



Theme Strategic Plan for ‘Water-Inland Theme’

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NGDA Datasets in ‘Water-Inland’:

(Master list: <http://www.fgdc.gov/initiatives/resources/ngda-master-dataset-list>):

‘Theme Name’ NGDA Dataset	Dataset Manager Agency
National Hydrography Dataset (NHD)	DOI-USGS
National Inventory of Dams	DOD-USACE
National Levee Database, series information for the current inventory of the Nation’s levees	DOD-USACE
National Wetlands Inventory (NWI) - Wetlands	DOI-FWS
Watershed Boundary Dataset (WBD)	DOI-USGS

It is important to note that not all of NGDA Datasets are managed by “**Theme Lead Agency.**” Management of the ‘Water-Inland’ Theme is an interagency effort.

The Water-Inland theme consists of five national datasets, managed by three separate agencies. Of those datasets, the NHD and WBD form a geospatial reference framework that is used widely across the entire water resources community.

The datasets in the theme are all essentially complete and are considered “Optimized; Established” according to the most recent NGDA Lifecycle Maturity Assessment. The emphasis of this five-year strategic plan, is four-fold: 1. To use results of the Hydrography Requirements and Benefits (HRBS) study to assess community needs and guide future programs; 2. To improve and enrich the capabilities/intelligence of the datasets; 3. To continue building and strengthening the water data community; and 4. To provide discoverable, standardized and interoperable data to users.

The Open Water Data Initiative (OWDI) is an activity led by the Department of Interior that will integrate currently fragmented water information into a connected, national water data framework and leverage existing systems, infrastructure and tools to underpin innovation, modeling, data sharing, and solution development. OWDI is coordinated through the Subcommittee on Spatial Water Data (SSWD), a subcommittee of both FGDC and the Advisory Committee on Water Information (ACWI). The SSWD has been building and coordinating a very active community surrounding water geospatial data, and this activity aligns very well with the NGDA Water-Inland theme goals. This Water-Inland theme strategy incorporates many aspects of the OWDI, and the NGDA datasets provide a foundational structure upon which to build the OWDI. This strategy aligns the theme goals with those of the OWDI, and improves the synergy between these closely related programs. To facilitate cross walking between efforts, the OWDI component associated with each goal is noted below.

Goal 1: Use results of the Hydrography Requirements and Benefits (HRBS) study to assess community needs and guide future programs to maximize the return on investment in meeting user needs. (OWDI: Community for Water Data, Tools)

Objective 1.1: Complete development of a cost-benefit analysis for hydrographic data

Outcome 1.1: Development of a program recommendation for future development of hydrographic data that maximizes user needs met

Action 1.1.1: Complete analysis of requirements and benefits data collected from the

user community (Goal: FY17)

Action 1.1.2: Execute pilot projects to determine implementation costs to support cost-benefit comparison among multiple scenarios (Goal: FY17)

Action 1.1.3: Develop and document proposed program direction based on study results (Goal: FY17)

Action 1.1.4: Vet proposed program direction with users/stakeholders to fine tune the approach (Goal: FY18)

Action 1.1.5: Publish action plan for new program direction (Goal: FY18)

Goal 2: Improve and enrich capabilities/intelligence of the datasets (OWDI: Enriching Water Data)

Objective 2.1: Using the NHD, WBD, and 10-meter seamless 3DEP elevation models as the source datasets, develop and implement the high-resolution (1:24,000 or better scale) NHDPlus as a foundational framework for georeferencing users' hydrologic and biologic observations for discovery and exploitation.

In a baseline study done within DOI as a precursor to the HRBS, 80% of respondents said that high-resolution NHDPlus would be useful or very useful. Of 420 Mission Critical Activities reported by the broad range of users in the HRBS, all but five had requirements for data at scales larger than 1:100,000. In response to this and other feedback, USGS has begun development of the high-resolution NHDPlus (NHDPlusHR). Currently the 1:100,000-scale NHDPlus meets the needs of some user groups with advanced attribution and network navigation capabilities, while the High Resolution NHD meets the needs of users requiring higher spatial resolution. By combining the advantages of each dataset into a single scalable geospatial framework, NHDPlusHR will meet user needs at many different scales with a single authoritative dataset, thereby reducing the effort now required to maintain separate geospatial frameworks and to link observations to those separate frameworks.

