STATE OF IDAHO

Hydrography Data Exchange Standard

for the Hydrography Framework Theme

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1. Introduction to the Water Features Data Exchange Standard

A statewide Hydrography Framework is a critical source of information for resource land management, community and economic development needs, infrastructure maintenance, research and analysis, business development, public safety, and more. Many private sector and local, state, and federal government agencies have business needs for Hydrography Framework.

A Hydrography Framework standard is intended to facilitate integration and sharing of up-to-date hydrography data and enhance the dissemination and use of hydrographic information. This standard does not instruct on how hydrologic databases are designed for internal use.

This standard was developed based on the National Hydrography Database (NHD). The standard was reviewed by the Idaho Hydrography Technical Work Group (Hydro TWG), for The Idaho Map (TIM). This standard will be reviewed on a regular basis and updated as needed.

1.1. **Mission and Goals of the Standard**

The purpose of the Hydrography Data Standard is to specify a common method for locating and identifying surface water features and nested drainage basin delineations in Idaho. Since it is based on national models, hydrography data maintained according to this standard can be exchanged with entities in other states and the federal government.

The Hydrography Data Exchange Standard supports a statewide dataset that is consistent with applicable state and national standards. It establishes the minimum attributes and geospatial feature classes within the National Hydrography Database schema for the Hydrography Framework. It will communicate with and may have similar attributes to other Idaho Framework data standards. It encourages all Idaho-based agencies with geospatial surface water data to contribute to Hydrography Framework.

1.2. **Relationship to Existing Standards**

This Water Features Data Exchange Standard relates to existing standards as follows:

Standards for the National Hydrography Dataset (Draft), Version 1.0, *et seq.*, provides a definition and structure for cadastral data sharing at all levels of government and the private sector and specifically facilitates participation in the cadastral component of the National Spatial Data Infrastructure.

Federal Standards and Procedures for the National Watershed Boundary Dataset, Fourth Edition, et seq., relates to this standard because surface water features are

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contained within Watershed Boundaries.

All geospatial datasets developed from this standard must also adhere to the Federal Geographic Data Committee, Content Standard for Digital Geospatial Metadata.

1.3. **Description of the Standard**

This standard includes the elements necessary to accurately identify and locate surface water features and watershed boundaries.

This standard describes the vision and geospatial data structure of a Hydrography Framework in the state of Idaho. This standard is devised to be:

- Simple, easy to understand, and logical
- Uniformly applicable, whenever possible
- Flexible and capable of accommodating future expansions
- Dynamic in terms of continuous review

1.4. **Applicability and Intended Uses**

This standard applies to the Hydrography theme of The Idaho Map (TIM). It is a digital representation of surface water features and drainage basins n the State of Idaho. When implemented, it will enable access to geometry and attribute information about Idaho surface water hydrography. It will increase interoperability between automated geographic information systems and enable sharing and efficient transfer of information for aggregation. Further, it will encourage partnerships between government, the private sector, and the public in order to avoid duplication of effort and ensure effective management of information resources. It will help improve hydrography data quality as errors are identified and resolved.

This standard does not consider data sharing agreements, contracts, transactions, privacy concerns, or any other issues relating to the acquisition and dissemination of hydrography data.

1.5. **Standard Development Process**

The National Hydrography Database (NHD) was developed by the United States Geological Survey (USGS) and U.S. Environmental Protection Agency (EPA) in the 1990s to support he needs of the National Map and water quality programs. Likewise the Watershed Boundary Dataset (WBD) has been developed since the 1970's by the USGS and National Resources Conservation Service (NRCS) to depict drainage basins in the U.S. The Standards and Procedures developed to support the NHD and WBD have been adopted by many federal, state, local, and private entities. State, local and federal partners have been involved in updating, enhancing and delineating both the NHD and WBD.

The Hydro TWG, is a voluntary group of private, city, county, tribal, state, and federal

representatives. While NHD has been a standard dataset within the in the Pacific Northwest, there is a need to go through the formal Idaho state process of examining the needs of Idaho hydrography users. In March 2014, the Hydro TWG Lead began developing a draft standard for TIM Hydrography Framework. The Draft Water Features Data Exchange Standard was written in the format required by the Idaho Technology Authority (ITA) Framework Standards Development Policy (P5030).

The draft standard was presented at the Hydro TWG meetings on July 24, 2014 and March 12, 2015. A comment period will be provided and iterations of the standard will be posted to incorporate any needed changes. The final standard is scheduled to be presented at the Idaho Geospatial Forum in May 2015, with hopes of having the Idaho Geospatial Council Executive Committee approve it in late 2015.

1.6. **Maintenance of the Standard**

This standard will be revised as needed and in accordance with the ITA Framework Standards Development Policy (P5030).

2. **Body of the Standard**

2.1. **Scope and Content**

The scope of the Water Features Data Exchange Standard is to describe statewide GIS data layers which identify the physical locations and attributes of surface water hydrography in Idaho. It encompasses any surface water features and drainage basin located within the state of Idaho. This includes but is not limited to: lakes, streams, canals, basins, and watersheds. The NHD has references to other framework features, for these items, the specific framework theme should be considered the authoritative source.

