

**MEMORANDUM OF UNDERSTANDING BETWEEN**

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

**AND**

**STATE OF NEW HAMPSHIRE  
NEW HAMPSHIRE GEOLOGICAL SURVEY  
NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES**

**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 State of New Hampshire, New Hampshire Department of Environmental Services (New Hampshire Geological Survey) and the U.S. Geological Survey (USGS), referred to as partners, will undertake to maintain, update, and improve the National Hydrography Dataset (NHD) in a program of data stewardship. The partners to this MOU represent Federal, State and Local 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. This MOU applies to high-resolution and local-resolution NHD data only.

**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 organizing surface water features and their attributes into a fully connected, flow-directed network. The NHD further serves as the basis for systematically assigning addresses to additional related data known as events that have been linked to segments or reaches within the network. Each reach in this framework is referenced by a permanent and unique feature identifier known as a reach code. The locations of events are specified by linear measures along their respective reaches, much like addresses on streets, so that each event can be related to any other event along a given flow path within the network. Because the 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.

The success of the NHD will depend on the partnerships that we establish with the 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, grassroots conservation groups, non-profit environmental organizations, and other Federal agencies. These organizations will work cooperatively to implement a program to exchange updates and make improvements to the NHD.

The New Hampshire Geological Survey (NHGS) will act as the principal steward for the State and will serve as the coordinator of stewardship activities for the State, as well as a focal point and arbiter for corrections and/or revisions recommended by other stakeholders. NHGS, in a principal steward role, will perform edits as needed and forward those edits to the USGS for incorporation into the NHD database. To manage the stewardship process, NHGS will work in cooperation with partner organizations, specifically the U.S. Forest Service and Complex Systems Research Center at the University of New Hampshire (host of the NH GRANIT statewide GIS clearinghouse), and will use the Hydrology Subcommittee of the NH Geographic Information System (GIS) Advisory Committee as a forum for circulating information, soliciting inputs, and resolving update issues as they arise.

The NH GIS Advisory Committee, through the Hydrology Subcommittee, is uniquely positioned to provide input and advice to the NHD stewardship process. The Hydrology Subcommittee has been actively involved in coordinating and promoting the development of surface water GIS databases for New Hampshire that maximize benefits to stakeholders while maintaining consistency with standardized national products. The NH GIS Advisory Committee furthermore is defining the state's geospatial architecture and strategic planning for the development and maintenance of important data layers.

### **III. AUTHORITIES**

The legislatively mandated mission of the New Hampshire Geological Survey is to “collect data and perform research on the land, mineral, and water resources of the state, and disseminate the findings of such research to the public through maps, reports, and other publications”.

This Agreement is 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).

### **IV. SCOPE**

The intent of this Agreement is to outline a partnership strategy and programmatic application for the long-term stewardship of high-resolution NHD sub-basins encompassing the State of New Hampshire (See Appendix D). This cooperation and coordination is the final phase of a multi-year effort to first develop and then maintain and enhance a high-resolution NHD for New Hampshire.

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. RESPONSIBILITIES

The State of New Hampshire, NHGS, *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 community of hydrographic data users in the State by providing the USGS with the most widely accepted representation of the surface water in the NHD.
3. Accept input from other agencies and organizations; consider any change submitted, decide authoritatively if it will be accepted or not, and report the decision publicly.
4. Work with partner agencies acting as NHD maintainers or content providers to obtain and incorporate new linework and updates as appropriate.
5. 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 30 days. Updates to the USGS shall be provided in a timely manner at intervals determined by need and available resources.
6. 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.
7. Use the Hydrology Subcommittee of the NH GIS Advisory Committee (or its successor) as a forum to publicize the NHD update process in New Hampshire, to elicit input from the hydrography user community, and to resolve any update issues. NHGS will work with the NH GIS Advisory Committee to help achieve the statewide coordination requirements outlined in items 1-6.
8. Provide updates in the agreed-upon format (Appendix A).
9. 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 and fully compatible with the transaction process. 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) Ensure that the core content (features, attributes and relationships identified in the NHD standards) is included (Appendix B).
10. Provide public access to the most current version of NHD through GRANIT, the State's repository for GIS datasets, and provide information on the current status of data stewardship activities.
11. Provide contact information for management and technical issues.
12. Provide metadata that clearly describe the sources used in the update and the process used to make the changes.
13. Rework updates returned for correction and resubmit to the USGS.
14. Utilize nationally consistent reach codes.
15. Ensure vertical integration of NHD and the Watershed Boundary Dataset (WBD) to the greatest possible extent.
16. Coordinate with the USGS on any edits originating at the national level.
17. Coordinate with the USGS and respective data stewards in the states of Vermont, Massachusetts, and Maine on any edits to the NHD and WBD associated with the 8-digit hydrologic units that extend beyond the New Hampshire state boundary. See Appendix D for a map and list of hydrologic units that are subject to this provision.
18. Coordinate with the NH State Names Authority on Geographic Names Information System (GNIS) hydrography names.

