

FGDC Technical Guidance: Data.gov and The GeoPlatform Metadata Recommendations

**Including Guidelines for
National Geospatial Data Assets (NGDA)**

version

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FGDC.GOV
FEDERAL GEOGRAPHIC DATA COMMITTEE



Federal Geographic Data Committee

Federal Geographic Data Committee, Reston, Virginia, USA: 2021

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Revision History:

Date	Revision
12/9/2019	Significant changes and additions made to the prior 2017 publication. Content is updated to ISO 19115-1 metadata standard and combines deprecated documents “Metadata Recommendations Supporting Data Discovery and Use in Data.gov and the Geospatial Platform” and “National Geospatial Data Asset (NGDA) Metadata Guidelines.”
10/27/2021	Incorporation of GDA metadata guidance and FAIR best practices. Revised ‘Title’ guidance. Clarification on ‘Date’ definitions and use of ‘DateTypeCodes’. Revisions to resource ‘Identifier’ guidance. Addition of NGDA# to NGDA ‘Keywords’. Removal of ‘OnlineFunctionCode’ specification. Removal of ‘xlink’ usage restriction. Addition of an ‘NGDA Metadata Checklist’. Revisions to ‘Direct Data Download’ guidance and xpath location of format name. Removal of ‘applicationProfile specification. Addition of GeoPlatform FAQ resources. Removal of ancillary guidance not specific to Data.gov and GeoPlatform operational best practices.
11/22/2022	Statement inserted before the introduction to clarify the document provides best practices vs compliance requirements. Modifications included Replacing the terms 'requirement' and 'required' with a more relevant term, e.g. best practice, recommendation, expectation, etc. throughout the document except when the term was specific to a standards requirement, e.g. ISO 19115* requires the Topic Category element be populated. Approximately 13 terms were revised.

This document provides best practices only and is not intended as policy that agencies must comply with, or for audit purposes.

Introduction

Metadata creation and management is a geospatial data management best practice. Metadata records document the *who, what, why, where, when, and how* of the resource (dataset or service) and provide context for data consumers as to the content, extent, quality, purpose, intended use, and limitations of the resource.

The Federal Geographic Data Committee (FGDC) has long promoted the creation of standardized geospatial metadata and recent legislation including the [Foundations for Evidence-Based Policymaking Act \(or OPEN Government Data Act, Pub.L. 115–435\)](#) and the [Geospatial Data Act of 2018 \(GDA\)](#) specify critical roles for metadata. The GDA requires Covered Agencies¹ to “include standards for metadata for geospatial data, and other appropriate standards, including documenting geospatial data with the relevant metadata and making metadata available through the GeoPlatform.”² Lead Covered Agencies³ are required to create and maintain “metadata for geospatial data within the National Geospatial Data Asset data theme.”⁴ The GDA establishes the GeoPlatform, which is required to “include metadata for all geospatial data collected by covered agencies, directly or indirectly.”⁵ Further, the GDA requires that metadata standards “to the maximum extent practicable, shall be consistent with international standards and protocols.”⁶

Documenting geospatial data resources robustly and in accord with national, and international, metadata standards is a data management and stewardship best practice based on the principles of [FAIR](#):

- **Findable**
Machine-readable metadata are essential for automatic discovery of datasets and services
- **Accessible**
Once the user finds the required data, they need to know how it can be accessed
- **Interoperable**
The data needs to work reliably with other data, applications, or workflows for analysis, storage, and processing
- **Reusable**
The metadata should be well-described so that data can be used to derive other data and replicated and/or combined in different settings.

The recommendations that follow are intended to support implementation of the GDA and support metadata publishers in developing rich metadata content that will enhance the discovery of resources within Data.gov and the GeoPlatform and enable the utility of the results within the GeoPlatform. Special attention is given to the use of standardized vocabularies when curating keywords, the incorporation of unique identifiers, and the documentation of geospatial web services. Consistent use of these metadata

¹ Title 43 USC Ch. 46: Geospatial Data, Sec. 2801. Definitions

² Title 43 USC Ch. 46: Geospatial Data, Sec. 2808. Covered Agency Responsibilities

³ Title 43 USC Ch. 46: Geospatial Data, Sec. 2801. Definitions

⁴ Title 43 USC Ch. 46: Geospatial Data, Sec. 2805. National Geospatial Data Asset Data Themes

⁵ Title 43 USC Ch. 46: Geospatial Data, Sec. 2807. GeoPlatform

⁶ Title 43 USC Ch. 46: Geospatial Data, Sec. 2806. Geospatial Data Standards

elements will enhance the user experience by enabling data download, visualization, analysis, and custom map production within the GeoPlatform and other geographical information systems.

The document outlines best practices for creating geospatial metadata and specifies metadata content recommendations that support the discovery of National Geospatial Data Assets (NGDA) within Data.gov and the GeoPlatform. The document also serves as a complement to the [Project Open Data Metadata Schema](#) provided at resources.data.gov.

Metadata Standards

In accord with the GDA, covered agencies are required to provide metadata to the GeoPlatform (via Data.gov) for all geospatial data. Metadata must be produced using a geospatial metadata standard. The FGDC currently endorses the FGDC-authored Content Standard for Geospatial Metadata (CSDGM) and several ISO 19000 series metadata standards.

Data.gov can ingest CSDGM and ISO 19115/19139 metadata and transforms the CSDGM metadata to ISO 19115/19139. GeoPlatform ingests the ISO metadata from Data.gov.

The ISO 19000 metadata series provides data stewards several advantages. It is a modular set of standards that enables the compilation of metadata elements specific to your data resource: digital map, geodatabase, imagery, web service, etc. The ISO metadata series provides for the documentation of current geospatial data formats and applications. Following are the ISO geospatial metadata standards in the 19000 series:

- [ISO 19115: Geographic Information – Metadata](#) content standard
 - formatted using [ISO/TS 19139:2007: Geographic information -- Metadata -- XML schema](#)
Note that FGDC has yet to endorse the 2019 update
[ISO/TS 19139-1:2019: Geographic information — XML schema implementation — Part 1: Encoding rules](#)
- [ISO 19115-1:2014 Geographic Information – Metadata – Part 1: Fundamentals – Metadata](#) content standard
 - formatted using [ISO/TS 19115-3:2016 Geographic information -- Metadata -- Part 3: XML schema implementation for fundamental concepts](#)
- [ISO 19115-2:2019 Geographic information -- Metadata -- Part 2: Extensions for acquisition and processing](#)
 - formatted using [ISO/TS 19139-2:2012: Geographic information — Metadata — XML schema implementation — Part 2: Extensions for imagery and gridded data](#)

The GDA and OMB Circular A-119 call for agencies to use voluntary consensus standards, such as those developed through ISO, in lieu of government-unique standards. The FGDC Steering Committee has approved an effort to establish a task team to evaluate and recommend a path forward for reestablishing a resourced and sustainable standards process. The goal is to meet the FGDC's and agencies' responsibilities related to standards under the GDA, A-16, and other relevant directives. This work will result in developing and updating a standards management process that can be used to establish metadata standards under the GDA.

This guidance is written using the element names, examples, and XPath paths from the most current, ISO 19115-1, standard. However, it provides specific guidance for CSDGM implementation and for ISO 19115 implementation where it differs from ISO 19115-1.

How to Read and Use This Document

This document provides guidance specific to the creation of metadata intended for publication to Data.gov and the GeoPlatform. The recommendations were developed to improve data discovery and to facilitate the assessment and application of found resources. Metadata producers are encouraged to read the entire document in order and incorporate the recommendations into their own metadata production process.