2.2. **Need**

Hydrography is a key dataset needed for resource land managers, community and business development needs, infrastructure maintenance, research, homeland security, public safety, and more. This standard provides the foundation to aggregate hydrography data for centralized access and stewardship information. It provides an elemental foundation not only for the consistent depiction of surface water features and drainage areas, but also information tied to these features. Its use spans a wide array of functions from providing background information on maps to enabling the modeling of flow and material transportation through a stream network.

2.3. **Participation in the Standard Development**

The development of the Water Features Data Exchange Standard adheres to the ITA Framework Standards Development Policy (P5030). The Hydro TWG tasked with

developing this standard represents private, county, state, and federal organizations. As the standard is reviewed in accordance with Policy P5030 requirements, there will be opportunity for broad participation and input by stakeholders in the development of this standard. The process will be equally broad for input on updates and enhancements to the standard. As with all Idaho Framework standards, public review and comments on the Water Features Data Exchange Standard is encouraged.

2.4. **Integration with Other Standards**

The Water Features Data Exchange Standard follows the same format as other Idaho geospatial framework data standards. The standard may contain some of the same attributes as other framework standards and may adopt the field name, definition, and domain from the other standards to promote consistency.

2.5. **Technical and Operation Context**

2.5.1. Data Environment

The data environment is a digital model, containing closed vector points, lines, and polygons with a specific, standardized set of attributes. The digital model is the data model of the National Hydrography Database (http://nhd.usgs.gov/NHDv2.2_poster_052714.pdf) or the Watershed Boundary Database (http://nhd.usgs.gov/WBDposter_6_30_09a.pdf). Hydrography data shared under these standards must be in a format supporting points, lines, or closed vector polygons depending on which feature is described. For a precise description of feature type for each feature, please refer to the NHD Feature Catalog (http://nhd.usgs.gov/userGuide/Robohelpfiles/NHD_User_Guide/Feature_Catalog/NHD_Feature_Catalog.htm) or Watershed Boundary Dataset Standards and Procedures (http://pubs.usgs.gov/tm/11/a3/).

2.5.2. Reference Systems

The NHD is published in the Geographic reference system, Datum: NAD83. NHD that are identified as part of the Hydrography Framework can be extracted from the NHD and published in the Idaho Transverse Mercator (IDTM) NAD83 coordinate system, which is the State of Idaho's single-zone coordinate system. Data is not required to be submitted in the ITDM coordinate system but must have a defined coordinate system clearly described in the metadata.

2.5.3. Global Positioning Systems (GPS)

Some data provided might contain geometry from GPS methods, and the provided metadata should describe this, if applicable. However, geometry from a GPS is not required to meet this standard.

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2.5.4. Interdependence of Themes

Feature geometry representing hydrography may be coincident with other framework data, such as parcels, roads, and structures. At this time there is no enforcement of coincidence or topology relationships between Hydrography Framework and other Idaho Framework elements.

2.5.5. Encoding

When data is imported into and exported from the National Hydrography Database, encoding will take place to convert data formats and attributes including the ESRI geodatabase format.

2.5.6. Resolution

The minimum accuracy for data in this standard is 1:24,000. Data of 1:24,000 or better is required for inclusion into the High-Resolution National Hydrography Database and Watershed Boundary Dataset. It is the intention of this standard to allow for the integration of data collected at multiple spatial resolutions. Feature specific resolution will be documented in the metadata.

2.5.7. Accuracy

The minimum accuracy for data in this standard is 1:24,000. Data of 1:24,000 or better is required for inclusion into the High-Resolution National Hydrography Database and Watershed Boundary Dataset. Feature specific accuracy will be documented in the metadata. As with resolution, the intention of this standard is to support varying levels of positional and attribute accuracy. Feature specific accuracy will be documented in the metadata.

2.5.8. Edge Matching

No edge matching between jurisdictions is required. Edge matching will occur when features are integrated into the National Hydrography Database or Watershed Boundary Dataset.

2.5.9. Unique Identifier

There is no requirement for a permanent unique identifier specific to each feature. However, one may be assigned when integrated into the National Hydrography Database or Watershed Boundary Dataset.

2.5.10. Attributes

Attributes for public and intergovernmental distribution are described in Section 3 of this standard.

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2.5.11. Stewardship

Perpetual maintenance and other aspects of lifecycle management are essential to Hydrography Framework. Details of stewards, their roles and responsibilities, and processes are set forth in a Hydrography Framework Stewardship Plan and related documents.

2.5.12. Records Management and Archiving

Details of records management and archiving for Hydrography Framework are set forth in a Hydrography Framework Stewardship Plan and related documents.

2.5.13. Metadata

The Hydrography Framework metadata will be stored at both the dataset and the feature level in the same fashion as it is collected and stored in the NHD. This metadata conforms to metadata standards of the State of Idaho as defined in the ITA Standard Geospatial Metadata (S4220) (http://ita.idaho.gov/psg/s4220.pdf) and accompany any files exchanged under this Standard.

