

MEMORANDUM OF UNDERSTANDING

BETWEEN

**THE DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY**

AND

**THE STATE OF NORTH DAKOTA
NORTH DAKOTA STATE WATER COMMISSION**

AND

NORTH DAKOTA DEPARTMENT OF HEALTH

FOR THE

**JOINT STEWARDSHIP OF THE NATIONAL HYDROGRAPHY DATASET AND
WATERSHED BOUNDARY DATASET
IN THE STATE OF NORTH DAKOTA**

August 23, 2010

This MEMORANDUM OF UNDERSTANDING (MOU) is hereby entered into by and between the U.S. Geological Survey, hereinafter referred to as the USGS, the State of North Dakota, North Dakota State Water Commission, hereinafter referred to as the NDSWC and the North Dakota Department of Health – Division of Water Quality, hereinafter referred to as the NDDoH.

I. PURPOSE

This Memorandum of Understanding (MOU), hereafter referred to as the "Agreement," identifies the activities that the North Dakota State Water Commission (NDSWC), the North Dakota Department of Health (NDDoH) and the U.S. Geological Survey (USGS) will undertake in order to cooperatively provide stewardship for key water-related GIS datasets in North Dakota. These datasets initially include the National Hydrography Dataset (NHD) and the Watershed Boundary Dataset (WBD), but can be expanded to include additional datasets in the future with the Agreement of the partners.

For the purposes of this Agreement, the NHD and WBD datasets will be considered together and referred to as the "Hydrography Dataset." This follows a decision by the national stewards for these datasets, the USGS for the NHD and the Natural Resources Conservation Service (NRCS) for the WBD, to integrate the datasets into a single GIS data model. It is anticipated that full integration of the datasets will occur in federal fiscal year 2010. This Agreement provides guidance for the stewardship of these datasets in both their stand alone and fully integrated forms. This Agreement applies to high-resolution NHD and WBD data.

Under the Agreement, the NDSWC and NDDoH agree to maintain, update, and improve the Hydrography Dataset in accordance with a program of data stewardship as outlined in the National Hydro Dataset Stewardship Handbook (Appendix A). This Agreement provides a clear statement of the approach for both in-state and regional stewardship. This then provides a framework for more effective cooperation with our national partners on implementing an integrated stewardship strategy.

II. BACKGROUND

- A. The NHD is a comprehensive set of digital spatial data that contains information about surface water features such as lakes, ponds, streams, rivers, springs, and wells. The NHD interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. The NHD is a national framework for spatial position of surface water features, their attribution, their connectivity in a flow network and an addressing system of linking additional related data known as events. Each reach in this framework is referenced by a permanent feature identifier known as a reach code. Each linear reach is also segmented into linear addresses measures along the reach. USGS is the authority for reach codes and measures. Because NHD provides a nationally consistent framework for addressing and analysis, water-related information linked to reach addresses by one organization (national, state, local) can be shared with other organizations and easily integrated into many different types of applications to the benefit of all.
- B. The WBD is a comprehensive aggregated collection of hydrologic unit data consistent with the national criteria for delineation and resolution. The WBD provides a common addressing system of consistent sized hydrologic units across the nation. The WBD in North Dakota adheres to national guidelines and is mapped to the 5th and 6th level watersheds and sub-watersheds. Specific organizational entities may add additional subdivisions (7th and 8th

level) within this dataset to meet agency-specific requirements. The dataset, at the 5th and 6th levels, has passed national certification. The WBD can accommodate various needs, such as: watershed modeling, resource inventory and assessment, total maximum daily load calculations of pollutants, floodplain management, wetland loss mitigation, and the generation of such other products as StreamStats and NHDPlus.

