DRAFT FOR REVIEW PURPOSES ONLY

MEMORANDUM OF UNDERSTANDING BETWEEN

THE DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

AND

THE WEST VIRGINIA OFFICE OF GIS STATE COORDINATOR

FOR

THE STEWARDSHIP OF THE NATIONAL HYDROGRAPHY DATASET

I. PURPOSE

The purpose of this Memorandum of Understanding (MOU) is to identify the activities that the West Virginia Office of the GIS State Coordinator and the U.S. Geological Survey (USGS), referred to as partners, will undertake to revise, improve and maintain the high resolution (1:24,000 scale or better) National Hydrography Dataset (NHD) in a program of statewide data stewardship in West Virginia. The partners to this MOU represent Federal and State government with an interest in providing current, accurate, and consistent surface water geospatial data to meet the requirements of the National Spatial Data Infrastructure for hydrography and of interested state and local agencies.

II. BACKGROUND

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 framework for spatial position for surface water features, their attribution, their connectivity in a flow network, and an addressing system of linking additional related data known as events. A permanent feature identifier known as a reach code references each reach in the framework. Each linear reach is also segmented into linear addresses measures along the reach. The USGS is the authority for reach codes and measures. Because the NHD provides a 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.

The success of the NHD will depend on the partnerships established with a wide variety of organizations that work with geospatial hydrographic data. The most current, highest resolution and continuously maintained geospatial information reside 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 NHD.

West Virginia has identified the NHD as a significant GIS component to support regional cooperative initiatives, effective and cooperative land management, cooperative ecosystem management, and a myriad of other applications. Thus it is included as an essential geospatial dataset in the West Virginia Spatial Data Infrastructure.

In West Virginia, the WV Office of the GIS State Coordinator, in cooperation with stakeholders listed in Appendix D, shall coordinate NHD stewardship policy and programmatic goals. For NHD maintenance and revisions, the WV GIS Technical Center at West Virginia University shall be the lead technical agency.

III. DEFINITIONS

For definition purposes in this MOU, 'stewardship' is defined as the overall programmatic coordination to maintain an up-to-date statewide NHD dataset while 'maintenance' is defined as the necessary revisions, corrections, updates, etc. to a particular sub-basin or set of sub-basins.

IV. SCOPE

The intent of this Agreement is to outline a partnership strategy and programmatic application for the long-term stewardship of high-to-local-resolution and NHD sub-basins encompassing the State of West Virginia. This cooperation and coordination is the final phase of a multi-year strategy to provide West Virginia with a robust high-resolution NHD dataset and a long-term stewardship program. This agreement covers all sub-basins in West Virginia as identified in Appendix F.

Both parties of this Agreement recognize that maintaining NHD consistency, currency, and accuracy will benefit both parties and all users of the NHD. The most direct benefit of shared maintenance is the ability to be informed about changes on the landscape and to receive spatial data that faithfully represents those changes. The best resources for information about changes are those closest to the change, such as state and local governments and organizations.

V. AUTHORITIES

1. 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 West Virginia.

2. This Agreement is entered into under the MOU between the USGS and WV NHD for the NSDI in the State of West Virginia. This MOU establishes a framework for

coordination and cooperation between the USGS and West Virginia for facilitating the conduct of cooperative activities in areas of mutual interest in support of The National Spatial Data Infrastructure. This Agreement is also entered into by the USGS under Public Law 99-591 that bestows permanent authority to the USGS to "prosecute projects in cooperation with other agencies, Federal, State, and private" (43 U.S.C. § 36c).

3. In accordance with West Virginia Executive Order 4-93, the WV GIS State Coordinator and WV GIS Technical Center manage and provide technical support, respectively, in advancing the State's Spatial Data Infrastructure.

