

# NGDA Dataset Report

**Official NGDA Title:** National Hydrography Dataset (NHD)

**Metadata Record Title:** USGS National Hydrography Dataset (NHD) Downloadable Data Collection - National Geospatial Data Asset (NGDA) National Hydrography Dataset (NHD)

**A-16 NGDA Theme:** Water - Inland

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## Metadata:

**Registration Status:** Complete

**Registered on** 12/17/2014

**GeoPlatform Link\*:** <https://www.geoplatform.gov/node/243/e6482162-4491-482b-b9dd-adb0b0a1141f>

**Data.gov Metadata Link\*:** <http://catalog.data.gov/harvest/object/5b48bec6-781b-46c8-9d09-559c0ed230d8/html>

\*If the metadata has been updated and reharvested after publication of this report, the link may no longer be valid. The dataset may be searched for manually in Data.gov or GeoPlatform.gov.

# NGDA Lifecycle Maturity Assessment (LMA) Report

## Time Frame:

1993-2015

## LMA Submission:

**Status:** Complete

**Date:** 10/5/2015

**Extension Requested:** No

## LMA Reviewer(s):

**Supervisor:** Vicki Lukas

**Theme Lead:** Did not review

**Executive Champion:** Did not review

**SAOGI\*:** Did not review

**Other:** Did not review

## LMA Verifier:

**Name:** Vicki Lukas

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## Attachments:

To get access to any attachments referenced in the report, email the LMA Help Desk at [NGDA\\_LMA\\_help@fgdc.gov](mailto:NGDA_LMA_help@fgdc.gov). Please use the subject "Dataset Report Attachment(s)" and indicate the associated official NGDA title.

\*Senior Agency Official for Geospatial Information (SAOGI)

## Lifecycle Maturity Assessment (LMA) Summary

### Overall Maturity:

**Optimized; Established**

General Questions: 91%

**Optimized; Established**

Stage 4 - Access: 100%

**Optimized; Established**

Stage 1 - Define/Plan: 90%

**Optimized; Established**

Stage 5 - Maintain: 100%

**Optimized; Established**

Stage 2 - Inventory/Evaluate: 100%

**Optimized; Established**

Stage 6 - Use/Evaluate: 100%

**Optimized; Established**

Stage 3 - Obtain: 100%

**Optimized; Established**

Stage 7 - Archive: 100%

**Optimized; Established**

### NGDA Dataset Maturity Definitions:

How To Calculate Maturity: [https://www.geoplatform.gov/sites/default/files/How\\_to\\_Calculate\\_Maturity.pdf](https://www.geoplatform.gov/sites/default/files/How_to_Calculate_Maturity.pdf)

Maturity	Maturity Characteristics for All Lifecycle Stages
Optimized; Established Rank = 5	Dataset meets virtually all business needs of all users. The dataset is considered authoritative by owners and secondary users. It is curated across all stages of the approved lifecycle. Future needs are defined on a regular basis and resources for addressing both current and future business requirements are available.
Mature; Consistent Rank = 4	Dataset meets all the business needs of the primary owner and most of the secondary users. The dataset is curated and used as authoritative by the primary owner. Dataset is used widely by secondary users actively engaged in sustaining the dataset. Future needs are identified and steps are planned to address these. All stages are supported and reviewed on a recurring basis. The dataset is well managed in relation to the approved lifecycle.
Managed; Predictable Rank = 3	Dataset meets a significant number of the business needs of the primary owner and is widely used as an authoritative resource by secondary users. Benchmark activities are occurring in at least four of the approved lifecycle stages. Management practices in relation to the approved lifecycle is moderate but consistent. Dataset is integrating changing business requirements in lifecycle stages impacting overall maturity.
Transition; Transformation Rank = 2	Dataset meets business needs of the primary owner and has moderate use by secondary users. Benchmark activities are occurring in at least three stages. Efforts to integrate funding, include partners, and obtain data are not supported in a sustained manner. Management practices in relation to the stages of the approved lifecycle is limited.
Planned; Initial Development Rank = 1	Dataset limited in meeting business needs of the primary owner. Benchmark activities in the approved lifecycle are just starting to consider secondary uses, partnerships are forming to support additional dataset uses. Dataset development is in a very early stage. Minimal or limited management against the benchmarks in the approved lifecycle.
No Activity Rank = no activity	Dataset meets project or local business needs of the primary owner, secondary or additional uses or users were not considered, not recognized as an authoritative data or is part of a similar dataset. Not managed to any of the benchmarks in the approved lifecycle.

