

National Spatial Data Infrastructure

Content Standard for Digital Geospatial Metadata Workbook

(For use with FGDC-STD-001-1998)

Version 2.0

Federal Geographic Data Committee

May 1, 2000

Federal Geographic Data Committee

Department of Agriculture • Department of Commerce • Department of Defense • Department of Energy
Department of Health & Human Services • Department of Housing and Urban Development
Department of the Interior • Department of Justice • Department of State
Department of Transportation • Environmental Protection Agency
Federal Emergency Management Agency • Library of Congress
National Aeronautics and Space Administration • National Archives and Records Administration
National Science Foundation • Tennessee Valley Authority

Federal Geographic Data Committee

Established by Office of Management and Budget Circular A-16, the Federal Geographic Data Committee (FGDC) promotes the coordinated development, use, sharing, and dissemination of geographic data.

The FGDC is composed of representatives from the Departments of Agriculture, Commerce, Defense, Energy, Health & Human Services, Housing and Urban Development, the Interior, Justice, State, and Transportation; the Environmental Protection Agency; the Federal Emergency Management Agency; the Library of Congress; the National Aeronautics and Space Administration; the National Archives and Records Administration; National Science Foundation, and the Tennessee Valley Authority. Additional Federal agencies participate on FGDC subcommittees and working groups. The Department of the Interior chairs the committee.

FGDC subcommittees work on issues related to data categories coordinated under the circular. Subcommittees establish and implement standards for data content, quality, and transfer; encourage the exchange of information and the transfer of data; and organize the collection of geographic data to reduce duplication of effort. Working groups are established for issues that transcend data categories.

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Metadata

Metadata — describe the content, quality, condition, and other characteristics of data.

Major uses of metadata:

- organize and maintain an organization's investment in data.
- provide information to data catalogs and clearinghouses.
- provide information to aid data transfer.



Definition: Metadata are "data about data" They describe the content, quality, condition, and other characteristics of data. Metadata help a person to locate and understand data.

Major uses of metadata:

Organize and maintain and organization's investment in data. Metadata help insure an organization's investment in data. As personnel change or time passes, information about an organization's data will be lost and the data may lose their value. Later workers may have little understanding of the content and uses for a digital data base and may find that they can't trust results generated from these data. Complete metadata descriptions of the content and accuracy of a geospatial data set will encourage appropriate use of the data. Such descriptions also may provide some protection for the producing organization if conflicts arise over the misuse of data.

Provide information to data catalogs and clearinghouses. Applications of geographic information systems often require many themes of data. Few organizations can afford to create all data they need. Often data created by an organization also may be useful to others. By making metadata available through data catalogs and clearinghouses, organizations can find data to use, partners to share data collection and maintenance efforts, and customers for their data. The FGDC is sponsoring the development of the National Geospatial Data Clearinghouse through which data producers can provide metadata to others using the Internet.

Provide information to aid data transfer. Metadata should accompany the transfer of a data set. The metadata will aid the organization receiving the data process and interpret data, incorporate data into its holdings, and update internal catalogs describing its data holdings.

Examples of Metadata

Identification

Title? Area covered? Themes? Currentness? Restrictions?

Data Quality

Accuracy? Completeness? Logical Consistency? Lineage?

Spatial Data Organization

Indirect? Vector? Raster? Type of elements? Number?

Spatial Reference

Projection? Grid system? Datum? Coordinate system?

Entity and Attribute Information

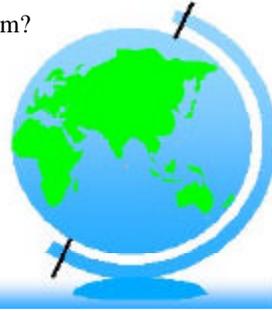
Features? Attributes? Attribute values?

Distribution

Distributor? Formats? Media? Online? Price?

Metadata Reference

Metadata currentness? Responsible party?



Metadata describe different aspect of data, including:

Identification -- What is the name of the data set? Who developed the data set? What geographic area does it cover? What themes of information does it include? How current are the data? Are there restrictions on accessing or using the data?

Data Quality -- How good are the data? Is information available that allows a user to decide if the data are suitable for his or her purpose? What is the positional and attribute accuracy? Are the data complete? Were the consistency of the data verified? What data were used to create the data set, and what processes were applied to these sources?

Spatial Data Organization -- What spatial data model was used to encode the spatial data? How many spatial objects are there? Are methods other than coordinates, such as street addresses, used to encode locations?

Spatial Reference -- Are coordinate locations encoded using longitude and latitude? Is a map projection or grid system, such as the State Plane Coordinate System, used? What horizontal and vertical datums are used? What parameters should be used to convert the data to another coordinate system?

Entity and Attribute Information -- What geographic information (roads, houses, elevation, temperature, etc.) is included? How is this information encoded? Were codes used? What do the codes mean?

Distribution -- From whom can I obtain the data? What formats are available? What media are available? Are the data available online? What is the price of the data?

Metadata Reference -- When were the metadata compiled? By whom?

Background



Development of the Standard

Summer 1992 - FGDC forum on metadata

Fall 1992 - draft standard released for 5½-month public comment period

Summer 1993 - revised draft tested as part of the clearinghouse prototype; subsequent drafts provided in January, March, and May 1994.

June 8, 1994 - FGDC approves the Standard.



Why and how was the standard developed?

There is a significant amount of data developed by the geospatial community, and these data often can serve many applications. The lack of an ability to identify what data exist, the quality of data, and how to access and use the data results in wasteful duplication of effort occurs, and hinders improved cooperation.

During June 1992, the FGDC sponsored an "Information Exchange Forum on Spatial Data." Presentations were given on many aspects of metadata, including efforts to standardize metadata, uses of metadata, and systems used to provide metadata to users. The need for a common definition of metadata in the community was identified. The FGDC accepted the offer of ASTM to develop a draft standard.

The FGDC sponsored a public review of the draft from October 1992 to April 1993. Many comments were received, and the draft was revised extensively. The revised draft was tested as part of a prototype for the National Geospatial Data Clearinghouse. Comments from this effort, a comparison of the draft with the U.S. Machine Readable Catalog (USMARC) standard and other documents, and other activities resulted in additional refinements.

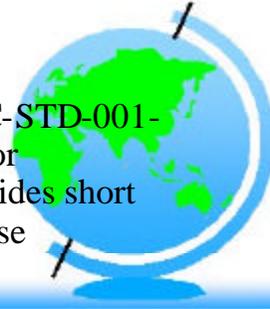
The FGDC approved the standard on June 8, 1994. Executive Order 12906, "Coordinating Geographic Data Acquisition and Access: The National Spatial Data Infrastructure," requires Federal agencies to use the standard to document data that they produce beginning in 1995.

Development of the Standard

March 10, 1995 – Metadata Implementers Meeting – requirements of Extensibility (user-defined metadata), Profiles, and short names (tags) raised.

April 1997 – FGDC CSDGM Version 2.0 circulated for Public review.

June 19, 1998 – FGDC endorses FGDC-STD-001-1998 (version 2.0) with Guidelines for Extensibility and Profiles. Also provides short names and minor modifications to ease implementation.



In March 1995, the FGDC held a Metadata Implementers Workshop to discuss the general issues surrounding the implementation of the Standard. The primary issues raised were:

- 1 - requirements for extensibility (how to extend the standard)
- 2 - requirements for profiles/subsets
- 3 - granularity and hierarchy/inheritance
- 4 - requirements for defined short names/tags
- 5 - element domains and use of "free text"
- 6 - sections subject to difficulty in implementation

In April 1997, the FGDC circulates, for public review, and second version of the CSDGM. This version attempted to address the issues raised at the March 1995 Implementers workshop.

In June 1998, the FGDC endorses the 2nd version of the FGDC Content Standard for Digital Geospatial Metadata (FGDC-STD-001-1998).

FGDC-STD-001-1998 provides

- 1 - guidelines for the development of profiles and user-defined metadata entities and elements
- 2 - short names/tags for all entities/elements
- 3 - reworked sections 4 (Spatial Reference) to ease implementation
- 4 - numerous domains were expanded to include "free text" as an acceptable value
- 5 - edits were made in Glossary.

Objectives (Does)

Supports common uses of metadata.

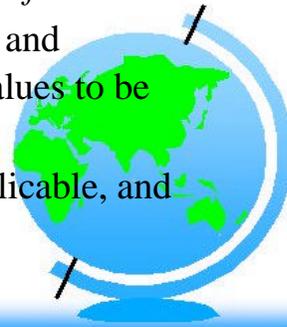
– *internal investment* - *clearinghouse* - *transfer*

Developed from the perspective of "what do I need to know about a data set?"

– *availability* - *fitness* - *access* - *transfer*

Provides a common set of terminology and definitions, and information about values to be provided.

Identifies mandatory, mandatory if applicable, and optional data elements.



The standard specifies the elements needed to support three major uses of metadata: (1) to maintain an organization's *internal investment* in geospatial data, (2) to provide information to data *clearinghouses* and catalogs, and (3) to provide information needed to process and interpret data *transferred* from another organization.

The standard defines the information required by a prospective user (1) to determine the *availability* of a set of geospatial data, (2) to determine the *fitness* of a set of geospatial data for an intended use, (3) to determine the means to *access* the set of geospatial data, and (4) to *transfer* the set of geospatial data successfully.

The standard specifies the information content for a set of digital geospatial data. The standard establishes a common set of terminology and definitions for concepts related to metadata, including:

- the names of data elements and compound elements (groups of data elements) to be used,
- the definitions of these compound and data elements, and
- information about the values that are to be provided for the data elements.

The standard also specifies the elements that are mandatory (must be provided), mandatory if applicable (must be provided if the data set exhibits the defined characteristic), and optional (provided at the discretion of the producer of the data set).

The standard defines a data set as a "collection of related data."

Objectives (Doesn't)

- ◆ The standards do not specify:
 - the means to organize information in a computer system.
 - the means to organize information in a data transfer.
 - the means by which the information is transmitted, communicated, or presented to the user.



The standard specifies information content, but not how to organize this information in a computer system or in a data transfer, or how to transmit, communicate, or present the information to a user. There are several reasons for this approach:

There are many means by which metadata could be organized in a computer. There include incorporating data as part of a geographic information system, in a separate data base, and as a text file. Organizations can choose the approach which suits their data management strategy, budget, and other institutional and technical factors.

There are many standards and formats with which geospatial and related data are transferred. Some include mechanisms permit the transfer metadata, some do not. Decisions about how to accommodate metadata in a transfer must be made by the organizations that maintain these standards and formats.

There are a large number of ways by which to transmit, communicate, and present metadata. Different metadata element will be valued by different users, or by one user for different tasks. The Internet and other technologies are causing rapid change in means to providing information. Many users continue to need or prefer metadata to be provided on physical media, including paper. The standard allows information providers to use the techniques and forms which best meet the needs of their users.

Persons implementing the standard have recommended that some common approaches to implementing the standard be provided, especially for use with the National Geospatial Data Clearinghouse. The FGDC invited recommendations about approaches that should be taken.

Implementation Decisions

- ◆ What is a "data set?"
- ◆ When is the best time to collect metadata?
- ◆ Who is this for, anyway?
 - Management — catalog — transfer.
 - Details, details, details.
 - “25¢ worth of metadata.”
 - You're not responsible for the world (are you?).
- ◆ Legacy data and the future.



The standard defines a *data set* as a "collection of related data." No statement is made about the granularity of data to which the standard should be applied, or limitations of how to apply the standard. Many organizations start to implement the standard for a collection known as a "layer" or "coverage." Some organizations have a series of "layers" for which some elements, such as spatial reference, entity and attribute, and distribution information, are the same. These elements are recorded once and "inherited" by the member "layers" of the series. Others are concerned about differences within a "layer," and are implementing some elements, such as lineage information, for components of the "layer."

These components "inherit" other information from the "layer" and "series" levels. As long as the "mandatory" and appropriate "mandatory if applicable" are available to users, the metadata comply with the standard. Decisions about what approach to take depend on the needs, budgets, and information strategies of an organization.

The *best time to collect metadata* is while the data are being developed, when the information needed for metadata is known. Waiting until after the data are developed risks less accurate information being recorded and increased costs caused by searching for information.

There are many decisions to make about metadata. Metadata serve many purposes, and not all purposes may need the same information. Internal data management activities may require more information than a clearinghouse or transfer. A huge number of details can be encoded in metadata; judgment is needed on what information is useful. The costs and value of metadata, to both immediate and longer term operations, should be evaluated. Judgment also is needed on deciding what information about source materials should be retained.

Documenting existing or "legacy" data can be daunting. Details are long forgotten and costs can be high.

These concerns are valid, but care should be taken to avoid allowing issues related to legacy data to unduly influence the documentation of new data.

The Standard



Elements of Definition

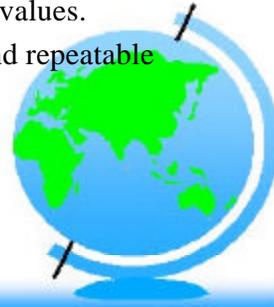
- ◆ Sections
- ◆ Compound Elements
- ◆ Data Elements



The standard is organized in series of elements that define the information content for metadata to document a set of digital geospatial data.

Sections

- ◆ Main “chapters” of the standards.
- ◆ Composed of:
 - Section definition.
 - List of elements, definitions, types, and values.
 - Information about what is mandatory and repeatable



The standard is organized using numbered chapters called "sections."

Each section begins with the name and definition of the section. These are followed by the component elements of the section. Each section provides the names and definitions of the component elements, information about the types of values that can be provided for the elements, and information about the elements that are mandatory or repeatable.

Example of a Section

Identification Information

```
<Definition>
Identification Information -- basic information about the data set.
    Type: compound
    Short Name: idnfo

<Production Rules>
Identification_Information =
    Citation +
    Description+
    Time_Period_of_Content +
    Status + . . .

1.1 Citation -- information to be used to reference the data set.
    Type: compound
    Short Name: citeinfo

1.2 Description -- a characterization of the data set, including its intended
    use and limitations.
    Type: compound
    Short Name: descript
```



In the standard, sections are organized in three parts: section definition, production rules, and list of component elements.

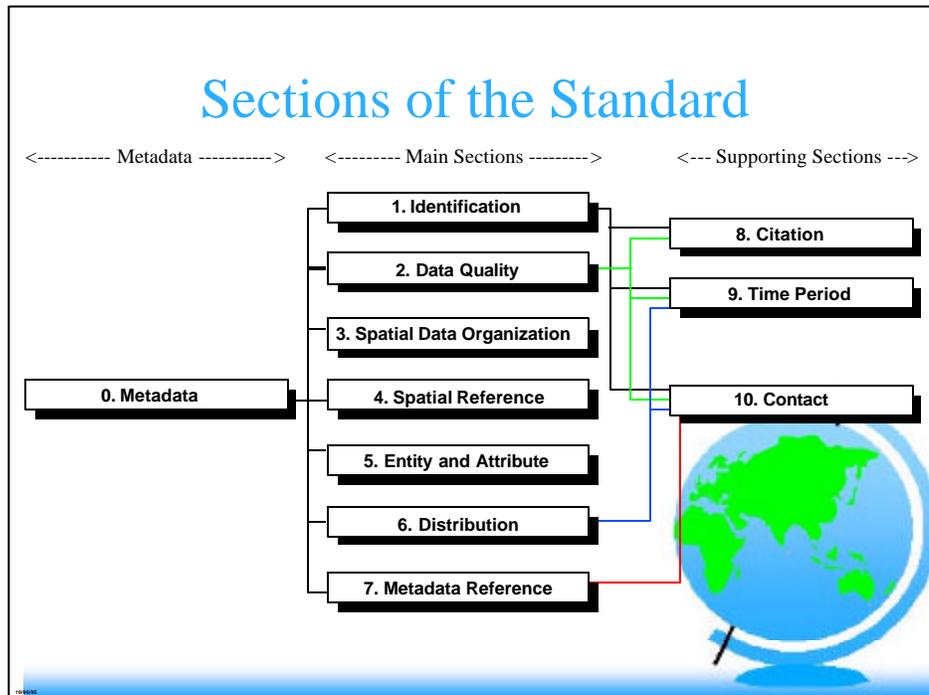
The *section definition* includes the name and definition of the section.

The *production rules* describe the section in terms of lower-level component elements. Each production rule has an identifier (left side) and an expression (right side) connected by the symbol "=", meaning that the term on the left side is replaced by or produces the term on the right side. By making substitutions using matching terms in the production rules, one can explain higher-level concepts using data elements. In addition to specifying the composition of higher-level elements, the production rules specify the elements that are mandatory and that can be repeated.

The production rules are provided using the syntax developed by Yourdon. The introduction to the standard describes the syntax and provides examples.

Each section is composed of data elements, either directly or through the use of intermediate elements. The composition of intermediate elements also is provided in the production rules.

The *list of component elements* provides the name and definition of each component element in the section, and information about values to be provided for data elements.



The standard has 11 sections numbered 0 through 10.

Section 0, "Metadata," provides the starting point. It is composed of the main sections of the standard.

Sections 1 through 7 are the main sections of the standard.