- C. The success of the Hydrography Dataset will depend on the partnerships established with a wide variety of organizations that work with geospatial hydrography data. It is recognized that the most current, highest resolution, and continuously maintained geospatial information resides with state and local governments, private entities, educational institutions, resource oversight organizations, and other federal agencies. These organizations will work cooperatively to implement a program to exchange updates and improvements to the Hydrography Dataset.
- D. The North Dakota Interagency Hydrologic Unit Work Group (IHUG) was established in 2000 to cooperatively delineate and digitize hydrologic units (the WBD) in the State. IHUG is a loose association of federal, tribal and state organizations that manage water resources, including the North Dakota Geological Survey, North Dakota Game and Fish Department, North Dakota Department of Transportation, North Dakota Water Users Association, USGS, U.S. Forest Service-Dakota Prairie Grasslands (USFS), National Weather Service, U.S. Department of Transportation, U.S. Fish and Wildlife Service, Natural Resource Conservation Service (NRCS), Bureau of Reclamation (BOR), Bureau of Land Management (BLM) and Army Corps of Engineers (ACOE). Under the direction of the NDDoH and NRCS, this group cooperatively prioritized subbasin delineations and digitization for the nationwide WBD effort. IHUG is in a unique position to provide input and advice to the joint NHD/WBD stewardship process. IHUG members have been actively involved with development of the WBD and are aware of the importance for standardized, accurate hydrography data layers. For the purposes of this Agreement, the IHUG will be renamed the Interagency Hydrology Work Group (IHWG). Hydrologists and GIS experts in the IHWG may be called upon when there are questions about potential impacts upon the spatial representation of water features in the State with the integrated WBD and NHD.
- E. North Dakota has identified both the WBD and NHD as significant GIS components to support regional cooperative initiatives, effective and cooperative land management, cooperative ecosystem management and a myriad of other applications. The NHD and WBD are often used jointly for analytical and statistical purposes and other applications. Both datasets provide a consistent framework for programmatic planning, implementation, and reporting at the national, regional, and local levels. The implementation of a successful stewardship program that addresses both datasets ensures the high data quality and vertical integration required by both the National Map and users across the country

III. SCOPE

- A. The NDSWC, NDDoH and USGS recognize that maintaining Hydrography Dataset consistency, currency, and accuracy will benefit the NDSWC, NDDoH, USGS and all users of the Hydrography Dataset. The most direct benefit of shared maintenance is the ability to be informed about changes to the landscape and to receive spatial data that faithfully

represents those changes. The best sources for information about changes are those closest to the change, such as state, tribal and local governments and organizations.

- B. The NDSWC is recognized as the State's authoritative source for all edit decisions regarding the NHD in North Dakota. For areas of interest that cover USFS, BLM, BOR, and ACOE and tribal lands, the NDSWC will coordinate and work with these federal agencies and organizations to assure that the NHD is maintained and the data is input into the National Database.
- C. The NDDoH, because of its business need to have an accurately maintained WBD is recognized as the State's source for all edit decisions regarding the WBD in North Dakota. For areas of interest that cover USFS, BLM, BOR, and ACOE and tribal lands, the NDDoH will coordinate and work with these federal agencies and organizations to assure that the WBD is maintained and the data is input into the National Database.
- D. This Agreement covers subbasins in North Dakota as identified in Appendix B. Stewardship of subbasins shared with adjacent states and provinces will be coordinated between the NDSWC, NDDoH, USGS, NRCS (for WBD) and those adjacent states and provinces and their corresponding stewardship representatives.
- E. The objectives in this Agreement have been jointly coordinated and mutually agreed upon between the NDSWC, NDDoH and USGS so that each agency's office can implement the programmatic and technical procedures in a coordinated manner.

IV. AUTHORITIES

- A. All activities conducted under this Agreement will be in accordance with the applicable laws, executive orders, regulations, and polices of the United States and the State of North Dakota.
- B. This Agreement establishes a framework for cooperative activities between the USGS, NDDoH and NDSWC in support of The National Spatial Data Infrastructure. This Agreement is also entered into by the USGS under Public Law 99-591, which provides USGS permanent authority to "prosecute projects in cooperation with other agencies, Federal, State, or private." (43 U.S.C. § 36c)

V. DEFINITIONS

"Stewardship" as used in this Agreement means the overall programmatic coordination to maintain an up-to-date Statewide integrated NHD and WBD dataset.

"Maintenance" as used in this Agreement means the necessary revisions, corrections and updates to a particular subbasin, set of subbasins, or segments thereof. The State stewards for NHD and WBD in North Dakota will comply with the current mission statement and goals outlined in the GIS Initiative Strategic Plan for the North Dakota State GIS Hub as of the signing of this Agreement.