VI. COOPERATIVE ACTIVITIES

The WV Office of the GIS State Coordinator and its state and local partners *will*:

1. Act as the principal point of contact for the USGS on stewardship issues related to the NHD within the State.
2. 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.
3. Take stewardship responsibility of the 32 hydrologic units that fall within West Virginia's borders as documented in Appendix E.
4. Accept input from other agencies and organizations; consider any change submitted and decide authoritatively if it will be accepted or not, and report the decision publicly.
5. Work with partner agencies acting as NHD maintainers or content providers to obtain and incorporate new line work and updates as appropriate. Partner agencies include but are not limited to those agencies identified in Appendix D.
6. Be responsive to the input received by responding to proposed updates within an agreed-upon, reasonable time. For purposes of this MOU, the time shall be 60 days. Updates to the USGS shall be provided in a timely manner at intervals to be determined.
7. Maintain an awareness of the activities of other agencies and organizations involved in stewardship of the State NHD information 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 A).
11. Provide metadata that clearly describe the sources used in the update and the process used to make the changes.
12. Provide the USGS with updates that meet agreed-upon quality standards, maintaining quality assurance as follows:

   a. Strive to ensure that the data is error free so that it will work in (1) the transaction process, (2) input to the working NHD geodatabase, (3) routine validation checks, (4) distribution, and (5) normal applications. The partner shall perform a quality assurance check on the data before it is delivered to the USGS. The method used to perform this check will be at the discretion of the partner.
   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 B).
13. Rework updates returned for correction and resubmit to the USGS.
14. Utilize nationally consistent reach codes.
15. Provide the USGS with test transactions to demonstrate the ability to meet the standards.
16. Seek sustained funding for NHD stewardship in West Virginia.

The U.S. Geological Survey *will*:

1. Be responsive to West Virginia by processing transactions to the point of distribution in a timely manner of 30 days.
2. Be responsive to West Virginia by providing the necessary information and assistance to allow the State to create a stewardship program.
3. Provide support for the NHDGeoEdit tool.
4. Provide the tools, documentation, and training to edit and update the NHD to be used in USGS' enterprise ArcSDE and Oracle environment (Appendix C).
5. Work with West Virginia to enhance West Virginia NHD data with additional information where desired.
6. Provide notification, documentation, and assistance in response to submitted updates that do not meet the requirements established and agreed upon by the partners. Return updates that need to be reworked to meet requirements.
7. Provide an Internet accessible reach code allocator and validate reach codes in update submissions.
8. Notify West Virginia of any changes to the NHD structure, format, or content that may affect the State.
9. Provide clear guidance on expectations for acceptable updates.
10. Provide documentation on validation criteria applied to updates.
11. Provide documentation on formats for update transactions.
12. Provide contact information for management and technical issues.

VII. DATA OWNERSHIP AND RIGHTS

All data produced, updated and maintained in the NHD is public domain and thus is available to any interested party.

VIII. FINANCIAL COMMITMENTS

This MOU does not constitute a financial commitment on the part of the USGS or WV Office of the GIS State Coordinator. The MOU is designed to serve as a mechanism under which each partner will work cooperatively to exchange updates and continually make improvements to the NHD. All roles and responsibilities are agreed upon in principle and are subject to budgetary and organizational constraints.

IX. PERIOD OF MOU

This MOU becomes effective on the date of signature by all partners and continues until modified by mutual consent or unless terminated with 60 days' written notice by any partner. The MOU will be reviewed periodically and amended or revised when required.

X. POINTS OF CONTACT

The USGS and West Virginia designate the following persons as contacts for the resolution of technical and production-related questions:

NHD Stewardship (Policy)
United States Geological Survey (USGS)
……..
Craig Neidig
USGS Geospatial Liaison West Virginia
U.S. Geological Survey
Water Science Center
11 Dunbar St.
Charleston, WV 25301
Telephone: (304) 347-5130 x 237
Fax: (304) 347-5133
Email: cneidig@usgs.gov

NHD Stewardship (Policy)
WV Office of GIS State Coordinator
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WV GIS State Coordinator
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Rm LM-10, The Greenbrooke
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Telephone: (304) 558-4218
Fax: (304) 558-4963
Email: Tony.A.Simental@wv.gov

NHD Maintenance (Technical)
USGS
……..
Carl Nelson
USGS NHD Stewardship POC - Region 5
U.S. Geological Survey
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Telephone: 573-308-2652
Fax: 573-308-2652
Email: cwnelson@usgs.gov

NHD Maintenance (Technical)
WV GIS Technical Center
……..
Kurt Donaldson
GIS Manager
WV GIS Technical Center, WVU
330 Brooks Hall, P.O. Box 6300
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Telephone: 304-293-9467
Fax: 304-293-6522
Email: kdonalds@wvu.edu

XI. NOTE

This Memorandum is not intended to and does not create any contractual rights or obligations with respect to the signatory agencies or any other parties.