Sections 8 through 10 support other sections. They provide a common method to define citation, temporal, and contact information. These sections are never used alone.

Compound Element

A group of related data elements or other compound elements.

All compound elements ultimately are comprised of data elements.

Form:

Compound element name -- definition.

Type: compound

Example:

Description -- a characterization of the data set, including its intended use and limitations.

Type: compound



A compound element is a group of data elements and other compound elements. All compound elements are described by data elements, either directly or through intermediate compound elements. Compound elements represent higher-level concepts that cannot be represented by an individual data element.

The form for the definition of a compound element is:

Compound element name -- definition.

Type: compound

The type of "compound" uniquely identifies the compound elements in the list of component elements.

An example of the definition of a compound element:

Description -- a characterization of the data set, including its intended use and limitations.

Type: compound

As stated above, a compound element is a group of elements. The composition of the element is needed to complete the example. Using the syntax for the production rules:

Description = Abstract + Purpose + (Supplemental Information)

which means that the compound element "Description" is composed of the elements "Abstract," "Purpose," and (optionally) "Supplemental Information."

Data Element

A logically primitive item of data.

Data elements are the things that you "fill in."

Form:

Data element name -- definition.

Type: (choice of "integer", "real", "text", "date", or "time")

Domain: (describes valid values that can be assigned)

Example:

Abstract -- a brief narrative summary of the data set.

Type: text

Domain: free text



A data element is a logically primitive item of data. The entry for a data element includes the name of the data element, the definition of the data element, and a description of the values that can be assigned to the data element.

The form for the definition of a data element is:

Data element name -- definition.

Type: (choice of "integer", "real", "text", "date", or "time")

Domain: (describes valid values that can be assigned)

The information about the values for that data elements include a description of the type of value, and a description of the domain of values. The type of the data element describes the kind of value to be provided. The choices are "integer" for integer numbers, "real" for real numbers, "text" for ASCII characters, "date" for day of the year, and "time" for time of the day.

The domain describes valid values that can be assigned to the data element. The domain may specify a list of valid values, or restrictions on the range of values that can be assigned to a data element.

An example of the definition of a data element is:

Abstract -- a brief narrative summary of the data set.

Type: text

Domain: free text

Data Element — Values

The **domain** of values for a data element:

may be specified only by type. In these cases, the domain is described by the word "free" followed by the type (for example, free integer, free text).

may be specified by a list of values, references to a list of values, or a range of values.

may be partly specified by a set of values, followed by the "free" convention. In this case, values should be selected from the provided set; if no value is adequate, the user may provide one.



The domain of values for a data element:

may be specified only by type. Any values that can be represented by the type of the data element can be assigned. These domains are represented by the use of the word "free" followed by the type of the data element (that is, free integer, free real, free text, free date, free time). For example:

Abstract -- a brief narrative summary of the data set.

Type: text

Domain: free text

may be specified by a list of values, references to a list of values, or a range of values. The value assigned must be selected from the domain. For example:

Progress -- the state of the data set.

Type: text

Domain: "Complete" "In work" "Planned"

may be partly specified by a set of values, followed by the "free" convention. The value assigned should be from the domain provided if possible. If a needed value is not available, providers may create and assign their own value. For example:

Depth Distance Units -- units in which depths are recorded.

Type: text

Domain: "meters" "feet" free text

A created value should not redefine a value provided by the standard.

Data Element Forms for Special Values

The standards specify the forms of four types of values:

- Calendar dates
- Time of day
- Latitude and longitude
- Network addresses and file names



Forms for Special Values

The form of the representation of data values is important to applications that will manipulate the data elements. This importance is especially true for metadata provided through the National Geospatial Data Clearinghouse. If the values are provided in a standard way, "client" software can help a user to evaluate data.

The following conventions for forms of values for data elements shall be used with the metadata standards:

Calendar Dates (Years, Months, and Days)

- A.D. Era to December 31, 9999 A.D. - - Values for day and month of year, and for years, shall follow the calendar data convention (general forms of YYYY for years; YYYYMM for month of a year (with month being expressed as an integer), and YYYYMMDD for a day of the year) specified in American National Standards Institute, 1986, Representation for calendar date and ordinal date for information interchange (ANSI X3.30-1985): New York, American National Standards Institute (adopted as Federal Information Processing Standard 4-1).
- B.C. Era to 9999B.C. - - Values for day and month of year, and for years, shall follow the calendar data convention, preceded by the lower case letters "bc" (general forms of bcYYYY for years; bcYYYYMM for month of a year (with month being expressed as an integer), and bcYYYYMMDD for a day of the year).
- B.C. Era before 9999 B.C. - - Values for the year shall consist of as many numeric characters as are needed to represent the number of the year B.C., preceded by the lower case letters "cc" (general form of ccYYYYYYYY....).

- A.D. Era after 9999 A.D. - - Values for the year shall consist of as many numeric characters as are needed to represent the number of the year A.D., preceded by the lower case letters "cd" (general form of cdYYYYYYYY....).

Time of Day (Hours, Minutes, and Seconds)

- Because of some geospatial data and related applications are sensitive to time of day information, three conventions are permitted. Only one convention shall be used for metadata for a data set. The conventions are:

-Local Time. For producers who wish to record time in local time, values shall follow the 24-hour timekeeping system for local time of day in the hours, minutes, seconds, and decimal fractions of a second (to the precision desired) without separators convention (general form of HHMMSSSS) specified in American National Standards Institute, 1986, Representations of local time of day for information interchange (ANSI X3.43-1986): New York, American National Standards Institute.

-Local Time with Time Differential Factor. For producers who wish to record time in local time and the relationship to Universal Time (Greenwich Mean Time), values shall follow the 24-hour timekeeping system for local time of day in hours, minutes, seconds, and decimal fractions of a second (to the resolution desired) without separators convention. This value shall be followed, without separators, by the time differential factor. The time differential factor expresses the difference in hours and minutes between local time and Universal Time. It is represented by a four-digit number preceded by a plus sign (+) or minus sign (-), indicating the hours and minutes the local time is ahead of or behind Universal Time, respectively. The general form is HHMMSSSSshhmm, where HHMMSSSS is the local time using 24-hour timekeeping (expressed to the precision desired), 's' is the plus or minus sign for the time differential factor, and hhmm is the time differential factor. (This option allows producers to record local time and time zone information. For example, Eastern Standard Time has a time differential factor of -0500, Central Standard Time has a time differential factor of -0600, Eastern Daylight Time has a time differential factor of -0400, and Central Daylight Time has a time differential factor of -0500.) This option is specified in American National Standards Institute, 1975, Representations of universal time, local time differentials, and United States time zone reference for information interchange (ANSI X3.51-1975): New York, American National Standards Institute.

-Universal Time (Greenwich Mean Time). For producers who wish to record time in Universal Time (Greenwich Mean Time), values shall follow the 24-hour timekeeping system for Universal Time of day in hours, minutes, seconds, and decimal fractions of a second (expressed to the precision desired) without separators convention, with the upper case letter "Z" directly following the low-order (or extreme right hand) time element of the 24-hour clock time expression. The general form is HHMMSSSSZ, where HHMMSSSS is Universal Time using 24-hour timekeeping, and Z is the letter "Z". This option is specified in American National

Standards Institute, 1975, Representations of universal time, local time differentials, and United States time zone reference for information interchange (ANSI X3.51-1975): New York, American National Standards Institute.

Latitude and Longitude

- Values for latitude and longitude shall be expressed as decimal fractions of degrees. Whole degrees of latitude shall be represented by a two-digit decimal number ranging from 0 through 90. Whole degrees of longitude shall be represented by a three-digit decimal number ranging from 0 through 180. When a decimal fraction of a degree is specified, it shall be separated from the whole number of degrees by a decimal point. Decimal fractions of a degree may be expressed to the precision desired.
 - Latitudes north of the equator shall be specified by a plus sign (+), or by the absence of a minus sign (-), preceding the two digits designating degrees. Latitudes south of the Equator shall be designated by a minus sign (-) preceding the two digits designating degrees. A point on the Equator shall be assigned to the Northern Hemisphere.
 - Longitudes east of the prime meridian shall be specified by a plus sign (+), or by the absence of a minus sign (-), preceding the three digits designating degrees of longitude. Longitudes west of the meridian shall be designated by a minus sign (-), preceding the three digits designating degrees. A point on the prime meridian shall be assigned to the Eastern Hemisphere. A point on the 180th meridian shall be assigned to the Western Hemisphere. One exception to this last convention is permitted. For the special condition of describing a band of latitude around the earth, the East Bounding Coordinate data element shall be assigned the value of +180 (180) degrees.
 - Any spatial address with a latitude of +90 (90) or -90 degrees will specify the position at the North or South Pole, respectively. The component for longitude may have any legal value.

With the exception of the special condition described above, this form is specified in American National Standards Institute, 1986, Representation of Geographic Point Locations for Information Interchange (ANSI X3.61-1986): New York, American National Standards Institute.

Network Addresses and File Names

- Values for file names, network addresses for computer systems, and related services should follow the Uniform Resource Locator convention of the Internet when possible. See <http://www.ncsa.uiuc.edu/demoweb/url-primer.html> for additional details about the Uniform Resource Locator.

FAQ: What is the Uniform Resource Locator (URL), and what is its form?

A URL is a network extension of the UNIX file naming conventions. A URL can point to any file in any directory of any machine. It also describes the Internet service available for use with the resource.

The basic form of the URL is: `service://hostname:port/path/filename`

where `service` - the name of the service to be used with the resource.

Examples include "Field", "ftp", "telnet", "gopher". "wais", "news", "http", "rlogin", and "tn3270".

`hostname:port` - the Internet address of the machine and the port through which the service is provided. The identification of the port is required only if a non-standard implementation is being used.

`path` - the directory path to the file.

`filename` - the name of the file.

Examples:

Anonymous FTP: `ftp://fgdc.er.usgs.gov/gdc/metadata/meta.6984.ps`

World Wide Web: `http://www.rpi.edu/Internet/Guides/decemj/icmc/top.html`

Gopher: `gopher://bingsuns.cc.binghamton.edu/11/acad/geogenv`

Telnet: `telnet://fedworld.doc.gov`

News: `news:comp.infosystems.gis`

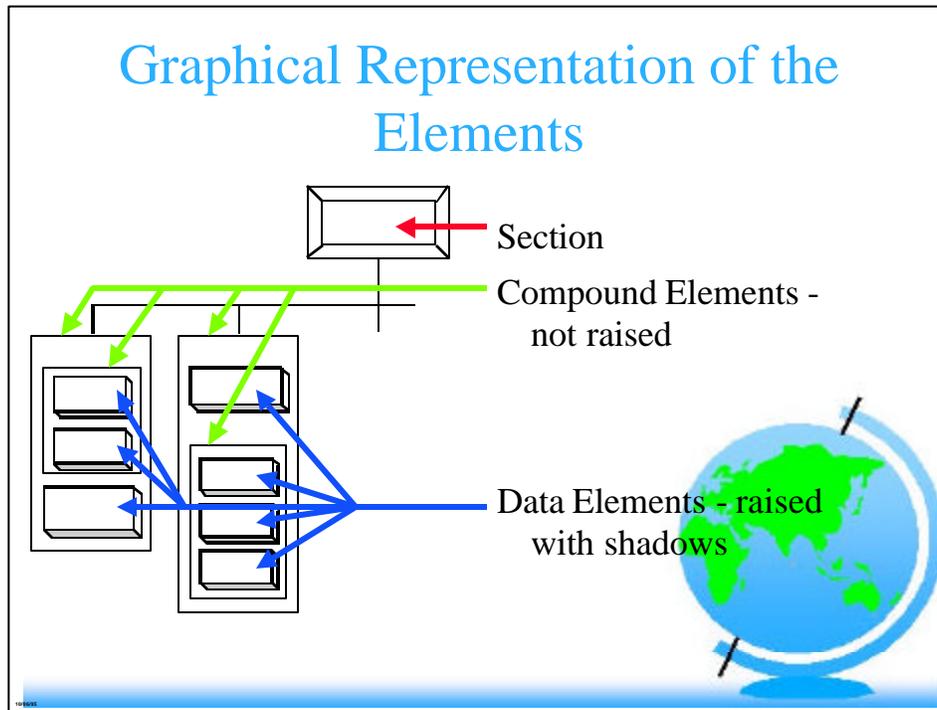
Local file on your (DOS) computer: `file:///c:/wp51/mad/letter.wpd`

FAQ: I'm planning to implement the metadata standard using a data base, but the data base software does not support the forms of the date and time special values. How do I comply with the standard?

Software systems often use special methods internally to encode values such as date and time. The main concern is that metadata provided to others, especially metadata provided through the National Geospatial Data Clearinghouse and for data transfer, be encoded using the forms specified by the metadata standards.

Graphical Representation of the Elements of the Content Standard



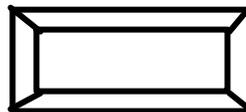


The workbook uses graphics to illustrate the organization of the standard. The graphics include most of the information provided by the production rules, including:

- How are elements grouped?
- What's mandatory? What's not?
- What can repeat? How many times?

(One exception is in section 4, for which the graphics do not provide the details for documenting map projection and grid system parameters (these details are provided in the text of the section in the workbook).)

Sections are depicted using the symbol:



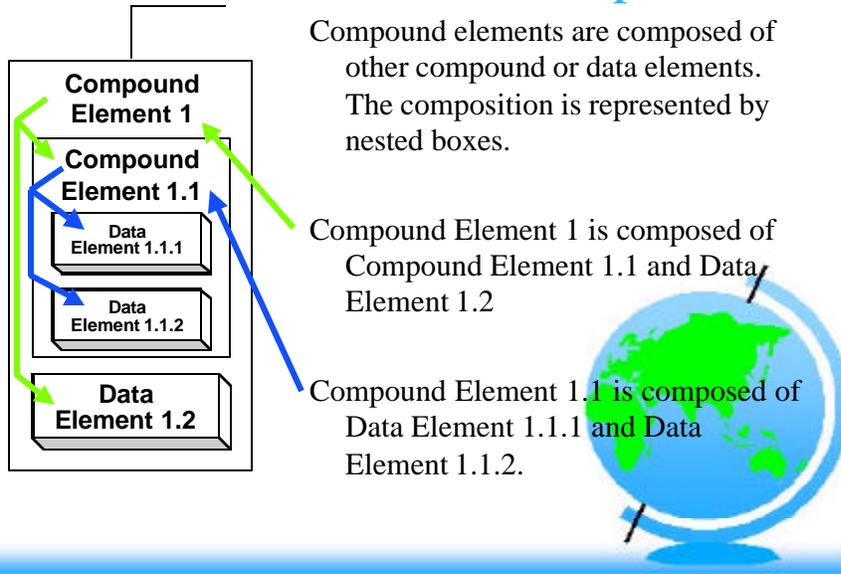
Compound elements are depicted using a box:



Data elements are depicted using a raised box with shadow:

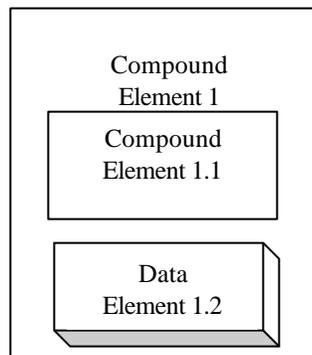


How Are Elements Grouped?

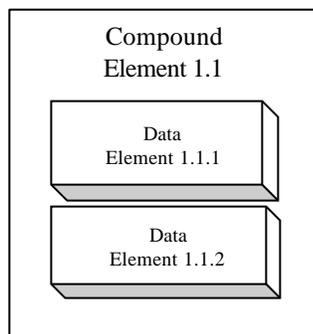


Compound elements are composed of other compound or data elements. The composition of compound elements is represented by nested boxes.

Compound Element 1 is composed of Compound Element 1.1 and Data Element 1.2:



Compound Element 1.1 is composed of Data Element 1.1.1 and Data Element 1.1.2:



What's Mandatory? What's Not?

<u>Compound Element</u>	<u>Data Element</u>	<u>Meaning</u>
		Mandatory - must be provided.
		<i>Mandatory if Applicable - must be provided if the data set exhibits the defined characteristic.</i>
		Optional - provided at the discretion of the data set producer.

The standard defines sections, compound elements, and data elements as being mandatory, mandatory if applicable, or option.