VI. STEWARDSHIP ROLES

State Stewardship Role: Most states have had a WBD Coordinator (Steward) who coordinated and provided oversight for the development of the WBD, and many states also have NHD stewardship agreements with the USGS. NHD and WBD stewardship at the state level generally are partnerships between Principal State Stewards and Local Stewards. Principal State Stewards are the focal point for stewardship within a state. Local Stewards provide on-the-ground knowledge and input to stewardship activities. In general, discussion of the Principal State Steward assumes the presence of Local Stewards.

Under this Agreement the NDSWC will serve as North Dakota's Principal State Steward for the NHD. The NDDoH will serve as North Dakota's Principal State Steward for the WBD. There must be an appropriate level of coordination to ensure adequate stewardship and governance within the State to better fulfill the stewardship function for North Dakota.

National Stewardship Role: The USGS and NRCS collaborate to fulfill their national stewardship responsibilities for the integrated NHD. The USGS has primary stewardship responsibility for the NHD, and the USGS and NRCS share responsibility for the WBD. The USGS Technical Points of Contact (POCs), working in coordination with the NHD Project Manager, provide key support to roles described in this section.

USGS Geospatial Liaisons facilitate communication of stewardship efforts. They work with state and federal agencies and other organizations within a state to develop in-state stewardship agreements. They coordinate with in-state Geographic Information Committees concerning stewardship. They assist State and National Stewards to develop stewardship agreements and governance plans.

VII. RESPONSIBILITIES

All parties to this Agreement recognize that maintaining NHD and WBD consistency, currency and accuracy will benefit all agencies and users of the NHD and WBD. All parties understand that there are considerable mutual benefits to be realized by maintaining these datasets simultaneously. The most direct benefit of shared maintenance is the ability to integrate natural and human-made changes on the landscape with the integrated NHD/WBD database to better produce and share spatial data that more faithfully represents those changes. The USGS and the State partners understand that this Agreement is a dynamic document that will need to be periodically updated as the State's stewardship program develops and as funding allows.

The responsibilities described below outline the respective responsibilities required to ensure the level of cooperation amongst all collaborating entities.

A. The NDSWC agrees to:

1. Act as the single entity the USGS will interface with on stewardship issues within the State regarding the NHD.

2. Take stewardship responsibility of the NHD for all hydrologic units as documented in Appendix B.
3. Represent the interests of the user community concerned with hydrography in the State by providing the USGS with the most widely accepted representation of the surface water in the NHD.
4. Act as the designated Principal State Steward for NHD in North Dakota as staffing and budget allow.
5. Accept input from other agencies and organizations. Consider any change submitted and coordinate with North Dakota's IHWG to decide if the update will be accepted and report the decision publicly.
6. Respond to proposed update requests from other agencies and organizations in a timely manner. Respond to update requests from USGS in a timely manner at intervals to be determined.
7. Maintain an awareness of the activities of other agencies and organizations involved in stewardship in order to include all applicable input for a given area.
8. Provide contact information for management and technical issues.
9. Provide publicly available information on the status of data stewardship activities.
10. Provide updates in the agreed upon format (Appendix C).
11. Provide metadata that clearly describes the sources used in the update and the process used to make the changes.
12. Provide USGS with updates that meet agreed upon quality standards (Appendix D). Maintain quality assurance as follows:
 - a. Strive to ensure that the data is error free so that it can be used for:
 1. the transaction process,
 2. input to the working NHD/WBD integrated geodatabase,
 3. routine validation checks,
 4. distribution, and
 5. normal applications.
 - b. Perform a quality assurance check on the data before it is delivered to the USGS and ensure that the core content (features, attributes and relationships) identified in the Standards and Quality (QA/QC) Assurance Specifications are included. QA/QC guidelines are found in the USGS QA /QC Standards (Appendix D).