Readers should be aware of the following document components:

CSDGM Guidance Call-out Boxes

Information specific to the publication of the FGDC *Content Standard for Digital Geospatial Metadata* (CSDGM) is presented in blue call-out boxes when the CSDGM elements, domain, or format significantly differs from ISO 19115-1. The call-out boxes are included, as needed, at the end of each relevant metadata topic.

NGDA Guidance Call-out Boxes

Information specific to the publication of FGDC-designated National Geospatial Data Asset (NGDA) resource metadata is presented in tan call-out boxes. The call-out boxes are included, as needed, at the end of each relevant metadata topic.

XPaths

XPaths are XML expressions that identify the location of the metadata element within the metadata record. Some metadata elements such as identifiers and dates occur in multiple locations throughout the metadata record. XPaths provide a navigable path for locating the element within the metadata section/class with which the element is associated. For example:

MD_Metadata.identificationInfo>MD_Identification.citation>CI_Citation.date>CI_Date.date

is read as

‘Within the metadata record (*MD_Metadata*), go to the *Identification* section (*MD_Identification*), locate the *Citation* section (*CI_Citation*), and provide a *date* (*CI_Date.date*) for the resource’.

Reference Section

A [Reference Section](#) is provided at the end of this document to provide users additional information about specific topics and to provide links to additional resources. Links to relevant Reference Section topics are provided throughout the document.

NGDA Metadata Checklist

A checklist of NGDA metadata best practices meant to facilitate ingestion into Data.gov and the GeoPlatform is provided below in the [Reference Section](#). The checklist summarizes the NGDA metadata best practices and is provided for NGDA publishers to review and verify their content.

Metadata Example Records

ISO and CSDGM metadata records have been developed to illustrate the implementation of these guidelines. The example records provide detailed XML and HTML presentations of the metadata content. Links to the example records are provided in the [Reference Section](#).

Metadata Content Best Practices

Write Informative Titles and Abstracts

Titles

A good title is descriptive and distinctive. It provides data consumers a good sense of the resource content and context and enables them to distinguish among similar resources. *Titles* should not try to replace an *Abstract* or *Purpose* statement, but they should strive to relay the *what, when, where* and, if relevant, the *who, why, and how* of the resource. For example:

- What feature or feature collection does the resource represent?
- When did the content occur or when was it captured?
- Where is the content located on the earth?
- Who is the authority for the resource?
- Why was the resource created?
- How is the resource formatted?

Title example:

Aquifer Systems and Recharge Potential in Louisiana, Louisiana Oil Spill Coordinator's Office (LOSCO), 2020, [aqrgeog3dpdeq.shp]

NGDA Guidance: Title

NGDA metadata titles, filenames, and Web Accessible Folder (WAF) file locations should remain the same to the greatest degree possible when updated records are published. When metadata titles, filenames, or locations are changed, Data.gov republishes the metadata with a new URL. If the Data.gov URL changes, it is difficult to maintain the registry of [NGDA Portfolio Datasets](#) maintained in the NGDA Theme Community site.

If the NGDA is updated on an annual, or other basis, consider creating a metadata record for the entire collection (See [Create and Publish Collection-level Metadata](#) below). The collection-level metadata record will contain the same content as the individual metadata records with the following changes:

- edit the abstract making clear that the record represents the entire collection
- add NGDA keywords to the collection-level metadata record *and* remove NGDA keywords from the individual dataset metadata records if previously included
- change temporal extent endpoint to 'now'
<gml:beginPosition>1992</gml:beginPosition>
<gml:endPosition indeterminatePosition="now"/>
- include distribution links for the most current version of the resource and, if relevant, the site from which all versions of the data resource can be accessed.

It is important that you notify the NGDA Portfolio Team (NGDATeam@FGDC.gov) if 1) the title or the Data.gov publication URL for your NGDA changes, or 2) a collection-level metadata record is created and published for your NGDA.

Abstracts

A good abstract provides the information necessary for data consumers to assess the relevance of an available data resource to their specific data needs. To meet this objective, the abstract should include:

- a general description of the data resource content and features
- the form of the data resource, e.g. GIS, imagery, database, service, application, etc.
- the purpose for which the data resource was developed
- relevant place names and references
- the time period of the data resource content
- the resolution of the resource
- information about special data characteristics or limitations, e.g. data access limitations, excluded geographies or content, completeness, etc.

Populate Date Elements Using the Correct Format

Date Elements

There are numerous options within the metadata record to record date values. Dates enable machines to improve search results and humans to determine the relevancy and ‘fitness for use’ of the resource.

To clarify the action associated with the date, ISO date elements require a companion *date type code*. The following *date types* are most useful in assessing a resource:

- creation
- publication
- lastUpdate (ISO19115-1) / revision (ISO 19115)

ISO 19115: To ensure that Data.gov and GeoPlatform reharvests your updated metadata records you must update the *Metadata Date Stamp* element described below.

Dates for the following metadata elements support data discovery and assessment:

- ***Data Resource Dates***

MD_Metadata.identificationInfo>MD_Identification.citation>CI_Citation.date>CI_Date.date

This is a repeatable element that should be used to provide:

- Original publication date of the *data resource*
CI_DateTypeCode = ‘publication’
- The latest update date for the *data resource*
CI_DateTypeCode = ‘lastUpdate’ (ISO19115-1) / ‘revision’ (ISO 19115)

- **Metadata Record Dates**

MD_Metadata.dateInfo>CI_Date.date (19115-1)

This is a repeatable element that should be used to provide:

- Original publication date of the metadata record
CI_DateTypeCode = 'publication'
- The latest update date for the *metadata record*
CI_DateTypeCode = 'lastUpdate'

MD_Metadata.dateStamp (19115)

This is a single date value, used by Data.gov, the GeoPlatform, and other systems to identify metadata records that have been updated and need to be reharvested and replaced. It is important that this date be updated every time the metadata is changed. While, technically, defined as the 'date the metadata file was created', the element is used because ISO 19115 does not include an element for the date the metadata was last updated.

The complete *CI_DateTypeCode* codelist is provided in the [Reference Section](#).

CSDGM User Note: Date Elements

CSDGM date elements do not have an associated *Date Type Code* because date elements are labeled, and defined, specific to the action, e.g. 'Publication Date', 'Process Date', etc. Provide the CSDGM date elements below.

- use **Publication Date** to identify the original publication date of the resource
metadata/idinfo/citation/citeinfo/pubdate
- use **Metadata Date** to identify the most current date of the metadata record
metadata>metainfo>metd

Date Formats

ISO 19115* requires that dates to be specified in [ISO 8601](#) format, for example:

YYYY-MM-DD

If the exact day or month is not known, the convention allows for the use of YYYY-MM and YYYY.

When the specific date is not known, *indeterminatePosition* allows for the use of date qualifiers: *before, after, now, and unknown, e.g.*

<gml:beginPosition indeterminatePosition="unknown"/>

CSDGM User Note: Date Format

CSDGM expects dates to be specified in the form: YYYYMMDD

The convention allows for the use of just the year: YYYY.

However, the 6-letter representation, YYYYMM, e.g. 201112 (December of 2011), must **not** be used as it is easily misinterpreted as the incorrect, but still used, YYMMDD form, e.g. 201112 (November 12, 2020).

Indicate the Status of the Resource

Information about the development status of the resource is critical to assessing the fitness for use of a data resource. The following elements are key to understanding the resource status.

- **Progress Code**

The developmental status of the resource

MD_Metadata.identificationInfo>MD_Identification.status>MD_ProgressCode

NOTE: Resources that are complete but subject to updates should have a status of ‘completed’ and use the Maintenance and Frequency code, below, to indicate that the resource is subject to updates.

The complete *MD_ProgressCode* codelist is provided in the [Reference Section](#).

- **Maintenance and Update Frequency**

Indicate if the resource is subject to regular, irregular, or as needed updates.