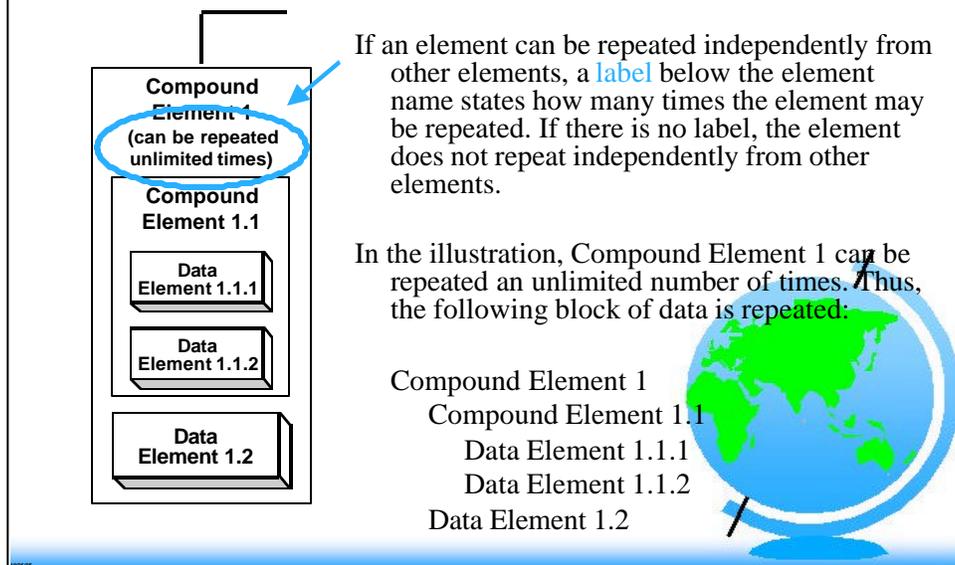
Mandatory elements must be provided. If the information is not know for a mandatory data element, the entry "Unknown" or a similar statement should be given. An example is compound element 1.2, Description. The element description must be provided for all data sets. The boxes representing mandatory data elements are not shaded in the graphics.

Mandatory if applicable elements must be provided if the data set exhibits the characteristic defined by the element. An example is compound element 4.2, Vertical Coordinate System Definition, from Section 4, Spatial Reference Information. The element is mandatory if applicable. So:

- If a data set has vertical (altitude/elevation or depth) information, the element is applicable and must be provided.
- If the data set does not have vertical information, the element is not applicable and is not provided.
- The boxes representing the mandatory if applicable elements are lightly shaded in the graphics.

Optional elements are provided at the discretion of the data set producer. An example is data element 10.7, Contact Facsimile Telephone. The producer may provide the telephone number of a contact's facsimile machine if it wishes to do so; otherwise, the element is not provided. The boxes representing optional elements are darkly shaded in the graphics.

What Can Repeat? How Many Times?



The standard defines compound elements and data elements that can be repeated.

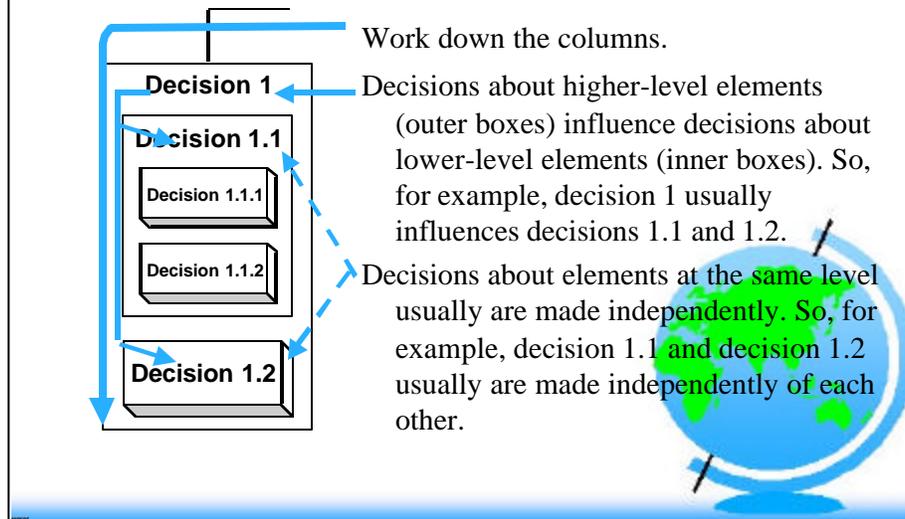
In the graphical representation, a label is placed below elements that can be repeated. The label tells the limits (if any) on the number of times the element can be repeated.

If an element is not followed by a label, it cannot be repeated.

In the example, Compound Element 1 can be repeated an unlimited number of times. So, the result is:

```
Compound Element 1
  Compound Element 1.1
    Data Element 1.1.1
    Data Element 1.1.2
  Data Element 1.2
Compound Element 1
  Compound Element 1.1
    Data Element 1.1.1
    Data Element 1.1.2
  Data Element 1.2
Compound Element 1
  Compound Element 1.1
  !
  !
```

Making Decisions About Documenting Your Data

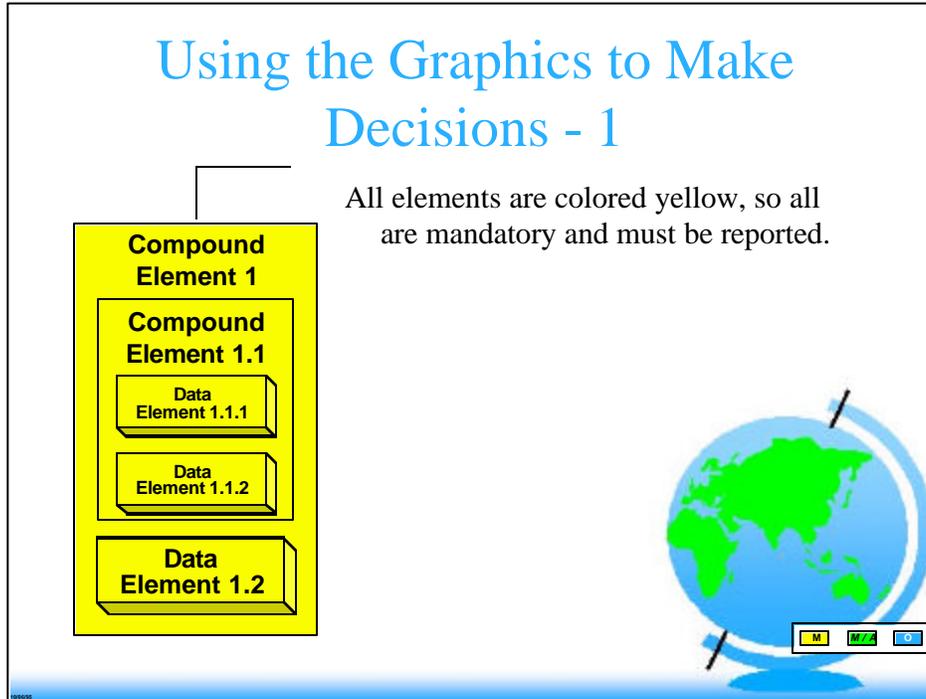


To use the graphical representation, work down the columns.

Higher-level compound elements can influence their component lower-level elements. Decisions about whether or not a higher-level "mandatory if applicable" element is applicable, if an optional higher-level element is to be provided, or if a higher-level element can be repeated will influence the elements nested within the element. So, decision 1 can influence decisions 1.1 and 1.2.

Elements at the same level of "nesting" in a column (for example, decisions 1.1 and 1.2) usually are independent of each other. A decision about one element normally will not influence a decision about another element at the same level.

Using the Graphics to Make Decisions - 1



Working down the column: Compound element 1 is mandatory (not shaded), so it must be provided. The element is not repeatable (no label under the element name). So:

Compound Element 1

Compound element 1.1 is mandatory and not repeatable. So:

Compound Element 1
Compound Element 1.1

Data element 1.1.1 is mandatory and not repeatable. In addition, it is the first element that requires an entry. So:

Compound Element 1
Compound Element 1.1
Data Element 1.1.1: <value>

Data element 1.1.2 is mandatory and not repeatable. So:

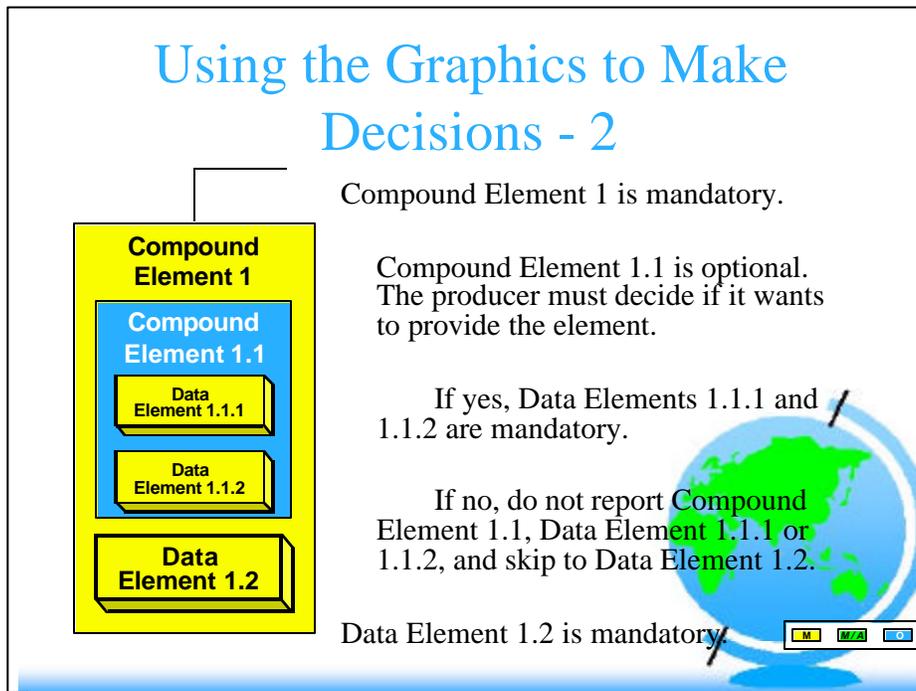
Compound Element 1
Compound Element 1.1
Data Element 1.1.1: <value>
Data Element 1.1.2: <value>

Data element 1.2 is mandatory and not repeatable. So:

Compound Element 1
Compound Element 1.1
Data Element 1.1.1: <value>
Data Element 1.1.2: <value>
Data Element 1.2: <value>

← **Outcome**

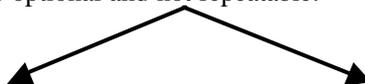
Using the Graphics to Make Decisions - 2



Working down the column: Compound element 1 is mandatory and not repeatable. So:

Compound Element 1

Compound element 1.1 is optional and not repeatable:



If the producer decides to provide the optional element:

Compound Element 1
Compound Element 1.1

Data elements 1.1.1 and 1.1.2 are mandatory and not repeatable. So:

Compound Element 1
Compound Element 1.1
Data Element 1.1.1: <value>
Data Element 1.1.2: <value>

Data element 1.2 is mandatory and not repeatable. So:

Compound Element 1
Compound Element 1.1
Data Element 1.1.1: <value>
Data Element 1.1.2: <value>
Data Element 1.2: <value>

If the producer decides **not** to provide the optional element:

Compound Element 1

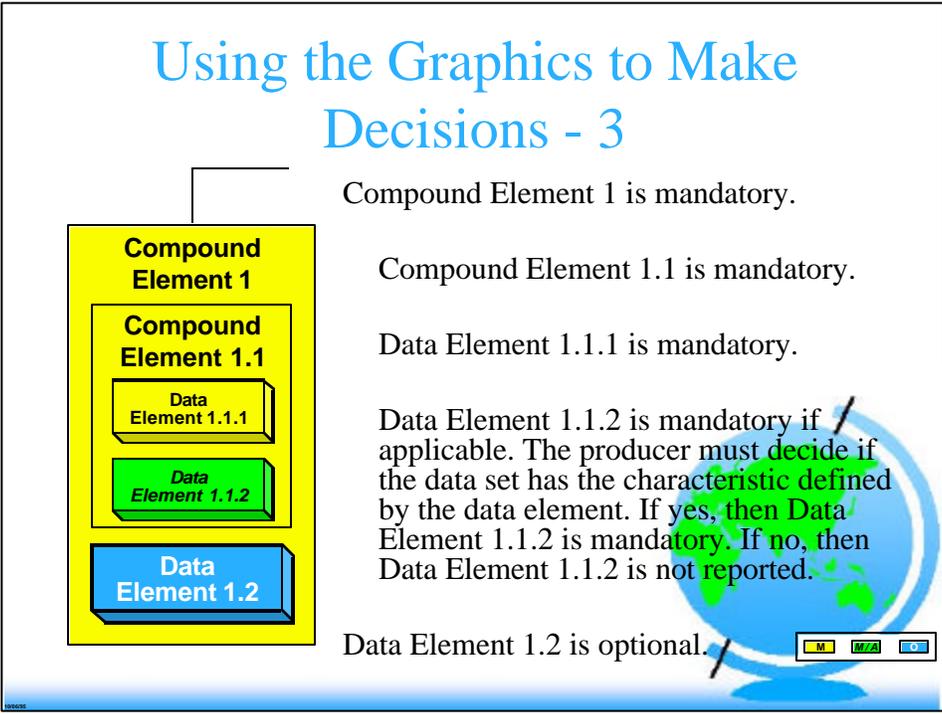
(Data elements 1.1.1 and 1.1.2 are not considered because the element of which they are a part, Compound element 1.1, is not being provided.)

Data element 1.2 is mandatory and not repeatable. So:

Compound Element 1
Data Element 1.2: <value>

Possible Outcomes

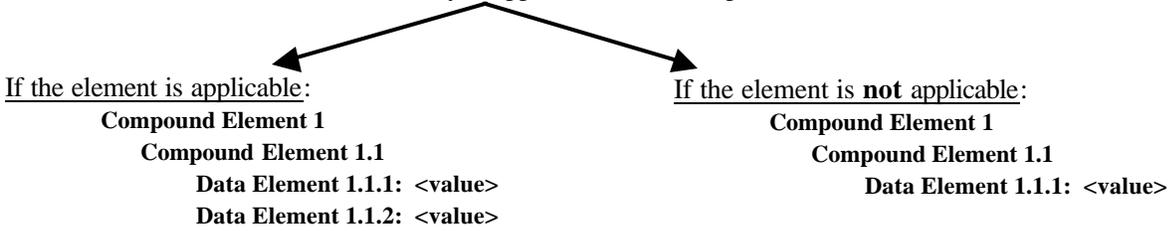
Using the Graphics to Make Decisions - 3



Working down the column: Compound elements 1 and 1.1 and data element 1.1.1 are mandatory and not repeatable:

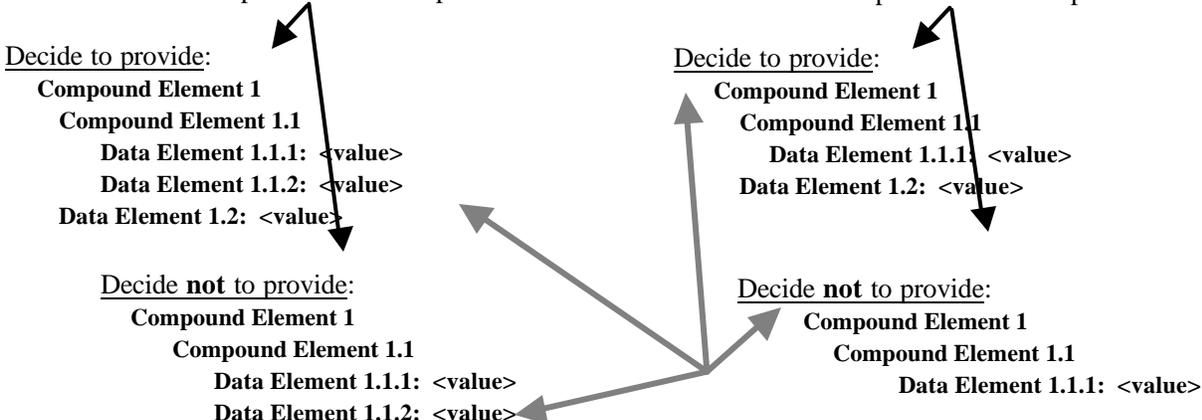
Compound Element 1
Compound Element 1.1
Data Element 1.1.1: <value>

Data element 1.1.2 is mandatory if applicable and not repeatable:



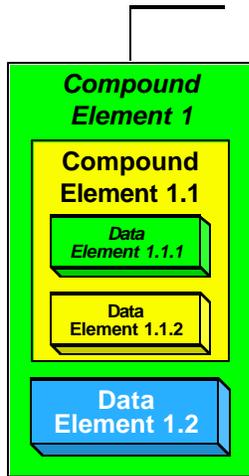
Date element 1.2 is optional and not repeatable:

Data element1.2 optional and not repeatable:



Possible Outcomes

Using the Graphics to Make Decisions - 4



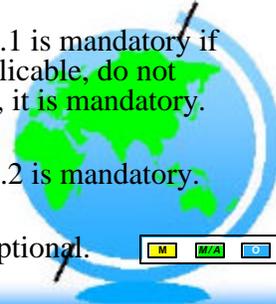
Compound Element 1 is mandatory if applicable. If not applicable to the data set, do not report any elements. If applicable, it is mandatory and:

Compound Element 1.1 is mandatory.

Data Element 1.1.1 is mandatory if applicable. If not applicable, do not report it. If applicable, it is mandatory.

Data Element 1.1.2 is mandatory.

Data Element 1.2 is optional.