13. Rework updates returned for correction and resubmit to the USGS in a timely manner.
 14. Utilize nationally consistent reach codes.
 15. Provide the USGS with test transactions to demonstrate the ability to meet the standards.
 16. Provide the USGS with updates on known and reported errors within 45 days.
- B. The North Dakota Department of Health – Division of Water Quality agrees to:
1. Act as the single entity the USGS will interface with on stewardship issues within the State regarding the WBD.
 2. Take stewardship responsibility of the WBD for hydrologic units documented in Appendix B.
 3. Represent the interests of the user community concerned with hydrologic units in the State by providing the USGS with the most widely accepted representation of the surface water boundaries in the WBD.
 4. Act as the designated Principal State Steward for WBD in North Dakota as staffing and budget allow.
 5. Accept input from other agencies and organizations. Consider any change submitted and coordinate with North Dakota's IHWG to decide if the update will be accepted and report the decision publicly.
 6. Respond to proposed updates requests from other agencies and organizations in a timely manner. Respond to updates requests from USGS in a timely manner at intervals to be determined.
 7. Maintain an awareness of the activities of other agencies and organizations involved in stewardship in order to include all applicable input for a given area.
 8. Provide contact information for management and technical issues.
 9. Provide publicly available information on the status of data stewardship activities.
 10. Provide updates in the agreed upon format (Appendix C).
 11. Provide metadata that clearly describes the sources used in the update and the process used to make the changes.

12. Provide USGS with updates that meet agreed upon quality standards (Appendix D). Maintain quality assurance as follows:

- a. Strive to ensure that the data is error free so that it can be used for:
 1. the transaction process,
 2. input to the working NHD/WBD integrated geodatabase,
 3. routine validation checks,
 4. distribution, and
 5. normal applications.

- b. Perform a quality assurance check on the data before it is delivered to the USGS and ensure that the core content (features, attributes and relationships) identified in the Standards and Quality (QA/QC) Assurance Specifications are included. QA/QC guidelines are found in the USGS QA/QC Standards (Appendix D).

13. Rework updates returned for correction and resubmit to the USGS in a timely manner.

14. Utilize nationally consistent hydrologic unit codes.

15. Provide the USGS with test transactions to demonstrate the ability to meet the standards.

16. Provide the USGS with updates on known and reported errors within 45 days.

C. The USGS agrees to:

1. Be responsive to the State by processing transactions to the point of distribution in a timely manner.
2. Be responsive to the State by providing the necessary information and assistance to allow the State to create and maintain a stewardship program.
3. Provide the in-state data stewards the tools, documentation, and training to edit and update the integrated NHD/WBD (Appendix E).
4. Work with the State to develop solutions to incorporate general hydrographic data needed by the State.
5. Provide notification, documentation, and assistance to ensure updates are appropriate. Return updates that need to be reworked.
6. Provide an Internet accessible reach code allocator and validate reach codes in update submissions.
7. Notify both the NDSWC and NDDoH of any changes to the NHD and WBD structure, format, or content.
8. Provide clear guidance on expectations for acceptable updates.

9. Provide documentation on validation criteria applied to updates.
10. Provide documentation on formats for update transactions (Appendix C).
11. Provide contact information for management and technical issues (Section XI).
12. Make updates submitted by the steward available in the geodatabase within 60 days.

VIII. DATA OWNERSHIP AND RIGHTS

All data produced, updated, and maintained in the integrated NHD/WBD database is in the public domain and will be available to any interested party.

IX. FINANCIAL COMMITMENTS

This Agreement does not constitute a financial commitment on the part of any partner. The Agreement is designed to serve as a mechanism under which each will work cooperatively to exchange updates and continually make improvements to the integrated NHD/WBD.

X. STANDARDS, DEFINITIONS, QUALITY ASSURANCE (QA/QC) SPECIFICATIONS, AND TECHNICAL REFERENCES

See Appendices A, C, D and E for the current references to the integrated WBD/NHD delivery formats, standards, definitions, and QA/QC.

XI. PERIOD OF AGREEMENT

This Agreement becomes effective on the date of signature by all partners and may be terminated within 30 days written notice by a partner. The Agreement will be reviewed periodically and amended or revised when required.

XII. POINTS OF CONTACT

USGS, NDDoH and NDSWC designate the following persons as points of contact for this Agreement and Stewardship program:

<u>NHD/WBD Integrated Stewardship</u>	<u>NHD Stewardship</u>	<u>WBD Stewardship</u>
U.S. Geological Survey	North Dakota State Water Commission	North Dakota Department of Health -Division of Water Quality
Name: Stephen Shivers	Rod Bassler	Ann Fritz
Title: NSDI Geospatial Liaison	GIS Coordinator	Environmental Scientist
Address: USGS	North Dakota State Water Commission	North Dakota Department of Health
1608 Mountain View Drive	900 E. Boulevard Avenue	918 E. Divide Avenue
Rapid City, SD 57702	Bismarck, ND 58505	Bismarck, ND 58501
Phone: 605-394-3216	701-328-4998	701-328-5162
FAX: 605-355-4523	701-328-3696	701-328-5200
Email: spshivers@usgs.gov	rbassler@nd.gov	afritz@nd.gov