The U.S. Geological Survey will:

1. Facilitate the State's efforts to build a successful stewardship program by providing necessary information and assistance, including opportunities to interact with stewards from other states.
2. Provide contact information for management and technical issues.
3. Provide the tools (notably the GeoEdit toolset) and complementary documentation and training to support efficient editing and updating of the NHD.
4. Provide clear guidance on expectations for acceptable updates.
5. Provide documentation on validation criteria applied to updates.
6. Provide documentation on formats for update transactions.
7. Provide an Internet accessible reach code allocator and validate reach codes in update submissions.
8. Be responsive to the State by processing transactions in a timely manner, enabling revised data to be distributed to the public within 30 days of submittal of updates.
9. Provide email notification of successful posting of submitted NHD transactions within 1 day of successful posting.
10. 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 within 5 days of update submittal.
11. Promote vertical integration of the NHD and WBD datasets.
12. Provide a representative to actively participate as a member of the Hydrology Subcommittee of the NH GIS Advisory Committee.
13. Coordinate with the State on any edits originating at the national level.
14. Notify the State of any proposed changes to the NHD structure or format and seek consensus from all affected NHD stewards prior to implementation of those changes
15. Consult with the State before altering either the geometry or attributes of data submitted by the State as an update transaction.
16. Work with the State to develop solutions to incorporate hydrographic data needed by the State, but not normally included in the NHD framework.
17. Facilitate coordination among the stewards of other states that border New Hampshire to avoid overlapping and conflicting edits of NHD and WBD.
18. Accept transactions affecting New Hampshire only if they have been initiated by the State or are subject to prior agreement with the respective steward of a neighboring state whenever the transaction involves an overlapping 8-digit hydrologic unit.
19. When requested, share access to source code on tools and applications related to NHD quality control, transaction processing, and functionality.
20. Provide best IT practices concerning database mirror, backup, recovery, etc.

## **VI. DATA OWNERSHIP AND RIGHTS**

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

## VII. FINANCIAL COMMITMENTS

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

## VIII. PERIOD OF AGREEMENT

This agreement becomes effective on the date of signature by both partners and continues until modified by mutual consent or unless terminated within 60 days written notice by either partner. The agreement will be reviewed periodically and amended or revised when required.

## IX. POINTS OF CONTACT

The USGS and State of New Hampshire, NHGS, designate the following persons as contacts for the resolution of technical and production-related questions:

<b>United States Geological Survey (USGS)</b>	<b>Partner</b>	<b>New Hampshire Geological Survey (NHGS)</b>
Pete Steeves	<b>Contact Name</b>	Frederick Chormann, Jr.
Physical Scientist (GIS)	<b>Title</b>	Senior Hydrogeologist
USGS-WRD	<b>Organization</b>	NH Geological Survey, NH Department of Environmental Services
10 Bearfoot Rd Northborough, MA, 01532	<b>Address</b>	29 Hazen Drive, PO Box 95, Concord, NH 03302-0095
508-490-5054	<b>Telephone</b>	603-271-1975
508-490-5068	<b>Fax</b>	603-271-3305
psteeves@usgs.gov	<b>Email</b>	rchormann@des.state.nh.us

**X. 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.**

**XI. APPROVALS**

**United States Geological Survey**

Kari J. Craun 2-14-08  
Kari J. Craun Date  
Director, National Geospatial Technical Operations Center

**New Hampshire Department of Environmental Services**

Thomas S. Burack 5/21/2008  
Thomas S. Burack Date  
Commissioner, NH Department of Environmental Services

## DATA DELIVERY FORMAT

### NHDGDB Input XML File Specification

All data transactions shall be in Extensible Language (XML) format, as defined in The NHDGDB Input XML File Specification below.