Working down the column: Compound element 1 is mandatory if applicable and not repeatable:

If the element is applicable:
Compound Element 1

If the element is not applicable:
<no elements>

Compound element 1.1 is mandatory and not repeatable:

Compound Element 1
Compound Element 1.1



Data element 1.1.1 is mandatory if applicable and not repeatable:

If the element is applicable:
Compound Element 1
Compound Element 1.1
Data Element 1.1.1 <value>

If the element is not applicable:
Compound Element 1
Compound Element 1.1

Data element 1.1.2 is mandatory and not repeatable; data element 1.2 is optional and not repeatable:

Decide to provide:
Compound Element 1
Compound Element 1.1
Data Element 1.1.1: <value>
Data Element 1.1.2: <value>
Data Element 1.2: <value>

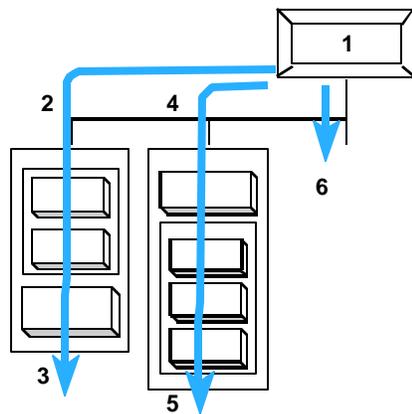
Data element 1.1.2 is mandatory and not repeatable; data element 1.2 is optional and not repeatable:

Decide to provide:
Compound Element 1
Compound Element 1.1
Data Element 1.1.2: <value>
Data Element 1.2: <value>

Decide not to provide:
Compound Element 1
Compound Element 1.1
Data Element 1.1.1: <value>
Data Element 1.1.2: <value>

Decide not to provide:
Compound Element 1
Compound Element 1.1
Data Element 1.1.2: <value>

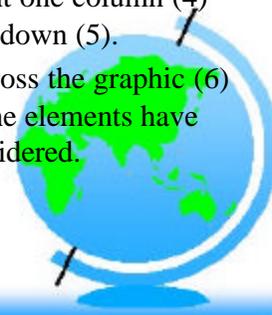
How to Read the Graphic Representation



Start at the section symbol (1).
Go to the leftmost column (2),
and work down (3).

After completing the column,
move right one column (4)
and work down (5).

Continue across the graphic (6)
until all the elements have
been considered.



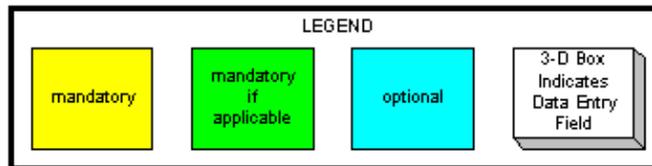
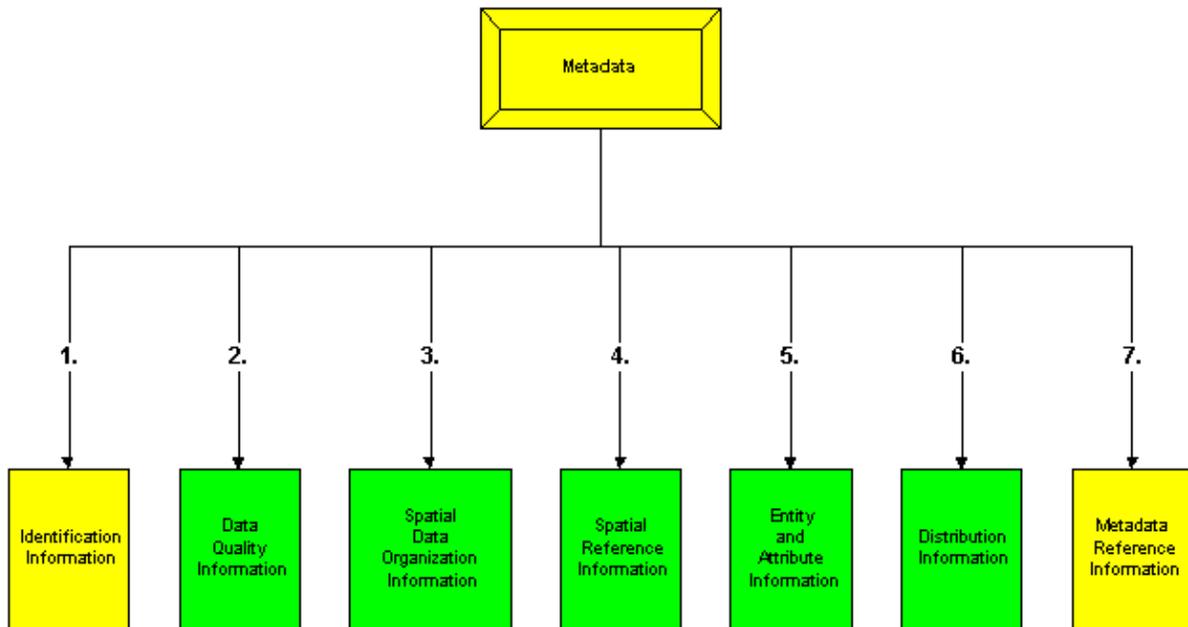
Graphical Representation of: The Federal Geographic Data Committee's Content Standards for Digital Geospatial Metadata

FGDC-STD-001-1998

June 1998 Version

Prepared by Susan Stitt
Technology Transfer Center
National Biological Information Infrastructure

In Conjunction with the FGDC Standards Working Group

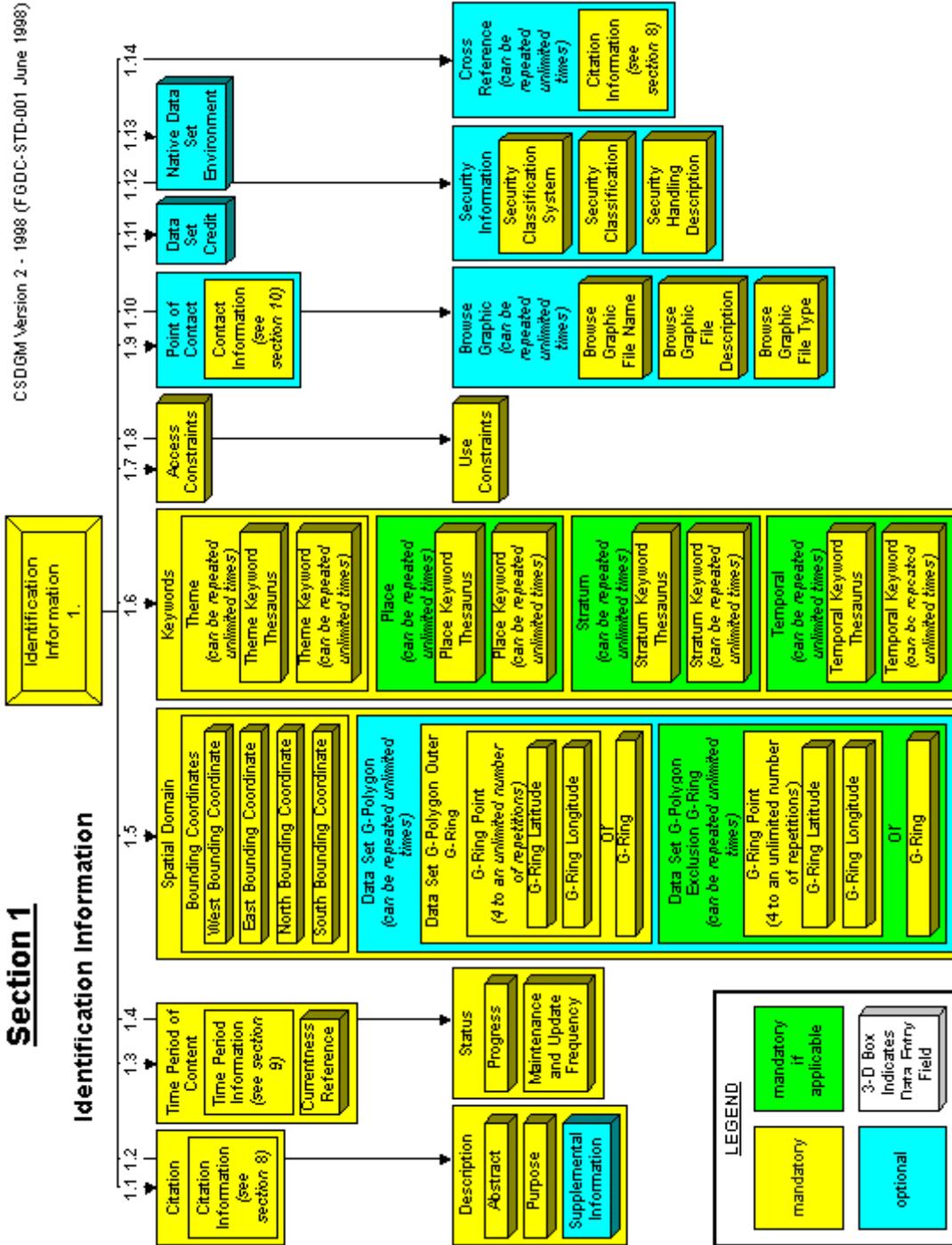


Metadata

- 0 Metadata -- data about the content, quality, condition, and other characteristics of data.
 - Type: compound
 - Short Name: metadata

Section 1

Identification Information



Identification Information

1 Identification Information -- basic information about the data set.

Type: compound
Short Name: idinfo

1.1 Citation -- information to be used to reference the data set.

Type: compound
Short Name: citation

FAQ: Where are the data elements for the "Citation" element?

Because the "Citation" elements are required by another section, the elements were grouped in Section 8.

1.2 Description -- a characterization of the data set, including its intended use and limitations.

Type: compound
Short Name: descript

1.2.1 Abstract -- a brief narrative summary of the data set.

Type: text
Domain: free text
Short Name: abstract

1.2.2 Purpose -- a summary of the intentions with which the data set was developed.

Type: text
Domain: free text
Short Name: purpose

FAQ: What is the difference between the "Abstract" and the "Purpose" elements?

The "Abstract" briefly describes the "what" aspects of the data set (For example, what information is in the data set? What area is covered? The "Purpose" describes the "why" aspects of the data set (For example, why was the data set created?).

1.2.3 Supplemental Information -- other descriptive information about the data set.

Type: text
Domain: free text
Short Name: supplinf

1.3 Time Period of Content -- time period(s) for which the data set corresponds to the currentness reference.

Type: compound
Short Name: timeperd

FAQ: Where are the data elements for the “Time Period of Content” element?

Because the “Time Period of Content” elements are required by another section, the elements were grouped in Section 9.

1.3.1 Currentness Reference -- the basis on which the time period of content information is determined.

Type: text

Domain: "ground condition" "publication date" free text

Short Name: current

FAQ: What does the “currentness reference” mean?

Information about the currentness of a data set (that is, information about how “up-to-date” is a data set) is important to many, if not most, potential users. Most users are interested in the currentness of a data set related to the “ground condition” (that is, when the “real world” looked the way it s described in the data set). Unfortunately, sometimes only the time that the information was recorded or published is known. The Currentness Reference element requires the producer to identify if the Time Period of Content dates and times refer to the ground condition, or some later time when the information was recorded, published, etc.

1.4 Status -- the state of and maintenance information for the data set.

Type: compound

Short Name: status

1.4.1 Progress -- the state of the data set.

Type: text

Domain: "Complete" "In work" "Planned"

Short Name: progress

1.4.2 Maintenance and Update Frequency -- the frequency with which changes and additions are made to the data set after the initial data set is completed.

Type: text

Domain: "Continually" "Daily" "Weekly" "Monthly" "Annually" "Unknown" "As needed" "Irregular" "None planned" free text

Short Name: update

1.5 Spatial Domain - the geographic areal domain of the data set.

Type: compound

Short Name: spdom

1.5.1 Bounding Coordinates - the limits of coverage of a data set expressed by latitude and longitude values in the order western-most, eastern-most, northern-most, and southern-most. For data sets that include a complete band of latitude around the earth, the West Bounding Coordinate shall be assigned the value -180.0, and the East Bounding

Coordinate shall be assigned the value 180.0

Type: compound

Short Name: bounding

- 1.5.1.1 West Bounding Coordinate -- western-most coordinate of the limit of coverage expressed in longitude.
 Type: real
 Domain: $-180.0 \leq \text{West Bounding Coordinate} < 180.0$
 Short Name: westbc
- 1.5.1.2 East Bounding Coordinate -- eastern-most coordinate of the limit of coverage expressed in longitude.
 Type: real
 Domain: $-180.0 \leq \text{East Bounding Coordinate} \leq 180.0$
 Short Name: eastbc
- 1.5.1.3 North Bounding Coordinate -- northern-most coordinate of the limit of coverage expressed in latitude.
 Type: real
 Domain: $-90.0 \leq \text{North Bounding Coordinate} \leq 90.0$;
 $\text{North Bounding Coordinate} \geq \text{South Bounding Coordinate}$
 Short Name: northbc
- 1.5.1.4 South Bounding Coordinate -- southern-most coordinate of the limit of coverage expressed in latitude.
 Type: real
 Domain: $-90.0 \leq \text{South Bounding Coordinate} \leq 90.0$;
 $\text{South Bounding Coordinate} \leq \text{North Bounding Coordinate}$
 Short Name: southbc
- 1.5.2 Data Set G-Polygon -- coordinates defining the outline of an area covered by a data set.
 Type: compound
 Short Name: dsgpoly
- 1.5.2.1 Data Set G-Polygon Outer G-Ring -- the closed nonintersecting boundary of an interior area.
 Type: compound
 Short Name: dsgpolyo
- 1.5.2.1.1 G-Ring Point -- a single geographic location.
 Type: compound
 Short Name: grngpoin
- 1.5.2.1.1.1 G-Ring Latitude -- the latitude of a point of the g-ring.
 Type: real
 Domain: $-90.0 \leq \text{G-Ring Latitude} \leq 90.0$
 Short Name: gringlat
- 1.5.2.1.1.2 G-Ring Longitude -- the longitude of a point of the g-ring.
 Type: real
 Domain: $-180.0 \leq \text{G-Ring Longitude} < 180.0$
 Short Name: gringlon
- 1.5.2.1.2 G-Ring -- a set of ordered pairs of floating-point numbers, separated by commas, in which the first number in each pair is the longitude of a point and the second is the latitude of the point. Longitude and latitude are specified in decimal degrees with north latitudes positive and south negative, east longitude positive and west negative
 Type: text
 Domain: $-90 \leq \text{Latitude_elements} \leq 90$,
 $-180 \leq \text{Longitude_Elements} \leq 180$
 Short Name: gring

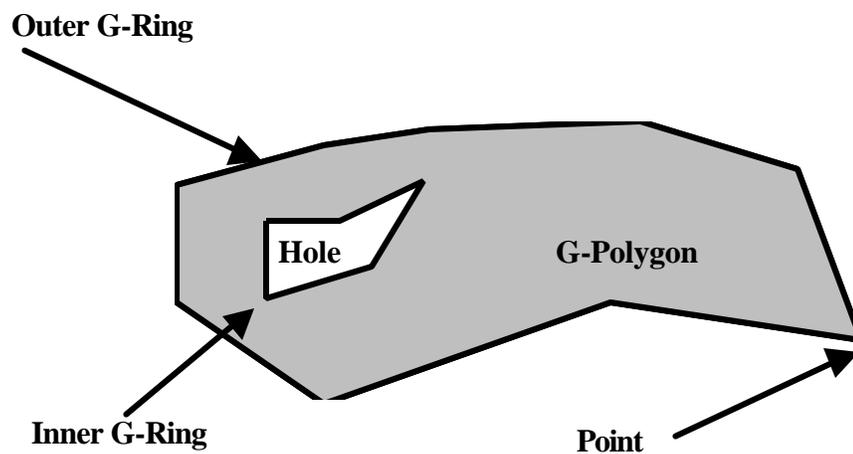
1.5.2.2 Data Set G-Polygon Exclusion G-Ring -- the closed nonintersecting boundary of a void area (or "hole" in an interior area).

Type: compound

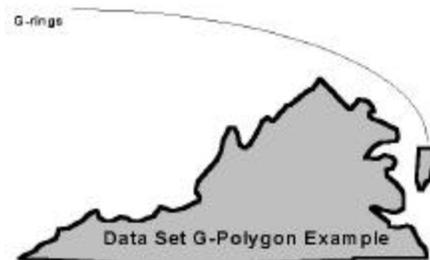
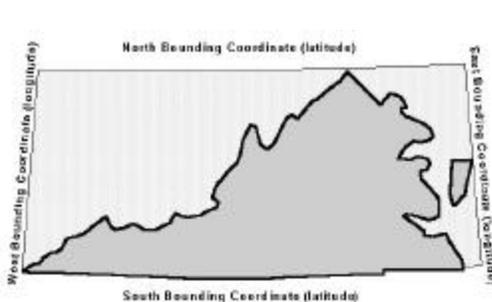
Short Name: dsgpolyx

FAQ: What is a G-Polygon? What is a G-Ring? What is the difference between an "outer" and "inner" G-Ring?