Outcome 2.1: The user community becomes unified on a single hydrography geospatial framework that is partially integrated with elevation, based on drainage enforcement; user observations become more interoperable

Action 2.1.1: Produce beta NHDPlusHR for nation (Goal: By end of FY17 or early FY18, depending on resource availability)

Action 2.1.2: Conduct QC efforts to improve the beta version in partnership with the community, including states, tribes, academia, the private sector, other federal agencies, and localities as possible (Goal: FY17 and 18)

Action 2.1.3: Edit NHD and WBD source datasets to reflect QC findings (Goal: FY17-19)

Action 2.1.4: Improve WBD and NHDPlusHR integration (Goal: FY17-19)

Action 2.1.5: Following QC and corrections of the beta version, quickly release Version 1.0 of NHDPlusHR (Goal: by FY18-19)

Action 2.1.6: Maintain NHDPlusHR over the long term, incorporating edits and refreshing as needed, in partnership with states, tribes, academia, the private sector, other federal agencies, and localities through established stewardship programs (ongoing)

Action 2.1.7: Develop methods and tools to generalize the NHDPlusHR flowline network and catchments to many different scales, while retaining feature identities, enabling linkages between scales. (Goal: FY17 and 18)

Objective 2.2: Provide support for linking water-related data to the NHDPlusHR hydrography framework

Outcome 2.2: Data become interoperable and can be used together seamlessly

Action 2.2.1: Support and promote desktop Hydro Event Management (HEM) tool for the short term. (ongoing)

Action 2.2.2: Develop web-based HEM tools, transition from desktop HEM for the longer term (Goal: FY17 and 18)

Objective 2.3: Develop integrated elevation and hydrography datasets based on high-accuracy 3DEP elevation data

Outcome 2.3: Improved accuracy and interoperability of hydrography data; hydrography and elevation data are integrated and consistent and can be used together seamlessly in a multitude of applications that will improve our understanding of hydrologic processes

Action 2.3.1: Research integrated data model for NHD, WBD, and 3DEP

Action 2.3.2: Research methods to evaluate, delineate, and store non-contributing areas in WBD or NHDPlus (Goal: FY16 and 17)

Action 2.3.3: Research methods to extract hydrography from 3DEP data (Goal: FY17 and 18)

Action 2.3.4: Research methods to automate or semi-automate WBD delineations from elevation so that WBD is composed of a collection of elevation-based catchments (Goal: FY17 and 18)

Action 2.3.5: Implement methods based on research results (Goal: FY18 and 19)

Objective 2.4: Improve NWI wetland code intelligence in the NWI data model

Outcome 2.4: Analytical capability is improved through NWI wetland codes linked to FGDC wetland definition and descriptions

Action 2.4.1: Develop parsed NWI wetland code tables (Goal: FY17)

Action 2.4.2: Develop NWI code interpreter (Goal: FY17)

Action 2.4.3: Integrate parsed NWI code tables into data model (Goal: FY19)

Action 2.4.4: Research integration of USACE wetland plant list to NWI wetland codes (Goal: FY19)

Objective 2.5: Refine methods for delineation of gaged drainage areas stored in the USGS National Water Information System (NWIS) from WBD.

Outcome 2.5: Improved integration of spatial hydrography data with drainage areas stored in NWIS thus tying NWIS to the spatial component of the national water data framework.

