

# The National Watershed Boundary Dataset or

## *Watersheds 101*



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North Dakota Department of Health  
Division of Water Quality

# ***OUTLINE***

- What is the WBD?
- Why did we develop the Watershed Boundary Dataset (WBD)?
- Who completed this data?
- How was the dataset created?
- How is it maintained?
- How can I get a copy of the WBD?

# *What is it?*

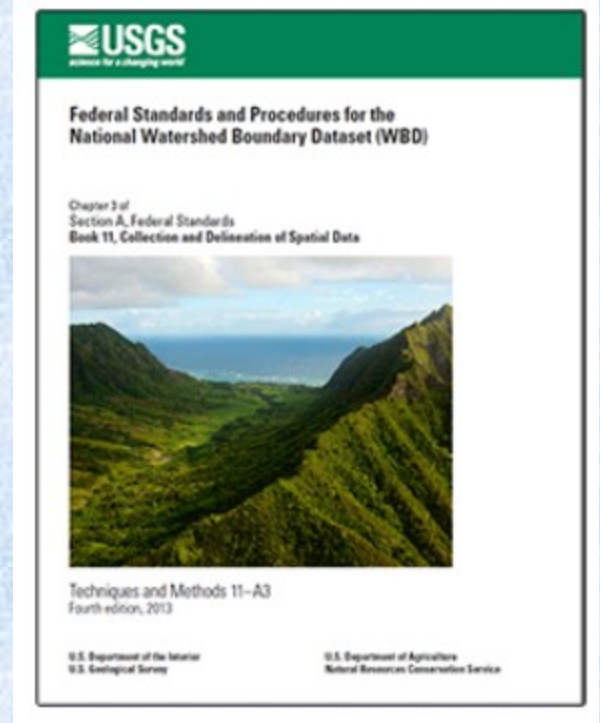
## **WBD = Watershed Boundary Dataset**

- A series of nested hierarchical drainage units encompassing all surface area drainage in the nation (containers).
- Each drainage unit is subdivided into uniform areas based on topography and hydrologic principles using Federal Standards.
- Baseline drainage area framework at 1:24,000 scale for the nation *in digital form (ie. GIS)*.
- Part of the U.S. Geological Survey *National Map*
- Distributed with the National Hydrologic Dataset - or NHD (streams and rivers, lakes and ponds)

# Standards & Certification process

Federal Standards and Procedures for the National Watershed Boundary Dataset (WBD), By the U.S. Geological Survey and U.S. Department of Agriculture, Natural Resource Conservation Service; Fourth Edition - 2013