MD_Metadata.identificationInfo>MD_Identification.resourceMaintenance>MD_MaintenanceInformation.maintenanceAndUpdateFrequency>MD_MaintenanceFrequencyCode

The complete *MD_MaintenanceFrequencyCode* codelist is provided in the [Reference Section](#).

NGDA User Note: Resource Status

The *Progress Code* for NGDA resources published to Data.gov should have a value of ‘completed’ to make clear that the resources are fully enabled for use. The *Maintenance and Update Frequency* element should be applied to resources that are updated on a regular, irregular, or as needed basis. The documentation of the resource status aligns with the objectives of the [NGDA Lifecycle Maturity Assessment](#).

Populate Unique Identifier Elements Formatted in Accord with Your Agency’s Policy

Unique Identifier Elements

Unique identifiers are character strings associated with a single entity and guaranteed to be unique. Identifiers increase the efficiency and accuracy of metadata by enabling direct and reliable access to individual resources. As the number of geospatial data resources rapidly increases, the ability to identify and locate resources becomes more complex and the role of unique identifiers more critical.

Many agencies have implemented a standardized approach for the assignment of unique identifiers to the resources produced by the agency. Agencies that have not implemented the assignment of unique identifiers are strongly encouraged to implement unique identifiers in accordance with the World Wide Web Consortium (W3C) and Open Geospatial Consortium (OGC) Best Practices listed in the [Reference Section](#) of this document. W3C and OGC recommend the use of a Uniform Resources Identifier (URI) - an IETF/W3C standard scheme for treating resource identifiers as globally unique and persistent, even when the resource ceases to exist or becomes unavailable.

File Identifiers

ISO metadata provides the following elements to uniquely identify data resources and the metadata record associated with the resource.

- **Citation Identifier** uniquely identifies the resource
MD_Metadata.identificationInfo>MD_Identification.citation>CI_Citation.identifier>MD_Identifier.code
- **Metadata Identifier** uniquely identifies the metadata record associated with the resource
MD_Metadata.metadataIdentifier>MD_Identifier.code (19115-1)
MD_Metadata.fileIdentifier (19115).

Other Identifiers

Identifiers are also used to represent commonly used specifications and eliminate the need to restate specification parameters that are published elsewhere and easily accessed.

For example, the European Petroleum Survey Group (EPSG), an industry standards organization, has created identifiers for each projection specification that consolidate and codify the parameters. Therefore, if a standard projection is used, without modification, the EPSG code can be provided as the unique and unambiguous ISO spatial *Reference System Identifier* and the projection parameters are fully referenced rather than explicitly documented.

- **Reference System Identifier** uniquely identifies the geospatial referencing system for the resource
MD_Metadata.referenceSystemInfo>MD_ReferenceSystem.referenceSystemIdentifier>MD_Identifier.code (ISO 19115-1)
MD_Metadata.referenceSystemInfo>MD_ReferenceSystem.referenceSystemIdentifier>RS_Identifier.code (ISO 19115)

CSDGM User Note: Identifiers

CSDGM does not provide specific elements for the documentation of unique identifiers. However, identifiers should be incorporated into elements with free text domains when relevant. For example, the unique identifier for a resource can be included within the *Other Citation Details* element of the metadata record *Citation*.

Provide Rich Keywords and Use Controlled Vocabularies

Rich Keywords

Data.gov and the GeoPlatform rely heavily on keywords to identify resources of highest interest to users. Keywords of all types should be provided, as relevant, including:

- theme
- place
- stratum
- temporal extent
- discipline

Keywords outline the content and purpose of the resource. Users and machines are best able discern, differentiate, and distinguish the resources when presented with a rich set of accurate keywords. Publishers are encouraged to include a wide variety of keywords bearing in mind that quality is far more important than quantity.

Example:

Listing all 50 U.S. States as keywords is not particularly helpful for humans or machines trying to distinguish whether a dataset is relevant to a specific location. In contrast, listing ‘United States of America’ as a keyword makes clear that the resource is national in scope.

Publishers are encouraged to consider selecting keywords that uniquely identify the resource. This is especially important when considering theme-related keywords.

Example:

‘Coastal’ is a very broad term that is applicable to many geospatial data resources. However, terms such as ‘dune regeneration’, ‘beach nourishment’, and ‘seawall’ impart detailed information about the content and purpose of the resource.

When documenting keywords, each keyword must be listed individually and not grouped into a delimited list.

Correct:

Theme Keyword: dune regeneration

Theme Keyword: beach nourishment

Theme Keyword: seawall

Incorrect:

Theme Keyword: dune regeneration, beach nourishment, seawall.

Controlled Vocabularies

Keywords are most effective when drawn from discipline-specific controlled vocabularies such as the *Classification of Wetlands and Deepwater Habitats of the United States* taxonomy, the *Global Change Master Directory (GCMD) Science Keywords*, and the *Global Names Index Service (GNIS) gazetteer*. The use of controlled vocabularies helps to standardize the spelling and definition of the term and therefore improves the relevancy of the search and user assessment results.

Use the following elements when documenting keywords from controlled vocabularies:

- **Thesaurus Name:** the title of the controlled vocabulary
MD_Metadata.identificationInfo>MD_Identification.descriptiveKeywords>MD_Keywords.thesaurusName>CI_Citation.title
- **Thesaurus Online Link:** an online link, if available, to the controlled vocabulary
MD_Metadata.identificationInfo>MD_Identification.descriptiveKeywords>MD_Keywords.thesaurusName>CI_Citation.onlineResource>CI_OnlineResource.linkage
- **Thesaurus Identifier:** the unique identifier, if available, for the controlled vocabulary
MD_Metadata.identificationInfo>MD_Identification.descriptiveKeywords>MD_Keywords.thesaurusName>CI_Citation.identifier>MD_Identifier.code.

If the vocabulary is not published, provide a contact for the vocabulary within the thesaurus *Citation* and encourage the contact to make the vocabulary available online.

Keywords from controlled vocabularies with well-known, authoritative, and complete thesaurus citations are essential for humans and machines to distinguish the best and most appropriate resources to use for a given purpose. A list of commonly used geospatial vocabularies is provided in the [Reference Section](#).

ISO Topic Category

In addition to *Keywords*, ISO 19115* requires the *Topic Category* element be populated. Metadata creators must select one or more *Topic Category* values to describe the general theme of the resource. The *Topic Category* codeset is an international controlled vocabulary used by Data.gov, the GeoPlatform, and many other systems to identify and sort available resources in a standardized manner. The Topic Category codeset is provided in the [Reference Section](#).

CSDGM User Note: Keywords

CSDGM does not include an element for *Topic Category*. Users should therefore include relevant *Topic Category* values (see [Reference Section](#)) as a *Theme Keyword* and specify "ISO 19115 Topic Category" as the *Theme Keyword Thesaurus*. The following example illustrates the CSDGM documentation of the ISO *Topic Categories* associated with a U.S. Census Metropolitan Statistical Areas dataset.

Keyword:

Theme:

Theme Keyword: Boundary

Theme Keyword: Society

Theme Keyword Thesaurus: ISO 19115 Topic Category

NGDA Guidance: Keywords

To facilitate the identification of the data as an NGDA resource and to support the population of the [GeoPlatform NGDA Theme Data Resource pages](#), separate the NGDA keywords under the *Theme Keyword Thesaurus: NGDA Portfolio Themes* as specified below.

Keyword:

Theme:

Theme Keyword: NGDA

Theme Keyword: National Geospatial Data Asset

Theme Keyword: NGDAID# (replace the # symbol with the NGDA ID number assigned to your NGDA resource and leave NO space between the text and the number, e.g. NGDAID167). NGDAID can be found in the [NGDA Portfolio Datasets list](#).