3. Data Characteristics

3.1. Minimum Graphic Data Elements

Minimum graphic data elements are the identified features in the following feature classes in the NHD. For the NHDArea and NHDWaterbodies feature classes, only features with the FTYPE specified below are required elements.

Described in the NHD Feature Catalog:
NHDFlowlines (Line Features)
NHDAreas (Polygon Features)
Specifically FTYPE:
- StreamRiver
- CanalDitch

NHDWaterbodies (Polygon Features)
Specifically FTYPE:
- LakePond
- Reservior

Described in the Federal Standards and Procedures for the National WBD:
WBDHU12 (Polygon Features)
WBDLine (Line Features)

Feature Templates for Selected NHD Hydrography Dataset Data Elements are listed in Appendix D. The current Feature Catalog for surface water elements is available at

http://nhd.usgs.gov/userGuide/Robohelpfiles/NHD_User_Guide/Feature_Catalog/NHD_Feature_Catalog.htm. Geospatial Data Structure and data capture requirements for watershed boundaries are available at http://pubs.usgs.gov/tm/11/a3/.

3.2. **Minimum Attributes or Non-graphic Data Elements**

The following attributes are established for public and government distribution.

Minimum attributes will be defined by the attribution required for the features identified in the following feature classes in the NHD. For the NHDArea and NHDWaterbodies feature classes, only features with the FTYPE specified below are required elements.

Described in the NHD Feature Catalog:
NHDFlowlines (Line Features)
NHDAreas (Polygon Features)
Specifically FTYPE:

- StreamRiver
- CanalDitch

NHDWaterbodies (Polygon Features)
Specifically FTYPE:

- LakePond
- Reservior

Described in the Federal Standards and Procedures for the National WBD:
WBDHU12 (Polygon Features)
WBDLine (Line Features)

Feature Templates for Selected NHD Hydrography Dataset Data Elements are listed in Appendix D. The current Feature Catalog for surface water elements is available at http://nhd.usgs.gov/userGuide/Robohelpfiles/NHD_User_Guide/Feature_Catalog/NHD_Feature_Catalog.htm. Geospatial Data Structure and data capture requirements for watershed boundaries are available at http://pubs.usgs.gov/tm/11/a3/.

Example attributes for area features:

Field Name	Data Type	Length	Description	Comments
FTYPE	INT	3	Three-digit integer value; unique identifier of a feature type.	Domain of Values
FCODE	INT	5	Five-digit integer value; composed of the feature type and combinations of characteristics and values.	Domain of Values

Elevation	Double		The vertical distance from a given datum	Range of Values. Stage of the water elevation is encoded in the FCode.
GNIS_ID	TXT	10	Unique identifier assigned by GNIS	GNIS_ID = “null” if no name associated with the feature
GNIS_NAME	TXT	65	Proper name, specific term, or expression by which a particular geographic entity is known	GNIS_Name = “null” if no name associated with the feature

Attributes for linear features:

Field Name	Data Type	Length	Description	Comments
FTYPE	INT	3	Three-digit integer value; unique identifier of a feature type.	Domain of Values
FCODE	INT	5	Five-digit integer value; composed of the feature type and combinations of characteristics and values.	Domain of Values
GNIS_ID	TXT	10	Unique identifier assigned by GNIS	GNIS_ID = “null” if no name associated with the feature
GNIS_NAME	TXT	65	Proper name, specific term, or expression by which a particular geographic entity is known	GNIS_Name = “null” if no name associated with the feature
FlowDir	TXT	4	Direction of flow relative to coordinate order	Domain of values: With digitized Uninitialized

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3.3. **Optional Graphic Data Elements**

The National Hydrography Database (NHD) stores several types of water related features. Optional graphic data elements are the any feature class supported by the NHD not specified below:

Described in the NHD Feature Catalog:
NHDFlowlines (Line Features)

Described in the Federal Standards and Procedures for the National WBD:

WBDHU12 (Polygon Features)
WBDLine (Line Features)

For the NHDArea and NHDWaterbodies feature classes, all feature types are optional except the those with the FTYPE specified below:

Described in the NHD Feature Catalog:
NHDAreas (Polygon Features)
Specifically FTYPE:

- StreamRiver
- CanalDitch

NHDWaterbodies (Polygon Features)
Specifically FTYPE:

- LakePond
- Reservior

For specifics on all features types and definitions, please see the NHD Feature Catalog (http://nhd.usgs.gov/userguide.html?url=NHD_User_Guide/Feature_Catalog/NHD_Feature_Catalog.htm) and the Federal Standards and Procedures for the National WBD (http://pubs.usgs.gov/tm/11/a3/).

3.4. **Optional Attributes or Non-graphic Data Elements**

The National Hydrography Database (NHD) stores several types of water related features.

For specifics on attributes of optional features types, please see the NHD Feature Catalog (http://nhd.usgs.gov/userguide.html?url=NHD_User_Guide/Feature_Catalog/NHD_Feature_Catalog.htm) and the Federal Standards and Procedures for the National WBD (http://pubs.usgs.gov/tm/11/a3/).