## General Questions for All Stages

1) Is there a recurring process to obtain funding for all lifecycle stages of this dataset?

**Answer:** Funding support exists but is not adequate to meet known requirements, most lifecycle stages are supported.

**Justification Comment:**

**Attachment(s):** 0

Yes. The National Hydrography Dataset is operated as a consortium numbering approximately forty entities. Each entity's contributions to the program are primarily in the form of participation in governance (5%), and contributions of data (95%). The U.S. Geological Survey is the leader of this consortium and accounts for about fifty-percent of the overall annual national investment in the program. The breakout of investment is (approximately) as follows: (1) USGS - 50%, (2) Other federal agencies – 20%, (3) State and local agencies – 30%. Each of the forty or so entities has its own funding protocol. In general each entity operates on an annual or bi-annual fiscal cycle, and typically includes recurring funding for NHD and NHD-related activities. However, entity members and their investments come and go due to variations in budgets. This is particularly applicable to state partners. In general, there is a downward trend in the number of personnel hours invested in the NHD as time progresses.

Of the lifecycle stages, the following is an assessment on investment: (1) Define/Plan - adequate, (2) Inventory/Evaluate - adequate, (3) Obtain - adequate, (4) Access – somewhat not adequate, (5) Maintain – not adequate, (6) Use/Evaluate - adequate, and (7) Archive – adequate.

Of these, Access is listed as “somewhat not adequate” due to a slower than expected shift from database downloads to data services. Maintain is listed as “not adequate” due to the inability to sufficiently invest in the technologies necessary to maintain a relatively sophisticated dataset, and because a number of state stewards lack sufficient funding to act as stewards.

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2) Is there a process in place to ensure that open government and transparency guidelines are followed in all lifecycle stages for this dataset?

**Answer:** Process is published as appropriate with respect to sensitivity requirements, process is transparent, published appropriately.

**Justification Comment:**

**Attachment(s):** 0

Yes. Open government and transparency is accomplished through a seven-point strategy: (1) A multi-agency team [NHD Advisory Team] composed of 110 members meets bi-weekly to exchange and debate ideas, and adjudicate decisions in the governance of the NHD. (2) A multi-agency executive team [NHD Management Team] composed of nine members meets bi-weekly to develop future vision and strategies to accomplish that vision. (3) A multi-agency team [Stewardship TEM] composed of approximately 40 members meets bi-weekly to exchange knowledge in the stewardship of the NHD. (4) A monthly newsletter [NHD Newsletter] published continuously for 14 years reaches approximately 1,000 people to communicate activities within the NHD program. (5) The NHD website serves as a resource to communicate information on the NHD including future vision strategy. (6) Members of the NHD consortium regularly present papers on the NHD program at professional conferences. (7) Special multi-agency teams [such as the NHD Data Model team] meet routinely to develop expanded capabilities for the NHD. Is this seven point strategy published anywhere – no? We just do it.

Of the lifecycle stages, the following is an assessment on open government and transparency: (1) Define/Plan – strong, (2) Inventory/Evaluate - strong, (3) Obtain – strong, (4) Access – strong, (5) Maintain – strong, (6) Use/Evaluate - strong, and (7) Archive – strong.

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3) Are there processes and tools in place so that staff are sufficiently knowledgeable to ensure a continuity of the dataset for all stages of the lifecycle, especially during staffing transitions?

