

Information Technology Resource Management Council (ITRMC)

ENTERPRISE GUIDELINES – G300 INFORMATION AND DATA

Category: G320 – GEOGRAPHIC METADATA GUIDELINE

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I. DEFINITION

1. Geographic Metadata – An information file on geospatial data.
2. Geographic Information System (GIS) – As defined in *ITRMC Policy 1070 – Geographic Information Systems (GIS)*, GIS are digital databases in which a geographic coordinate system is used to reference the location of features represented by the data. In general, typical components of a GIS are the tools used to capture, store, transform, analyze, model, simulate, and display spatial and tabular data.
3. Federal Geographic Data Committee (FGDC) – A nineteen (19) member interagency committee composed of representatives from the Executive Office of the President of the United States, Cabinet-level and independent agencies. FGDC authority and directions are established through Revised Circular No. A-16 and Presidential Executive Order 12906.

II. RATIONALE

Proper documentation is often overlooked when developing new databases to be used for geographic information system processing. When essential information about data is missing, its value is severely reduced. Where did the data come from? When was it collected? How accurate is it and how is it to be appropriately used? Without clear and complete documentation, no easy resolution to these fundamental questions exists. Confusion created by such uncertainty leads to a lack of confidence in the data that blemishes the outcome of any analysis in which it is used.

Bridges are built among users of geographic data when a common approach to documentation is used. Agreement on how we describe our data cultivates a common vocabulary and improved understanding. An investment in thorough data documentation can pay for itself through increased data longevity, a greater ability to share data, decreased user support requirements, and in extreme cases, the avoidance of litigation related to data misuse or copyright violations.

The *Idaho Geographic Metadata Guidelines* provide that common approach for documenting all types of geographic data. They have been designed to be straightforward, intuitive and complete. This document describes those guidelines which are based on a standard developed by the Federal Geographic Data Committee; *The Content Standards for Geospatial Metadata (CSDGM Version 2 - FGDC-STD-001-1998)*. In developing the *Idaho Geographic Metadata Guidelines*, the Idaho Geospatial Committee sought to reduce the complexity of the federal standard yet retain the essence of its original content.

There are numerous software applications that can be used to create metadata. Today most popular GIS software packages will automatically populate certain metadata elements.

III. GUIDELINE

1. General Recommendations

A. Consider creating metadata on all types of spatial information. Metadata can be created on spatial content types such as:

(1) Data:

(a) Shapefiles, coverages, images, feature datasets, etc.

(b) Live data such as -Internet Map Services

(2) Documents:

(a) Static Map Images in .pdf (and other) formats

(b) Reports that pertain to a geographic area

(3) Resources:

(a) Geographic activities

(b) Applications (Decision support applications)

(c) Services (Address matching)

B. Publish metadata through the clearinghouse. Actual data and documents, or resources do not have to be published.

C. Populate elements with care. Take the time to write a good quality title, abstract, purpose, etc.

(1) Well-populated metadata examples:

(a) Specific:

<http://insideidaho.org/asp/metadata/metadata.aspx?ResourceID=17&XSL=FGDCClassic.xsl>

(b) General:

(i) <http://www-atlas.usgs.gov/>

- (ii) <http://www.geodata.gov>
- (iii) <http://logic.lsu.edu/datacatalog/>
- (iv) <http://insideidaho.org/geodata/Search.htm>

