heavily ditched areas and delineations around large lakes. These are documented in the metadata for the DNR Lakeshed Delineation Project.

Cross-Reference of State and Federal Watershed Terminology and Numbering

HU level	HU Name	Digits	Size	HU Code	Example	State watershed equivalents
1	Region	HU_2	Avg: 178,000 sq. mi.	04	Great Lakes	
2	Subregion	HU_4	Avg: 16,800 sq .mi.	0401	Western Lake Superior	
3	Basin	HU_6	Avg: 10,600 sq. mi.	040103	Southwestern Lake Superior	

4	Subbasin	HU_8	> 250,000 acres	04010301	Beartrap-Nemadji River	DNR major watershed (DNR Code 05)
5	Watershed	HU_10	40,000 - 250,000 acres	0401030101	Nemadji River	
6	Subwatershed	HU_12	10,000 - 40,000 acres	040103010105	Net River	
	No federal equivalent		> 3,000 acres			DNR minor watershed (minor5) (DNR Code 05019)
	No federal equivalent		> 100 acres			DNR lakeshed (hu_id) (DNR Code 0501901)

Contact

Further information about this standard may be obtained from the Minnesota Geospatial Information Office (MnGeo).

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