**Answer:** Processes and tools to ensure dataset continuity are in place and implemented for all lifecycle stages.

**Justification Comment:****Attachment(s):** 0

Yes. The NHD program is made up of a large consortium involved in the dataset lifecycle. This numbers perhaps a couple hundred people at all levels and within this group members come and go with a moderate level of turnover. As people leave and are replaced, the replacements are primarily trained through apprenticeship, working with co-workers. The pool is sufficiently large that there is always a strong degree of stability of the knowledge base. There are also programs in place for transfer of knowledge such as: (1) NHD Applications Workshops – over 130 workshops have been taught reaching roughly 2,000 people. (2) Stewardship training – over 80 sessions have been held reaching roughly 300 people. (3) Specialty training [Conflation, Event Management] – over 30 classes have been held reaching roughly 200 people. (4) NHD Web Site [Feature Catalog, User Guide] offers extensive reference material. (5) Training Videos designed to educate data users. (6) Instructional Tutorial documents to develop skills. (7) NHDPlus Workshops – six workshops have been held reach roughly 300 people. (8) NHDPlus User Guide providing documentation to the NHDPlus. Of the lifecycle stages, the following is an assessment of knowledge continuity: (1) Define/Plan – strong, (2) Inventory/Evaluate - strong, (3) Obtain – strong, (4) Access – strong, (5) Maintain – strong, (6) Use/Evaluate - strong, and (7) Archive – strong.

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**STAGE 1 - Define/Plan****4)** Are user and business requirements defined and formalized?**Answer:** A recurring process is in place, including defining new partner and stakeholder business needs as they arise, and is fully implemented.**Justification Comment:****Attachment(s):** 0

Yes. From day one when the NHD program was launched in 1993, it was a collaborative process. Initially this was with the USGS and the USEPA, and then expanded to more and more partners as the program grew. By 2000 the growth in partners expanded rapidly reaching new heights in 2007 when the high resolution NHD was completed by a consortium of some 60 partnering agencies. That consortium lived on in the formation of the NHD Advisory Team, which has been meeting about bi-weekly on a continuous basis since then, with about 110 participants. The primary function of that team is to exchange and debate ideas, as well as adjudicate decisions, to continuously advance the NHD. All stakeholders are welcome to the team and through this forum are able to raise issues to meet their business needs. Meetings are documented. In addition, the NHD Management Team, meeting bi-weekly, is an executive level team of six partnering agencies, designed to ensure the NHD is serving the needs of the hydrography community by its observation and involvement in hydrography applications. Furthermore, the Water Community of Use has been formed of about 30 members to extend the reach to meet user needs, primarily in water science.

Of the lifecycle stages, the following is an assessment of business requirements: (1) Define/Plan – strong, (2) Inventory/Evaluate - strong, (3) Obtain – strong, (4) Access – strong, (5) Maintain – strong, (6) Use/Evaluate - strong, and (7) Archive – strong.

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**5)** How are partners/stakeholders involved in the requirements collection process?**Answer:** A recurring process is in place, including defining new partner and stakeholder business needs as they arise, and is fully implemented.**Justification Comment:****Attachment(s):** 0

Yes. From day one when the NHD program was launched in 1993, it was a collaborative process. Initially this was with the USGS and the USEPA, and then expanded to more and more partners as the program grew. By 2000 the growth in partners expanded rapidly reaching new heights in 2007 when the high resolution NHD was completed by a consortium of some 60 partnering agencies. That consortium lived on in the formation of the NHD Advisory Team, which has been meeting about bi-weekly on a continuous basis since then, with about 110 participants. The primary function of that team is to exchange and debate ideas, as well as adjudicate decisions, to continuously advance the

NHD. All stakeholders are welcome to the team and through this forum are able to raise issues to meet their business needs. Meetings are documented. In addition, the NHD Management Team, meeting bi-weekly, is an executive level team of six partnering agencies, designed to ensure the NHD is serving the needs of the hydrography community by its observation and involvement in hydrography applications. Furthermore, the Water Community of Use has been formed of about 30 members to extend the reach to meet user needs, primarily in water science.

Of the lifecycle stages, the following is an assessment of partner/stakeholder involvement: (1) Define/Plan – strong, (2) Inventory/Evaluate - strong, (3) Obtain – strong, (4) Access – strong, (5) Maintain – strong, (6) Use/Evaluate - strong, and (7) Archive – strong.

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**6)** Is there a quality assurance process for the dataset?