Theme Keyword: (select the Theme that relates to your NGDA resource from the list below. Note: Do not include commas or other punctuation as some search engines cannot properly handle punctuation)

Address Theme

Biodiversity and Ecosystems Theme

Cadastral Theme

Climate and Weather Theme

Cultural Resources Theme

Elevation Theme
Geodetic Control Theme
Geology Theme
Governmental Units and Administrative and Statistical Boundaries Theme
Imagery Theme
Land Use Land Cover Theme
Real Property Theme
Soils Theme
Transportation Theme
Utilities Theme
Water Inland Theme
Water Oceans and Coasts Theme
Theme Keyword Thesaurus: NGDA Portfolio Themes

NOTE: Do not include other, non-NGDA, keywords in the *NGDA Portfolio Themes Thesaurus* list of keywords.

Include Links to Browse Graphics

Browse or “thumbnail” graphics are especially valuable for the identification of relevant search results. The adage “a picture tells a thousand words” is true and a quick view of the data can often provide sufficient information for a user to discern its appropriateness. Provide the following *Browse Graphic* information to enable Data.gov and the GeoPlatform to display the graphic with the search results.

ISO 19115-1

- **Browse Graphic Linkage:** a link that enables access and display of the graphic
*MD_Metadata.identificationInfo>MD_Identification.graphicOverview>MD_BrowseGraphic.l
inkage.*

ISO 19115

- ISO 19115 does not include a browse graphic linkage element so metadata creators should include the linkage as the **Browse Graphic File Name**
*MD_Metadata.identificationInfo>MD_Identification.graphicOverview>MD_BrowseGraphic.f
ileName*

Best Practices:

- If more than one browse graphic is specified, the first browse graphic listed should be the best representation of the resource. For datasets, this is commonly a small map that illustrates the extent and nature of the content.
- To facilitate efficient machine processing and positive user experiences, browse graphic images should be relatively small, for example, no larger than 800x600 pixels (~1MB) and encoded with compression as JPG or PNG format.

CSDGM User Note: Browse Graphics

CSDGM does not specify a linkage element for Browse Graphic. Publishers are encouraged to provide the URL as the *Browse Graphic File Type*.

Provide Contact Information

Organization Name: Agency Name

Like controlled vocabularies, naming authorities establish consistency in organizational reference. As such, federal agencies should directly and unambiguously follow guidance from those organizations whose mission and authority is to maintain lists of government and affiliated organization identifiers.

OMB agency names and Bureau Codes are available from [Preparation, Submission, and Execution of the Budget, Circular A-11, Appendix C](#).

Multiple *Responsibility.organizationName* elements can be used to include the agency and bureau names as shown below.

Responsibility

Organization Name: Department of the Interior

Responsibility

Organization Name: United States Geological Survey

Central Point of Contact for the Resource

- While there are many opportunities within the ISO metadata record to identify contacts, the inclusion of a *Point of Contact* enables Data.gov and the GeoPlatform to direct users to a single point of inquiry for the resource. To facilitate discovery by ‘organization’ within Data.gov and the GeoPlatform, the *Point of Contact* should be the agency directly responsible for the metadata publication.

MD_Metadata.identificationInfo>MD_Identification.pointOfContact>CI_Responsibility.organizationName (ISO 19115-1)

MD_Metadata.identificationInfo>MD_Identification.pointOfContact>CI_ResponsibleParty.organizationName (ISO 19115)

Contact Information

In addition to identifying the *Point of Contact* agency responsible for publishing the resource, other contacts (distributor, originator, processor, etc.) and supporting information are needed to guide the data consumer to the contact most relevant to their inquiry.

- Agency units associated with the resource
 - ...>*CI_Responsibility.organizationName* (ISO 19115-1)
 - ...>*CI_ResponsibleParty.organizationName* (ISO 19115)
- Staff positions associated with the resource
 - ...>*CI_Responsibility.positionName* (ISO 19115-1)
 - ...> *CI_ResponsibleParty.positionName* (ISO 19115)
- Agency/unit/position role with regard to the resource
 - ...>*CI_Responsibility.role* (*CI_RoleCode*) (ISO 19115-1)
 - ...>*CI_ResponsibleParty.role* (*CI_RoleCode*) (ISO 19115)

- The email address of the contact
...>*CI_Responsibility.contactInfo>CI_Contact.address>CI_Address.electronicMailAddress* (ISO 19115-1)
...>*CI_ResponsibleParty.contactInfo>CI_Contact.address>CI_Address.electronicMailAddresses* (ISO 19115)
- The phone number for the contact:
...>*CI_Responsibility.contactInfo>CI_Contact.phone>CI_Telephone.number* (ISO 19115-1)
...>*CI_ResponsibleParty.contactInfo>CI_Contact.phone>CI_Telephone.number* (ISO 19115).

CSDGM User Note: Contact Information

Use the following elements to document contacts associated with the resource:

- **Point of Contact** agency responsible for publishing the resource
metadata>idinfo>ptcontac>cntinfo>cntorgp>cntorg
- **Email address** of the contact
metadata>idinfo>ptcontac>cntinfo>cntvoice
- **Phone number** for the contact:
metadata>idinfo>ptcontac>cntinfo>cntemail

Provide Direct URLs to Data Download

Data.gov and the GeoPlatform depend on operational, direct links to provide users access to available resources and associated information. The primary mission of Data.gov and the GeoPlatform is to connect users with data. As such, a direct access URL to the data download is expected when available.

It is understood that a direct data download URL is not an option for NGDAs that represent a large number of associated data resources, e.g. collections, or are served via an agency website that provides users options in configuring and compiling the data for download. In these cases, agencies are encouraged to coordinate with the NGDA team (NGDATeam@fgdc.gov) to explore solutions for supporting GeoPlatform web mapping and other services that download and utilize the data.

ISO 19115-1

Provide the direct data download URL and supporting information as listed below:

- Provide the download URL as either:
MD_Metadata.identificationInfo>MD_DataIdentification.citation>CI_Citation.onlineResource>CI_OnlineResource.linkage
or
MD_Metadata.distributionInfo>MD_Distribution.transferOptions>MD_DigitalTransferOptions.onlineLine>CI_OnlineResource.linkage
- Provide the download file name as either:
MD_Metadata.identificationInfo>MD_DataIdentification.citation>CI_Citation.onlineResource>CI_OnlineResource.name
or
MD_Metadata.distributionInfo>MD_Distribution.transferOptions>MD_DigitalTransferOptions.onlineLine>CI_OnlineResource.name

- Provide a description of the download resource product as either:
MD_Metadata.identificationInfo>MD_DataIdentification.citation>CI_Citation.onlineResource>CI_OnlineResource.description
or
MD_Metadata.distributionInfo>MD_Distribution.transferOptions>MD_DigitalTransferOptions.onLine>CI_OnlineResource.description
- Indicate the format of the download, e.g. ESRI Shapefile, ESRI Smart Data Compression, Triangular Irregular Network, MrSID, JPEG 2000, PDF, ZIP, as recommended by the FAQ - GeoPlatform Formats document.
MD_Metadata.identificationInfo>MD_DataIdentification.resourceFormat>MD_Format.formatSpecificationCitation>CI_Citation.title
or
MD_Metadata.distributionInfo>MD_Distribution.distributionFormat>MD_Format.formatSpecificationCitation>CI_Citation.title