The Terminology of G-Polygon and G-Ring is taken from the Spatial Data Transfer Standard. In simple terms, a G-Polygon is a closed, connected (contiguous) area. A G-Ring is a set of coordinates that defines a boundary of the area. The first and last points in the set of coordinates must be the same. The "outer" G-Ring describes the outside edge of the G-Polygon. "Inner" G-Rings describe any "holes" that may occur in the G-Polygon.



FAQ: What is the difference between the Bounding Coordinates and the Data Set G-Polygon?



The Bounding Coordinates are the west-, east-, north-, and south-most extent of the data set.

The g-rings that describe the Data Set G-Polygon form the outline of the data set.

FAQ: Why do the standards allow both Bounding Coordinates and Data Set G-Polygons? Why are Bounding Coordinates mandatory, and the Data Set G-Polygons optional?

The purpose of the Spatial Domain element is to describe the "footprint" of the data set. This footprint can be used for spatial searches in data catalogs and other purposes.

Coordinates instead of the more demanding (but more exact) Data Set G-Polygons. To provide a common means of conducting spatial searches on all metadata, Bounding Coordinates were made mandatory. Many users indicated a desire to provide the data Set G-Polygons to allow the results of spatial searches to be more exact, and so the Data Set G-Polygon elements were added as an option.

FAQ: Why are the g-rings composed of four or more points? A triangle can be represented by three points.

The ring must be closed (that is, the first and last points must be the same). So the minimum number of points to describe a triangle is four (point 1, point 2, point 3, point 1).

1.6 Keywords -- words or phrases summarizing an aspect of the data set.

Type: compound

Short Name: keywords

FAQ: What is the purpose of the keywords?

A keyword is a work or phrase that signifies the meaning or main ideas of a data set. They often are used as an index to the contents of a data set. The standards provide for four types of keywords: theme (the subject of the data set, such as wetlands, vegetation, etc.), place (the geographic location of the data set, such as Montgomery County, Yellowstone National Park), stratum (the vertical location of the data set, such as seafloor, seabed, troposphere, stratosphere), and temporal (time references for a data set, such as pre-Columbian, World War II).

1.6.1 Theme -- subjects covered by the data set (for a list of some commonly-used thesauri, see Part IV: Subject/index term sources in Network Development and MARC Standards Office, 1988, USMARC code list for relators, sources, and description conventions: Washington, Library of Congress).

Type: compound

Short Name: theme

1.6.1.1 Theme Keyword Thesaurus -- reference to a formally registered thesaurus or a similar authoritative source of theme keywords.

Type: text

Domain: "None" free text

Short Name: themekt

1.6.1.2 Theme Keyword -- common-use word or phrase used to describe the subject of the data set.

Type: text

Domain: free text

Short Name: themekey

1.6.2 Place -- geographic locations characterized by the data set.

Type: compound

Short Name: place

1.6.2.1 Place Keyword Thesaurus -- reference to a formally registered thesaurus or a similar authoritative source of place keywords.

Type: text

Domain: "None" "Geographic Names Information System" free text

Short Name: placekt

1.6.2.2 Place Keyword -- the geographic name of a location covered by a data set.

Type: text

Domain: free text

Short Name: placekey

1.6.3 Stratum -- layered, vertical locations characterized by the data set.

Type: compound

Short Name: stratum

1.6.3.1 Stratum Keyword Thesaurus -- reference to a formally registered thesaurus or a similar authoritative source of stratum keywords.

Type: text

Domain: "None" free text

Short Name: stratkt

1.6.3.2 Stratum Keyword -- the name of a vertical location used to describe the locations covered by a data set.

Type: text

Domain: free text

Short Name: stratkey

1.6.4 Temporal -- time period(s) characterized by the data set.

Type: compound

Short Name: temporal

1.6.4.1 Temporal Keyword Thesaurus -- reference to a formally registered thesaurus or a similar authoritative source of temporal keywords.

Type: text

Domain: "None" free text

Short Name: tempkt

1.6.4.2 Temporal Keyword -- the name of a time period covered by a data set.

Type: text

Domain: free text

Short Name: tempkey

1.7 Access Constraints -- restrictions and legal prerequisites for accessing the data set. These include any access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the data set.

Type: text

Domain: "None" free text

Short Name: accconst

1.8 Use Constraints -- restrictions and legal prerequisites for using the data set after access is granted. These include any use constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on using the data set.

Type: text

Domain: "None" free text

Short Name: useconst

FAQ: What types of constraints are to be provided for Access Constraints and Use Constraints?

The types of constraints intended are those applied to ensure rights of privacy or intellectual property, and any other special restrictions, limitations, or warranties on obtaining or using the information resources, or its

component products. Recommendations on the types of uses to which the data set may or may not be applied should be described in the "Purpose" data element (1.2.2). Descriptions of data quality should be provided using the elements in section 2.

1.9 Point of Contact -- contact information for an individual or organization that is knowledgeable about the data set.

Type: compound

Short Name: ptcontac

FAQ: Where are the data elements for the "Point of Contact" element?

Because the "Point of Contact" elements are required by another section, the elements were grouped in Section 10.

What is the difference between the "Originator" in compound element "Citation" (1.1) and the "Point of Contact" element?

The "Originator" is the person(s) and organization(s) that developed the data set. The "Point of Contact" is the person(s) and organization(s) that can be contacted if questions arise about the data set. The "Originator" and the "Point of Contact" may be the same.

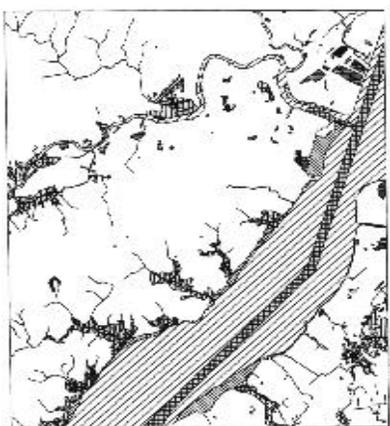
1.10 Browse Graphic -- a graphic that provides an illustration of the data set. The graphic should include a legend for interpreting the graphic.

Type: compound

Short Name: browse

FAQ: What is the purpose of a browse graphic?

A browse graphic is an image of the data set. The image allows prospective users to move beyond textual descriptions and see what the data set looks like. The image might show a simple display of the data set, the results of an application that used the data set, different aspects of the quality of the data set, or other information. Examples:



The map is a reduced-scale plot of the DLG hydrography overlay for Wilmington South, Delaware-New Jersey. The data were digitized from a 1:24,000-scale topographic map quadrangle.



Portion of an orthophotoquad near Rochester, Minnesota.

1.10.1 Browse Graphic File Name -- name of a related graphic file that provides an illustration of the data set.

Type: text

Domain: free text

Short Name: browsen

1.10.2 Browse Graphic File Description -- a text description of the illustration.

Type: text

Domain: free text

Short Name: browsed

1.10.3 Browse Graphic File Type -- graphic file type of a related graphic file.

Type: text

Domain: domain values in the table below; free text

Short Name: browset

<u>Domain Value</u>	<u>Definition</u>
"CGM"	Computer Graphics Metafile
"EPS"	Encapsulated Postscript format
"EMF"	Enhanced Metafile
"GIF"	Graphic Interchange Format
"JPEG"	Joint Photographic Experts Group format
"PBM"	Portable Bit Map format
"PS"	Postscript format
"TIFF"	Tagged Image File Format
"WMF"	Windows metafile
"XWD"	X-Windows Dump

1.11 Data Set Credit -- recognition of those who contributed to the data set.

Type: text

Domain: free text

Short Name: datacred

FAQ: What is the purpose of the "Data Set Credit" data element?

The "Data Set Credit" data element was provided to allow the originator to recognize other person(s), organization(s), or events that made the data set possible. These might include sponsors, sources of funds, reviewers, dedications, etc.

1.12 Security Information -- handling restrictions imposed on the data set because of national security, privacy, or other concerns.

Type: compound

Short Name: secinfo

1.12.1 Security Classification System -- name of the classification system.

Type: text

Domain: free text

Short Name: secsys

1.12.2 Security Classification -- name of the handling restrictions on the data set.

Type: text

Domain: "Top secret" "Secret" "Confidential" "Restricted" "Unclassified" "Sensitive"
free text

Short Name: secclass

1.12.3 Security Handling Description -- additional information about the restrictions on handling the data set.

Type: text

Domain: free text

Short Name: sechandl

1.13 Native Data Set Environment -- a description of the data set in the producer's processing environment, including items such as the name of the software (including version), the computer operating system, file name (including host-, path-, and filenames), and the data set size.

Type: text

Domain: free text

Short Name: native

1.14 Cross Reference -- information about other, related data sets that are likely to be of interest.

Type: compound

Short Name: crossref

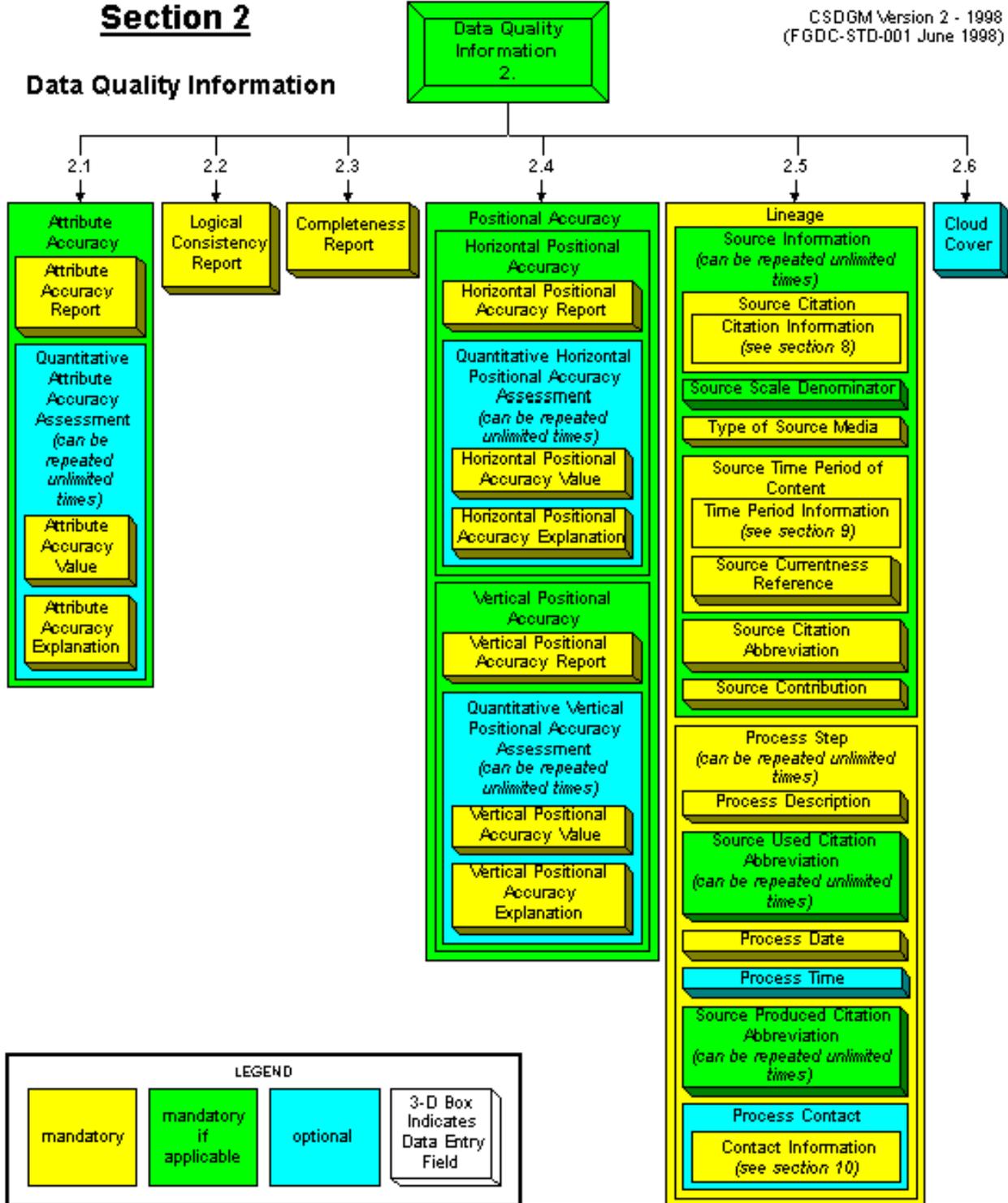
FAQ: Where are the data elements for the Cross Reference element?

Because the "Cross Reference" elements are required by another section, the elements were grouped in Section 8.

Section 2

CSDGM Version 2 - 1998
(FGDC-STD-001 June 1998)

Data Quality Information



Data Quality Information

- 2 Data Quality Information -- a general assessment of the quality of the data set. (Recommendations on information to be reported and tests to be performed are found in "Spatial Data Quality," which is chapter 3 of part 1 in Department of Commerce, 1992, Spatial Data Transfer Standard (SDTS) (Federal Information Processing Standard 173): Washington, Department of Commerce, National Institute of Standards and Technology.)

Type: compound

Short Name: dataqual

FAQ: Must the quality information be reported only in textual form?

No. Quality and other information can be provided in the form of browse graphics, or through online services. To provide non-textual information, furnish the URL of the graphic or service at the appropriate place in the quality report.

- 2.1 Attribute Accuracy -- an assessment of the accuracy of the identification of entities and assignment of attribute values in the data set.

Type: compound

Short Name: attracc

- 2.1.1 Attribute Accuracy Report -- an explanation of the accuracy of the identification of the entities and assignments of values in the data set and a description of the tests used.

Type: text

Domain: free text

Short Name: attraccr

- 2.1.2 Quantitative Attribute Accuracy Assessment -- a value assigned to summarize the accuracy of the identification of the entities and assignments of values in the data set and the identification of the test that yielded the value.

Type: compound

Short Name: qattracc

- 2.1.2.1 Attribute Accuracy Value -- an estimate of the accuracy of the identification of the entities and assignments of attribute values in the data set.

Type: text

Domain: "Unknown" free text

Short Name: attraccv

- 2.1.2.2 Attribute Accuracy Explanation -- the identification of the test that yielded the Attribute Accuracy Value.

Type: text

Domain: free text

Short Name: attracce

FAQ: What is the difference between the Attribute Accuracy Report and the Quantitative Attribute Accuracy Assessment?

[This answer applies to both the attribute and positional accuracy elements.] The Attribute Accuracy Report is a complete description of the accuracy of the attribute information in the data set, include the

identification of tests used, testing methodology, results obtained, etc.

In developing the metadata standard, reviewers asked that a summary method of providing results also be permitted. While this summary method would not relieve producers of the obligation to provide a thorough report, it would allow users, especially those using a data catalog, to quickly exclude those data sets that obviously would not serve a user's needs. The Quantitative Attribute

Accuracy Assessment (and its horizontal and vertical accuracy counterparts) were provided in response to this request. A producer identifies the test used by name and the value obtained from the test. The derivation of these values should be described in the accuracy reports.

FAQ: What does SDTS say about attribute accuracy?

Attribute Accuracy

Accuracy assessment for measures on a continuous scale shall be performed using procedures similar to those used for positional accuracy (providing a numerical estimate of expected discrepancies). The report of a test of attribute accuracy shall include the data of the test and the dates of the materials used. In the case of different dates, the report shall describe the rates of change in the phenomena classified. Spatial variations in attribute accuracy may be reported in a quality overlay.

Accuracy tests for categorical attributes may be performed by one of the following methods. All methods shall make reference to map scale in interpreting classifications.

Deductive Estimate Any estimate, even a guess based on experience, is permitted. The basis for the deduction shall be explained. Statements such as "good" or "poor" should be explained in as quantitative a manner as possible.

Tests based on Independent Samples. A misclassification matrix shall be reported as counts of sample units cross-tabulated by the categories of the sample and of the tested material. The sampling procedure and the location of sample units shall be described.

Tests Based on Polygon Overlay. A misclassification matrix shall be reported as areas. The relationship between the two maps shall be explained; as far as possible, the two sources should be independent and on should have higher accuracy.

2.2 Logical Consistency Report -- an explanation of the fidelity of relationships in the data set and tests used.

Type: text
Domain: free text
Short Name: logic

FAQ: What does SDTS say about logical consistency?

Logical Consistency

A report on logical consistency shall describe the fidelity of relationships encoded in the data structure of the digital spatial data. The report shall detail the tests performed and the results of the tests.

Tests of Valid Values. Tests for permissible values may be applied to any data structure. Such a test can detect gross blunders, but it does not ensure all aspects of logical consistency.

General Tests for Graphic Data. A data base containing lines may be subjected to the following general

questions:

- Do lines intersect only where intended?
- Are any lines entered twice?
- Are all areas completely described?
- Are there any overshoots or undershoots?
- Are any polygons too small, or any lines too close?

Different tests may be applied to address these questions, but the quality report shall contain a description of the tests applied or a reference to documentation of the software used. The report shall state whether all inconsistencies were corrected or it shall detail the remaining errors by case.

Specific Topological Tests. For exhaustive areal coverage data transmitted as chains or derived from chains, it is permissible to report logical consistency as "Topologically Clean" under the condition that an automated procedure has verified the following conditions:

- (a) All chains intersect at nodes. Use of exact case or tolerance shall be reported.
- (b) Cycles of chains and nodes are consistent around polygons. Or, alternatively, cycles of chains and polygons are consistent around nodes.
- (c) Inner rings embed consistently in enclosing polygons.