<http://pubs.usgs.gov/tm/11/a3/>



# Hydrologic Unit Hierarchy

## REGION 1

21 Nationally  
HU Code: 2 digit



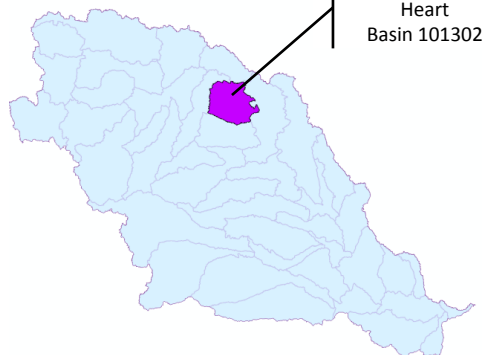
## SUBREGION 2

221 Nationally  
HU Code: 4 digit



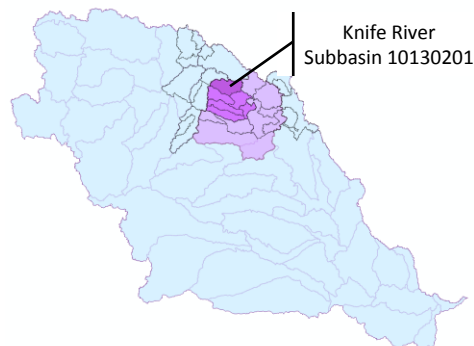
## BASIN 3

378 Nationally  
HU Code: 6 digit



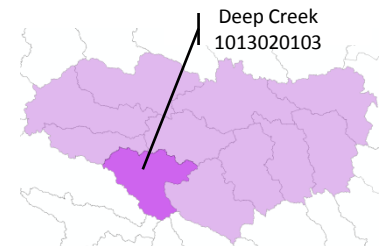
## SUBBASIN 4

2236 Nationally  
HU Code: 8 digit  
average size: 700 mi<sup>2</sup>



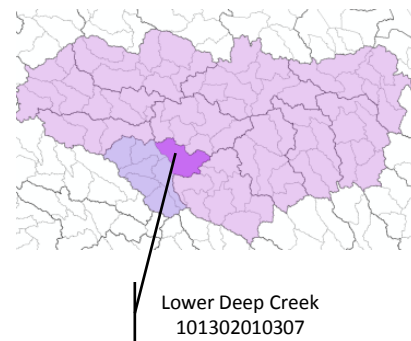
## WATERSHED 5

5-15 per Subbasin  
HU Code: 10 digit  
size: 40,000-250,000 acres

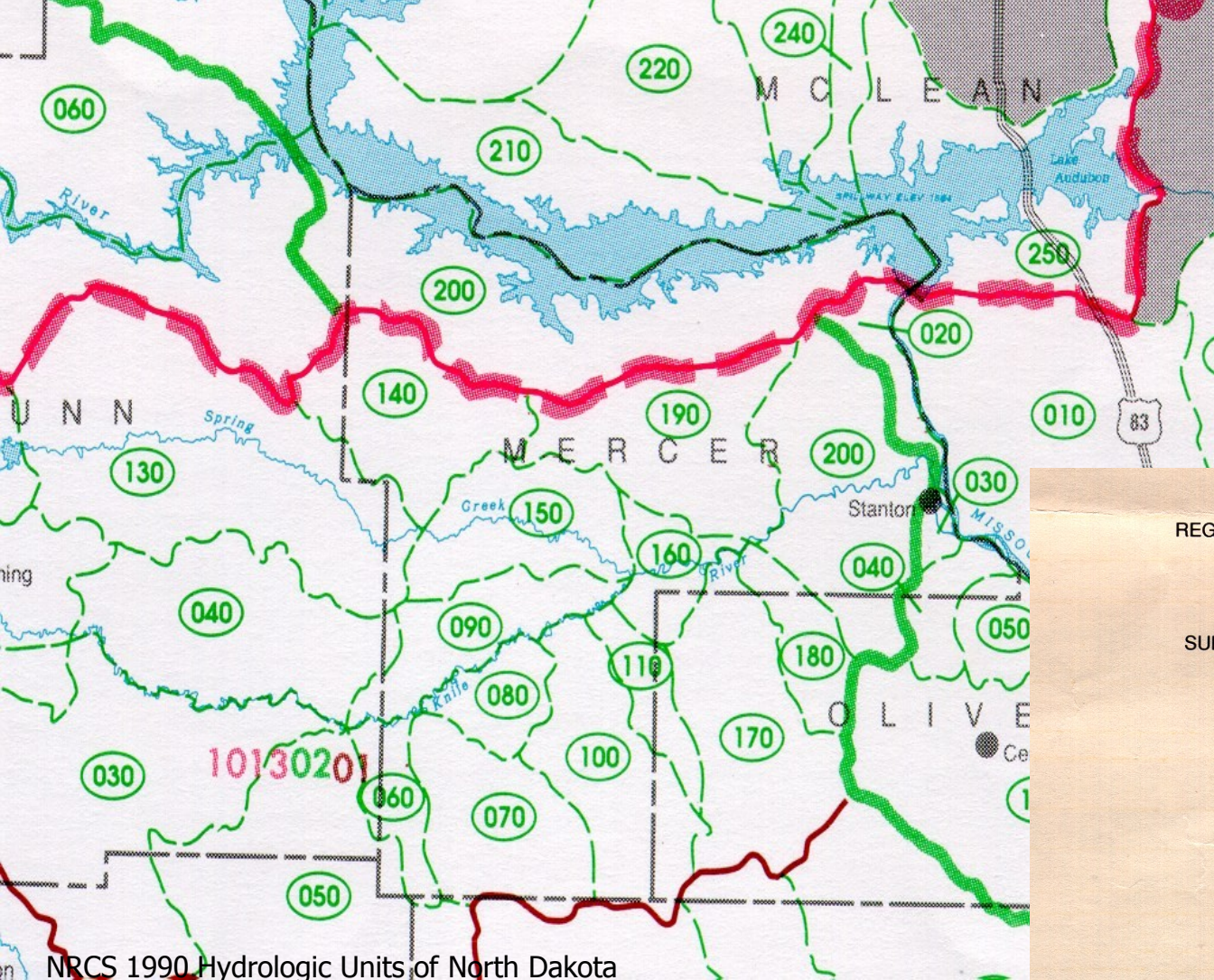


## SUBWATERSHED 6

5-15 per Watershed  
HU Code: 12 digit  
size: 10,000-40,000 acres  
(not less than 3,000)



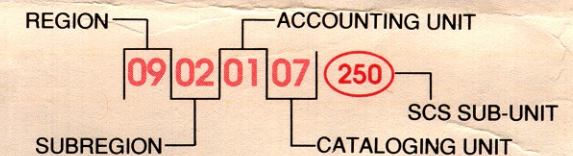




# WHY?

- The "Old" Hydrologic Unit Codes and polygons followed political or administrative borders; did not accurately reflect hydrologic drainage (divides down stream centerlines)
- Different terminology between different agencies
- Stopped at international borders of Canada and Mexico.

## HYDROLOGIC UNIT CODE



REGIONAL BOUNDARY

SUBREGIONAL BOUNDARY

ACCOUNTING UNIT BOUNDARY

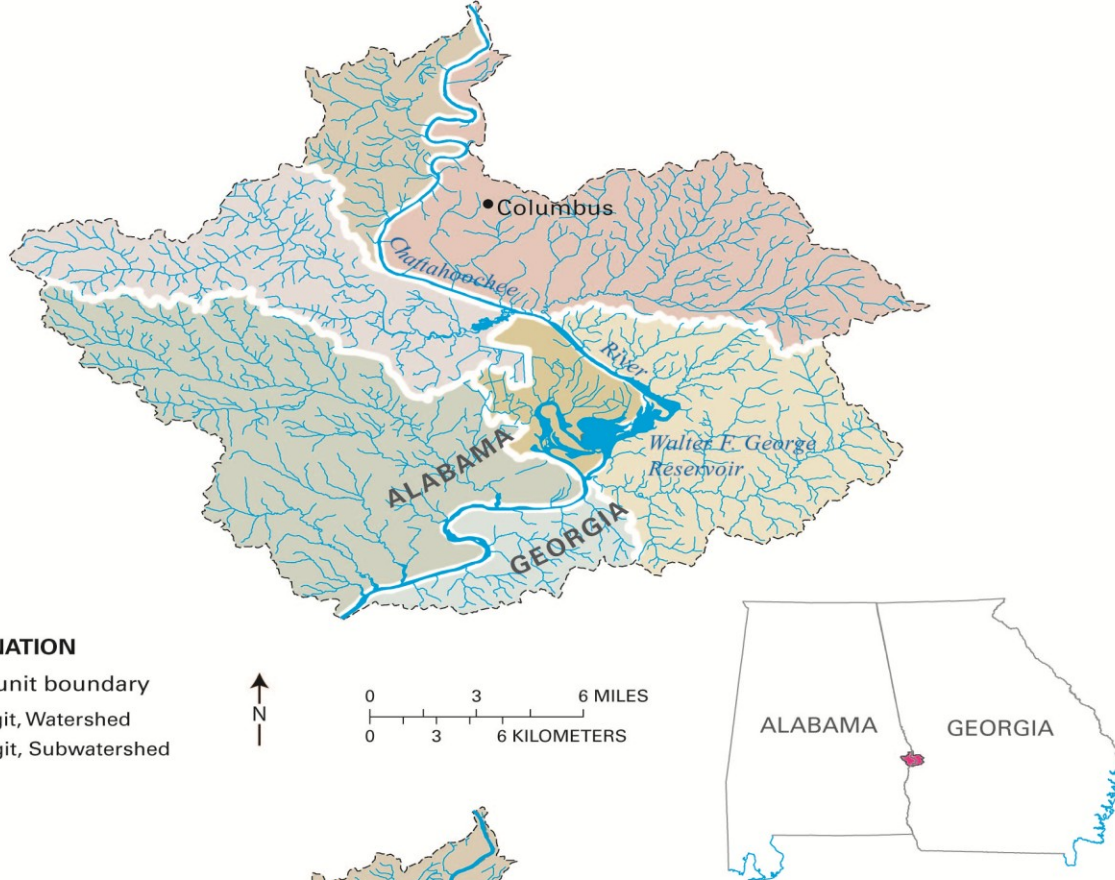
CATALOGING UNIT BOUNDARY

SCS SUB-UNIT BOUNDARY

The Regional and Subregional Boundaries serve as Accounting Unit Boundaries as well as Cataloging Unit Boundaries except where discontinued at the International Boundary



**A. Incorrect**



**B. Correct**



“New” Delineations of hydrologic features based on land surface, surface water flow and hydrogeographic features. NOT administrative or political features.