ISO 19115

- Provide the download URL as either:
MD_Metadata.identificationInfo>MD_DataIdentification.citation>CI_Citation.citedResponsibleParty>CI_ResponsibleParty.contactInfo>CI_Contact.onlineResource>CI_OnlineResource.linkage
or
MD_Metadata.distributionInfo>MD_Distribution.transferOptions>MD_DigitalTransferOptions.onLine>CI_OnlineResource.linkage
- Provide the download file name as either:
MD_Metadata.identificationInfo>MD_DataIdentification.citation>CI_Citation.citedResponsibleParty>CI_ResponsibleParty.contactInfo>CI_Contact.onlineResource>CI_OnlineResource.name
or
MD_Metadata.distributionInfo>MD_Distribution.transferOptions>MD_DigitalTransferOptions.onLine>CI_OnlineResource.name
- Provide a description of the download resource to give consumers much needed context for the URL as either:
MD_Metadata.identificationInfo>MD_DataIdentification.citation>CI_Citation.citedResponsibleParty>CI_ResponsibleParty.contactInfo>CI_Contact.onlineResource>CI_OnlineResource.description
or
MD_Metadata.distributionInfo>MD_Distribution.transferOptions>MD_DigitalTransferOptions.onLine>CI_OnlineResource.description
- Indicate the format of the download, e.g. ESRI Shapefile, ESRI Smart Data Compression, Triangular Irregular Network, MrSID, JPEG 2000, PDF, ZIP, as recommended by the FAQ - GeoPlatform Formats document.
MD_Metadata.identificationInfo>MD_DataIdentification.resourceFormat>MD_Format.name
or
MD_Metadata.distributionInfo>MD_Distribution.distributionFormat>MD_Format.name

CSDGM User Note: Data Download

The data download URL should be documented in the *Distribution* section (vs. *Citation.onlineLink*) so that key format information is also captured.

- Provide the download URL as
Network Address
Metadata>Distribution>Standard Order Process>Digital Transfer Option>Online Option>Network Address
- Provide a description of the download resource as
Format Information Content
Metadata>Distribution>Standard Order Process> Digital Form> Digital Transfer Information>Format Information Content
- Indicate the format of the download, e.g. ESRI Shapefile, ESRI Smart Data Compression, Triangular Irregular Network, MrSID, JPEG 2000, PDF, ZIP, or other, as
Format Name
Metadata>Distribution>Standard Order Process> Digital Form> Digital Transfer Information>Format Name
- Provide the CSDGM mandatory format version information as
Format Version Name
Metadata>Distribution>Standard Order Process>Digital Transfer Information>Format Version Name
or
Format Version Date
Metadata>Distribution>Standard Order Process>Digital Transfer Information>Format Version Date
- Provide the CSDGM mandatory statement of cost as
Fees
Metadata>Distribution>Standard Order Process>Fees

Establish and Document Web Services

Establish Web Services for Geospatial Data

Web services play a key role in any open platform experience. GeoPlatform provides this experience in two ways:

- Application services (tools) that run in a browser so users can perform useful tasks
- Web services that a developer integrates into their own application, through standards-based application program interfaces (APIs).

Agencies are expected to establish web services for their geospatial data and to document those services in a manner that enables the GeoPlatform to access and ingest those services. GeoPlatform supported web service APIs are outlined in the [FAQ - Baseline of GeoPlatform Standards](#)

Fully Document Web Services

ISO metadata allows for the documentation of services:

Within a dataset metadata record

- *Service Identification*
- *Distribution Method*

or

As a stand-alone ISO 19115-1 or 19115 metadata record

- *Service Identification* (in place of *Data Identification*)

If a stand-alone ISO 19115-1 or 19115 metadata record is created for the service, datasets hosted by the service, current and future, can be linked to the same service metadata record and information about the service is maintained and updated in a central location.

Most existing metadata creation workflows do not include the creation of stand-alone service metadata records. Organizations are encouraged to incorporate the production of service metadata records into their workflow. Until then, service information should be added to existing dataset metadata records within the Online Resource component of any of the following:

- Data Citation
MD_Metadata.identificationInfo>MD_Identification.citation>CI_Citation.onlineResource
- Distribution Transfer Option
MD_Metadata.distributionInfo>MD_Distribution.transferOptions>MD_DigitalTransferOptions.online
- Distribution Distributor
Metadata.distributionInfo>MD_Metadata.distributionInfo>MD_Distribution.distributor>MD_Distributor.distributorTransferOptions>MD_DigitalTransferOptions.online

Metadata for a web service should include:

1. A name for the service.

MD_Metadata.identificationInfo>MD_Identification.citation>CI_Citation.onlineResource>CI_OnlineResource.name

or

MD_Metadata.distributionInfo>MD_Distribution.transferOptions>MD_DigitalTransferOptions.online>CI_OnlineResource.name

or

Metadata.distributionInfo>MD_Metadata.distributionInfo>MD_Distribution.distributor>MD_Distributor.distributorTransferOptions>MD_DigitalTransferOptions.online>CI_OnlineResource.name.

2. A description that outlines the purpose and content of the service.

MD_Metadata.identificationInfo>MD_Identification.citation>CI_Citation.onlineResource>CI_OnlineResource.description

or

MD_Metadata.distributionInfo>MD_Distribution.transferOptions>MD_DigitalTransferOptions.online>CI_OnlineResource.description

or

Metadata.distributionInfo>MD_Metadata.distributionInfo>MD_Distribution.distributor>MD_Distributor.distributorTransferOptions>MD_DigitalTransferOptions.online>CI_OnlineResource.description.

3. An *actionable* (i.e., online and consumable) service endpoint URL that provides direct access to the geospatial web service of the specified resource type.

The URL must enable uniform and reliable access to a dataset as maps and layers via online services that are compliant with the OGC WMS and/or Esri REST API specifications. If there are multiple services for an individual dataset, all the endpoint URLs for map services that host the dataset should be documented.

MD_Metadata.identificationInfo>MD_Identification.citation>CI_Citation.onlineResource>CI_OnlineResource.linkage

or

MD_Metadata.distributionInfo>MD_Distribution.transferOptions>MD_DigitalTransferOptions.online>CI_OnlineResource.linkage

or

Metadata.distributionInfo>MD_Metadata.distributionInfo>MD_Distribution.distributor>MD_Distributor.distributorTransferOptions>MD_DigitalTransferOptions.online>CI_OnlineResource.linkage.

CSDGM User Note: Publish Web Services

The web services URL should be documented in the *Distribution* section (vs. *Citation.onlineLink*) so that key format information is also captured.

- Provide the service URL as
Network Address
Metadata>Distribution>Standard Order Process>Digital Transfer Option>Online Option>Network Address
- Provide a description of the service as
Format Information Content
Metadata>Distribution>Standard Order Process> Digital Form> Digital Transfer Information>Format Information Content
- Indicate the format of the service, using the application profile types listed above, as
Format Name
Metadata>Distribution>Standard Order Process> Digital Form> Digital Transfer Information>Format Name
- Provide the webservice mandatory format version information as
Format Version Name
Metadata>Distribution>Standard Order Process>Digital Transfer Information>Format Version Name
or
Format Version Date
Metadata>Distribution>Standard Order Process>Digital Transfer Information>Format

Version Date

- Provide the CSDGM mandatory statement of cost as Fees

Metadata>Distribution>Standard Order Process>Fees

Metadata Publication Best Practices

Create and Publish Collection-level Metadata

Collections and series are comprised of data resources that share similar, homogenous content but may vary in terms of spatial and temporal dimensions. Examples include orthoimagery, elevation points, hydrography, and land cover. Collection-level metadata is useful in guiding users toward specific data resources.

Create Collection-level and Collection Member Metadata Records

Create metadata records for both the collection and, as feasible, the members of the collection using the following steps.