3.5. **Data Quality**

Data quality considerations for the Hydrography Framework will be consistent with those of the NHD. These considerations for surface water features include:

a) All waterbody polygons should close.
b) Vertical relationships between features in a feature class should be identified.
c) Flow direction for linear hydrography dataset features should be with digitized.
d) All Hydrologic Unit numbering should flow from upstream unit to downstream unit.

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Appendix A: References

Simley, Jeffrey D. and William J. Carswell, Jr. March 2010. *The National Map – Hydrography*, revised. U.S. Geological Survey Fact Sheet 2009-3054. Internet. http://pubs.usgs.gov/fs/2009/3054/pdf/FS2009-3054.pdf

U.S. Environmental Protection Agency and U.S. Department of the Interior, U.S. Geological Survey, National Mapping Division, July 1999. *Standards for the National Hydrography Dataset (Draft).* Internet. http://nationalmap.gov/standards/pdf/NHDH0799.PDF

U.S. Geological Survey and U.S. Department of Agriculture, Natural Resources Conservation Service, 2013, *Federal Standards and Procedures for the National Watershed Boundary Dataset (WBD) (4 ed.): Techniques and Methods 11–A3*, 63 p. Internet. http://pubs.usgs.gov/tm/11/a3/

Environmental Systems Research Institute (ESRI). Internet. http://www.esri.com

Information Technology Authority (ITA). *Information and Data Policy P5000, Category: P5030 Framework Standards Development Policy.* Internet. http://ita.idaho.gov/psg/p5030.pdf

Information Technology Authority (ITA). *Enterprise Standards S4000 Geographic Information Systems (GIS) Data, Category: S4220 Geospatial Metadata.* Internet. http://ita.idaho.gov/psg/S4220.pdf

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Appendix B: Glossary

Data Customer: anyone who uses Hydrography Framework Data. This includes public citizens, private businesses, educational institutions, non-profit organizations, and government agencies at all levels. Hydrography Technical Working Group.

Framework: Dtatewide base map datasets identified and described in the Strategic and Business Plans for Development and Deployment of Idaho's Spatial Data Infrastructure (http://gis.idaho.gov/portal/coordination/standards.html#Plans) and depicted in the Framework Diagram (http://gis.idaho.gov/portal/pdf/Framework/Administration/Visuals/FrameworkDiagram.pdf). Idaho Technology Authority Framework Standards Development Policy 5030.

Hydrography Framework: a statewide parcel layer, stored as polygons, made up of hydrography data provided by Idaho-based agencies. Hydrography Technical Working Group.

Hydrography Framework\Water Features Stewardship Plan: A document associated with the Water Features Data Exchange Standard governing the life cycle management of the Hydrography Framework\Water Features Element. Hydrography Technical Working Group.

Spatial Data Infrastructure: The technology, polices, standards, human resources, and related activities necessary to acquire, process, distribute, use, maintain, and preserve spatial data. Idaho Technology Authority Framework Standards Development Policy 5030.

Water Features Data Exchange Standard: The document which describes the vision, minimum attributes, and geospatial database schema for TIM Hydrography Framework\Water Features Element. Hydrography Technical Working Group.

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Appendix C: Acronyms

EPA: United States Environmental Protection Agency

FGDC: Federal Geographic Data Committee

Hydro TWG: Hydrography Technical Working Group

IDTM83:

IGC: Idaho Geospatial Council

IGC-EC: Idaho Geospatial Council Executive Committee

INSIDE Idaho: Interactive Numeric and Spatial Information Data Engine of Idaho

ITA: Idaho Technology Authority

ITRMC: Information Technology Resource Management Council

NHD: National Hydrography Dataset

P5030: Idaho Technology Authority Framework Standards Development Policy 5030

S4220: Idaho Technology Authority Geospatial Metadata Standard 4220

SDI: Spatial Data Infrastructure

TIM: The Idaho Map

USGS: United States Geological Survey

WBD: Watershed Boundary Dataset

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Appendix D: Feature Templates for Selected NHD Hydrography Dataset Data Elements

NHD WATERBODY

Definition – Lake/Pond

A standing body of water with a predominantly natural shoreline surrounded by land or a flooded river system where a dam has been built to withhold water.

Delineation

The limit of LAKE/POND where STREAM/RIVER enters or leaves is determined by the conformation of the land.

The limit of a naturally formed, perennial LAKE/POND is the position of shoreline when the water is at the stage that prevails for the greater part of the year (Average Water Elevation) or if this limit cannot be determined, the visible edge of the water body (Date of Photography).

The limit of an artificially formed, perennial LAKE/POND is the position of shoreline when the water is at the stage that prevails for the greater part of the year (Normal Pool), or if this limit cannot be determined, the limits defined by the spillway (Spillway Elevation), or the visible edge of the water body (Date of Photography).

The limit of an intermittent LAKE/POND is the position of shoreline when the water is at the stage that prevails when the feature is at or near capacity (High Water Elevation) or, if this limit cannot be determined, the visible edge of the water body (Date of Photography).