- D. Use the **Metadata Validation Service** <http://geo-nsdi.er.usgs.gov/validate.php>. This service checks FGDC-compatible metadata record using mp (metadata parser). Aim to create metadata that parses without error.
- E. Create a metadata template (or templates). A metadata template is a text file containing information that is identical across a set of metadata files. For example, originator, access constraints, use constraints, etc.
- F. Create thumbnails for resources. A thumbnail is a snapshot describing the geographic data contained in a resource. See the help topic "Creating Thumbnails: in *ArcCatalog* to learn more about how to create a thumbnail.
- G. Take advantage of these helpful resources:
- (1) *An Image Map of the Content Standard for Digital Geospatial Metadata. Version 2* (1998). <http://biology.usgs.gov/fgdc.metadata/version2/>. This site offers a graphic presentation of the FGDC metadata standard. By clicking on each category, you are led through the standard's hierarchy to each specific field. At each field, the same information is provided as in the FGDC's document, along with an indication of whether that field is mandatory, mandatory if applicable, or optional.
 - (2) *FGDC Metadata Workbook* http://fgdc.gov/metadata/meta_workbook.html. This resource is filled with many rich explanations and examples.
 - (3) *Content Standard for Digital Geospatial Metadata (CSDGM)* <http://www.fgdc.gov/metadata/contstan.html>. This site provides access to the full text of the metadata standard in either pdf, HTML, text (.txt), or WordPerfect 6.1 (.wpd) format.
 - (4) *Metadata in Plain Language* <http://geochange.er.usgs.gov/pub/tools/metadata/tools/doc/ctc/>. This document provides a general interview approach for creating metadata. It is not necessarily exhaustive but is intended to convey in plain language the basic information that will be contained in the metadata and link to pages specifying the steps required to write that information into the metadata document itself.

2. Metadata Element Description

Note: Sections 1 and 7 of the FGDC metadata standard are mandatory, sections 2 - 6 are mandatory only if applicable.

Example: If the resource has a projection, populate Section 4. If it does not, as may be the case with a .pdf map image, do not fill out Section 4.

3. FGDC Metadata Standard Section Help

A. Identification (Section 1)

Basic information about the data set.

(1) Citation (1.1)

(a) Originator (8.1)

It is recommended that you indicate the party responsible for the resource. While that is most commonly the organization that developed the resource, in some cases, it is not. For example, if a county planning department hires a contractor to build a street centerline road file, the planning department, not the contractor should be identified as the Originator. The contractor should be fully cited using the Data_Set_Credit (1.11) element, e.g. “this data set was developed for the Wayne County Planning Department by Smith Engineering, Inc.”

(b) Publication_Date (8.2)

The date that the resource was published or otherwise made available.
Format: YYYYMMDD.

(c) Title (8.4)

Minimum – what, where; e.g. Digital Raster Graphic (DRG) of the Boise North 7.5 Minute Quadrangle, Idaho

(d) Publication Place (8.8.1) *

The name of the city, state, and country where the resource was published or released.

(e) Publisher (8.1.2) *

The name of the individual or organization that published the resource.

(f) Online_Linkage (8.10) **

As “repeatable” elements, Online_Linkage (Citation Information) and Network_Resource_Address (6.4.2.2.1.1.1) are used to provide access to a variety of content types. Use this field to fully represent your geospatial information access and distribution capabilities by providing complete URLs and necessary information to indicate the nature of the weblink using the following style guidance:

- (i) Direct downloads include URLs, that start with either ftp:// or http:// and point to filenames with .zip, .tgz, .gz, etc. extensions.
- (ii) Documents include URLs, that start with either ftp:// or http:// and point to filenames with .doc, .pdf, .wpd, etc. extensions.
- (iii) ArcIMS “Image” services using a URL-like request:
http://<server>/image/<service_name
- (iv) OGC Web Map Service (WMS) links include a ‘getmap’ request with a layer name, version, preferred image format, and preferred SRS, at a minimum:
http://server/service?REQUEST=getmap&VERSION=1.1.0&LAYERS=roads&FORMAT=image/gif&SRS=EPSG:4326

(2) Abstract (1.2.1)

Be sure to include:

- (a) General content and features
- (b) Content form (GIS, CAD, image, Dbase)
- (c) Geographic coverage (county/city name)
- (d) Time period of content (begin and end date or single date)
- (e) Special characteristics or limitations

(3) Purpose (1.2.2)

A summary of the intentions for which the resource was developed.

(4) Time_Period_of_Content (1.3)

The relevant date of the resource content. Can be a single date, multiple dates, or a range of dates.

(5) Currentness_Reference (1.3.1)

The context for the Time_Period_of_Content. For example: an orthophotograph may have been compiled and delivered in June (publication date) but flown in February (ground condition).

(6) Progress (1.4.1)

The status of the resource, this field has a fixed domain of: “Complete,” “In Work,” and “Planned.”