1. Create a metadata record for the entire collection (parent) that provides a(n):
 - **Title** that references the resource as a collection or series
MD_Metadata.identificationInfo>MD_Identification.citation>CI_Citation.title
 - **Identifier** that uniquely identifies the data collection
MD_Metadata.identificationInfo>MD_Identification.citation>CI_Citation.identifier
 - **Abstract** that identifies and describes the resource as a collection or series, e.g. ‘This is a collection-level metadata record’
MD_Metadata.identificationInfo>MD_Identification.citation>CI_Citation.identifier
 - **Geographic Extent** for the complete collection
MD_Metadata.identificationInfo>MD_Identification.extent>EX_Extent.geographicElement>EX_GeographicExtent.(polygon, bounding box, or identifier)
 - **Temporal Extent** for the complete collection
MD_Metadata.identificationInfo>MD_Identification.extent>EX_Extent.temporalElement>EX_TemporalExtent.extent
 - **Online Linkage** to the website that describes the collection and/or provides access to individual collection members
MD_Metadata.identificationInfo>MD_Identification.citation>CI_Citation.onlineResource>CI_OnlineResource.linkage
2. Create metadata records for the individual collection members (children) and subset compilations, as feasible. The collection-level metadata can be transformed to an individual record by editing the:
 - **Title** that references the resource as a member of a collection or series and indicates the specific geography and/or temporal extent
 - **Identifier** that uniquely identifies the collection member
 - **Abstract** that identifies and describes the resource as a member of the collection of series, e.g. ‘This resource is a member of a collection’

- **Geographic Extent** and/or **Temporal Extent** for the individual member
- **Online Linkage** to the website that provides information about or access to individual collection member

In addition, the metadata record for the individual member of a resource collection should document the relationship to the larger collection and include:

- **Title** of associated larger collection
MD_Identification.associatedResource>MD_AssociatedResource.name>CI_Citation.title (ISO 19115-1)
MD_Identification.aggregationInfo>MD_AggregationInfo.aggregateDataSetName>CI_Citation.title (ISO 19115)
- **Association** of the individual member to the larger collection
MD_Identification.associatedResource>MD_AssociatedResource.associationType>DS_AssociationTypeCode, e.g. ‘largerWorkCitation’, ‘partOfSeamlessDatabase’ (ISO 19115-1)
MD_Identification.aggregationInfo>MD_AggregationInfo.associationType>DS_AssociationTypeCode, e.g. ‘largerWorkCitation’, ‘partOfSeamlessDatabase’, ‘collectiveTitle’, ‘series’ (ISO 19115)
- **Identifier** for the associated larger collection.
MD_Identification.associatedResource>MD_AssociatedResource.name>CI_Citation.Identifier (ISO 19115-1)
MD_Identification.aggregationInfo>MD_AggregationInfo.aggregateDataSetIdentifier>CI_Citation.identifier (ISO 19115).

CSDGM User Note: Collection Level Metadata Records

CSDGM users should follow the same steps as above using the elements designated below.

1. Create a metadata record for the entire collection (parent) that provides a(n):
 - **Title** that references the resource as a collection or series.
 - **Abstract** that identifies and describes the resource as a collection or series, e.g. ‘This is a collection-level metadata record’.
 - **Geographic Extent** and **Temporal Extent** for the complete collection.
 - **Online Linkage** to websites that describes the collection.
2. Create metadata records for the individual collection members (children) and subset compilations, as feasible. The collection-level metadata can be transformed to an individual record by editing the:
 - **Title** that references the resource as a member of a collection or series and indicates the specific geography and/or temporal extent.
 - **Abstract** that identifies and describes the resource as a member of the collection of series, e.g. ‘This resource is a member of a collection’.
 - **Geographic Extent** and/or **Temporal Extent** for the individual member.
 - **Online Linkage** that provides direct access to the individual member.
 - **Larger Work Citation** for the collection of which the individual resource is a member.

Publish Collection-level and Collection Member (Parent/Child) Metadata Records

Once metadata is created for both the collection and the individual collection members, it is important to organize and place the metadata in a manner that enables Data.gov to harvest collection-member metadata and the collection-level metadata without introducing duplicates.

At this time, Data.gov expects publishers to:

1. Place the individual member metadata records in a single WAF that is separate from the WAF that contains the collection level-metadata record.
2. Register the member metadata WAF as a "WAF Homogeneous Collection" Harvest Source in catalog.data.gov.
3. Create the "WAF Homogeneous Collection," providing agency-specific URLs for the following Harvest Source registration elements:
 - **URL** – provide a link to the WAF that contains the member metadata records
 - **Collection Metadata URL** – provide a link to the collection-level metadata record.

By organizing and registering collection-level and member metadata records in this manner, Data.gov and the GeoPlatform are able to point users to member metadata records upon discovery of the collection-level metadata record. This greatly facilitates user access to the resource that best meets their information needs.

Don't Publish Metadata for Resources Produced by Others

Metadata must be published to Data.gov by the agency that is responsible for the resource. If metadata for the same resource is duplicated, it can result in conflicting information about the resource, confusion about the resource authority, and the unintended use of derived resources. When committing resources to Data.gov, a publisher is asserting that the resources conform to the data quality guidelines of the publishing organization and that they are authors of such data.

If an organization modifies a resource, the *Title*, *Abstract*, and *Lineage* of the metadata record for the modified resource should make clear the modification and attribute both the source of the resource and the authority responsible for the resource.

In some cases, publishers may serve as a metadata clearinghouse for other organizations, such as a federal Enterprise Data Inventory (EDI) or a State metadata catalog. These publishers are encouraged to publish to Data.gov if the metadata records within their catalog are unique and clearly cite the authority responsible for the resource. If the publisher cannot assure that the records are unique, the *Title* and *Abstract* for each metadata record should include the publisher's name, e.g. 'State of Oregon Metadata Clearinghouse – National Hydrography Dataset (NHD)...' to distinguish it from the possible publication of the same resource by another organization.

If a source metadata record is copied, modified, and republished for derived data, remove any keywords or organization information that are not associated with the derived data.

Reference Section

FGDC Endorsed Geospatial Metadata Standards

- ISO 19115-1:2014 Geographic Information – Metadata – Part 1: Fundamentals – Metadata (<https://www.iso.org/standard/53798.html>)
Encoded by
 - ISO/TS 19115-3:2016 Geographic information -- Metadata -- Part 3: XML schema implementation for fundamental concepts (<https://www.iso.org/standard/32579.html>)
- ISO 19115:2003 Geographic Information – Metadata (<https://www.iso.org/standard/26020.html>)
Encoded by
 - ISO/TS 19139:2007: Geographic information -- Metadata -- XML schema (<https://www.iso.org/standard/32557.html>)
- ISO 19115-2:2009 Geographic information - Metadata - Part 2: Extensions for imagery and gridded data (<https://www.iso.org/standard/67039.html>)
Encoded by
 - ISO/TS 19139-2:2012: Geographic information — Metadata — XML schema implementation — Part 2: Extensions for imagery and gridded data (<https://www.iso.org/standard/57104.html>)
- FGDC-STD-001-1998 Content Standard for Digital Geospatial Metadata (https://www.fgdc.gov/standards/projects/metadata/base-metadata/v2_0698.pdf)
Encoded by
 - CSGDM XML Schema Document (XSD) (<https://www.fgdc.gov/schemas/metadata/>)

Federal Geospatial Metadata Guidance Documents, Reports, and Information Resources

- ISO Metadata Summit Summary Report (<https://www.fgdc.gov/metadata/events/iso-metadata-summit-2017/iso-metadata-summit-summary-report-20170630.pdf>)
- How to Get Your Open Data on Data.gov (<https://www.digitalgov.gov/resources/how-to-get-your-open-data-on-data.gov/>)
- ISO Metadata Standards (<https://www.fgdc.gov/metadata/iso-standards>)
- *ISO Geospatial Metadata Implementation Model Workflow* (<https://www.fgdc.gov/metadata/iso-implementation-model-workflow>)
- *FAQ – GeoPlatform Formats* (<https://geoplatform.atlassian.net/wiki/spaces/GC/pages/1069154305/FAQ+-+GeoPlatform+Formats>)
- *FAQ – Baseline of GeoPlatform Standards* (<https://geoplatform.atlassian.net/wiki/spaces/GC/pages/1068433459/FAQ+-+Baseline+of+GeoPlatform+Standards>)