The quality report shall identify the software (name and version) used to verify these conditions.

Date of Test. The report shall include the date on which the tests were applied. If corrections and modifications have occurred after the test for logical consistency, the quality report shall indicate how the new information was checked for logical consistency.

2.3 Completeness Report -- information about omissions, selection criteria, generalization, definitions used, and other rules used to derive the data set.

Type: text

Domain: free text

Short Name: complete

FAQ: What does SDTS say about completeness?

Completeness

The quality report shall include information about selection criteria, definitions used and other relevant mapping rules. For example, geometric thresholds such as minimum area or minimum width shall be reported.

In encoding spatial entities, standard geocodes (such as described in the FIPS codes for States, counties, municipalities, and places) shall be employed if possible. Deviations from standard definitions and interpretations shall be described.

The report on completeness shall describe the relationship between the objects represented and the abstract universe of all such objects. In particular, the report shall describe the exhaustiveness of a set of features. Exhaustiveness concerns spatial and taxonomic (attribute) properties, both of which can be tested. A test for spatial completeness can be obtained from topological tests for

logical consistency described in 3.4.3 [of SDTS]. Tests for taxonomic completeness operate by comparison of a master list of geocodes to the codes actually appearing in the file. The procedures used for testing and the results shall be described in the quality report.

2.4 Positional Accuracy -- an assessment of the accuracy of the positions of spatial objects.

Type: compound

Short Name: posacc

2.4.1 Horizontal Positional Accuracy -- an estimate of accuracy of the horizontal positions of the spatial objects.

Type: compound

Short Name: horizpa

2.4.1.1 Horizontal Positional Accuracy Report -- an explanation of the accuracy of the horizontal coordinate measurements and a description of the tests used.

Type: text

Domain: free text

Short Name: horizpar

2.4.1.2 Quantitative Horizontal Positional Accuracy Assessment -- numeric value assigned to summarize the accuracy of the horizontal coordinate measurements and the identification of the test that yielded the value.

Type: compound

Short Name: qhorizpa

2.4.1.2.1 Horizontal Positional Accuracy Value -- an estimate of the accuracy of the horizontal coordinate measurements in the data set expressed in (ground) meters.

Type: real

Domain: free real

Short Name: horizpav

2.4.1.2.2 Horizontal Positional Accuracy Explanation -- the identification of the test that yielded the Horizontal Positional Accuracy Value.

Type: text

Domain: free text

Short Name: horizpae

2.4.2 Vertical Positional Accuracy -- an estimate of accuracy of the vertical positions in the data set.

Type: compound

Short Name: vertacc

2.4.2.1 Vertical Positional Accuracy Report -- an explanation of the accuracy of the vertical coordinate measurements and a description of the tests used.

Type: text

Domain: free text

Short Name: vertaccr

2.4.2.2 Quantitative Vertical Positional Accuracy Assessment -- numeric value assigned to summarize the accuracy of vertical coordinate measurements and the identification of the test that yielded the value.

Type: compound

Short Name: qvertpa

2.4.2.2.1 Vertical Positional Accuracy Value -- an estimate of the accuracy of the vertical coordinate measurements in the data set expressed in (ground) meters.

Type: real

Domain: free real

Short Name: vertaccv

2.4.2.2.2 Vertical Positional Accuracy Explanation -- the identification of the test that yielded the Vertical Positional Accuracy Value.

Type: text

Domain: free text

Short Name: vertacce

FAQ: What is the difference between the positional accuracy reports and the positional quantitative accuracy assessments?

See faq for Attribute Accuracy (element 2.1).

FAQ: What does SDTS say about positional accuracy?

Positional Accuracy

The quality report portion on positional accuracy shall include the degree of compliance to the spatial registration standard (see section 4.1.3.5 [of SDTS]. Quality of control surveys shall be reported by using the procedures established in the geodetic standard. If a separate control survey has been used, it shall be described in the standard form, even if results fall below the recognized classification thresholds.

Descriptions of positional accuracy shall consider the quality of the final product after all transformations. The information on transformations forms a part of the lineage portion of the quality report.

The report of any test of positional accuracy shall include the date of the test. Variations in positional accuracy shall be reported either as additional attributes of each spatial object or through a quality overlay (reliability diagram).

Measures of positional accuracy may be obtained by one of the following optional methods.

Deductive Estimate. Any deductive statement based on knowledge of errors in each production step shall include reference to complete calibration tests and shall also describe assumptions concerning error propagation. Results from deductive estimates shall be distinguished from results of other tests.

Internal Evidence. Federal Geodetic Control Committee procedures will be used for tests based on repeated measurement and redundancy such as closure of traverse or residuals from an adjustment.

Comparison to Source. When using graphic inspection of results ("check plots"), the geometric tolerances applied shall be reported and the method of registration shall also be described. Use of check plots shall be included in the lineage portion.

Independent Source of Higher Accuracy. The preferred test for positional accuracy is a comparison to an independent source of higher accuracy. The test shall be conducted using the rules prescribed in the "ASPRS Accuracy Standards for Large Scale Maps" (see 1.3.3 [of SDTS]). When the dates of testing and source material differ, the report shall describe the procedures used

to ensure that the results relate to positional error and not to temporal effects. The numerical results in ground units, as well as the number and location of the test points, shall be reported. A statement of compliance to a particular threshold is not adequate in itself. This test may only be applicable to well-defined points.

2.5 Lineage -- information about the events, parameters, and source data which constructed the data set, and information about the responsible parties.

Type: compound

Short Name: lineage

2.5.1 Source Information -- list of sources and a short discussion of the information contributed by each.

Type: compound

Short Name: srcinfo

2.5.1.1 Source Citation -- reference for a source data set.

Type: compound

Short Name: srccite

FAQ: Where are the data elements for the "Source Citation" element?

Because the elements are required by another section, the elements were grouped in Section 8.

2.5.1.2 Source Scale Denominator -- the denominator of the representative fraction on a map (for example, on a 1:24,000-scale map, the Source Scale Denominator is 24000).

Type: integer

Domain: Source Scale Denominator > 1

Short Name: srcscale

2.5.1.3 Type of Source Media -- the medium of the source data set.

Type: text

Domain: "paper" "stable-base material" "microfiche" "microfilm"
"audiocassette" "chart" "filmstrip" "transparency" "videocassette" "videodisc"
"videotape" "physical model" "computer program" "disc" "cartridge tape"
"magnetic tape" "online" "CD-ROM" "electronic bulletin board" "electronic
mail system" free text

Short Name: typesrc

2.5.1.4 Source Time Period of Content -- time period(s) for which the source data set corresponds to the ground.

Type: compound

Short Name: srctime

2.5.1.4.1 Source Currentness Reference -- the basis on which the source time period of content information of the source data set is determined.

Type: text

Domain: "ground condition" "publication date" free text

Short Name: srccurr

- 2.5.1.5 Source Citation Abbreviation -- short-form alias for the source citation.
Type: text
Domain: free text
Short Name: srccitea
- 2.5.1.6 Source Contribution -- brief statement identifying the information contributed by the source to the data set.
Type: text
Domain: free text
Short Name: srccontr
- 2.5.2 Process Step -- information about a single event.
Type: compound
Short Name: procstep
- 2.5.2.1 Process Description -- an explanation of the event and related parameters or tolerances.
Type: text
Domain: free text
Short Name: procdesc
- 2.5.2.2 Source Used Citation Abbreviation -- the Source Citation Abbreviation of a data set used in the processing step.
Type: text
Domain: Source Citation Abbreviations from the Source Information entries for the data set.
Short Name: srcused
- 2.5.2.3 Process Date -- the date when the event was completed.
Type: date
Domain: "Unknown" "Not complete" free date
Short Name: procddate
- 2.5.2.4 Process Time -- the time when the event was completed.
Type: time
Domain: free time
Short Name: proctime
- 2.5.2.5 Source Produced Citation Abbreviation -- the Source Citation Abbreviation of an intermediate data set that (1) is significant in the opinion of the data producer, (2) is generated in the processing step, and (3) is used in later processing steps.
Type: text
Domain: Source Citation Abbreviations from the Source Information entries for the data set.
Short Name: srcprod
- 2.5.2.6 Process Contact -- the party responsible for the processing step information.
Type: compound
Short Name: proccont

FAQ: Where are the data elements for the "Process Contact" element?

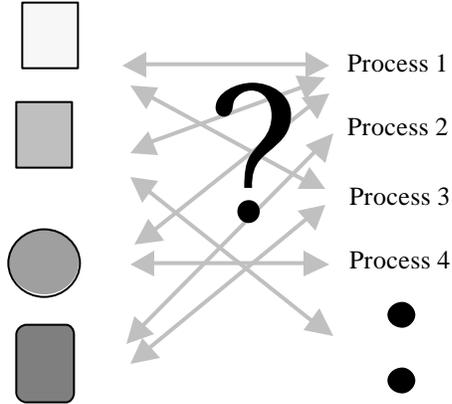
Because the elements are required by another section, the elements were grouped in Section 10.

FAQ: How do the "Source Citation Abbreviation" and "Source Used Citation Abbreviation" work?

The standards are a set of sources (the "Source Information" element) and a set of processes (the "Process Step" element). Usually, many sources and many processes are used to develop a data set of geospatial data. How can the sources and the process steps be linked?

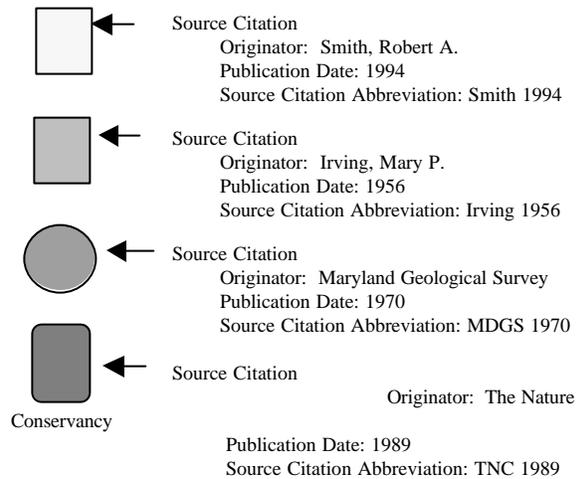
One could describe each source used in the description of each processing step, or describe all the processing steps in which each source participates in the description of the sources. A between way would be to link the source descriptions to the appropriate processing steps. The standards do this through the source abbreviations.

How can the sources and the processing steps be linked?



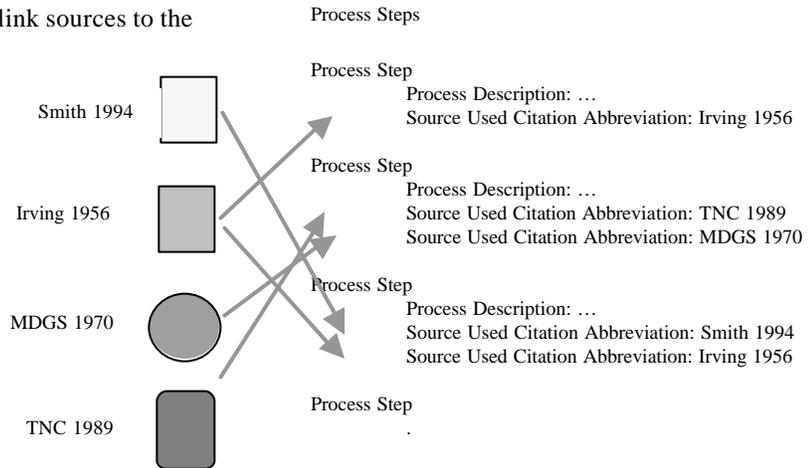
Assign a unique abbreviation to each source. The standards do not describe how to create the abbreviation. One means is to use the Originator and Publication Date of the source. Other styles also are possible. For example, a discipline that had a standard style for citing references in professional papers might choose that style for the abbreviation. Large organizations that have a library of source materials may choose to use the library's unique identifier for each source as the abbreviation. The most important thing is that each source must have a unique abbreviation.

Source Information



Assign a unique abbreviation to each source

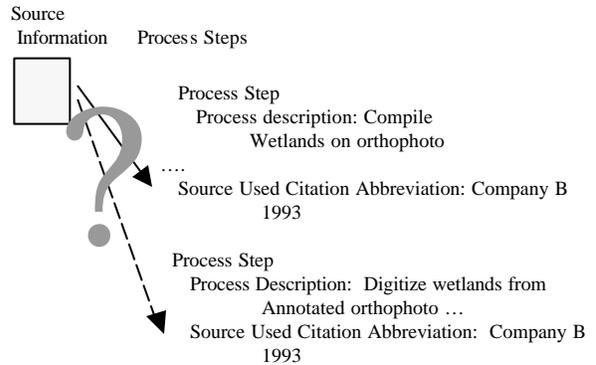
Use the abbreviations to link sources to the processing steps.



FAQ: How does the "Source Produced Citation Abbreviation" work?

The "Source Produced Citation Abbreviation" is used when a process generates an intermediate data set that an organization wishes to note separately. To use this feature, the intermediate data set must be documented as a source. It can be referenced by any processing step.

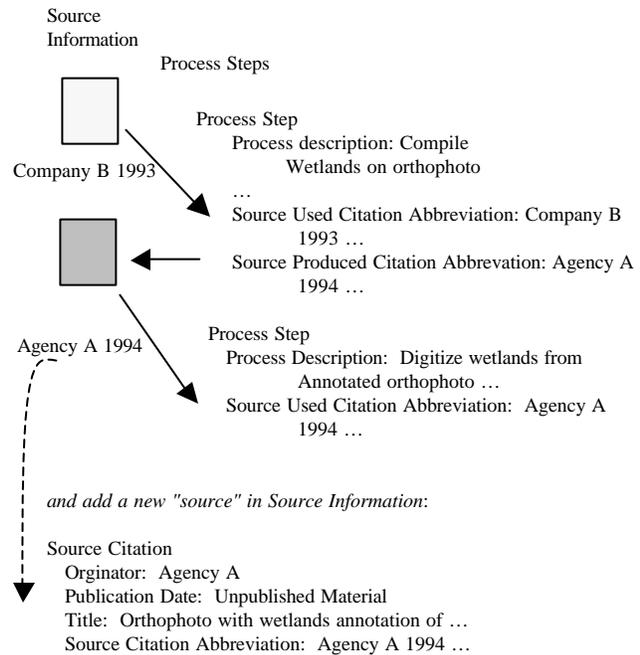
For example (see figures at right), an organization (named Agency A), might compile wetlands information on an orthophoto and then digitizes wetlands information. The organization wishes to document the activity using the standards, and requires that the compilation and digitizing process steps be described separately. In addition, the organization obtained the orthophoto from another organization (named Company B).



In source "Company B 1993" the source for the second processing step.

In the first process step, wetlands are compiled onto the orthophoto (source Company B 1993). In the second step, the wetlands are digitized from the annotated orthophoto. But from what source? One choice is source Company B 1993, although that source (the orthophoto) does not have the compiled wetlands information.

Another choice is to have the first process step produce a "source" which is the annotated orthophoto. This source would be described using the Source Information element, and abbreviated as Agency A 1994. Source Agency A 1994 (the annotated orthophoto) can then be referenced by subsequent process steps.



FAQ: What does SDTS say about lineage?

Lineage

The lineage portion of a quality report shall include a description of the source material from which the data were derived and the methods of derivation, including all transformations involved in producing the final digital files. The description shall include the dates of the source material and the dates of ancillary information used for update. The date assigned to a source shall reflect the date that the information corresponds to the ground; however, if this date is not known, then a date of publication may be used, if declared as such.

Any data base created by merging information obtained from distinct sources shall be described in sufficient detail to identify the actual source for each element in the file. In these cases, either a lineage code on each element or a quality overlay (course data index, etc.) shall be required.

The lineage portion shall also include reference to the specific control information used. Control form the National Geodetic Reference System shall be identified according to identifiers in that system, while other points used for control shall be described with sufficient detail to allow recovery.