Data Extraction

<u>Capture Conditions</u>

If LAKE/POND is in an arid area, Or If LAKE/POND is not in an arid area and is ≥ 0.05" along the shortest axis, then capture.

<u>Attribute Information</u>

If Hydrographic Category = Intermittent, Then Stage = High Water Elevation, Or If High Water Elevation cannot be determined, Then Stage = Date of Photography.

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If LAKE/POND is a natural lake, and Hydrographic Category = Perennial, Then Stage = Average Water Elevation, Or If Average Water Elevation cannot be determined, Then Stage = Date of Photography.

If LAKE/POND is an artificially impounded lake, and Hydrographic Category = Perennial, and the water level is reasonably constant, Then Stage = Normal Pool.

If LAKE/POND is an artificially impounded lake, and Hydrographic Category = Perennial, and the water level is not reasonably constant, Then Stage = Spillway Elevation.

If LAKE/POND is an artificially impounded lake, and Hydrographic Category =

Perennial, and the Normal Pool or Spillway Elevation cannot be determined, Then Stage = Date of Photography.

See INUNDATION AREA for capture of flood elevation.

If LAKE/POND has a printed elevation on a 1:24,000-scale graphic,

Then Elevation = (Integer Value)

Else Elevation = Unspecified.

<u>Source Interpretation Guidelines</u>

All

Do not capture dry lakes as LAKE/POND. See PLAYA.

Refer to the feature definition to decide how to categorize a given feature instance. Do not use the proper name of the feature as a guide. Many features that are known as "Reservoirs" or labeled on the graphic as "Reservoirs" will be captured as LAKE/PONDS. "Stock Tanks" may be RESERVOIR or LAKE/POND depending on their form. As a general rule, if a water body has a geometric shape or other information indicates it is contained by a constructed basin, capture it as RESERVOIR. If it does not appear to be contained by a constructed basin, capture it as LAKE/POND.

The minimum size for islands within LAKE/POND is 0.03" along the shortest axis.

Graphic

If Elevation shown on map is preceded by "Spillway",

Then Stage = Spillway.

If Elevation is collected from the graphic, and LAKE/POND is artificially impounded, and "Spillway (elevation)" is not printed,

Then Stage = Normal Pool.

Revision – General

If image shows lower than average water level, then capture LAKE/POND at a normal pool or average water level by using ancillary sources or evidence of water marks on images.

If image shows lower than average water level and the average water elevation or normal Pool elevation cannot be determined, then capture LAKE/POND at the visible edge of the water body. If image shows higher than average water level, then capture LAKE/POND at a normal pool or average water level by using ancillary sources.

If image shows higher than average water level and the average water elevation or normal pool elevation cannot be determined, then capture LAKE/POND at the visible edge of the water body.

Within a newly added manmade LAKE/POND, retain contours, single and double-line drains, blue water tint, drain names, PLSS subdivisions, and civil boundaries. All other features are deleted.

Revision - Standard

Revision - Limited

Use ancillary source when the collection of Elevation is required.

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Encode the value for Hydrographic Category by looking at the surrounding drainage

(http://nhd.usgs.gov/userGuide/Robohelpfiles/NHD_User_Guide/Feature_Catalog/Hydrography_Dataset/Feature_Delineation_Popups/NHDWaterbodyPopups/LakePond.htm)

Definition – Reservoir

A constructed basin formed to contain water or other liquids.

Delineation

The limit of RESERVOIR is the rim of the constructed basin.

Data Extraction

Capture Conditions

If RESERVOIR is a sewage treatment pond or a filtration pond, Or If RESERVOIR is for water storage and is in an arid region, Or If RESERVOIR is not a sewage treatment pond or filtration plant, and is ≥ 0.03" along the shortest axis, Then capture.

Attribute Information

If RESERVOIR has a printed elevation on a 1:24,000-scale graphic, Then Elevation = (Integer Value), Else Elevation = Unspecified.

If Reservoir Type = Water Storage and Cover Status = Covered, Then Hydrographic Category = Unspecified.

If Reservoir Type = Water Storage and Construction Material = Nonearthen, then Hydrographic Category = Unspecified.

If Disposal Type = Tailings Pond, Then Construction Material = Earthen.

Reservoir Type = Unspecified only in limited update. See Source Interpretation Guidelines,

Revision.

If Reservoir Type = Decorative Pool or Swimming Pool,Then Construction

Material = Nonearthen.

If Cover Status = Covered, Then Construction Material = Nonearthen.

If Reservoir Type = Aquaculture or Treatment, Then Construction Material = Unspecified.

If Reservoir Type = Evaporator, Then Construction Material = Unspecified.

Source Interpretation Guidelines

All

Refer to the feature definition to decide how to categorize a given feature instance.

Do not use the proper name of the feature as a guide. Many features that are known as "Reservoirs" or labeled on the graphic as "Reservoirs" will be captured as LAKE/PONDS. "Stock Tanks" may be RESERVOIR or LAKE/POND depending on their form. As a general rule, if a water body has a geometric shape or other information indicates it is contained by a constructed basin, capture it as RESERVOIR. If it does not appear to be contained by a constructed basin, capture it as LAKE/POND.