Action 2.5.1: Develop improved toolsets for drainage area delineation (Goal: FY17 and 18)

Goal 3: Continue building and strengthening the water data community with states, tribes, academia, the private sector, other federal agencies, and localities that meet the needs of users (OWDI: Community for Water Data, Tools)

Objective 3.1: Investigate coordination and mutually beneficial activities between data sets

Outcome 3.1: Identify opportunities to leverage dataset resources and enhance dataset quality

Action 3.1.1: Continue meetings between theme dataset development teams (ongoing)

Objective 3.2: Engage partners, stakeholders, and users by providing educational and discussion forums

Outcome 3.2: Community members have opportunities to engage, learn, and share Information, and to provide input to the ongoing improvement of the theme

Action 3.2.1: Continue education and collaboration activities including NHD Advisory team, WBD State Stewardship workgroup, Hydrography Technical Exchange Meetings, Hydrography Seminar Series, and Wetlands Mapping Consortium (ongoing)

Action 3.2.2: Continue and expand, if possible, participation of staff in scientific Conferences (ongoing)

Objective 3.3: Foster a culture of open-source development and code sharing

Outcome 3.3: Tools developed to support theme datasets are shared in public open-source

repositories and are building a community of users around them, development investments are leveraged across the community

Action 3.3.1: Release NHD and WBD toolsets in open source formats (Goal: FY17)

Action 3.3.2: Encourage others in community to contribute tools and best practices (ongoing)

Action 3.3.3: Explore the use of challenge grants and other community events like mapathons to engage and expand the field of users and developers

Objective 3.4: Provide a web-based forum and collaborative workspace for the Open Water Data Initiative

Outcome 3.4: Improved collaboration and coordination within the spatial water data community

Action 3.4.1: Establish OWDI wiki and collaborative space within the GeoPlatform Water-Inland Theme Community space (Goal: FY16 and 17)

Objective 2.2: Continue stakeholder and partner coordination for acquisition of NWI data

Outcome 2.2: Integrate wetlands data created by stakeholders and partners into the NWI dataset

Action 2.2.1: Provide updated Wetlands Data Verification tools (Goal: FY17 and FY19)

Action 2.2.2: Provide wetland mapping training webinars and documentation (Goal: FY17)

Action 2.2.3: Continue outreach activities with the Association of State Wetland Managers (ASWM) (ongoing)

Objective 2.3: Continue steward coordination for acquisition and improvement of NHD and WBD data

Outcome 2.3: A well-functioning stewardship process that ensures timely update and improvement of the NHD and WBD datasets

Action 2.3.1: Maintain NHD and WBD edit toolsets and steward websites (ongoing)

Action 2.3.2: Provide NHD and WBD tool and edit training (ongoing)

Action 2.3.3: Develop web-edit capability to simplify and streamline edit process (Goal: FY 17 and 18)

Action 2.3.4: Continue to engage with stewardship partners, and to develop partnership agreements with new partners to the extent possible (ongoing)

Objective 2.4: Engage international partners (Canada and Mexico)

Outcome 2.4: Seamless continental hydrography data that support cross-border applications

Action 2.4.1: Continue to complete cross-border data harmonization with WBD and NHD (ongoing)

Action 2.4.2: Evaluate the feasibility of developing an international integrated elevation and hydrography data model that leverages domestic plans and directions outlined in this strategy (Goal: FY 17 and 18)

Action 2.4.3: Conduct one or more pilot studies developing NHDPlusHR datasets for river basins spanning the U.S.-Canada border (Goal: FY17 and 18)

Action 2.4.4: Initiate discussions with Mexico regarding possible partnership on NHDPlusHR datasets for river basins spanning the U.S.-Mexico border (Goal: FY17)

Action 2.4.5: Conduct one or more pilot studies developing NHDPlusHR datasets for river basins spanning the U.S.-Mexico border (Goal: FY17 and 18)

Goal 4: Provide discoverable, standardized and interoperable data to users (OWDI: Water data as a service and water data catalog)

Objective 4.1: Provide datasets as open and interoperable web services in compliance with agency policies

Outcome 4.1: Datasets are openly available and interoperable via web services

Action 4.1.1: Continue to leverage current technologies and formats to provide open dataset access via interoperable web services (ongoing)