(7) Maintenance and Update Frequency (1.4.2)

The frequency with which changes and additions are made to the resource after the initial resource is completed. This field has a fixed domain of: “Continually,” “Daily,” “Weekly,” “Monthly,” “Annually,” “Unknown,” “As needed,” “Irregular,”

“None planned, ” or free text.

(8) Bounding Coordinates (1.5.1)

The limits of coverage of the resource expressed by latitude and longitude values in the order western-most, eastern-most, northern-most, and southern-most.

(Decimal degree)

(a) West Bounding Coordinate: $-180.0 \leq \text{West Bounding Coordinate} < 180.0$

(b) East Bounding Coordinate: $-180.0 \leq \text{East Bounding Coordinate} \leq 180.0$

(c) North Bounding Coordinate: $-90.0 \leq \text{North Bounding Coordinate} \leq 90.0$

(d) South Bounding Coordinate: $-90.0 \leq \text{South Bounding Coordinate} \leq 90.0$

(9) Theme_Keyword and Theme_Keyword_Thesaurus (1.6.1.1 & 1.6.1.2)

Include broad and specific terms and use controlled vocabularies (thesauri) when possible. You may use an unlimited number of keywords and keyword thesauri.

(a) At minimum, Include at least one ISO Topic Category (listed in this document) referencing the associated Theme_Keyword_Thesaurus as “ISO 19115 Topic Category.”

(b) Include additional descriptive terms as needed

(10) Place_Keyword and Place_Keyword_Thesaurus (1.6.2.1 & 1.6.1.2) **

Include specific and regional references such as:

(a) City or county name

(b) State

(c) State acronym

(d) Regional descriptions and references e.g., Treasure Valley, Silver Valley, etc.

(11) Access_Constraints (1.7)

Any restrictions or legal prerequisites to accessing the actual resource.

Commonly applies to resources that are exempt from public records laws such as endangered species, personal health, and intellectual properties.

(12) Use_Constraints (1.8)

Any restrictions or legal prerequisites to using the resource.

(13) Point_of_Contact (1.9) **

The individual or organization that is knowledgeable about the resource and should be contacted with questions. Choose a primary contact person and/or organization. At minimum include the address type, address, city, state, zip code and voice telephone number.

(14) Data_Set_Credit (1.11) **

Identify others that should be recognized for their contributions to the resource. This includes development contractors as discussed, above, for Originator.

B. Data Quality (Section 2)

General assessment of the quality of the data set.

(1) Attribute_Accuracy_Report (2.1.1) **

How sure are you that it IS a pine tree?

Assessments as to how 'true' the attribute values may be. May refer to field checks, cross-checks with other documents, statistical analysis of values, and parallel independent measures. It does NOT refer to the positional accuracy of the feature.

(2) Logical_Consistency_Report (2.2)

Did you check for bad values and conditions?

Tests used to check for data inconsistencies including topological checks (clean and build), and data base QA/QC routines such as: Are the X values always between '0' and '100'? Are all 'Y' values text format? Does value Z always equal the sum of values 'R' and 'S'?

(3) Completeness_Report (2.3)

Is there anything I might expect to be in the data set that isn't?

Identification of data omitted from the data set that might normally be expected, as well as the reason for the exclusion. This may include geographic exclusions, 'data was not available for the South Shores neighborhood'; categorical exclusions 'municipalities with populations under 1,000 were not included'; and definitions used 'floating marsh was mapped as land'.

(4) Positional_Accuracy_Report (2.4) **

How sure are you that the pine tree is where you say it is?

Assessments as to the horizontal and/or vertical location of the feature. May refer to field checks, Maximum Allowable PDOP, survey quality, cross-checks with other locational references, etc.

(5) Source Information (2.5.1) **

List of sources and a short discussion of the information contributed by each.

(6) Process_Step (2.5.2)

Can be a single collective description or individual process steps based upon:

(a) Stages of processing

(b) Incorporation of sources

(c) Project milestone

(d) At minimum include the process description and the process date

(7) Process_Contact (2.5.2.6) **

The individual responsible for the data processing and 'putting' the data together. Choose a primary contact person and/or organization. At minimum include the address type, address, city, state, zip code and voice telephone number.