If RESERVOIR is identified as a Minnow Pond, Fish Hatchery, Rearing Pond, Fish Pond, or similar facility, then capture RESERVOIR with Reservoir Type = Aquaculture.

Fish ponds in natural water bodies are not captured as RESERVOIR. See ESTUARY, LAKE/POND or SEA/OCEAN.

If RESERVOIR is < 0.03" along the shortest axis and is within 0.02" of another RESERVOIR with the same attribute values, then capture as one RESERVOIR only if the combined areas are ≥ 0.03" along the shortest axis.

If two RESERVOIRS are < 0.005" apart and have the same attribute values, then capture as two RESERVOIRS with a shared perimeter line.

If two RESERVOIRS are < 0.005" apart and do not have the same attribute values, then displace the perimeter lines equally and capture so that the perimeter lines are 0.005" apart.

If RESERVOIR is an oil sump or sludge pit, then collect in the theme Built-Up.

If RESERVOIR is divided by wire mesh, screens, or grates, then do not capture the resulting divisions as separate RESERVOIRS.

If RESERVOIR is identified as a sewage disposal pond, then capture RESERVOIR with Reservoir Type = Treatment and Treatment Type = Sewage Treatment Pond.

Graphic

If RESERVOIR is symbolized with a black outline,then Construction Material = Nonearthen.

If RESERVOIR is symbolized with a blue or brown outline, then Construction Material = Earthen.

If RESERVOIR is < 0.03" along the shortest axis, and shares an outline with another

RESERVOIR with the same attribute values and their combined area is ≥ 0.03"along the shortest axis, then capture the combined areas as one RESERVOIR.

Revision – Standard

Revision - Limited

Reservoir Type = Unspecified for newly collected RESERVOIRS. Retain Reservoir

Type on existing RESERVOIRS.

Elevation = Unspecified for newly collected RESERVOIRS. Retain Elevation on existing RESERVOIRS.

(http://nhd.usgs.gov/userGuide/Robohelpfiles/NHD_User_Guide/Feature_Catalog/Hydrography_Dataset/Feature_Delineation_Popups/NHDWaterbodyPopups/Reservori_Template.htm)

NHDFLOWLINE

Definition – Stream/River

A body of flowing water.

Delineation – Stream/River

The limit of a perennial STREAM/RIVER is the position of the shoreline when the water is at the stage that prevails for the greater part of the year.

The limit of an intermittent STREAM/RIVER is the position of the shoreline when the water is at the stage that prevails when the feature is at or near capacity.

The limit of an ephemeral STREAM/RIVER is the edge of the channel.

The upper limit of STREAM/RIVER is where the feature first becomes evident as a channel.

The limit of STREAM/RIVER where it enters or leaves LAKE/POND is determined by the conformation of the land.

The limit of STREAM/RIVER where it enters ESTUARY is based on the Tidal Fresh Zone from the NOAA Coastal Assessment Framework (CAF).

To accommodate variations in the shortest axis of STREAM/RIVER:

If shortest axis of STREAM/RIVER is: < 0.025" but ≥ 0.01" for a distance < 2.64", and is connected at both ends to a 2- dimensional STREAM/RIVER, Then STREAM/RIVER is represented as a 2-dimensional basic feature object.

< 0.025" but ≥ 0.01" for a distance ≥ 2.64", or < 0.01" regardless of distance, and is connected at both ends to a 2-dimensional STREAM/RIVER, then STREAM/RIVER is represented as a 1-dimensional basic feature object.

≥ 0.025" but < 0.04" for a distance < 2.64", and is connected at both ends to a 1-dimensional STREAM/RIVER, then STREAM/RIVER is represented as a 1-dimensional basic feature object.

≥ 0.025" but < 0.04" for a distance ≥ 2.64", or ≥ 0.04" regardless of distance, and is connected at both ends to a 1-dimensional STREAM/RIVER, then STREAM/RIVER is represented as a 2-dimensional basic feature object.

Data Extraction

Capture Conditions

If STREAM/RIVER flows from LAKE/POND or SPRING/SEEP, Or If STREAM/RIVER is ≥ 1.25" along the longest axis, Or If STREAM/RIVER is perennial and is in an arid region, Then capture.

Attribute Information

If the water level of STREAM/RIVER is controlled for navigation by DAM/WEIR or GATE with Gate Type = Lock, then Elevation = (Integer Value), Else Elevation = Not Applicable.

If STREAM/RIVER coincides with LOCK CHAMBER, Then Elevation = Not Applicable.

If STREAM/RIVER is represented as a 2-dimensional basic feature object, Then Positional

Accuracy = Not Applicable

Source Interpretation Guidelines

All

In arid areas it is difficult to distinguish between narrow intermittent and ephemeral drains and no distinction will be made. All drainages < 0.025" are collected as 1-dimensional intermittent streams. Thin drainage in arid areas to appropriately represent the "wetness" of the area. Rules for thinning intermittent streams in arid areas will be documented as more information becomes available.