## XML Overview

XML stands for **EX**tensible **M**arkup **L**anguage. The XML file format is required to load data to the NHD geodatabase. It is a markup language much like HTML that was designed to describe data. The syntax rules of XML are very simple and very strict. Below is a sample XML file.

```
<?xml version="1.0"?>
<Transaction>
  <GDBVersionInformation>NHD20040728</GDBVersionInformation>
  <ProcessingOrganization>USGSMCMC</ProcessingOrganization>
  <Resolution>High</Resolution>
  <CreateMetadata>
    <ID>-2</ID>
    <Attribute>
      <POD>Deleted overlapping reach in NHDFlowline to join
with adjacent subbasin.</POD>
      <PDA>20040727</PDA>
    </Attribute>
  </CreateMetadata>
  <DeleteFeature>
    <ID>113794769</ID>
  </DeleteFeature>
</Transaction>
```

*The first line in the document - the XML declaration - defines the XML version. The next line describes the root element of the document. The next lines describe the 5 child elements of the root. And finally the last line defines the end of the root element.*

All XML elements must have a closing tag. XML tags are case sensitive. All XML documents must contain a single tag pair to define a root element - <Transaction></Transaction> for NHDGDB XML files.

## Required Elements of a NHDGDB XML File

Every XML file must start with the XML declaration line: <?xml version="1.0"?>

The second line of the XML file must be the opening tag of the root element: <Transaction>

The last line of the XML file must be the closing tag of the root element: </Transaction>

Every XML file must contain the following child elements:

#### GDBVersionInformation

**Opening/Closing Tag:** <GDBVersionInformation></GDBVersionInformation>

**Description:** The version of the GDB the updates will be applied to. If you are loading only new data then the version will be NewLoad. If you are loading updates to existing data the version is the version found in the NHDPProcessingParameters table in the distributed personal geodatabase.

**Example:**

<GDBVersionInformation>NHD20040728</GDBVersionInformation>

#### Processing Organization

**Opening/Closing Tag:** <ProcessingOrganization></ProcessingOrganization>

**Description:** The processing organization loading the data. This must be the same as the processing organization that allocated the reach codes used in the load file.

**Example:**

<ProcessingOrganization>USGSRMMC</ProcessingOrganization>

#### Resolution

**Opening/Closing Tag:** <Resolution></Resolution>

**Description:** The resolution of the data being loaded. Valid values are Local, High or Medium.

**Example:**

<Resolution>High</Resolution>

#### CreateMetadata

**Opening/Closing Tag:** <CreateMetadata></CreateMetadata>

**Description:** This transaction contains the data that was in the CMDI transaction of the FCP file. The attributes are loaded to the NHDMetadata and NHDSourceCitation tables. The CreateMetadata element contains 2 child elements - <ID></ID> and <Attribute></Attribute>. The ID element contains a numeric identifier that is unique across all CreateMetadata transactions. If there are multiple CreateMetadata transactions in the XML file this identifier is used in the CreateRelationship transactions that specify Feature-to-Metadata relationships. This identifier is re-assigned when it is loaded into the geodatabase and stored in the NHDMetadata table as the DUUID.

**Attributes:**

XII. XML Tag	XIII. Field Name
AAR	AttributeAccuracyReport
LCR	LogicalConsistencyReport
COR	CompletenessReport
HOR	HorizPositionalAccuracyReport
VOR	VertPositionalAccuracyReport
POD	ProcessDescription
PDA	ProcessDate
MED	MetadataDate
MSN	MetadataStandardName
MSV	MetadataStandardVersion
DSC	DatasetCredit

COO	ContactOrganization
ADT	AddressType
ADD	Address
CIT	City
STP	StateOrProvince
PSC	PostalCode
CVT	ContactVoiceTelephone
COI	ContactInstructions
SourceCitation	--

There can be multiple SourceCitation elements. Each element is stored as a record in the NHDSourceCitation table. The DUUID column of the NHDSourceCitation record will be the DUUID assigned to the NHDMetadata record. The SourceCitation element can have the following child elements:

XIV. XML Tag	XV. Field Name
TIT	Title
SCA	SourceCitationAbbreviation
ORG	Originator
PUD	PublicationDate
BED	BeginningDate
END	EndingDate
SRC	SourceContribution
SSD	SourceScaleDenominator
TSM	TypeOfSourceMedia
CAD	CalendarDate
SCR	SourceCurrentnessReference

The ProcessDescription attribute (POD) is the only required attribute in the CreateMetadata transaction. If an attribute is null it does not need to be included in the XML file.