C. Spatial Data Organization (Section 3)

The mechanism used to represent spatial information in the data set.

Note: This section is auto-populated by popular GIS software packages.

D. Spatial Reference (Section 4)

The description of the reference frame for, and the means to encode, coordinates in the resource.

Note: This section is auto-populated by most popular GIS software packages.

E. Entity and Attributes (Section 5)

Details about the information content of the data set

(1) Detailed_Description (5.1) **

Summary of, and citation to a detailed description of, the information content of the data set. Provide a detailed description if your database is not documented in another form such as a data dictionary or data specification manual.

(2) Attribute_Domain_Values (5.1.2.4) **

Domain types:

- (a) Enumerated Domain
A defined set of possible values, a picklist
Example: Land cover classes

- (b) Range Domain

A sequence, series, or scale that has defined maximum and minimum values -
can be numeric or alphabetical
Example: Date fields

- (c) Codeset Domain

Any published codeset
Example: USGS Digital Line Graph codes, FIPS codes

- (d) Unrepresentable Domain

Any value that is not prescribed
Example: Names

(3) Overview_Description (5.2)

Provide an overview description if:

- (a) Your database is well-documented as a data dictionary, data specification manual, or some other format, AND you can provide data consumers a citation for the document and, if applicable, a website link to the document.
- (b) Your database is minimal and you can adequately describe in a short descriptive paragraph. For example, for a black and white orthophotograph, you may want to indicate that each pixel will have a gray scale value between 0 (black) and 255 (white). Be sure to explain any unclear attribute labels and codes.

F. Distribution (Section 6)

Information about the distributor of and options for obtaining the data set.

(1) Distributor_Contact (6.1)

The individual or organization that distributes the resource. Choose a primary contact person and/or organization. At minimum include the address type, address, city, state, zip code and voice telephone number.

(2) Distribution_Liability (6.3)

A statement of the liability assumed by the Distributor. A legal-like section that may: deny liability if the data are incorrect, incomplete, or misused limit third party distribution of the data set

(3) Standard_Order_Process (6.4) **

The common ways in which the resource may be obtained or received, and related instructions and fee information.

G. Metadata Reference (Section 7)

Information on the status of the metadata information, and the responsible party.

(1) Metadata_Date (7.1)

The date that the metadata is written or completed. Like other date fields, it can be a single date, multiple dates, or a range of dates.

(2) Metadata_Contact (7.4)

The individual or organization that is responsible for the metadata for the resource. Choose a primary contact person and/or organization. At minimum include the address type, address, city, state, zip code and voice telephone number.

(3) Metadata_Standard_Name (7.5)

Content Standard for Digital Geospatial Metadata

(4) Metadata_Standard_Version (7.6)

As of Oct 2002: FGDC-STD-001-1998

(5) Metadata_Access_Constraints (7.8)

Restrictions and legal prerequisites for accessing the metadata (not the resource). With the exception of classified information and intellectual properties, the response is almost always “none.” Even if a data set is exempted from public record laws (endangered species locations, personal health data, etc.) the metadata is typically fully accessible.

(6) Metadata_Use_Constraints (7.9)

Restrictions and legal prerequisites for using the metadata (not the resource) after access is granted. This may be applicable for the protection of privacy or intellectual properties. Note that though a resource may be exempt from public access, the metadata seldom contains any protected information such as the location of an endangered species nesting site or the address of an AIDS patient.

4. Binary

A. Thumbnail **

A thumbnail is a snapshot describing the geographic data contained in a resource.

5. ISO 19115 Topic Categories from ISO/DIS 19115

Note: This is one example of a thesaurus with controlled keywords. You may use an unlimited number of keyword thesauri and keywords.

A. Theme Keywords and the ISO Topic Categories

The International Organization for Standards (ISO) metadata standard (ISO 19115) provides a set of Core metadata elements that must occur in every national profile/implementation. Most of these elements either map to existing CSDGM metadata elements or represent properties of the data that can be determined and populated using a data integrated metadata tool. Topic Category is the only mandatory element of the ISO core metadata set that requires new information that cannot be directly captured from the data. The following 19 subject headings represent the domain for the Topic Category element.