If a portion of STREAM/RIVER flows through SWAMP/MARSH, then select the appropriate Hydrographic Category according to the definitions given.

Do not capture areal dry washes, arroyos, dry gulches and ephemeral streams as STREAM/RIVER. See WASH.

The minimum size for islands within STREAM/RIVER is 0.03" along the shortest axis.

If a stream flows in a braided pattern, Then see AREA OF COMPLEX CHANNELS.

Graphic

If STREAM/RIVER flows from SPRING/SEEP, then capture STREAM/RIVER starting at the center of SPRING/SEEP symbol

Revision - General

If the headwaters of STREAM/RIVER are closer than 0.5" from a saddle or divide, then capture STREAM/RIVER starting 0.5" from the saddle or divide.

If image shows lower than average water level, then capture STREAM/RIVER at a normal pool or average water level by using ancillary sources or evidence of water marks on images.

If image shows lower than average water level and the average water elevation or normal pool elevation cannot be determined, then capture STREAM/RIVER at the visible edge of the water body.

If image shows higher than average water level, then capture STREAM/RIVER at a normal pool or average water level by using ancillary sources.

If image shows higher than average water level and the average water elevation or normal pool elevation cannot be determined, then capture STREAM/RIVER at the visible edge of the water body.

Revision – Standard

Revision – Limited

Do not add new features. Modify existing features only if there are obvious changes in the stream channel.

Use ancillary source if Elevation is required.

Value Hydrographic Category by looking at the surrounding drainage.

(http://nhd.usgs.gov/userGuide/Robohelpfiles/NHD_User_Guide/Feature_Catalog/Hydrography_Dataset/Feature_Delineation_Popups/NHDFlowline_Popups/StreamRiver_Template.htm)

Definition – Canal/Ditch

An artificial open waterway constructed to transport water, to irrigate or drain land, to connect two or more bodies of water, or to serve as a waterway for watercraft.

Delineation

The limit of CANAL/DITCH is the top of the banks of the artificial waterway.

To accommodate variations in the shortest axis of CANAL/DITCH:

If shortest axis of CANAL/DITCH is:

- < 0.025" but ≥ 0.01" for a distance < 2.64", and is connected at both ends to a 2-dimensional CANAL/DITCH, Then CANAL/DITCH is represented as a 2-dimensional basic feature object.

- < 0.025" but ≥ 0.01" for a distance ≥ 2.64", or < 0.01" regardless of distance, and is connected at both ends to a 2-dimensional CANAL/DITCH, Then CANAL/DITCH is represented as a 1-dimensional basic feature object.

- ≥ 0.025" but < 0.04" for a distance < 2.64", and is connected at both ends to a 1-dimensional CANAL/DITCH, Then CANAL/DITCH is represented as a 1-dimensional basic feature object.

- ≥ 0.025" but < 0.04" for a distance ≥ 2.64", or ≥ 0.04" regardless of distance, and is connected at both ends to a 1-dimensional CANAL/DITCH, Then CANAL/DITCH is represented as a 2-dimensional basic feature object.

Data Extraction

Capture Conditions

If CANAL/DITCH is named, Or If CANAL/DITCH is ≥ 0.005" along the shortest axis, Then capture.

Attribute Information

If water level of CANAL/DITCH is controlled by GATE with Gate Type = Lock, and CANAL/DITCH is ≥ 0.025" along the shortest axis and ≥ 0.5" along the longest axis and is not coincident with LOCK CHAMBER, then Elevation = (Integer Value), Else Elevation = Not Applicable.

Source Interpretation Guidelines

All

If CANAL/DITCH meets capture conditions, and coincides with BRIDGE, LOCK CHAMBER, or TUNNEL, Then capture both CANAL/DITCH and the other feature.

If CANAL/DITCH meets capture conditions, and coincides with a structure, but that structure does not meet the definition and capture conditions for another feature (BRIDGE, FLUME, PIPELINE with Pipeline Type = Siphon, TUNNEL), Then capture CANAL/DITCH and, if required, capture UNDERPASS to allow definition of the relationship between CANAL/DITCH and the feature over or under which it passes.

Structures which carry CANAL/DITCH over another feature are captured as FLUME or BRIDGE.

Do not capture underground aqueducts that are not in TUNNEL as CANAL/DITCH. See PIPELINE with Product = Water, Pipeline Type = Aqueduct, and Relationship to Surface = Underground.

Do not capture rivers that have been channelized to control flooding or erosion, or to maintain flow for navigation as CANAL/DITCH. See STREAM/RIVER. Capture as CANAL/DITCH only those inland navigation waterways that are cut through land to bypass outcrops or rapids, or to connect two bodies of water.

If a canal or ditch passes through a siphon that meets capture conditions for PIPELINE with Pipeline Type = Siphon, then do not capture CANAL/DITCH. See PIPELINE.

Do not capture ditches associated with a cranberry bog.

If 2-dimensional CANAL/DITCH meets capture conditions, and coincides with NONEARTHEN SHORE or WALL, then capture both CANAL/DITCH and the other feature.