The lineage portion shall describe the mathematical transformations of coordinates used in each step from the source material to the final product. The locations of any registration point for coordinate transformations shall be given. The methods used to make coordinate transformations shall be documented. To fulfill this standard, it is acceptable to make reference to separate documentation for the coordinate transformation algorithm used, but the specific parameters applied shall be described for the particular case. Documentation of a transformation algorithm shall include the nature of computational steps taken to avoid loss of digits through roundoff and

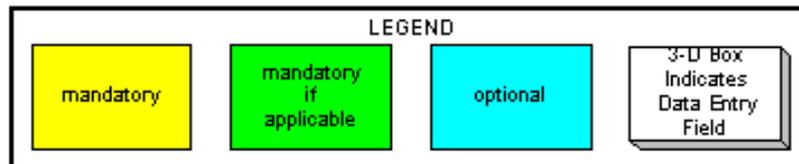
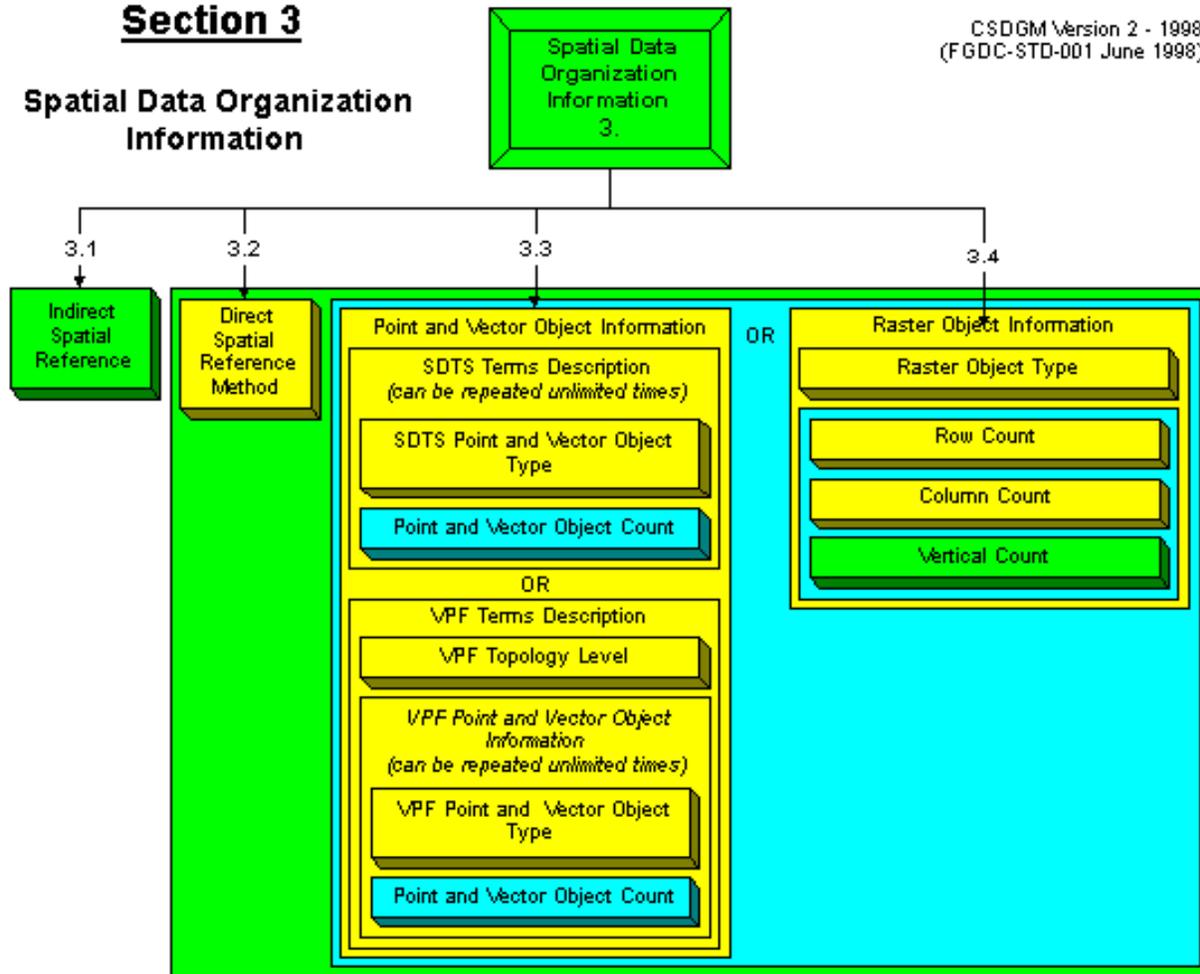
shall include a set of sample computations including numerical values of coefficients to confirm equivalence of transformations. The documentation of a transformation algorithm shall be available on request by a user obtaining digital data even if that user is not licensed to use the particular software.

- 2.6 Cloud Cover -- area of a data set obstructed by clouds, expressed as a percentage of the spatial extent.
Type: integer
Domain: $0 \leq \text{Cloud Cover} \leq 100$ "Unknown"
Short Name: cloud

Section 3

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Spatial Data Organization Information



Spatial Data Organization Information

3 Spatial Data Organization Information -- the mechanism used to represent spatial information in the data set.

Type: compound

Short Name: spdoinfo

3.1 Indirect Spatial Reference -- name of types of geographic features, addressing schemes, or other means through which locations are referenced in the data set.

Type: text

Domain: free text

Short Name: indspref

FAQ: What is an indirect spatial reference?

An indirect spatial reference is any way to describe a location without using coordinates. Indirect spatial reference methods usually use a geographic feature, such as a county, state, township or section of the Public Land Survey System, or a road, to uniquely identify a place. The reference may use the name of the feature) for example "Westmoreland County") or a code that identifies the feature (such as a county FIPS code). Other examples of indirect spatial references include street addresses, linear reference systems, and River Reach codes.

FAQ: Why are indirect spatial references included in the metadata standards?

Indirect spatial references are included because they are a very common means by which observations or other attribute information are tied to a place. The location of many socioeconomic, environmental, and other data often are referenced by identifying a unit of political geography (e.g. a city, county, or state), census geography (e.g. block, block group, or tract), street address, linear referencing systems (e.g. milepost), and so on. While these indirect spatial references alone may not be sufficient for geographic analyses, they can serve as a means to link the attribute data to coordinate descriptions of the places to which the attribute data apply.

3.2 Direct Spatial Reference Method -- the system of objects used to represent space in the data set.

Type: text

Domain: "Point" "Vector" "Raster"

Short Name: direct

3.3 Point and Vector Object Information -- the types and numbers of vector or nongridDED point spatial objects in the data set.

Type: compound

Short Name: ptvctinf

3.3.1 SDTS Terms Description -- point and vector object information using the terminology and concepts from "Spatial Data Concepts," which is Chapter 2 of Part 1 in Department of Commerce, 1992, Spatial Data Transfer Standard (SDTS) (Federal Information Processing Standard 173): Washington, Department of Commerce, National Institute of Standards and Technology. (Note that this reference to the SDTS is used ONLY to provide a set of terminology for the point and vector objects.)

Type: compound

Short Name: sdtsterm

3.3.1.1 SDTS Point and Vector Object Type -- name of point and vector spatial objects used to locate zero-, one-, and two-dimensional spatial locations in the data set.

Type: text

Domain: (The domain is from "Spatial Data Concepts," which is Chapter 2 of Part 1 in Department of Commerce, 1992, Spatial Data Transfer Standard (SDTS) (Federal Information Processing Standard 173): Washington, Department of Commerce, National Institute of Standards and Technology):
"Point" "Entity point" "Label point" "Area point" "Node, planar graph"
"Node, network" "String" "Link" "Complete chain" "Area chain"
"Network chain, planar graph" "Network chain, nonplanar graph"
"Circular arc, three point center" "Elliptical arc" "Uniform B-spline"
"Piecewise Bezier" "Ring with mixed composition"
"Ring composed of strings" "Ring composed of chains"
"Ring composed of arcs" "G-polygon" "GT-polygon composed of rings"
"GT-polygon composed of chains"
"Universe polygon composed of rings"
"Universe polygon composed of chains"
"Void polygon composed of rings" "Void polygon composed of chains"

Short Name: sdtstype

3.3.1.2 Point and Vector Object Count -- the total number of the point or vector object type occurring in the data set.

Type: integer

Domain: Point and Vector Object Count > 0

Short Name: ptvctcnt

3.3.2 VPF Terms Description -- point and vector object information using the terminology and concepts from Department of Defense, 1992, Vector Product Format (MIL-STD-600006): Philadelphia, Department of Defense, Defense Printing Service Detachment Office. (Note that this reference to the VPF is used ONLY to provide a set of terminology for the point and vector objects.)

Type: compound

Short Name: vpfterm

3.3.2.1 VPF Topology Level -- the completeness of the topology carried by the data set. The levels of completeness are defined in Department of Defense, 1992, Vector Product Format (MIL-STD-600006): Philadelphia, Department of Defense, Defense Printing Service Detachment Office.

Type: integer

Domain: $0 \leq \text{VPF Topology Level} \leq 3$

Short Name: vpflevel

3.3.2.2 VPF Point and Vector Object Information -- information about VPF point and vector objects

Type: compound

Short Name: vpfinfo

3.3.2.2.1 VPF Point and Vector Object Type -- name of point and vector spatial objects used to locate zero-, one-, and two-dimensional spatial locations in the data set.

Type: text

Domain: (The domain is from Department of Defense, 1992, Vector Product Format (MIL-STD-600006): Philadelphia, Department of Defense, Defense Printing Service Detachment Office):
"Node" "Edge" "Face" "Text"

Short Name: vpftype

3.4 Raster Object Information -- the types and numbers of raster spatial objects in the data set.

Type: compound

Short Name: rastinfo

3.4.1 Raster Object Type -- raster spatial objects used to locate zero-, two-, or three-dimensional locations in the data set.

Type: text

Domain: (With the exception of "voxel", the domain is from "Spatial Data Concepts," which is chapter 2 of part 1 in Department of Commerce, 1992, Spatial Data Transfer Standard (SDTS) (Federal Information Processing Standard 173): Washington, Department of Commerce, National Institute of Standards and Technology):

"Point" "Pixel" "Grid Cell" "Voxel"

Short Name: rasttype

3.4.2 Row Count -- the maximum number of raster objects along the ordinate (y) axis. For use with rectangular raster objects.

Type: Integer

Domain: Row Count > 0

Short Name: rowcount

3.4.3 Column Count -- the maximum number of raster objects along the abscissa (x) axis. For use with rectangular raster objects.

Type: Integer

Domain: Column Count > 0

Short Name: colcount

3.4.4 Vertical Count -- the maximum number of raster objects along the vertical (z) axis. For use with rectangular volumetric raster objects (voxels).

Type: Integer

Domain: Depth Count > 0

Short Name: vrtcount

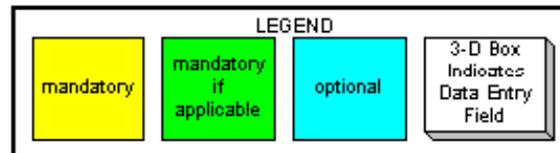
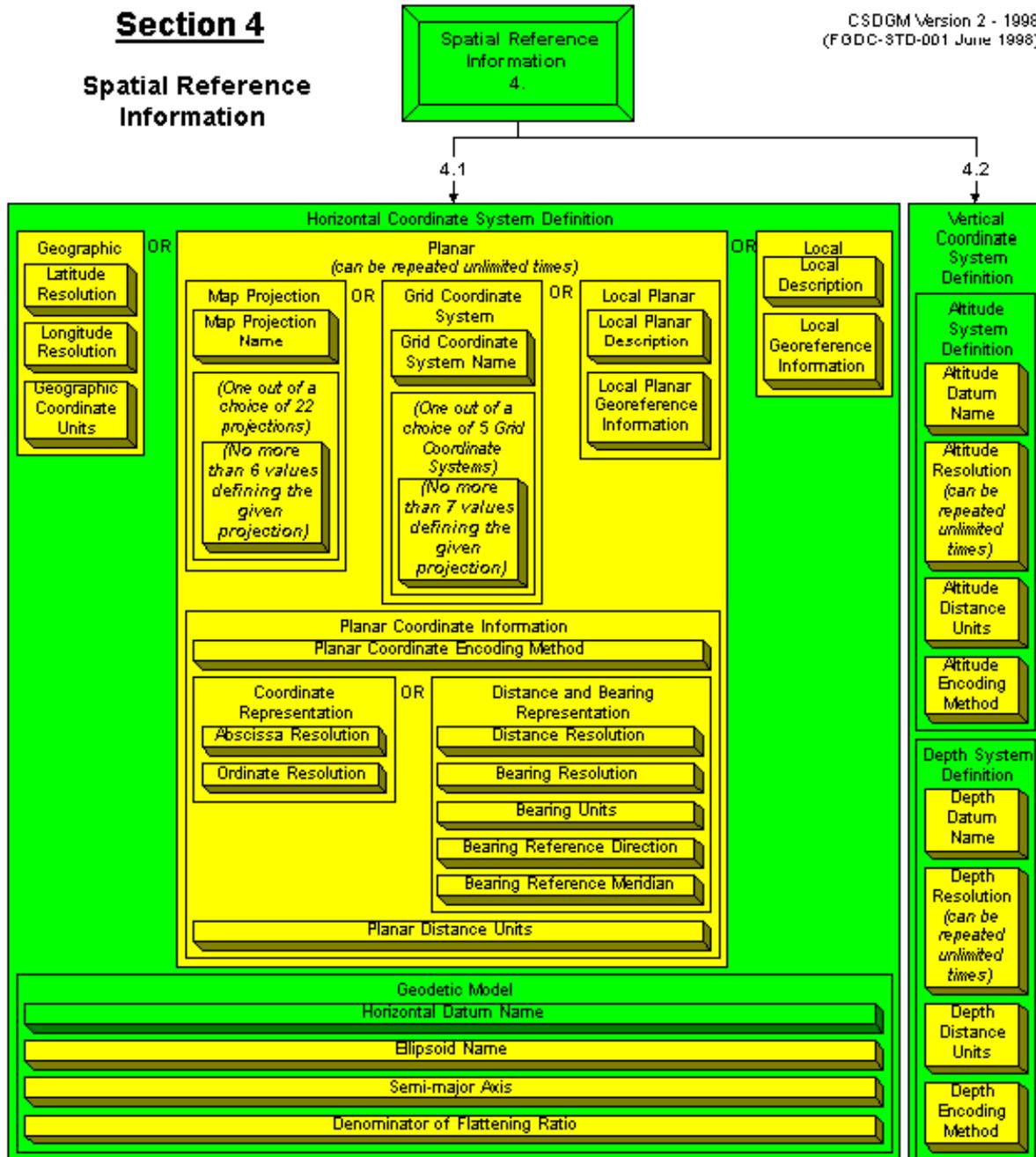
FAQ: Where can I record the resolution of the raster objects?

Coordinate resolution information is encoded in section 4. For raster data recorded in geographic (longitude-latitude) coordinates, use "Latitude Resolution" (4.1.1.1) and "Longitude Resolution" (4.1.1.2). For planar (x-y) coordinates, use "Abscissa Resolution" (4.1.2.4.2.1) and "Ordinate Resolution" (4.1.2.4.2.2). For other (local) systems, include resolution information in "Local Description" (4.1.3.1). The resolution of vertical measurements should be provided in "Altitude Resolution" (4.2.1.2) for altitudes or elevations and "Depth Resolution" (4.2.2.2) for depths.

Section 4

Spatial Reference Information

CSDGM Version 2 - 1998
(FGDC-STD-001 June 1998)



Spatial Reference Information

4 Spatial Reference Information -- the description of the reference frame for, and the means to encode, coordinates in the data set.

Type: compound
Short Name: spref

4.1 Horizontal Coordinate System Definition -- the reference frame or system from which linear or angular quantities are measured and assigned to the position that a point occupies.

Type: compound
Short Name: horizsys

4.1.1 Geographic -- the quantities of latitude and longitude which define the position of a point on the Earth's surface with respect to a reference spheroid.

Type: compound
Short Name: geograph

4.1.1.1 Latitude Resolution -- the minimum difference between two adjacent latitude values expressed in Geographic Coordinate Units of measure.

Type: real
Domain: Latitude Resolution > 0.0
Short Name: latres

4.1.1.2 Longitude Resolution -- the minimum difference between two adjacent longitude values expressed in Geographic Coordinate Units of measure.

Type: real
Domain: Longitude Resolution > 0.0
Short Name: longres

4.1.1.3 Geographic Coordinate Units -- units of measure used for the latitude and longitude values.

Type: text
Domain: "Decimal degrees" "Decimal minutes" "Decimal seconds" "Degrees
and decimal minutes" "Degrees, minutes, and decimal seconds" "Radians"
"Grads"
Short Name: geogunit

4.1.2 Planar -- the quantities of distances, or distances and angles, which define the position of a point on a reference plane to which the surface of the Earth has been projected.

Type: compound
Short Name: planar

FAQ: (!) Do I really need to do all the map projections that follow? all the grid systems that follow? (!)

Remember that the purpose of the metadata standards is to allow the description of data sets. The standards provide explicit means to encode parameters for map projections and grid systems that are commonly used in the United States, as well as the means to develop encodings of parameters for map projections and grid systems that are used less frequently. You only need to use the parts of the standards for the maps projections and grid systems that you use in your data sets. The rest of the map projections and grid systems don't apply to you; ignore them.

4.1.2.1 Map Projection -- the systematic representation of all or part of the surface of the Earth on a plane or developable surface.