# *The WBD ....*

- 💧 Is surface area drainage for the nation.
  - 💧 Provides baseline data for the all federal and state agencies that deal with natural resources.
  - 💧 Was consistently created across the nation using Federal Standards.
- 💧 *We're all on the same page*



# ***WHO created the WBD?***

- North Dakota Cooperators (signed MOU in 2000)
  - ND Dept. of Health
  - ND State Water Commission
  - ND Geological Survey
  - U.S. Forest Service - Dakota Prairie Grasslands
  - U.S. Geological Survey
  - U.S. Dept. of Agriculture - Natural Resource Conservation Service

Additional technical or financial support provided by U.S. Bureau of Reclamation, ND GISTC Data Acquisition Funds, EPA Consolidated Funding Grant, and EPA National Environmental Information Exchange Network grants.

Also included with original delineation efforts: NWS, International Joint Commission, USACE, ND DEM, ND WUA, Federal Highway Administration, USF&W



# ***WHO created the WBD?***

- **Regional Cooperators**

Scientists and hydrologists who consulted each other when delineating across state boundaries.

- Minnesota Department of Natural Resources
- U.S. Geological Survey – MN Water Resource District office
- U.S. Geological Survey – SD Water Resource District Office
- U.S. Forest Service - Dakota Prairie Grasslands
- U.S. Dept. of Agriculture - Natural Resource Conservation Service (MT, ND, SD state offices)



# ***WHO created the WBD?***

- **International Cooperators**

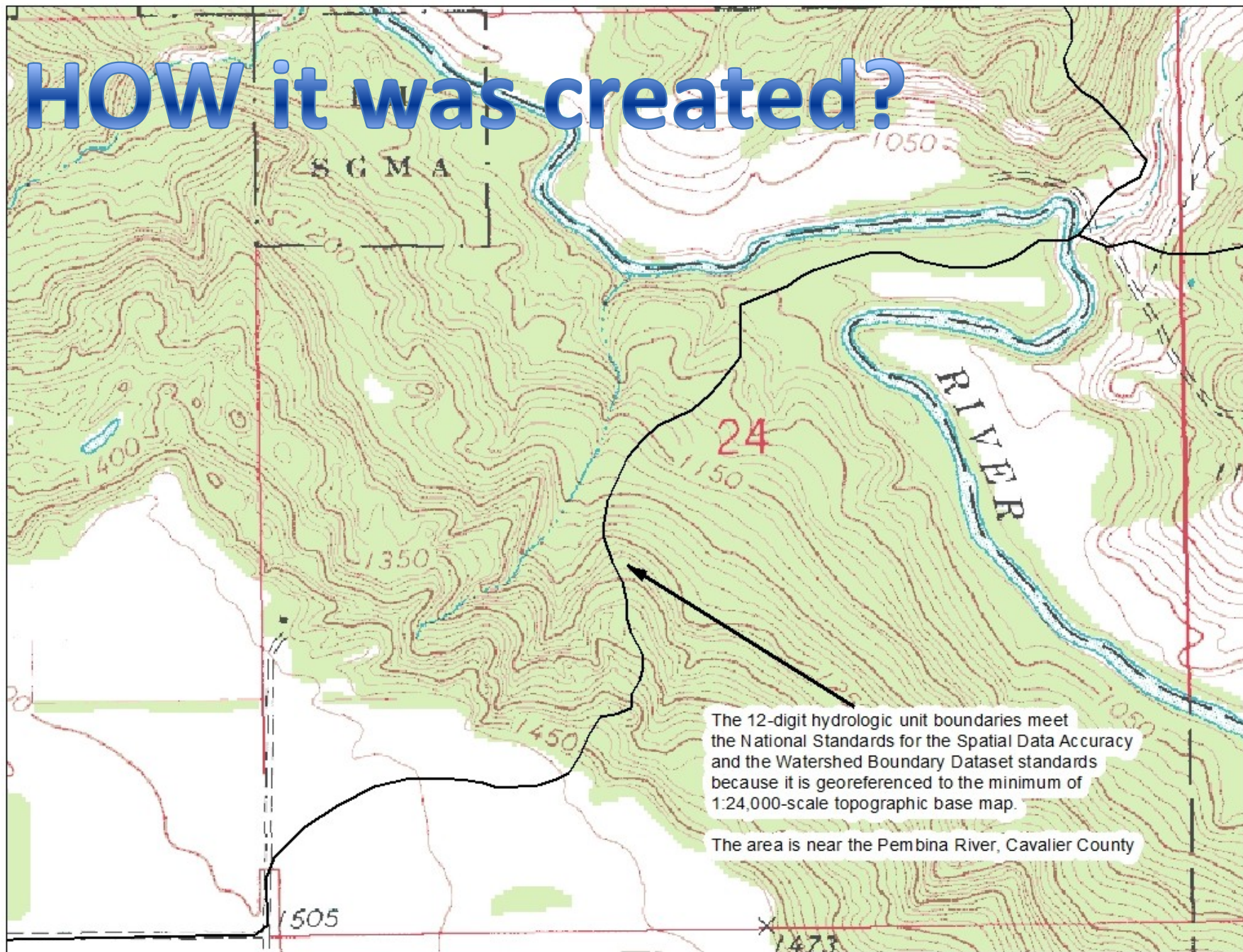
Scientists and hydrologists who consulted each other when delineating across ND- Canada boundaries.