Graphic

Revision - General

Revision - Standard

Revision - Limited

Use ancillary source when the collection of Elevation is required.

(http://nhd.usgs.gov/userGuide/Robohelpfiles/NHD_User_Guide/Feature_Catalog/Hydrography_Dataset/Feature_Delineation_Popups/NHDAreaPopups/CanalDitch_Template.htm)

Definition – Pipeline

A closed conduit, with pumps, valves and control devices, for conveying fluids, gases, or finely divided solids.

Relationship to Surface

- Vertical location relative to the surface.

At or near - At or slightly above the surface

Elevated - Supported above the earth

Underground - Buried

Underwater - Always submerged

Unspecified - The value is not known and is not required

Delineation

The limit of PIPELINE that is underground is the edge of the ground scars or linear clearings.

The limit of PIPELINE that is at or near the ground or elevated is the extent of the structure.

The limit of PIPELINE that is underwater is as shown on the final compilation

provided to USGS by NOS.

Data Extraction

Capture Conditions

If PIPELINE is an aqueduct, Or If PIPELINE is aboveground and is outside of a congested area; and is a trunk line; and is ≥ 0.25" from a paralleling road, railway, or other linear feature, Or If PIPELINE is underground and surface scars are present; and is outside of a congested area; and is a trunk line; and is ≥ 0.25" from a paralleling road, railway, or other linear feature, Or If PIPELINE is a penstock or siphon and is ≥ 0.12" along the longest axis, Then capture.

If PIPELINE is for stormwater, local data stewards will provide capture conditions.

Attribute Information

If Pipeline Type = Siphon, Then Relationship to Surface = Unspecified.

Source Interpretation Guidelines

All

If PIPELINE, with Pipeline Type = Siphon, causes a gap in CANAL/DITCH, Then capture PIPELINE only.

If a siphon does not meet capture conditions for PIPELINE, Then capture CANAL/DITCH and, if required, capture UNDERPASS to allow definition of the relationship between CANAL/DITCH and the feature over or under which it passes.

If PIPELINE is elevated over a depression by a structure built for that purpose, Thencapture only PIPELINE, with Relationship to Surface = Elevated.

If PIPELINE is within TUNNEL, Then capture both PIPELINE and TUNNEL.

If PIPELINE conveys water, Then collect in the theme Hydrography.

If PIPELINE conveys a product other than water, Then collect in the theme Built-up.

Graphic

If PIPELINE is labeled "Pipeline Bridge", Then capture PIPELINE, with Relationship to Surface = Elevated.

Revision – General

Revision – Standard

Revision – Limited

Revise above ground pipelines only. Retain existing features.

(http://nhd.usgs.gov/userGuide/Robohelpfiles/NHD_User_Guide/Feature_Catalog/Hydrography_Dataset/Feature_Delineation_Popups/NHDFlowline_Popups/Pipeline_Template.htm)

Definition – Connector

A known, but nonspecific, invisible connection between two nonadjacent network segments.

Delineation

The limit of CONNECTOR is the imaginary line connecting two nonadjacent network segments.

Data Extraction

Capture Conditions

If CONNECTOR is required to maintain connectivity between two network feature objects that represent AREA OF COMPLEX CHANNELS, CANAL/DITCH, ESTUARY,LAKE/POND, RESERVOIR, SEA/OCEAN, or STREAM/RIVER, then capture.

Source Interpretation Guidelines

All

The following list of conditions indicates when and why the capture of CONNECTOR is important:

1) When CONNECTOR is part of a network that is represented as being connected.

2) When there is a gap with no collected network feature object between pieces of the network, for example, at a 2-dimensional DAM/WEIR that causes a gap between an upstream LAKE/POND and a downstream STREAM/RIVER.

Graphic

Revision – General

Revision – Standard

Revision - Limited

(http://nhd.usgs.gov/userGuide/Robohelpfiles/NHD_User_Guide/Feature_Catalog/Hydrography_Dataset/Feature_Delineation_Popups/NHDFlowline_Popups/Connector_Template.htm)

Definition – Artificial Path

A surrogate for general flow direction in NHDWaterbodies and NHDAreas. Artificial Paths carry the name of the flowline feature. NHDArea StreamRivers will have an Artificial Path that will carry the name of the River.

Delineation

The limit of ARTIFICIAL PATH is:

the connection between the inflow and outflow points of an in-line open water body;

the line through a head or terminal open water body that connects to the inflow or outflow point.

Data Extraction

Source Interpretation Guidelines

All

If ARTIFICIAL PATHS are used to model flow through an ESTUARY that also has COASTLINE around the ESTUARY, flow direction will be “with digitized” on the ARTIFICIAL PATHS and the COASTLINE around the ESTUARY will have flow direction = “uninitialized”. This rule is necessary to allow network models to work properly.

Graphic

Revision – General

Revision – Standard

Revision – Limited

(http://nhd.usgs.gov/userGuide/Robohelpfiles/NHD_User_Guide/Feature_Catalog/Hydrography_Dataset/Feature_Delineation_Popups/NHDFlowline_Popups/Artificial_Path_Template.htm)

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