Include the Topic Category Names (as presented below) as Theme_Keywords and cite your related Theme_Keyword_Thesaurus as: "ISO 19115 Topic Category." The FGDC intends to develop CSDGM to ISO translation software that will insert the Topic Category Code when the Topic Category Name is found, however, those wishing to include the Topic Category Code as a Theme_Keyword can do so using the same Theme_Keyword_Thesaurus: "ISO 19115 Topic Category."

Include all pertinent Topic Category Names, e.g.:

- (1) Business districts =
 - (a) Boundaries
 - (b) Economy
- (2) Toxic release inventory =
 - (a) Environment
 - (b) Health
- (3) Soil fertility =
 - (a) Geoscientific Information
 - (b) Farming

B. ISO Topic Category Name, ISO Topic Category Code

- (1) Farming, 001

Rearing of animals and/or cultivation of plants;
e.g., agriculture, crops, livestock
- (2) Biota, 002

Flora and/or fauna in natural environments;
e.g., flora and fauna, ecology, wetlands, habitat

(3) Boundaries, 003

Legal land descriptions;
e.g., political and administrative boundaries

(4) ClimatologyMeteorologyAtmosphere, 004

Processes and phenomena of the atmosphere;
e.g., processes and phenomena of the atmosphere

(5) Economy, 005

Economic activities, conditions, and employment;
e.g., business and economics

(6) Elevation, 006

Height above or below the earth's surface;
e.g., altitude, bathymetry, dem's, slope, derived products

(7) Environment, 007

Environmental resources, protection, and conservation;
e.g., natural resources, pollution, impact assessment, monitoring, land analysis

(8) GeoscientificInformation, 008

Information pertaining to the earth sciences;
e.g., geology, minerals, earthquakes, landslides, volcanoes, soils, gravity,
permafrost, hydrogeology, erosion

(9) Health, 009

Health, health services, human ecology, and safety;
e.g., disease, illness, factors affecting health, hygiene, substance abuse

(10) ImageryBaseMapsEarthCover, 010

Base maps;
e.g., land cover, topographic maps, imagery, annotations

(11) IntelligenceMilitary, 011

Military bases, structures, activities;
e.g., military bases, structures, activities

- (12) InlandWaters, 012
Inland water features, drainage systems and characteristics;
e.g., rivers, glaciers, lakes, water use plans, dams, currents, floods, water quality, hydrographic charts
- (13) Location, 013
Positional information and services;
e.g., addresses, geodetic networks, control points, postal zones, place names
- (14) Oceans, 014
Features and characteristics of salt water bodies;
e.g., tides, tidal waves, coastal information, reefs
- (15) PlanningCadastre, 015
Information used for appropriate actions for future use of the land;
e.g., land use maps, zoning maps, cadastral surveys, land ownership
- (16) Society, 016
Characteristics of society and culture;
e.g., anthropology, archaeology, religion, demographics, crime and justice
- (17) Structure, 017
Man-made construction;
e.g., architecture, buildings, museums, churches, factories, housing, monuments, shops, towers
- (18) Transportation, 018
Means and aids for conveying persons and/or goods;
e.g., roads, airports, airstrips, shipping routes, tunnels, nautical charts, vehicle and vessel locations, aeronautical charts, railways, trails
- (19) UtilitiesCommunication, 019
Energy, water and waste systems, and communications infrastructure;
e.g., hydroelectricity, geothermal, solar, and nuclear sources of energy, water purification and distribution, sewage collection and disposal, electrical and gas distribution, data communication, telecommunication, radio, communication networks.

IV. PROCEDURE REFERENCE

Policies for metadata are detailed in ITRMC Information Technology Enterprise Policies [P1070 – Geographic Information Systems \(GIS\)](#).

V. CONTACT INFORMATION

For more information, contact the ITRMC Staff at (208) 332-1876.

REVISION HISTORY

6/16/09 – Added Procedure Reference, Contact Information and Revision History to this guideline; changed the layout and deleted Timeline.
Effective Date: December 13, 2005

* Required section if resource is available to the public

** Recommended