- Manitoba Water Stewardship
- Saskatchewan Water Stewardship
- Environment Canada
- Canadian Agri-Environment Services Branch - PFRA

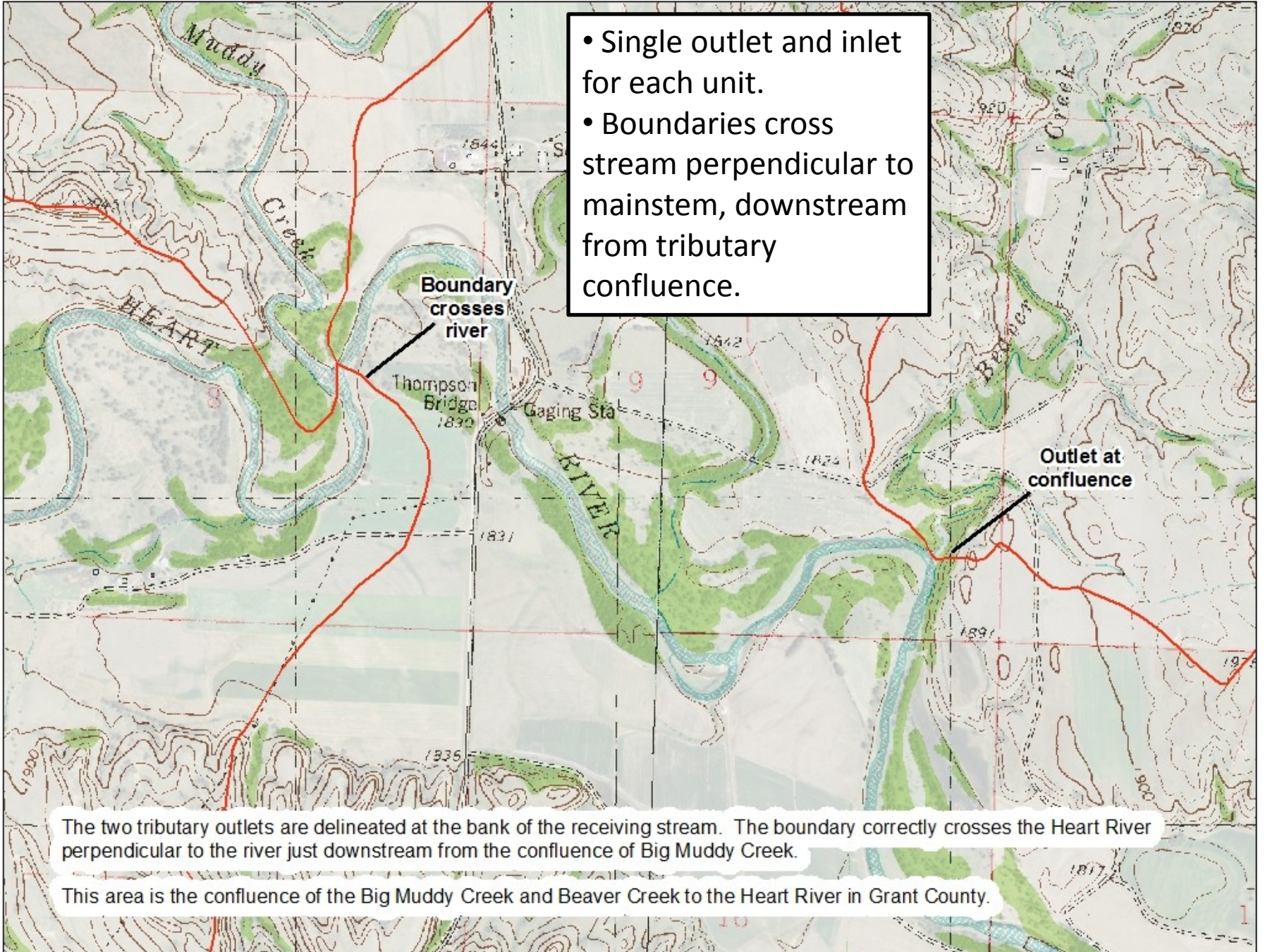




# HOW it was created?





- 
- Single outlet and inlet for each unit.
  - Boundaries cross stream perpendicular to mainstem, downstream from tributary confluence.

The two tributary outlets are delineated at the bank of the receiving stream. The boundary correctly crosses the Heart River perpendicular to the river just downstream from the confluence of Big Muddy Creek.

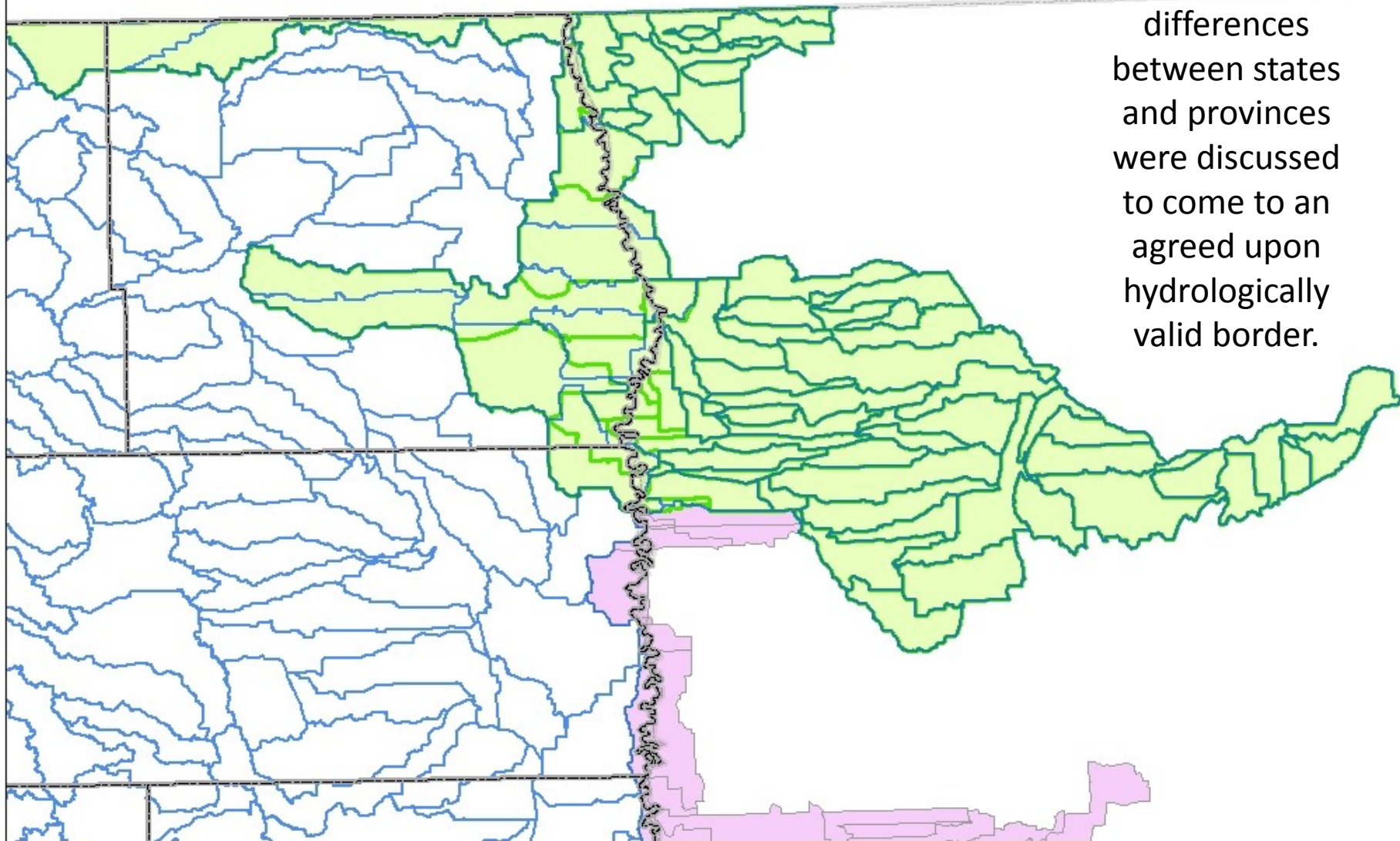
This area is the confluence of the Big Muddy Creek and Beaver Creek to the Heart River in Grant County.