Objective 4.2: Ensure all datasets in theme have current FGDC compliant metadata in the GeoPlatform and are identified as an NGDA

Outcome 4.2 All theme datasets are readily discoverable through the GeoPlatform and clearly identified as NGDAs

Action 4.2.1: Ensure all theme datasets have current FGDC compliant metadata including the NGDA theme keyword (ongoing)

Action 4.2.2: Ensure all data are distributed with FGDC compliant metadata (ongoing)

Action 4.2.3: Publish metadata records on data clearinghouse applications including Data.gov and GeoPlatform.gov (ongoing)

Objective 4.3: Maintain and update existing standards as needed to reflect best practices

Outcome 4.3: Well documented and easily accessible standards allow both dataset managers and user community to understand and implement best practices for using and maintaining data

Action 4.3.1: Update WBD standards (<http://pubs.usgs.gov/tm/11/a3/>, 4th edition) in FY 2017 to meet current best practice guidelines.

Action 4.3.2: Revise NHD and WBD standards to reflect updated delineation practices developed during research into NHDPlus catchment integration and automated delineation efforts (Objective 2.3., FY18 and 19)

Action 4.3.3: Investigate use of Specifications Explorer as a standards delivery mechanism for NHD and WBD.

Objective 4.4: Improve accessibility of dams and levee information

Outcome 4.4: Dams and levee information are more discoverable and accessible to users

Action 4.4.1: Start annual publication of the National Inventory of Dams in early 2017 with updated dam information from states

Action 4.4.2: Improve publish mapping and data access capabilities for the National Levee Database in early 2017

Action 4.4.3: Start publication of the National Levee Database with updated levee information from states and other federal agencies in mid 2017

Objective 4.5: Develop toolsets and web services to deliver drainage area boundaries for gages stored in the USGS National Water Information System (NWIS)

Outcome 4.5: Improved accessibility of gaged drainage areas

Action 4.5.1: Leverage current technologies to develop open dataset access via web services (Goal: FY17 and 18)

Objective 4.6: Provide network-based data discovery and analysis framework

Outcome 4.6: Data linked to the hydrography framework can be easily discovered and shared for multiple uses

Action 4.6.1: Continue development of a network-linked data index (ongoing)

Action 4.6.2: Develop network-linked data index services based on NHDPlusHR (Goal: FY17 and 18)

Action 4.6.3: Promote listing of datasets in network-linked data index (ongoing)

External Factors, Challenges, and Opportunities

Opportunity: HRBS will provide the first comprehensive insights into user needs and benefits for the Water-Inland theme.

Challenge: Additional resources will be needed to maximize user benefits that can be realized.

Opportunity: Data management, governance, and stewardship of hydrography data (NHD and WBD) needs to be more tightly integrated to form a seamless data information system.

Integration of elevation and hydrography datasets affords an opportunity to develop a tightly linked, scalable terrain data that can be used for both modeling and reporting at multiple scales.

Challenge: Existing approaches to integration rely on having a high-quality up-to-date hydrography dataset, which is used to impose hydrographic enforcement on elevation data. This is quite resource intensive. New methods to automate extraction of hydrography from elevation data are needed, and research is planned. Additionally, simplifying and integrating the data models may help. However, it is likely that additional funding resources will be required to accomplish the desired level of integration, in spite of these anticipated improvements.

Opportunity: Synergistic datasets, such as NHD and NWI, exist that can be combined to better guide decision-making relative to either stand-alone dataset.

Challenge: Additional funding resources would be required to accomplish this integration.

Opportunity: The Open Water Data Initiative, managed through the Subcommittee on Spatial Water Data, provides a focal point and leadership to making water-related information accessible and interoperable. Ongoing high-level engagement in OWDI by the Department of the Interior, FGDC and ACWI – even across Administration change - supports the advancement of OWDI goals.

Challenge: 26 Federal agencies, and countless state and local entities play a range of roles in collecting, reporting and synthesizing water information. Data are fragmented and not easily accessible.