**Example:**

```
<CreateMetadata>
<ID>1</ID>
<Attribute>
  <MSV>FGDC-STD-001-1998</MSV>
  <MSN>FGDC Content Standard For Digital Geospatial Metadata, ver.2</MSN>
  <MED>20040512</MED>
  <COO>U.S. Geological Survey</COO>
  <COI>Monday-Friday, 7AM-3PM CST</COI>
  <CVT>(573) 308-3647</CVT>
  <PSC>65401</PSC>
  <STP>Missouri</STP>
  <CIT>Rolla</CIT>
  <ADD>Mid-Continent Mapping Center - 1400 Independence
    Road</ADD>
  <ADT>Mailing and Physical Address</ADT>
```

```

<POD>Create high-resolution NHD from revised DLG data and U.S. Forest Service
Cartographic Feature Files (CFFs).</POD>
<PDA>20040420</PDA>
<SourceCitation>
  <SCA>NHD basic features</SCA>
  <SCR>Date the revision process step was completed</SCR>
  <CAD>20040405</CAD>
  <TSM>online</TSM>
  <SSD>24000</SSD>
  <SRC> spatial and attribute information</SRC>
  <END>Not Applicable</END>
  <BED>Not Applicable</BED>
  <PUD>unpublished materials</PUD>
  <TIT>NHD basic features</TIT>
  <ORG> U.S. Geological Survey  </ORG>
</SourceCitation>
<VOR>Statements of vertical positional accuracy for elevation
of water surfaces are based on accuracy statements made for
U.S. Geological Survey topographic quadrangle maps...</VOR>
<HOR>Statements of horizontal positional accuracy are based on accuracy statements made
for U.S. Geological Survey topographic quadrangle maps. ...</HOR>
<COR>The completeness of the data reflects the published USGS
topographic quadrangle and/or the U.S. Forest Service Primary
Base Series (PBS) map...</COR>
<LCR>For DLG data, points, nodes, lines, and areas conform to
topological rules...</LCR>
</Attribute>
</CreateMetadata>

```

## Other Elements of a NHDGDB XML File

The other elements that may be included in the NHDGDB XML file are used to create, modify or delete features and reaches and to create, modify, or delete relationships.

### CreateFeature

**Opening/Closing Tag:** <CreateFeature></CreateFeature>

**Description:** This transaction is used to create a feature in a feature class or create a reach in the NHDReachcodeComId table. It contains five child elements:

- 1) ID – a numeric identifier that is unique across all features in the XML file. This identifier will be reassigned a unique comid when the feature is loaded to the geodatabase.
- 2) FeatureType – the feature type of the feature
- 3) Dimensionality – a number representing the feature's dimension: 2 for point, 3 for line, 4 for polygons, or 5 for reaches
- 4) Coordinate – This element contains the collection of points that define the geometry of the feature. Each point is a child element of the Coordinate element. The format for the Point element is

```
<Point X="-89.3687125" Y="46.8583277" />
```

- 5) Attribute – This element contains the attributes for the feature or reach. Note that not all attributes in the list below will apply to every feature type. There are several attributes that are not stored as fields in the feature class. These attributes along with the feature type are used to derive the FCODE attribute.

XVI. XML Tag	XVII. Field Name
RSL	Resolution
GID	GNIS_ID
NAM	GNIS_NAME
FLD	FlowDir
ELE	Elevation
RCH	Reachcode
OWT	WBAreaComId
ICS	(used to derive fcode)
RET	(used to derive fcode)
COM	(used to derive fcode)
HYC	(used to derive fcode)
STG	(used to derive fcode)
PIT	(used to derive fcode)
RTS	(used to derive fcode)
SZT	(used to derive fcode)
OPS	(used to derive fcode)
POA	(used to derive fcode)
CDY	(used to derive fcode)
CGC	(used to derive fcode)

Each of the 5 child elements listed above is required to create a feature. The Coordinate element does not apply to reaches. There are no required attributes. If an attribute is null it does not need to be included in the XML file. If there are no attributes for the feature, the Attribute element can be empty –

```
<Attribute></Attribute>
```