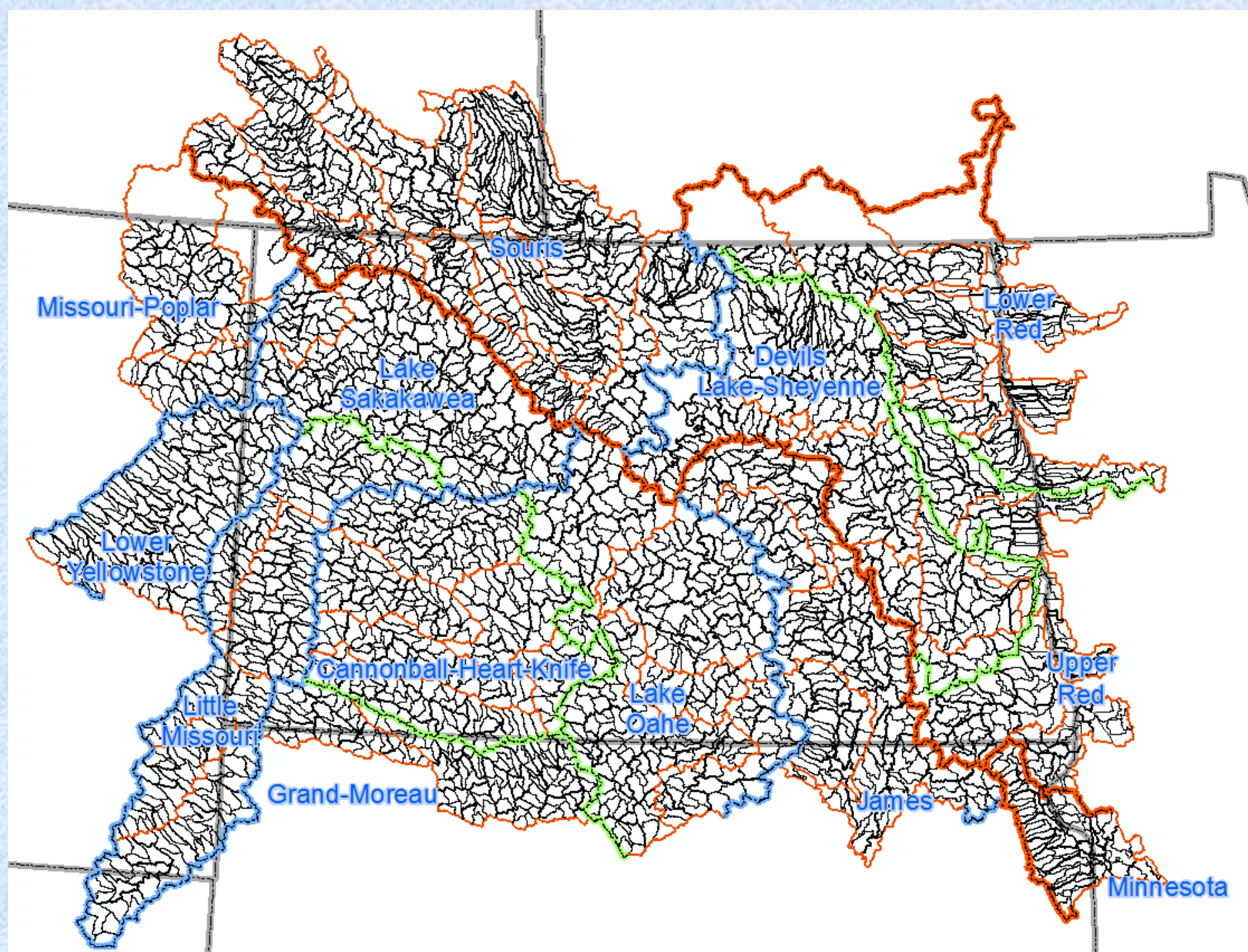
Lower Red  
09020311

North Dakota WBD  
Minnesota WBD

Interpretive  
differences  
between states  
and provinces  
were discussed  
to come to an  
agreed upon  
hydrologically  
valid border.







# How do I get it?



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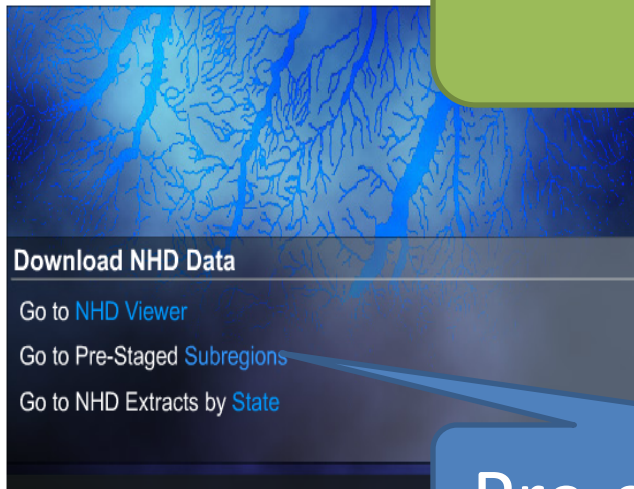
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Watershed Boundary Dataset

## Hydrography

National Hydrography Dataset  
Watershed Boundary Dataset



### Download NHD Data

Go to [NHD Viewer](#)

Go to Pre-Staged [Subregions](#)

Go to NHD Extracts by [State](#)

# nhd.usgs.gov

## Pre-staged Subregions

water quality, and fish population.