NHD Technical

NHD Technical

U.S. Geological Survey	North Dakota State Water Commission
Name: Paul Kimsey	Rod Bassler
Title: Cartographer	GIS Coordinator
Address: USGS, NGTOC	North Dakota State Water Commission
P.O. Box 25046, MS 510	900 E. Boulevard Avenue
Denver, CO	Bismarck, ND 58505
Phone: 303-202 4560	701-328-4998
FAX: 303-202-4504	701-328-3696
Email: pjkimsey@usgs.gov	rbassler@nd.gov

WBD Technical

WBD Technical

U.S. Geological Survey	North Dakota Department of Health
Name: Stephan Daw	Ann Fritz
Title: WBD National Technical Coordinator	Environmental Scientist
Address: USGS, NGTOC	North Dakota Department of Health
PO Box 25046, MS 510	918 E. Divide Avenue
Denver, CO 80225-0046	Bismarck, ND 58501
Phone: 303-202 4418	701-328-5162
FAX: 303-202-4504	701-328-5200
Email: sgdaw@usgs.gov	afritz@nd.gov

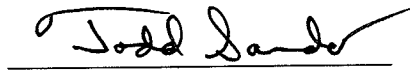
XIII. APPROVALS



U.S. Geological Survey
Geospatial Programs Representative

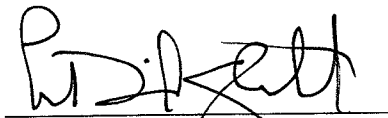
Kari J. Craun, Director, USGS-NGTOC

Date: *9-24-2010*



Todd Sando
State Engineer
North Dakota State Water Commission

Date:



Dave Glatt
Chief, Environmental Health Section
North Dakota Department of Health

Date:

Appendices

- A – Stewardship of the National Hydro Database Handbook
- B – North Dakota Hydrologic Unit Code List
- C – Data Delivery Format
- D – Standards and Quality Assurance Specifications
- E – Edit Tools To Be Used

Appendix A

<insert National Hydrography Stewardship Handbook>

Appendix B

Subbasins that are covered in the terms of this Agreement include:

07020001 - Upper Minnesota	09020316 – Lower Pembina +
09010001 - Upper Souris River*(name and number will be retired and area incorporated into 09010006, 09010007 and 09010008)	10060005 - Charlie-Little Muddy Creek
09010002 - Des Lacs River	10060006 - Big Muddy Creek
09010003 - Lower Souris River	10060007 - Brush Creek Closed Basin
09010004 - Willow Creek	10100004 - Lower Yellowstone River
09010005 - Deep River	10110101 - Lake Sakakawea
09010006 – Long Creek +	10110102 - Little Muddy River
09010007 - Headwaters Souris +	10110201 - Upper Little Missouri River
09010008 – Moose Mountain-Souris +	10110202 - Boxelder Creek
09020101 - Bois de Sioux River	10110203 - Middle Little Missouri River
09020104 - Upper Red River	10110204 - Beaver Creek (Little Missouri)
09020105 - Western Wild Rice	10110205 - Lower Little Missouri River
09020107 - Elm-Marsh River	10130101 - Painted Woods-Square Butte
09020109 - Goose River	10130102 - Upper Lake Oahe
09020201 - Devils Lake	10130103 - Apple Creek-Long Lake
09020202 - Upper Sheyenne River	10130104 - Beaver Creek (Lake Oahe)
09020203 - Middle Sheyenne River	10130106 - West Missouri Coteau
09020204 - Lower Sheyenne River	10130201 - Knife River
09020205 - Maple River	10130202 - Upper Heart River
09020301 - Sandhill-Wilson Rivers	10130203 - Lower Heart River
09020306 - Grand Marais Creek	10130204 - Upper Cannonball River
09020307 - Turtle River	10130205 - Cedar Creek
09020308 - Forest River	10130206 - Lower Cannonball River
09020310 - Park River	10130301 - North Fork of the Grand River
09020311 - Lower Red River*	10130303 - Grand River
09020313 - Pembina River*(name and number will be retired and incorporated into 09020315 and 09020316)	10160001 - James River Headwaters
09020315 – Upper Pembina +	10160002 - Pipestem River
	10160003 - Upper James River
	10160004 - Elm-Maple River

* Denotes that the HUC_8 code and subbasin name will change due to harmonization across the US-Canadian border that will occur in 2010-2011. Other name and code changes may occur at the watershed and subwatershed level as harmonization progresses.