Federal Geospatial Data Policies and Programs

- Foundations for Evidence-Based Policymaking Act of 2018 (<https://www.congress.gov/bill/115th-congress/house-bill/4174/text>)
- OPEN Government Data Act (<https://www.congress.gov/115/bills/s760/BILLS-115s760is.pdf>)
- FAIR Principles (<https://www.go-fair.org/fair-principles/>)
- Geospatial Data Act of 2018 (<https://www.fgdc.gov/gda>)
- OMB A119 Revised (<https://www.whitehouse.gov/wp-content/uploads/2017/11/Circular-119-1.pdf>)

- Supplemental Guidance on the Implementation of M-13-13 “Open Data Policy – Managing Information as an Asset (Project Open Data implementation Guide) (<https://project-open-data.cio.gov/implementation-guide/>)
- Federal Open Data Policy M-13-13 (<https://digital.gov/open-data-policy-m-13-13/>)
- NGDA Portfolio (<https://communities.geoplatform.gov/ngda-portfolio/ngda-portfolio/>)
- Federal Register Listing of Agency Names (<https://www.federalregister.gov/agencies>)
- Preparation, Submission, and Execution of the Budget, Circular A-11, Appendix C: (https://obamawhitehouse.archives.gov/sites/default/files/omb/assets/a11_current_year/app_c.pdf)

Example Metadata Records

Example ISO and CSDGM metadata records, and other metadata-related resources, are provided at:

<https://www.fgdc.gov/technical-guidance>

W3C & OGC Best Practices

- Data on the Web Best Practices (<https://www.w3.org/TR/dwbp/>)
 - a. Best Practice 9: Use persistent URIs as identifiers of datasets (<https://www.w3.org/TR/dwbp/#DataIdentifiers>)
- Spatial Data on the Web Best Practices, OGC and W3C, 2017, (<https://www.w3.org/TR/sdw-bp/>)
 - a. Best Practice 1: Use globally unique persistent HTTP URIs for Spatial Things (<https://www.w3.org/TR/sdw-bp/#bp-identifiers>)
- OGC Naming Authority Best Practices (<http://www.opengeospatial.org/standards/na>).
 Note specifically, the policy document titled “OGC-NA Name type specification - specification elements“(10-103). The generic scheme for identifying persistent names for online resources (e.g., service type identifiers) follows this pattern: <http://{namingAuthority}/spec/{specName}/{version}>

Uniform Resource Identifiers (URIs)

Title	Description	URL
DOI Foundation	Not-for-profit membership organization that governs and manages Digital Object Identifier (DOI) services and registration	http://doi.org/
Uniform Resource Identifiers (URI): Generic Syntax	Specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements (1998)	http://www.ietf.org/rfc/rfc2396.txt
URI review procedures	OGC Naming Authority (OGC-NA) process for assigning URIs for OGC resources, such as OGC documents, standards, XML namespaces, ontologies (2013)	https://www.opengeospatial.org/projects/groups/ogcnasc
USGS Data Management DOI	Guidance provided to USGS on use of DOIs	https://www.usgs.gov/products/data-and-tools/data-management/digital-object-identifiers?qt-science_support_page_related_con=0#qt-science_support_page_related_con
Permanent Identifiers for the Web	Provides a secure, permanent URL re-direction service for Web applications. This service is run by the W3C Permanent Identifier	https://w3id.org/

Persistent URL (PURL) Service	Community Group. The PURL service is an initiative of the Internet Archive, a 501(c)(3) non-profit, building a digital library of Internet sites and other cultural artifacts in digital form.	http://purl.org/
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Controlled Vocabularies

Controlled Vocabulary	Description	URL
Classification of Wetlands and Deepwater Habitats of the United States (aka Cowardin System)	Wetlands are classified by landscape position, vegetation cover and hydrologic regime. The Cowardin system includes five major wetland types: marine, tidal, lacustrine, palustrine and riverine.	https://www.fws.gov/wetlands/documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States-2013.pdf
Global Change Master Directory (GCMD) Science Keywords	Earth science dataset and service descriptions which cover subject areas within Earth and environmental sciences.	https://gcmd.nasa.gov/search/Keywords.do#keywords
Global Names Index Service (GNIS)	The official names for places, features, and areas in the 50 States, the District of Columbia, the territories, and outlying areas of the United States, including Antarctica. Coordinated with State naming authorities to standardize geographic names.	https://geonames.usgs.gov/apex/f?p=138:1:6351264625746
USGS Thesaurus	The USGS Thesaurus is a controlled vocabulary providing category terms for scientific information products generated. The thesaurus is faceted, meaning its top terms delineate general aspects of information resources: by the U.S. Geological Survey.	https://www2.usgs.gov/science/about/
Topographic Feature Vocabularies and Semantics	The TOPO files contain a subset of basic data resources from The National Map to link to other RDF data. The LOD graphs are based on two primary resources: the USGS feature Name, relevant identification codes, and the Open Geospatial Consortium GeoSPARQL ontology.	https://www.usgs.gov/core-science-systems/ngp/cegis/linked-geospatial-data

ISO 19115-1 Codelists

Reference: <https://standards.iso.org/iso/19115/resources/Codelists/cat/codelists.html>

ISO 19115-1 Date Type Codes (Date element)

Date Type Code	Description
creation	date identifies when the resource was brought into existence
publication	date identifies when the resource was issued
revision	date identifies when the resource was examined or re-examined and improved or amended
adopted	date identifies when resource was adopted
deprecated	date identifies when resource was deprecated
distribution	date identifies when an instance of the resource was distributed
expiry	date identifies when resource expires
inForce	date identifies when resource became in force
lastRevision	date identifies when resource was last reviewed
lastUpdate	date identifies when resource was last updated
nextUpdate	date identifies when resource will be next updated
released	the date that the resource shall be released for public access
superseded	date identifies when resource was superseded or replaced by another resource
unavailable	date identifies when resource became not available or obtainable
validityBegins	time at which the data are considered to become valid. NOTE: There could be quite a delay between creation and validity begins
validityExpires	time at which the data are no longer considered to be valid
creation	date identifies when the resource was brought into existence
publication	date identifies when the resource was issued

ISO 19115-1 Progress Codes (Status element)

Progress Code	Description
completed	has been completed
historicalArchive	stored in an offline storage facility
obsolete	no longer relevant
onGoing	continually being updated
planned	fixed date has been established upon or by which the resource will be created or updated
required	needs to be generated or updated
underDevelopment	currently in the process of being created
final	progress concluded and no changes will be accepted
pending	committed to, but not yet addressed
retired	item is no longer recommended for use. It has not been superseded by another item
superseded	replaced by new
tentative	provisional changes likely before resource becomes final or complete
valid	acceptable under specific conditions
accepted	agreed to by sponsor

Progress Code	Description
notAccepted	rejected by sponsor
withdrawn	removed from consideration
proposed	suggested that development needs to be undertaken
deprecated	resource superseded and will become obsolete, use only for historical purposes

ISO 19115-1 Maintenance Frequency Code (Status element)

Progress Code	Description
continual	resource is repeatedly and frequently updated
daily	resource is updated each day
weekly	resource is updated on a weekly basis
fortnightly	resource is updated every two weeks
monthly	resource is updated each month
quarterly	resource is updated every three months
biannually	resource is updated twice each year
annually	resource is updated every year
asNeeded	resource is updated as deemed necessary
irregular	resource is updated in intervals that are uneven in duration
notPlanned	there are no plans to update the data
unknown	frequency of maintenance for the data is not known
periodic	resource is updated at regular intervals
semimonthly	resource updated twice a monthly
biennially	resource is updated every 2 years