#### Examples:

```
<CreateFeature>
<ID>2741</ID>
<FeatureType>460</FeatureType>
<Dimensionality>3</Dimensionality>
<Coordinate>
  <Point X="-89.357778" Y="46.8515609"/>
  <Point X="-89.3578384" Y="46.8515731"/>
  <Point X="-89.3578863" Y="46.8515721"/>
  <Point X="-89.3579428" Y="46.85158"/>
  <Point X="-89.3580227" Y="46.8515783"/>
  <Point X="-89.3619394" Y="46.852555"/>
</Coordinate>
<Attribute>
  <HYC>289</HYC>
  <FLD>1</FLD>
```

```

    <RSL>2</RSL>
  </Attribute>
</CreateFeature>

<CreateFeature>
  <ID>2</ID>
  <FeatureType>557</FeatureType>
  <Dimensionality>5</Dimensionality>
  <Attribute>
    <RCH>04020101000002</RCH>
  </Attribute>
</CreateFeature>

```

### ModifyFeature

**Opening/Closing Tag:** <ModifyFeature></ModifyFeature>

**Description:** This transaction is used to modify an existing feature in a feature class or modify a reach. The ModifyFeature transaction contains the same elements as the CreateFeature transaction. The ID element is the comid of the feature or reach to modify. The Coordinate element only needs to be provided for a feature if the geometry of that feature has changed.

**Example:**

```

<ModifyFeature>
  <ID>49081000</ID>
  <FeatureType>334</FeatureType>
  <Dimensionality>3</Dimensionality>
  <Attribute>
    <GID>01552301</GID>
    <NAM>New River</NAM>
  </Attribute>
</ModifyFeature>

```

### DeleteFeature

**Opening/Closing Tag:** <DeleteFeature></DeleteFeature>

**Description:** This transaction is used to delete a feature from a feature class or delete a reach from the NHDReachcodeComId table. It contains one child element (ID) that specifies the comid of the feature or reach to be deleted. When a feature is deleted, all vertical relationships for that feature are also deleted. When a reach is deleted, the reachcode, GNIS\_id, and GNIS\_name attributes of all features related to the reach are deleted (set to null).

**Example:**

```

<DeleteFeature>
  <ID>113794781</ID>
</DeleteFeature>

```

### CreateRelationship

**Opening/Closing Tag:** <CreateRelationship></CreateRelationship>

**Description:** This transaction is used to create composed-of relationships, vertical relationships, or feature-to-metadata relationships. It contains 4 required child elements.

- 1) ID – a numeric identifier

- 2) Object1 – For composed-of relationships this is the comid or temporary id of the reach. For vertical relationships this is the comid or temporary id of the 'abovecomid'. For feature-to-metadata relationships this is the temporary duuid found in the CreateMetadata transaction.
- 3) Object2 - For composed-of relationships this is the comid or temporary id of the basic feature. For vertical relationships this is the comid or temporary id of the 'belowcomid'. For feature-to-metadata relationships this is the temporary id of the feature.
- 4) TypeRelationship – specifies the relationship type: 1 for composed-of relationships, 5 for vertical relationships, and 7 for feature-to-metadata relationships.

The NHDGDB load software does not load flow relationships into the geodatabase.

Creating a composed-of relationship will cause the feature to have the same reachcode attribute as the reach. If the reach has the GNIS\_ID and GNIS\_NAME attributes populated, the GNIS attributes of the feature will be updated to be the same as the GNIS attributes of the reach.

Creating a vertical relationship adds a record to the NHDVerticalRelationship table.

Creating a feature-to-metadata relationship adds a record to the NHDFeatureToMetadata table.

**Example:**

```
<CreateRelationship>
<ID>1</ID>
<Object1>6</Object1>
<Object2>2737</Object2>
<TypeRelationship>1</TypeRelationship>
</CreateRelationship>
```

**ModifyRelationship**

**Opening/Closing Tag:** <ModifyRelationship></ModifyRelationship>

**Description:** This transaction is used to modify composed-of relationships. This transaction can not be used to modify vertical relationships or feature-to-metadata relationships. It contains 4 child elements.

- 1) ID – the comid of the feature in the composed-of relationship
- 2) Object1 – the comid of the reach
- 3) Object2 – the comid of the feature
- 4) TypeRelationship – specifies the relationship type (1). This element is not required.