The WBD exists in six levels of a nested hierarchy permitting the analysis to determine which drainage basin a particular location is enclosed in. This makes it possible to determine which rivers and lakes could be affected by an event such as a toxic spill. Using basic NHD features like flow network, linked information, and other characteristics, along with one of the six levels of WBD areas, it is possible to study cause and effect relationships, such as how a source of poor water quality upstream might affect a fish population downstream.

Some of the files on this page are presented in Portable Document Format (PDF); the latest version of Adobe Acrobat Reader or similar software is required to view it. [Download the latest version of Acrobat Reader, free of charge.](#)





# Hydrologic Unit Hierarchy

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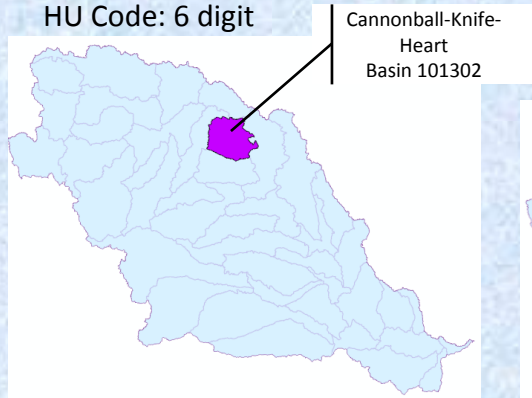
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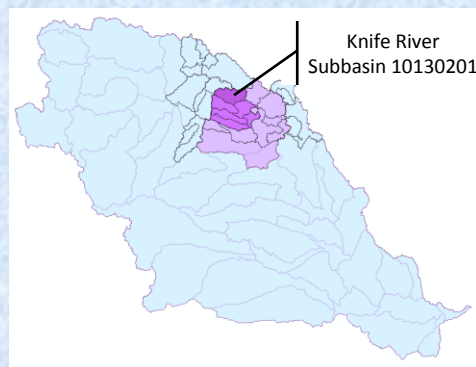
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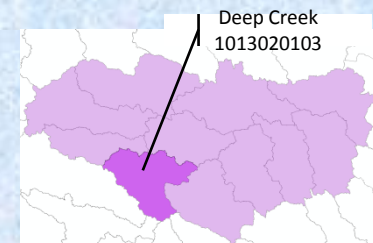
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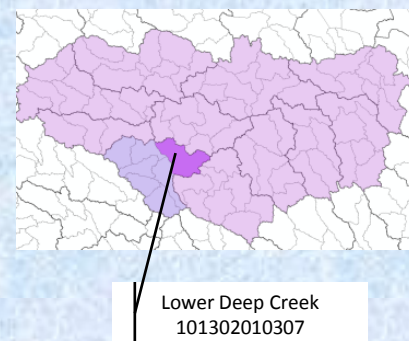
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## Index of ftp://nhdftp.usgs.gov/DataSets/Staged/SubRegions/FileGDB/

Up to higher level directory			
NHDH1003_931v210.zip	49893 KB	2/14/2014	8:20:00 PM
NHDH1004_931v210.zip	71014 KB	2/13/2014	5:02:00 PM
NHDH1005_931v210.zip	84483 KB	2/21/2014	10:22:00 AM
NHDH1006_931v210.zip	43434 KB	2/14/2014	5:17:00 PM
NHDH1003_931v210.zip	49893 KB	2/14/2014	8:20:00 PM
NHDH1004_931v210.zip	71014 KB	2/13/2014	5:02:00 PM
NHDH1005_931v210.zip	84483 KB	2/21/2014	10:22:00 AM
NHDH1006_931v21			
NHDH1007_931v21			
NHDH1008_931v21			
NHDH1009_931v21			
NHDH1010_931v21			
NHDH1011_931v21			
NHDH1012_931v21			
NHDH1013_931v21			
NHDH1014_931v21			
NHDH1015_931v21			
NHDH1016_931v21			
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NHDH1020_931v21			
NHDH1021_931v21			
NHDH1022_931v21			
NHDH1023_931v21			
NHDH1024_931v21			
NHDH1025_931v21			
NHDH1026_931v21			

### Opening NHDH1013\_931v210.zip

You have chosen to open:



**NHDH1013\_931v210.zip**

which is: Compressed (zipped) Folder (146 MB)  
from: ftp://nhdftp.usgs.gov

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Do this automatically for files like this from now on.

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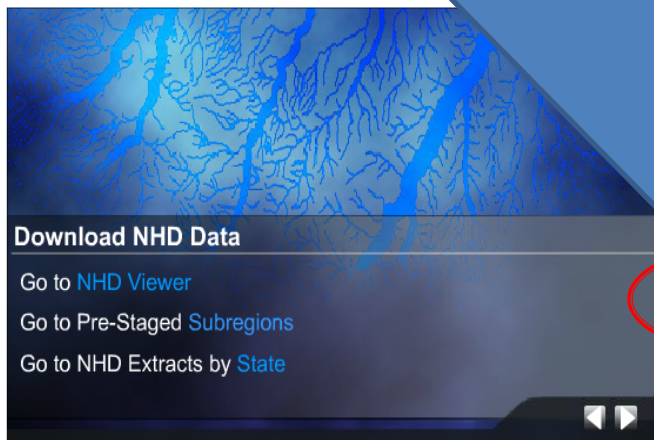
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Watershed Boundary Dataset

## Hydrography

National Hydrography Dataset  
Watershed Boundary Dataset

## Download NHD Data

Go to [NHD Viewer](#)Go to Pre-Staged [Subregions](#)Go to NHD Extracts by [State](#)

The National Hydrography Dataset (NHD) and Watershed Boundary Dataset (WBD) are used to portray surface water on The National Map. The NHD represents the drainage network with features such as rivers, streams, canals, lakes, ponds, coastline, dams, and streamgages. The WBD represents drainage basins as enclosed areas in eight different size categories. Both datasets represent the real world at a nominal scale of 1:24,000-scale, which means that one inch of The National Map data equals 2,000 feet on the ground. To maintain mapping clarity not all water features are represented and those that are use a moderate level of detail.