+ Denotes new HUC_8 code and subbasin name that will be implemented as harmonization across the US-Canadian border is completed and old codes are retired.

Appendix C

DATA DELIVERY FORMAT

All data transactions shall be in Extensible Language (XML) format, as defined in ISO Standard 15022. For more information on this standard, go to:

<http://www.iso15022.org/ISO15022XML/defaultXML.htm>

Appendix D

STANDARDS and QUALITY ASSURANCE SPECIFICATIONS

For standards on data content, use:

Standards for National Hydrography Dataset - High Resolution (DRAFT)
Defines features, feature attributes, attribute values, delineation, representation rules, and data extraction for the National Hydrography Dataset-High Resolution (NHD-HR) at scales larger than 1:100,000. (145 p., 271KB, PDF) <http://rmmcweb.cr.usgs.gov/public/nmpstds/nhdstds.html>

For reference documents on features, attributes and relationships in the NHD, please go to:
<http://nhd.usgs.gov/techref.html>

Here you will find:

- **NHD Quickstart** - The "NHD Quickstart" is a condensed reference document to help users obtain and view NHD data, and navigate the NHD Flow Path.
- **NHDinGEO Tasks** - The "NHDinGEO Tasks for ArcGIS 8.3 and Higher" is an in-depth reference document which describes how to use the NHD with ESRI's ArcGIS system.
- **NHDinGEO Feature Codes (FCodes) by layer** - Lists of FCodes by layer which include the feature type, FCode, and description.
- **Concepts and Contents**
- "Concepts and Contents" is the primary reference document for the National Hydrography Dataset. In this document, one will find information ranging from a high level overview of the NHD to detailed descriptions of the NHD data content. The "Concepts and Contents" document describes the elements of the dataset that make the NHD an effective resource to new users as well as those who have been using the USGS Digital Line Graph and the EPA Reach File. The main points of this document are summarized in the "NHDinARC QuickStart" document.
- **Introducing the NHDinARC**
- "Introducing the NHDinARC" is a document that describes a common distribution format for the National Hydrography Dataset known as the NHDinARC format. Among the topics discussed within this document are a description of the NHDinARC data model and ARC/INFO elements used within the NHDinARC. The NHDinARC Schema, below, is a companion graphic to the "Introducing the NHDinARC".
- **NHDinGEO Schema** - Diagram of the tables, the table items, the item definitions, and the relationships between the tables in the NHDinGEO data model.
- **NHD Data Standards** - Defines valid feature types and their characteristics, the delineation or extent of a feature, how a feature is stored in the data, and detailed capture conditions for each of the feature types in the National Hydrography Dataset (NHD).
- **NHD Fact Sheet** - A brief summary of the history and characteristics of the NHD, with additional information concerning obtaining, and maintaining the NHD.
- **Geographic Names Information System (GNIS)** - Access GNIS to check, submit new, or make changes to names in GNIS.
- **A Guide to NHD Stewardship Parts 1 & 2** – General Guidelines and Best Practices

Appendix E

EDIT TOOLS TO BE USED

A tool is needed to specifically edit the integrated NHD/WBD data since the data structure is somewhat complex. This complexity is part of the design that makes the integrated NHD/WBD so suitable for a stewardship environment. Many components are tracked in special tables that trace the legacy of the data. The NHDGeoEdit tool was developed by the U.S. Forest Service and made available to the partner for use. The USGS has assumed responsibility for the maintenance of the NHDGeoEdit tool being shared with the partner. USGS is developing a tool to edit the WBD portion of the database. USGS will provide the stewardship partners training on how to use the tools. Also, in order to use these tools the USGS will provide three Enterprise ArcInfo licenses dedicated to the NHD/WBD Stewardship Program.