XII. APPROVALS

United States Geological Survey

_____ _____

Kari J. Craun Date
Director, National Geospatial Technical Operations Center
US Geological Survey
1400 Independence Road
Rolla, MO 65401

WV Office of GIS State Coordinator

_____ _____

Tony Simental Date
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1124 Smith St.
Rm LM-10, The Greenbrooke
Charleston, WV 25301
(304) 558-4218
Tony.A.Simental@wv.gov

LIST OF APPENDICES

APPENDIX A – 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 B – 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. (145p., 271KB, PDF). http://rmmcweb.cr.usgs.gov/public/nmpstds/nhdstds.html

For technical references on features, attributes and relationships in the NHD, refer to the following link: 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.
  - **Adobe PDF Format** (497KB)

- **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.
  - **Adobe PDF Format** (133KB)

- **NHDinGEO Feature Codes (FCodes) by layer** - Lists of FCodes by layer which include the feature type, FCode, and description.
  - **Adobe PDF Format** (68KB)

- **Concepts and Contents** **HTML 597k** | **PDF 739k**
  "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** **HTML 150k** | **PDF 289k**
  "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.
    - **Adobe PDF Format** (5.5MB)

- **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.

APPENDIX C – EDIT TOOLS TO BE USED

A tool is needed to specifically edit NHD data since the NHD structure is somewhat complex. This complexity is a part of the design that makes the NHD so suitable for a stewardship environment. Many components are tracked in special tables that trace the legacy of the data. This tool, known as NHDGeo Edit, is being developed by the U.S. Geological Survey and will be made available to the partner for use.