The NHD and WBD are digital vector datasets used by geographic information systems (GIS). These data are designed to be used in general mapping and in the analysis of surface water systems. In order to make a map these data must be used by a GIS to render the data and then print a map or make an image. The NHD is portrayed on the [US Topo](#) map product produced by the USGS and the NHD and WBD can be viewed on the [Hydrography Viewer](#) or the general mapping oriented [The National Map Viewer](#).

In mapping, the NHD and WBD are used with other data themes such as elevation, boundaries, transportation, and structures to produce general reference maps. The NHD and WBD are often used by scientists using GIS. GIS technologies take advantage of a rich set of attributes imbedded in the data to generate specialized information. These analyses are possible because the NHD contains a flow network that allows for tracing water downstream or upstream. The NHD and WBD use an addressing system based on reach codes and linear referencing to link specific information about the water such as water discharge rates,

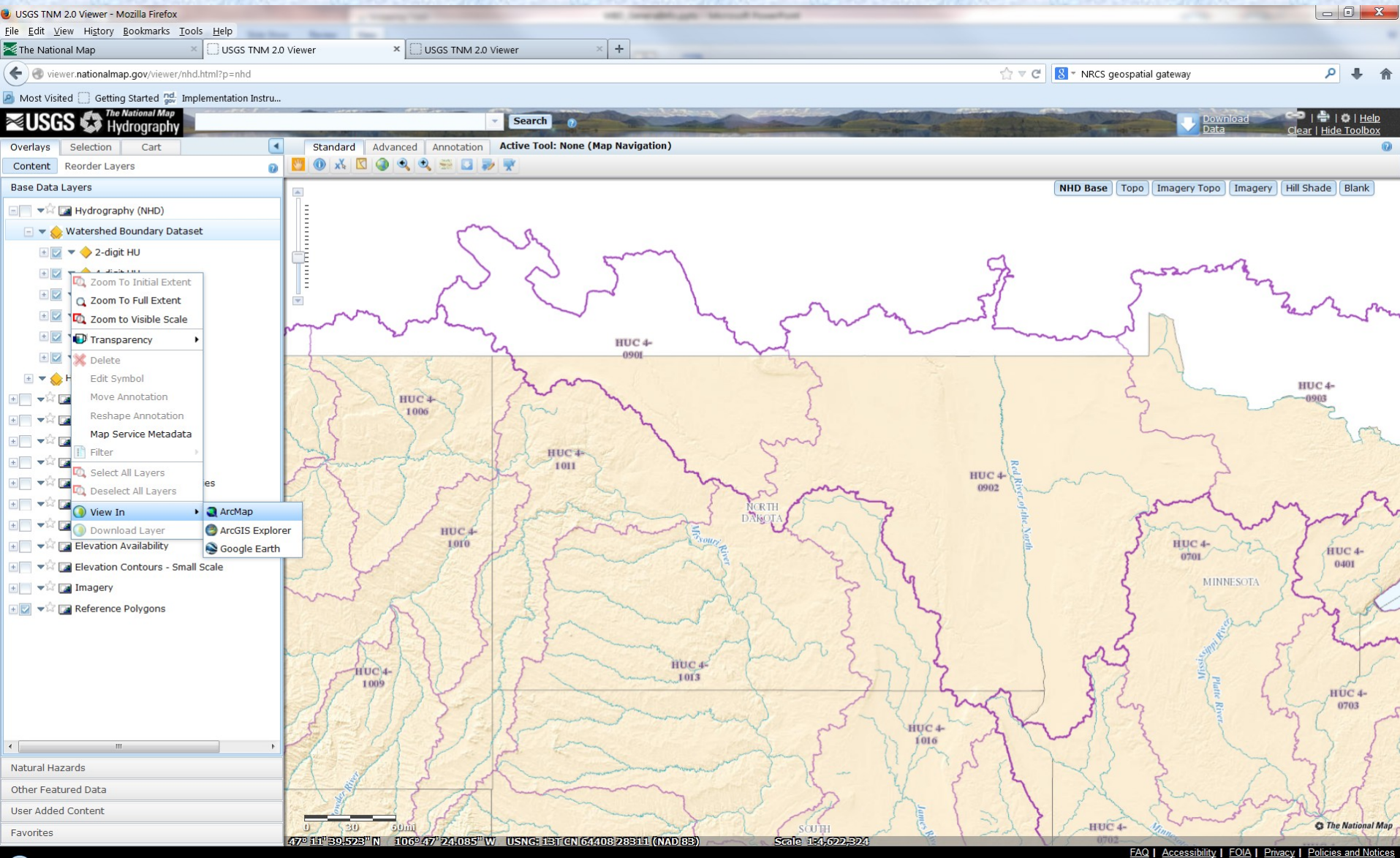
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<http://viewer.nationalmap.gov/viewer/nhd.html?p=nhd>







<http://datagateway.nrcs.usda.gov/>

- Click “GET DATA”
- Order by interactive map, bounding box, or place (state(s) or county(ies), or custom Area Of Interest
- Click “CONTINUE”

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## Welcome to GDG

the one stop source for environmental and natural resource data

### System Status

**Please Note:**  
**4/10/2014 6:19:22 PM MST:**  
 Welcome to Gateway 5.9. All products and services are running normally.

**4/10/2014 6:19:18 PM MST:**  
 FY2013 gSSURGO data is still available but will be replaced with FY2014 when complete. Completion is anticipated to be April 2014.

The Geospatial Data Gateway (GDG) is the One Stop Source for environmental and natural resources data, at anytime, from anywhere, to anyone. The Gateway allows you to choose your area of interest, browse and select data from our catalog, customize the format, and have it downloaded or shipped on CD or DVD.

This service is made available through a close partnership between the three Service Center Agencies ([SCA](#)); Natural Resources Conservation Service ([NRCS](#)), Farm Service Agency ([FSA](#)), and Rural Development ([RD](#)).