**Answer:** Process established, significant portions of the documentation is complete.

**Justification Comment:**

**Attachment(s):** 0

Yes. With a dataset as extensive as the NHD there is an almost endless list of ways to characterize the quality of the dataset and not everything can be checked. However, a substantial number of ways have been coded into data processing checks. This was done in two stages: First were validation routines in the initial building of the NHD, these were very good, but not perfect. Second are the validation routines embedded in the data editing software, plus post editing database loading validation. These are extremely good and results in data that meet the highest degrees of quality, perhaps 99.97% accurate (error in 3 per 10,000). These are documented in the NHD feature catalog [http://nhd.usgs.gov/userguide.html?url=NHD\\_User\\_Guide/Feature\\_Catalog/NHD\\_Feature\\_Catalog.htm](http://nhd.usgs.gov/userguide.html?url=NHD_User_Guide/Feature_Catalog/NHD_Feature_Catalog.htm) (see the feature template), in the NHD feature rules [http://usgs-mrs.cr.usgs.gov/NHDHelp/FeatureRules/feature\\_rules.htm](http://usgs-mrs.cr.usgs.gov/NHDHelp/FeatureRules/feature_rules.htm), and more explicitly in the coding of the software itself.

That said, there are still gaps. For example, the accuracy of names has about 3% error. Positional accuracy shows that 90% of the data are within 50 feet of true position, not the NMAS of 40 feet that is strived for. Content is harder to measure. The data at 1:24,000-scale has a stream density of 2.5 miles of stream per square mile, but many users demand more density (they are really asking for a larger scale of representation).

Likewise there are also some gaps in the documentation of quality and for that reason the score is not higher.

Of the lifecycle stages, the following is an assessment of quality assurance process: (1) Define/Plan – strong, (2) Inventory/Evaluate - strong, (3) Obtain – strong, (4) Access – strong, (5) Maintain – good, (6) Use/Evaluate - good, and (7) Archive – strong.

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**7)** Is there a process to evaluate the sensitivity, privacy, and confidentiality of this dataset?

**Answer:** Sensitivity, privacy, and confidentiality evaluations fully implemented, reviewed and updated on a recurring basis.

**Justification Comment:**

**Attachment(s):** 0

Yes, the sensitivity, privacy, and confidentiality of this dataset has been evaluated and there are no sensitivity concerns since the data was determined to be open to the public. The NHD, including its content, is regarded as freely populated, fully accessible, in the public domain and no sensitivity, privacy, or confidentiality restrictions are in place.

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**8)** Are defined data standards used in collecting, processing, and/or rendering the data?

**Answer:** Standards being implemented.

**Justification Comment:**

**Attachment(s):** 0

Yes. Almost everything is on-line at

[http://nhd.usgs.gov/userguide.html?url=NHD\\_User\\_Guide/Feature\\_Catalog/NHD\\_Feature\\_Catalog.htm](http://nhd.usgs.gov/userguide.html?url=NHD_User_Guide/Feature_Catalog/NHD_Feature_Catalog.htm)

. No, the NHD does not have a peer-reviewed “published” document.

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## STAGE 2 - Inventory/Evaluate

9) Is there a process for determining if data necessary to meet requirements already exist from other sources (either within or outside the agency) before collecting or acquiring new data?

**Answer:** Process for determining appropriate data is being reused fully implemented, reviewed, and updated on a regular basis.

**Justification Comment:**

**Attachment(s):** 0

Yes. The “process” is for members of the consortium local to the data to analyze the alternative data and then to take action or not take action to conflate into the NHD. There are multiple representations of hydrography scattered throughout the U.S. The NHD consortium is aware of these and in general does not duplicate these data. However, the NHD is also a “wall-to-wall” dataset and does not avoid a geography because alternate hydrography is available. Most new (post 2007) hydrography in the U.S. is edited directly into the NHD or conflated in a post processing operation.

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## STAGE 3 - Obtain

10) Is there a process for obtaining data in relation to this dataset?

**Answer:** Process is fully implemented, reviewed and updated on a regular basis.

**Justification Comment:**

**Attachment(s):** 0

Yes. The NHD at 1:100,000-scale representation was completed in 2002 and the NHD at 1:24,000-scale was completed in 2007. Since then the dataset has been in maintenance mode, which includes obtaining new replacement data over select areas at 1:24,000-scale, but often at much larger scales such as 1:5,000-scale. The process is twofold: First is data stewardship in which a number of states voluntarily contribute data to the NHD. Second is an in-house program to contribute data improvements to attain some degree of national consistency to the data quality.

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11) Is the metadata in a FGDC endorsed geospatial metadata standard?

**Answer:** Metadata is available in a format endorsed by the FGDC, it fully describes the dataset and provides all the information required to make the dataset discoverable, accessible, and usable.