Modifying a composed-of relationship will cause the feature to have the same reachcode attribute as the reach. If the reach has the GNIS\_ID and GNIS\_NAME attributes populated, the GNIS attributes of the feature will be updated to be the same as the GNIS attributes of the reach.

**Example:**

```
<ModifyRelationship>
<ID>54487893</ID>
<Object1>54488305</Object1>
<Object2>54487893</Object2>
<TypeRelationship>1</TypeRelationship>
</ModifyRelationship>
```

**DeleteRelationship**

**Opening/Closing Tag:** <DeleteRelationship></DeleteRelationship>

**Description:** This transaction is used to delete composed-of relationships and vertical relationships. It contains 1 child element - ID. When deleting a composed-of relationship,

ID is the comid of the feature in the composed-of relationship. When deleting a vertical relationship, the ID is the comid of the vertical relationship. Deleting a composed-of relationship causes the reachcode, gnis\_id, and gnis\_name attributes of the feature to be set to null.

**Example:**

```
<DeleteRelationship>
  <ID>36475343</ID>
</DeleteRelationship>
```

**Other Notes:**

With XML white space inside elements is preserved. For example, if the process description in your XML file contains leading spaces, there will be leading spaces in the process description in the geodatabase.

Indentation of child elements is not required, but may be useful for readability. For example, the following transactions are considered the same:

```
<ModifyFeature>
  <ID>49081000</ID>
  <FeatureType>334</FeatureType>
  <Dimensionality>3</Dimensionality>
  <Attribute>
    <GID>01552301</GID>
    <NAM>New River</NAM>
  </Attribute>
</ModifyFeature>
```

```
<ModifyFeature>
<ID>49081000</ID>
<FeatureType>334</FeatureType>
<Dimensionality>3</Dimensionality>
<Attribute>
<GID>01552301</GID>
<NAM>New River</NAM>
</Attribute>
</ModifyFeature>
```

## 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://rockyweb.cr.usgs.gov/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:

- **Concepts and Contents** [HTML 597k](#) | [PDF 739k](#) [Word Doc 1.93MB](#) "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 "NHDinGEO" document.
- [NHDinGEO Data Model Schema](#) - Diagram of the tables, the table items, the item definitions, and the relationships between the tables in the NHDinGEO data model.
  - [Hydrography](#) (66k)
  - [Metadata and Misc. Objects](#) (107k)
- [NHD Model Version 1.06 \(Draft\)](#) The NHD Model Version 1.06 only exist in draft form. Until the release of version 1.06, please reference NHD Model Version 1.04.
- [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

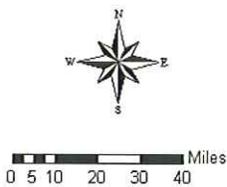
### **EDIT TOOLS TO BE USED**

A tool is needed to specifically edit NHD data since the NHD structure is somewhat complex. This complexity is 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. 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.

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

Appendix D

## NEW HAMPSHIRE HYDROLOGIC UNITS



### CONNECTICUT 0108

- 01080101: Upper Connecticut
- 01080103: Waits
- 01080104: Upper Connecticut-  
Mascoma
- 01080105: White
- 01080106: Black-  
Ottauquechee
- 01080107: West
- 01080201: Middle  
Connecticut
- 01080202: Miller

### ANDROSCOGGIN 0104

- 01040001: Upper  
Androscoggin
- 01040002: Lower  
Androscoggin

### SACO 0106

- 01060002: Saco
- 01060003: Piscataqua-  
Salmon Falls

### MERRIMACK 0107

- 01070001: Pemigewasset
- 01070002: Winnepesaukee
- 01070003: Contoocook
- 01070004: Nashua

#### Units overlapping with the State of Maine:

- 01040001 Upper Androscoggin River
- 01040002 Lower Androscoggin River
- 01060002 Saco River

#### Units overlapping with the State of Massachusetts:

- 01070004 Nashua River
- 01070006 Merrimack River
- 01080202 Millers River

#### Units overlapping with the States of Maine and Massachusetts:

- 01060003 Piscataqua-Salmon Falls River

#### Units overlapping with the State of Vermont:

- 01080101 Upper Connecticut River
- 01080103 Waits River
- 01080104 Upper Connecticut-Mascoma River
- 01080105 White River
- 01080106 Black-Ottauquechee River
- 01070107 West River

#### Unit overlapping with the States of Massachusetts and Vermont:

- 01080201 Middle Connecticut River