Last Modified: 3/11/2014 2:45:18 PM

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



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<http://datagateway.nrcs.usda.gov/>

## 1-WHERE

## 2-WHAT

The list in the middle pane indicates the available map layers for your area of interest. The number of maps and total size of the map layers are listed next to the description. Clicking on the  icon will provide a pop-up window with that map layer's description. Use the  icon to get a list of individual maps for that map layer. Within the list of maps, use the  icon to get metadata for the specific map and the  icon for an individual map preview. You may collapse this map list with the  icon. Your selections will be added to the YOUR ORDER Panel on the far right.

You may change your map layers after this step but all of the subsequent choices made for your order will be removed.

Maps in layers that are "...by State" cover an entire state.



## 3-HOW

## 4-WHO



## 5-REVIEW



## WHAT



Here are the available map layers for your selected area of interest.



☐ National scale Geology by State, 1 map 5.706 MB  



### Government Units



☐ NRCS Counties by State, 1 map 0.859 MB  

☐ NRCS States by State, 1 map 0.166 MB  



☐ TIGER/NRCS 113th Congress Districts by State, 1 map 0.500 MB  

☐ TIGER 2010 Urban Areas by State, 1 map 0.236 MB  


☐ TIGER 2010 American Indian Lands, 23 maps 2.021 MB  



☐ Federal, State, Tribal, etc. Protected Areas Land Ownership, 53 maps 24.646 MB  



### Hydrography



☐ National Hydrography Dataset 1:24,000, 55 maps 1338.123 MB  

### Hydrologic Units



☐ 8 Digit Watershed Boundary Dataset **NRCS Version**, 55 maps 15.728 MB  



☐ 10 Digit Watershed Boundary Dataset in HUC8 **NRCS Version**, 55 maps 38.702 MB  

☐ 12 Digit Watershed Boundary Dataset in HUC8 **NRCS Version**, 55 maps 80.469 MB  



☐ Watershed Boundary Dataset Lines for HUC2-12, 55 maps 50.925 MB  



### Land Use Land Cover



☐ National Land Cover Dataset by State, 1 map 29.175 MB  



☐ Cropland Data Layer by State, 1 map 860.299 MB  

### Map Indexes

☐ Quadrangle Index 1:12,000, 53 maps 3.085 MB  

☐ Quadrangle Index 1:24,000, 53 maps 0.966 MB  

☐ Quadrangle Index 1:100,000 by State, 1 map 0.051 MB  

☐ Quadrangle Index 1 Degree by State, 1 map 0.018 MB  

CONTINUE

WBD on NRCS Data Gateway is a snapshot in time; usually updated twice per year.



Download \*RECENT\* WBD from  
<ftp://nhdftp.usgs.gov/DataSets/Staged/SubRegions/>

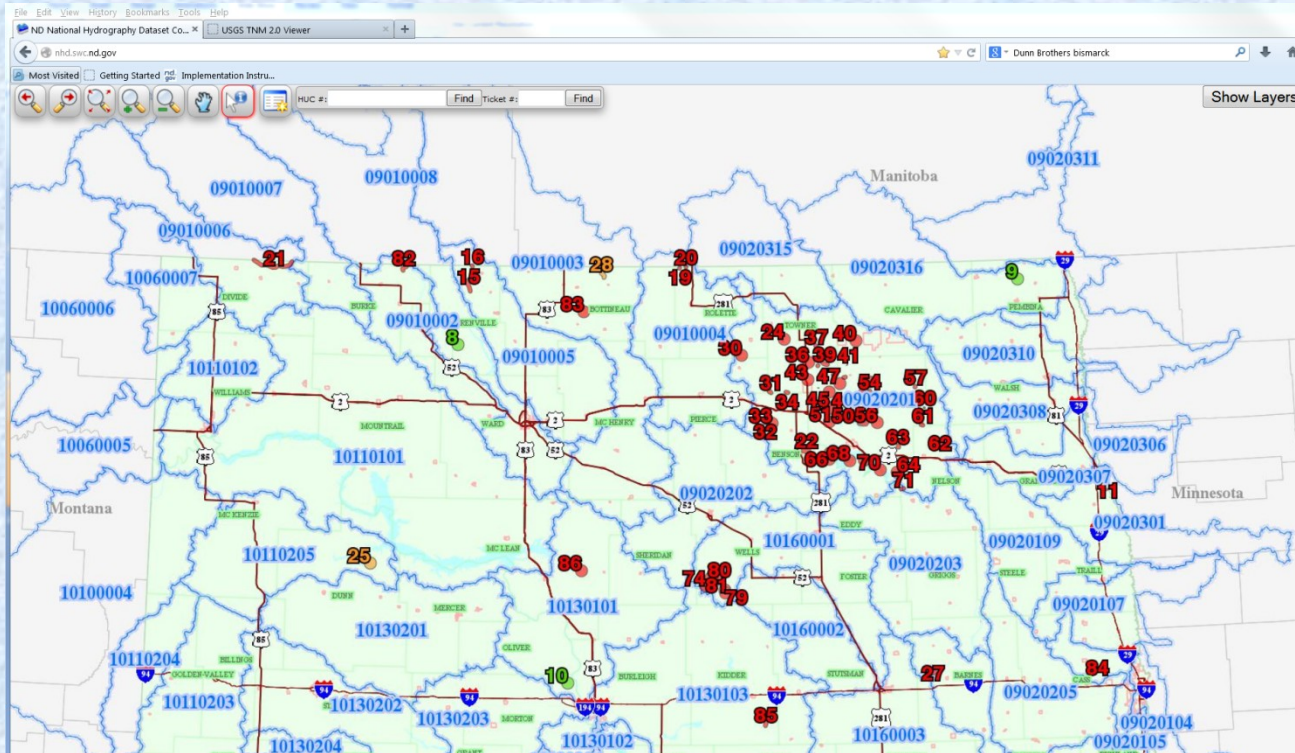
or

\*SNAPSHOT in TIME\*  
NRCS Geospatial Data Gateway:  
<http://datagateway.nrcs.usda.gov/>

# ND NHD Comment Website

If you notice an area that needs to be corrected by the Data Stewards

<http://nhd.swc.nd.gov/>



# For more information contact:

- Ann Fritz, ND WBD Data Steward  
ND Dept. of Health  
Division of Water Quality  
918 E. Divide Avenue  
Bismarck, ND 58501-1947

Phone: 701.328.5162

Email: [afritz@nd.gov](mailto:afritz@nd.gov)