ISO 19115-1 Topic Category Codes (Topic Category element)

Topic Category Code	Description	Examples
farming	rearing of animals and/or cultivation of plants.	agriculture, irrigation, aquaculture, plantations, herding, pests and diseases affecting crops and livestock
biota	flora and/or fauna in natural environment.	wildlife, vegetation, biological sciences, ecology, wilderness, sealife, wetlands, habitat
boundaries	legal land descriptions.	political and administrative boundaries
climatologyMeteorologyAtmosphere	processes and phenomena of the atmosphere.	cloud cover, weather, climate, atmospheric conditions, climate change, precipitation
economy	economic activities, conditions and employment.	production, labor, revenue, commerce, industry, tourism and ecotourism, forestry, fisheries, hunting, exploration and exploitation of resources such as minerals, oil and gas
elevation	height above or below sea level.	altitude, bathymetry, digital elevation models, slope, derived products
environment	environmental resources, protection and conservation.	environmental pollution, waste storage and treatment, environmental impact

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Topic Category Code	Description	Examples
		assessment, monitoring environmental risk, nature reserves, landscape
geoscientificInformation	information pertaining to earth sciences.	geophysical features and processes, geology, minerals, sciences dealing with the composition, structure and origin of the earth's rocks, risks of earthquakes, volcanic activity, landslides, gravity information, soils, permafrost, hydrogeology, erosion
health	health, health services, human ecology, and safety.	disease and illness, factors affecting health, hygiene, substance abuse, mental and physical health, health services
imageryBaseMapsEarthCover	base maps.	land cover, topographic maps, imagery, unclassified images, annotations
intelligenceMilitary	military bases, structures, activities.	barracks, training grounds, military transportation, information collection
inlandWaters	inland water features, drainage systems and their characteristics.	rivers and glaciers, salt lakes, water utilization plans, dams, currents, floods, water quality, hydrographic charts
location	positional information and services.	addresses, geodetic networks, control points, postal zones and services, place names
oceans	features and characteristics of salt water bodies (excluding inland waters).	tides, tidal waves, coastal information, reefs
planningCadastre	information used for appropriate actions for future use of the land.	land use maps, zoning maps, cadastral surveys, land ownership
society	characteristics of society and cultures.	settlements, anthropology, archaeology, education, traditional beliefs, manners and customs, demographic data, recreational areas and activities, social impact assessments, crime and justice, census information
structure	man-made construction.	buildings, museums, churches, factories, housing, monuments, shops, towers
transportation	means and aids for conveying persons and/or goods.	roads, airports/airstrips, shipping routes, tunnels, nautical charts, vehicle or vessel location, aeronautical charts, railways
utilitiesCommunication	energy, water and waste systems and communications infrastructure and services.	hydroelectricity, geothermal, solar and nuclear sources of energy, water purification and distribution, sewage collection and disposal, electricity and gas distribution, data communication, telecommunication, radio, communication networks
extraterrestrial	region more than 100 km above the surface of the earth	space, planets
disaster	information related to disasters	site of the disaster, evacuation zone, disaster prevention facility, disaster

Topic Category Code	Description	Examples
		relief activities

ISO 19115-1 Role Codes (Responsible Party element)

Responsible Party Role Code	Description
author	the individual or organization whose name should appear first in the citation for the resource (for names that come after the first use co-author). while it is possible to have an author and principle investigator be the same individual or organization, author is not the same as nor synonymous with principle investigator. applicable mainly to documents, reports, memos, etc.
custodian	the individual or organization that has accountability and responsibility for the data and ensures appropriate care and maintenance of the resource.
distributor	the organization that is responsible for providing the PARR required access to the data.
originator	the name of the individual or organization who is responsible for the data at the point when the data was first created. applicable for datasets that are an aggregation of two or more datasets or if the dataset is the first instance of the signal having been converted into data.
owner	the individual or organization that has ownership of the resource.
pointOfContact	the individual or organization who is responsible for the initial triage of and answering questions related to the resource.
principalInvestigator	the individual or individuals who are the lead researchers for a grant (i.e. head of the laboratory, research group leader, etc.). if there are co-principal investigators then this field will repeat for each principle investigator. while it is possible to have a principal investigator and author be the same individual or organization, principal investigator is not the same nor synonymous with author.
processor	the name of the individual or organization who has processed the data in a manner such that the resource has been modified.
publisher	the individual or organization who prepares and issues the resource.
resourceProvider	the individual or organization that supplies or allocates the resource for another entity.
sponsor	the individual or organization who is providing sponsorship for the resource.
user	the individuals or organizations who are the intended consumers of the resource.
coAuthor	the individual(s) or organization(s) who name(s) should appear after the first name in a citation for the resource (use author to denote the first name in the citation). while it is possible to have a co-author and principal investigator/collaborator be the same individual or organization, co-author is no the same as nor synonymous with principle investigator or collaborator
collaborator	party who assists with the generation of the resource other than the principal

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Responsible Party Role Code	Description
	investigator
contributor	the individuals or organizations whose contributions deserve recognition in the citation. contributor is mutually exclusive from author, co-author, principal investigator, and collaborator. use ISO MD_Identification credit field to identify individual or organizations that should be given acknowledgement only.
editor	the individual who has made a corrective or editorial change to the resource as part of a systematic revision process.
funder	the individual or organization which has provided all or part of the finances associated with the resource.
mediator	a class of entity that mediates access to the resource and for whom the resource is intended or useful
rightsHolder	the individual or organization who has ownership of the legal right to the resource.
stakeholder	an individual or organization who has an interest in the resource and/or is affected by or affects the actions of the resource

NGDA Metadata Checklist

completed	Content	Description	Ref Page
	NGDA Title	The metadata title matches the NGDA Portfolio title	4
	Citation Date	A citation ‘publication’ date is provided for the resource	5
	Metadata Date	A metadata ‘publication’ date (19115-1) or ‘date.stamp’ (19115) is provided for the metadata record	6
	Date Format	Dates are formatted using the YYYY-MM-DD format	6
	Progress Code	Progress code ‘completed’ or other, as applicable, is provided for the resource	7
	Maintenance and Update Frequency	A maintenance and update frequency is provided for resources that are updated on a regular, irregular, or as needed basis	7
	Resource Unique Identifier	If the agency has implemented assignment of identifiers, a unique identifier is provided for the resource	7
	ISO 19115 Topic Category (ISO only)	One or more ISO 19115 Topic Category specified	10
	ISO 19115 Topic Category as Theme Keywords (CSDGM only)	One or more ISO 19115 Topic Category specified as a Theme Keyword	10
	ISO 19115 Topic Category Theme Keyword Thesaurus (CSDGM only)	ISO Topic Category keywords associated with Keyword Thesaurus: ‘ISO 19115 Topic Category’	10
	NGDA Theme Keywords	NGDA Theme Keywords [‘NGDA’, National Geospatial Data Asset’, ‘(NGDA-specified) Theme’, ‘NGDAID# (NGDA-specified #)’]	10
	NGDA Theme Keyword Thesaurus	NGDA keywords associated with Keyword Thesaurus: ‘NGDA Portfolio Themes’	11
	Browse Graphic URL	A Browse Graphic URL is specified for the Browse Graphic file name	11
	Point of Contact	Contact information is provided for the Point of Contact element	12
	Direct Data Download URL	A URL is provided for direct download of the resource	13
	Direct Data Download URL documentation	The direct download URL is fully documented with descriptive and informative file name (ISO only), file description, and file format	13
	Web Service URL	A URL is provided to access the resource via a web service	16
	Web Service URL documentation	The web service URL is fully documented with descriptive and informative file name (ISO only), file description, and format specification	16