For user-developed applications, go to: http://nhd.usgs.gov/applications.html

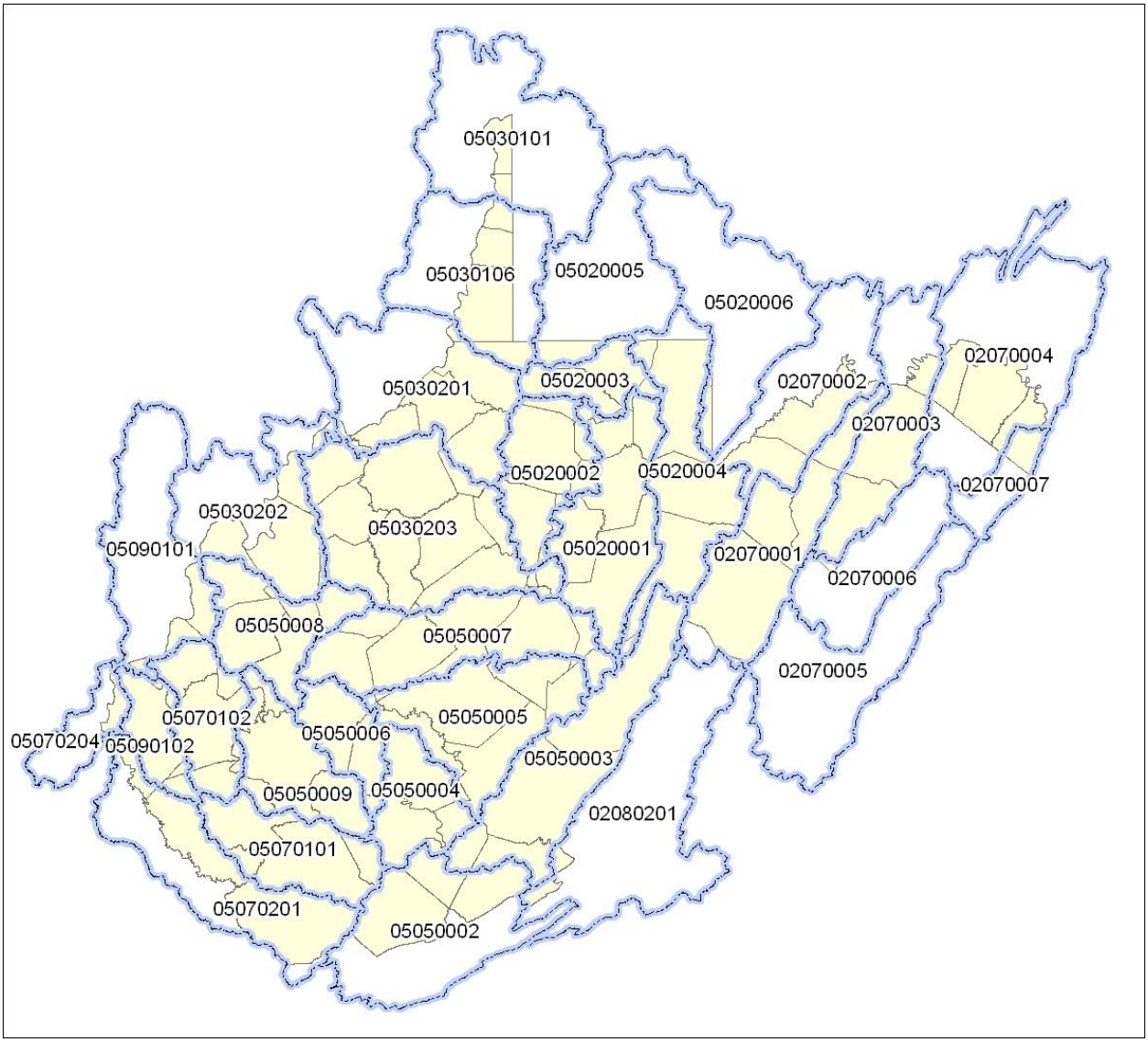
APPENDIX D – WEST VIRGINIA STAKEHOLDERS

- Canaan Valley Institute
- Monongahela National Forest, U.S. Forest Service
- Natural Resource Analysis Center, West Virginia University
- WV Department of Environmental Protection
- WV Department of Health and Human Resources
- WV Department of Transportation
- WV Division of Natural Resources
- WV GIS Technical Center, West Virginia University

This identification as a state partner (as a maintainer of NHD) does not imply any financial commitment on the part of these agencies.

These agencies may take the NHDGeoEdit training in the future but at present, will likely contribute updates to the maintenance steward manually.

APPENDIX E – MAP OF WEST VIRGINIA WATERSHEDS



APPENDIX F – WEST VIRGINIA HYDROLOGIC UNIT CODE LIST (32 Units)

Sub-basin Code	Sub-basin Name
02070001	South Branch Potomac. West Virginia, Virginia.
02070002	North Branch Potomac. Maryland, West Virginia, Pennsylvania.
02070003	Cacapon-Town. Maryland, Pennsylvania, West Virginia.
02070004	Conococheague-Opequon. MD, PA, VA, WV.
02070006	North Fork Shenandoah. Virginia, West Virginia.
02070007	Shenandoah. Virginia, West Virginia.
02080201	Upper James. Virginia, West Virginia.
05020001	Tygart Valley. West Virginia.
05020002	West Fork. West Virginia.
05020003	Upper Monongahela. Pennsylvania, West Virginia.
05020004	Cheat. Pennsylvania, West Virginia.
05020005	Lower Monongahela. Pennsylvania, West Virginia.
05020006	Youghiogheny. Maryland, Pennsylvania, West Virginia.
05030101	Upper Ohio. Ohio, Pennsylvania, West Virginia.
05030106	Upper Ohio-Wheeling. Ohio, Pennsylvania, West Virginia.
05030201	Little Muskingum-Middle Island. Ohio, West Virginia.
05030202	Upper Ohio-Shade. Ohio, West Virginia.
05030203	Little Kanawha. West Virginia.
05050002	Middle New. Virginia, West Virginia.
05050003	Greenbrier. West Virginia.
05050004	Lower New. West Virginia.
05050005	Gauley. West Virginia.
05050006	Upper Kanawha. West Virginia.
05050007	Elk. West Virginia.
05050008	Lower Kanawha. West Virginia.
05050009	Coal. West Virginia.
05070101	Upper Guyandotte. West Virginia.
05070102	Lower Guyandotte. West Virginia.
05070201	Tug. Kentucky, Virginia, West Virginia.
05070204	Big Sandy. Kentucky, West Virginia.
05090101	Raccoon-Symmes. Ohio, West Virginia.
05090102	Twelvepole. West Virginia.