**Justification Comment:**

**Attachment(s):** 0

Yes. The NHD has compliant metadata registered with Data.gov and Geoplatform.gov as well as metadata embedded in NHD downloaded datasets. The NHD also has extensive feature level metadata on all 26-million features in the dataset.

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12) How complete is the geographic coverage as defined in the requirements for the dataset?

**Part 1 Answer:** Business requirements for cyclic updates identified and a process is in place.

**Part 2 Answer:** Dataset has presently attained the greatest geographic coverage as defined by the current requirements or roughly 100%.

**Justification Comment:**

**Attachment(s):** 0

Part 1. The NHD had a business plan for nationwide completion at 1:24,000-scale coverage, which was achieved in 2007. The current business plan is for the maintenance of that data (1) on a three-year cyclic inspection and update, and (2) on an area-specific basis as determined by the data stewards.

Part 2. The coverage of the NHD is for all states and territories at primary mapping scales, normally 1:24,000-scale. In a number of areas the coverage is at much larger scales, typically 1:5,000-scale. In Alaska the coverage is being converted from 1:63,360 to 1:25,000-scale.

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## STAGE 4 - Access

**13)** Do you have a process for providing users access to the data in an open digital machine readable format?

**Answer:** User access process is fully implemented, data is available, process is reviewed and updated on a recurring basis.

**Justification Comment:**

**Attachment(s):** 0

Yes, the NHD is available in a shapefile format.

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## STAGE 5 - Maintain

**14)** Is there a maintenance process for updating and storing the dataset?

**Answer:** Dataset maintenance process is fully implemented and processes are reviewed and periodically updated.

**Justification Comment:**

**Attachment(s):** 0

Yes, the NHD is maintained using two strategies: (1) Nationally on a three-year cyclic inspection and update performed by the USGS. This involves a. photo-inspection and update, b. names improvement, c. hydrographic network improvement, and d. quality improvement campaigns. (2) On an area-specific basis as determined by data stewards, typically states and territories. Currently about 30 states and territories participate. The 25 or so states and territories that don't participate have a lower condition of maintenance, but do have reasonably good data.

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**15)** Is there an error correction process as part of dataset maintenance?

**Answer:** Error correction process includes user notification, process reviewed on a recurring basis.

**Justification Comment:**

**Attachment(s):** 0

Yes, maintenance involves correcting errors found as necessary. There are several processes for seeking out and detecting errors. Not all errors found warrant correction if they don't meet criticality criteria. Data liaisons (known as "POC's") communicate with user-stewards about errors.

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## STAGE 6 - Use/Evaluate

**16)** Is there a process to determine if the dataset meets user needs?

**Answer:** Process is fully implemented and repeated on a recurring basis.

**Justification Comment:**

**Attachment(s):** 0

Yes. The NHD Advisory Team, consisting of about 110 users and representing the overall user community, meets bi-weekly to provide continuous feedback to the USGS on the performance of the NHD. The NHD Management Team maintains awareness of the industry and guides the USGS on dataset performance. In addition, feedback on an ad hoc basis through communication with all members of the NHD consortium, but in particular with the dataset leads, occurs on a continuous basis.

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**17)** Is there a process to provide users information on how to access and properly use the dataset?

**Answer:** Process is fully implemented supporting access and proper use, process is reviewed on a recurring basis.

**Justification Comment:**

**Attachment(s):** 0

Yes. The NHD web site <http://nhd.usgs.gov/data.html> provides information on obtaining the data. To use the data there are a number of resources found under the NHD User Guide <http://nhd.usgs.gov/userguide.html>.

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**18)** Are the business processes and management practices assessed to meet changing technology?

**Answer:** Assessment process is fully implemented for taking advantage of changing technology, process is reviewed on a recurring basis.

**Justification Comment:**

**Attachment(s):** 0

Yes. Specific teams are in place to address changing technology related to: (1) database design, (2)

data management, (3) data delivery, (4) tools development, (5) data standards, (6) stewardship practices, and (7) web site practices.

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## **STAGE 7 - Archive**

**19)** Is there an archiving process for the dataset?

**Answer:** Archival and disposition processes are fully implemented.

**Justification Comment:**

**Attachment(s):** 0

Yes. Since 2004 the NHD is backed up on a weekly basis. Recovery of all or any specific data dating back to 2004 is possible. The NHD is also archived off site for long term preservation at regular intervals.