Type: compound

Short Name: mapproj

4.1.2.1.1 Map Projection Name -- name of the map projection.

Type: text

Domain: "Albers Conical Equal Area" "Azimuthal Equidistant"

"Equidistant Conic" "Equirectangular" "General Vertical Near-sided Perspective" "Gnomonic" "Lambert Azimuthal Equal Area"

"Lambert Conformal Conic" "Mercator" "Modified Stereographic for Alaska" "Miller Cylindrical" "Oblique Mercator" "Orthographic" "Polar Stereographic" "Polyconic" "Robinson" "Sinusoidal" "Space Oblique Mercator" "Stereographic" "Transverse Mercator" "van der Grinten" free

text

Short Name: mapprojn

4.1.2.1.2 Albers Conical Equal Area -- contains parameters for the Albers Conical Equal Area projection.

Type: compound

Short Name: albers

4.1.2.1.3 Azimuthal Equidistant -- contains parameters for the Azimuthal Equidistant projection.

Type: compound

Short Name:azimequi

4.1.2.1.4 Equidistant Conic -- contains parameters for the Equidistant Conic projection.

Type: compound

Short Name: equicon

4.1.2.1.5 Equirectangular -- contains parameters for the Equirectangular projection.

Type: compound

Short Name: equirect

4.1.2.1.6 General Vertical Near-sided Perspective -- contains parameters for the General Vertical Near-sided Perspective projection.

Type: compound

Short Name: gvnspp

4.1.2.1.7 Gnomonic -- contains parameters for the Gnomonic projection.

Type: compound

Short Name: gnomonic

4.1.2.1.8 Lambert Azimuthal Equal Area -- contains parameters for the Lambert Azimuthal Equal Area projection.

Type: compound

Short Name: lamberta

4.1.2.1.9 Lambert Conformal Conic -- contains parameters for the Lambert Conformal Conic projection.

Type: compound

Short Name:lambertc

- 4.1.2.1.10 Mercator -- contains parameters for the Mercator projection
 Type: compound
 Short Name: mercator

- 4.1.2.1.11 Modified Stereographic for Alaska -- contains parameters for the Modified Stereographic for Alaska projection.
 Type: compound
 Short Name: modsak

- 4.1.2.1.12 Miller Cylindrical -- contains parameters for the Miller Cylindrical projection.
 Type: compound
 Short Name: miller

- 4.1.2.1.13 Oblique Mercator -- contains parameters for the Oblique Mercator projection.
 Type: compound
 Short Name: obqmerc

- 4.1.2.1.14 Orthographic -- contains parameters for the Orthographic projection
 Type: compound
 Short Name: orthogr

- 4.1.2.1.15 Polar Stereographic -- contains parameters for the Polar Stereographic projection.
 Type: compound
 Short Name: polarst

- 4.1.2.1.16 Polyconic -- contains parameters for the Polyconic projection.
 Type: compound
 Short Name: polycon

- 4.1.2.1.17 Robinson -- contains parameters for the Robinson projection.
 Type: compound
 Short Name: robinson

- 4.1.2.1.18 Sinusoidal -- contains parameters for the Sinusoidal projection.
 Type: compound
 Short Name: sinusoid

- 4.1.2.1.19 Space Oblique Mercator (Landsat) -- contains parameters for the Space Oblique Mercator (Landsat) projection.
 Type: compound
 Short Name: spaceobq

- 4.1.2.1.20 Stereographic -- contains parameters for the Stereographic projection.
 Type: compound
 Short Name: stereo

- 4.1.2.1.21 Transverse Mercator -- contains parameters for the Transverse mercator projection.
 Type: compound
 Short Name: transmer

4.1.2.1.22 van der Grinten -- contains parameters for the van der Grinten projection.

Type: compound
Short Name: vdgrin

4.1.2.1.23 Map Projection Parameters -- a complete parameter set of the projection that was used for the data set. The information provided shall include the names of the parameters and values used for the data set that describe the mathematical relationship between the Earth and the plane or developable surface for the projection.

Type: compound
Short Name: mapprojp

Assemble the parameters for the projection as follows:

Albers Conical Equal Area

(one or two occurrences of) Standard Parallel:
Longitude of Central Meridian:
Latitude of Projection Origin:
False Easting:
False Northing:

Lambert Azimuthal Equal Area

Longitude of Projection Center:
Latitude of Projection Center:
False Easting:
False Northing:

Azimuthal Equidistant

Longitude of Central Meridian:
Latitude of Projection Origin:
False Easting:
False Northing:

Lambert Conformal Conic

(one or two occurrences of) Standard Parallel:
Longitude of Central Meridian:
Latitude of Projection Origin:
False Easting:
False Northing:

Equidistant Conic

(one of two occurrences of) Standard Parallel:
Longitude of Central Meridian:
Latitude of Projection Origin:
False Easting:
False Northing:

Mercator

Standard Parallel: *or* Scale Factor at Equator:
Longitude of Central Meridian:
False Easting:
False Northing:

Equiarectangular

Standard Parallel:
Longitude of Central Meridian:
False Easting:
False Northing:

Modified Stereographic for Alaska

False Easting:
False Northing:

General Vertical Near-sided Perspective

Height of Perspective Point Above Surface:
Longitude of Projection Center:
Latitude of Projection Center:
False Easting:
False Northing:

Miller Cylindrical

Longitude of Central Meridian:
False Easting:
False Northing:

Gnomonic:

Longitude of Projection Center:
Latitude of Projection Center:
False Easting:
False Northing:

Oblique Mercator
Scale Factor at Center Line:
Oblique Line Azimuth
Azimuthal Angle:
Azimuth Measure Point Longitude:

or

Oblique Line Point
(two occurrences of both)
Oblique Line Latitude:
Oblique Line Longitude:
Latitude of Projection Origin:
False Easting:
False Northing:

Orthographic
Longitude of Projection Center:
Latitude of Projection Center:
False Easting:
False Northing

Polar Stereographic
Straight-Vertical Longitude from Pole:
Standard Parallel:

or

Scale Factor at Projection Origin:
False Easting:
False Northing:

Polyconic
Longitude of Central Meridian:
Latitude of Projection Origin:
False Easting:
False Northing:

Robinson
Longitude of Projection Center:
False Easting:
False Northing:

Sinusoidal
Longitude of Central Meridian:
False Easting:
False Northing

Space Oblique Mercator (Landsat)
Landsat Number:
Path Number:
False Easting:
False Northing:

Stereographic
Longitude of Projection Center:
Latitude of Projection Center:
False Easting:
False Northing:

Transverse Mercator
Scale Factor at Central Meridian:
Longitude of Central Meridian:
Latitude of Projection Origin:
False Easting:
False Northing:

van der Grinten
Longitude of Central Meridian:
False Easting:
False Northing:

4.1.2.1.23.1 Standard Parallel -- line of constant latitude at which the surface of the Earth and the plane or developable surface intersect.

Type: real
Domain: $-90.0 \leq \text{Standard Parallel} \leq 90.0$
Short Name: stdparll

4.1.2.1.23.2 Longitude of Central Meridian -- the line of longitude at the center of a map projection generally used as the basis for constructing the projection.

Type: real
Domain: $-180.0 \leq \text{Longitude of Central Meridian} < 180.0$
Short Name: longcm

- 4.1.2.1.23.3 Latitude of Projection Origin -- latitude chosen as the origin of rectangular coordinates for a map projection.
 Type: real
 Domain: $-90.0 \leq \text{Latitude of Projection Origin} \leq 90.0$
 Short Name: latprjo
- 4.1.2.1.23.4 False Easting -- the value added to all "x" values in the rectangular coordinates for a map projection. This value frequently is assigned to eliminate negative numbers. Expressed in the unit of measure identified in Planar Coordinate Units.
 Type: real
 Domain: free real
 Short Name: feast
- 4.1.2.1.23.5 False Northing -- the value added to all "y" values in the rectangular coordinates for a map projection. This value frequently is assigned to eliminate negative numbers. Expressed in the unit of measure identified in Planar Coordinate Units.
 Type: real
 Domain: free real
 Short Name: fnorth
- 4.1.2.1.23.6 Scale Factor at Equator -- a multiplier for reducing a distance obtained from a map by computation or scaling to the actual distance along the equator.
 Type: real
 Domain: Scale Factor at Equator > 0.0
 Short Name: sfequat
- 4.1.2.1.23.7 Height of Perspective Point Above Surface -- height of viewpoint above the Earth, expressed in meters.
 Type: real
 Domain: Height of Perspective Point Above Surface > 0.0
 Short Name: heightpt
- 4.1.2.1.23.8 Longitude of Projection Center -- longitude of the point of projection for azimuthal projections.
 Type: real
 Domain: $-180.0 \leq \text{Longitude of Projection Center} < 180.0$
 Short Name: longpc
- 4.1.2.1.23.9 Latitude of Projection Center -- latitude of the point of projection for azimuthal projections.
 Type: real
 Domain: $-90.0 \leq \text{Latitude of Projection Center} \leq 90.0$
 Short Name: latprjc
- 4.1.2.1.23.10 Scale Factor at Center Line -- a multiplier for reducing a distance obtained from a map by computation or scaling to the actual distance along the center line.
 Type: real
 Domain: Scale Factor at Center Line > 0.0
 Short Name: sfctrln
- 4.1.2.1.23.11 Oblique Line Azimuth -- method used to describe the line along which an oblique mercator map projection is centered using the map projection origin and an azimuth.
 Type: compound
 Short Name: obqlazim
- 4.1.2.1.23.11.1 Azimuthal Angle -- angle measured clockwise from north, and expressed in degrees.
 Type: real
 Domain: $0.0 \leq \text{Azimuthal Angle} < 360.0$
 Short Name: azimangl

- 4.1.2.1.23.11.2 Azimuth Measure Point Longitude -- longitude of the map projection origin.
 Type: real
 Domain: $-180.0 \leq \text{Azimuth Measure Point Longitude} < 180.0$
 Short Name: azimptl
- 4.1.2.1.23.12 Oblique Line Point -- method used to describe the line along which an oblique mercator map projection is centered using two points near the limits of the mapped region that define the center line.
 Type: compound
 Short Name: obqlpt
- 4.1.2.1.23.12.1 Oblique Line Latitude -- latitude of a point defining the oblique line.
 Type: real
 Domain: $-90.0 \leq \text{Oblique Line Latitude} \leq 90.0$
 Short Name: obqllat
- 4.1.2.1.23.12.2 Oblique Line Longitude -- longitude of a point defining the oblique line.
 Type: real
 Domain: $-180.0 \leq \text{Oblique Line Longitude} < 180.0$
 Short Name: obqllong
- 4.1.2.1.23.13 Straight Vertical Longitude from Pole -- longitude to be oriented straight up from the North or South Pole.
 Type: real
 Domain: $-180.0 \leq \text{Straight Vertical Longitude from Pole} < 180.0$
 Short Name: svlong
- 4.1.2.1.23.14 Scale Factor at Projection Origin -- a multiplier for reducing a distance obtained from a map by computation or scaling to the actual distance at the projection origin.
 Type: real
 Domain: $\text{Scale Factor at Projection Origin} > 0.0$
 Short Name: sfprjorg
- 4.1.2.1.23.15 Landsat Number -- number of the Landsat satellite. (Note: This data element exists solely to provide a parameter needed to define the space oblique mercator projection. It is not used to identify data originating from a remote sensing vehicle.)
 Type: Integer
 Domain: free integer
 Short Name: landsat
- 4.1.2.1.23.16 Path Number -- number of the orbit of the Landsat satellite. (Note: This data element exists solely to provide a parameter needed to define the space oblique mercator projection. It is not used to identify data originating from a remote sensing vehicle.)
 Type: integer
 Domain: $0 < \text{Path Number} < 251$ for Landsats 1, 2, or 3
 $0 < \text{Path Number} < 233$ for Landsats 4 or 5
 free integer
 Short Name: pathnum
- 4.1.2.1.23.17 Scale Factor at Central Meridian -- a multiplier for reducing a distance obtained from a map by computation or scaling to the actual distance along the central meridian.
 Type: real
 Domain: $\text{Scale Factor at Central Meridian} > 0.0$
 Short Name: sfctrmer

4.1.2.1.23.18 Other Projection's Definition -- a description of a projection, not defined elsewhere in the standard, that was used for the data set. The information provided shall include the name of the projection, names of parameters and values used for the data set, and the citation of the specification for the algorithms that describe the mathematical relationship between Earth and plane or developable surface for the projection.

Type: text
Domain: free text
Short Name: otherprj

4.1.2.2 Grid Coordinate System -- a plane-rectangular coordinate system usually based on, and mathematically adjusted to, a map projection so that geographic positions can be readily transformed to and from plane coordinates.

Type: compound
Short Name gridsys

4.1.2.2.1 Grid Coordinate System Name -- name of the grid coordinate system.

Type: text
Domain: "Universal Transverse Mercator"
"Universal Polar Stereographic"
"State Plane Coordinate System 1927"
"State Plane Coordinate System 1983"
"ARC Coordinate System"
"other grid system"
Short Name: gridsysn

Assemble the parameters for the grid system as follows:

Universal Transverse Mercator

UTM Zone Number:
Transverse Mercator
(use parameters from *Transverse Mercator*)

State Plane Coordinate System

SPCS Zone Identifier
Lambert Conformal Conic
or
Transverse Mercator
or

Universal Polar Stereographic

UPS Zone Identifier:
Polar Stereographic
(use parameters from *Polar Stereographic*)

Oblique Mercator

or
Polyconic
(use parameters from the *appropriate projection*)

ARC Coordinate System

ARC System Zone Identifier:
Equirectangular
or
Azimuthal Equidistant
(use parameters from the *appropriate projection*)

4.1.2.2.2 Universal Transverse Mercator (UTM) -- a grid system based on the transverse mercator projection, applied between latitudes 84 degrees north and 80 degrees south on the Earth's surface.

Type: compound
Short Name: utm

- 4.1.2.2.2.1 UTM Zone Number -- identifier for the UTM zone.
 Type: integer
 Domain: 1 <= UTM Zone Number <= 60 for the northern hemisphere;
 -60 <= UTM Zone Number <= -1 for the southern hemisphere
 Short Name: utmzone
- 4.1.2.2.3 Universal Polar Stereographic (UPS) -- a grid system based on the polar stereographic projection, applied to the Earth's polar regions north of 84 degrees north and south of 80 degrees south.
 Type: compound
 Short Name: ups
- 4.1.2.2.3.1 UPS Zone Identifier -- identifier for the UPS zone.
 Type: text
 Domain: "A" "B" "Y" "Z"
 Short Name: upszone
- 4.1.2.2.4 State Plane Coordinate System (SPCS) -- a plane-rectangular coordinate system established for each state in the United States by the National Geodetic Survey.
 Type: compound
 Short Name: spcs
- 4.1.2.2.4.1 SPCS Zone Identifier -- identifier for the SPCS zone.
 Type: text
 Domain: Four-digit numeric codes for the State Plane Coordinate Systems based on the North American Datum of 1927 are found in Department of Commerce, 1986, Representation of geographic point locations for information interchange (Federal Information Processing Standard 70-1): Washington: Department of Commerce, National Institute of Standards and Technology. Codes for the State Plane Coordinate Systems based on the North American Datum of 1983 are found in Department of Commerce, 1989 (January), State Plane Coordinate System of 1983 (National Oceanic and Atmospheric Administration Manual NOS NGS 5): Silver Spring, Maryland, National Oceanic and Atmospheric Administration, National Ocean Service, Coast and Geodetic Survey.
 Short Name: spcszone
- 4.1.2.2.5 ARC Coordinate System -- the Equal Arc-second Coordinate System, a plane-rectangular coordinate system established in Department of Defense, 1990, Military specification ARC Digitized Raster Graphics (ADRG) (MIL-A-89007): Philadelphia, Department of Defense, Defense Printing Service Detachment Office.
 Type: compound
 Short Name: arcsys
- 4.1.2.2.5.1 ARC System Zone Identifier -- identifier for the ARC Coordinate System Zone.
 Type: integer
 Domain: 1 <= ARC System Zone Identifier <= 18
 Short Name: arczone
- 4.1.2.2.6 Other Grid System's Definition -- a complete description of a grid system, not defined elsewhere in this standard, that was used for the data set. The information provided shall include the name of the grid system, the names of the parameters and values used for the data set, and the citation of the specification for the algorithms that describe the mathematical relationship between the Earth and the coordinates of the grid system.
 Type: text
 Domain: free text
 Short Name: othergrd

4.1.2.3 Local Planar -- any right-handed planar coordinate system of which the z-axis coincides with a plumb line through the origin that locally is aligned with the surface of the Earth.

Type: compound

Short Name: localp

FAQ: What is the "local planar" system?

A local planar coordinate system is any planar coordinate system for which the relationship between the planar coordinates and geographic (latitude and longitude) coordinates is not known. In these cases, the standards ask the producer to describe the coordinate system (the orientation of the axes, etc.) And any means that can be used to link the local system to geographic coordinates.

4.1.2.3.1 Local Planar Description -- a description of the local planar system.

Type: text

Domain: free text

Short Name: localpd

4.1.2.3.2 Local Planar Georeference Information -- a description of the information provided to register the local planar system to the Earth (e.g. control points, satellite ephemeral data, inertial navigation data).

Type: text

Domain: free text

Short Name: localpgi

4.1.2.4 Planar Coordinate Information -- information about the coordinate system developed on the planar surface.

Type: compound

Short Name: planci

4.1.2.4.1 Planar Coordinate Encoding Method -- the means used to represent horizontal positions.

Type: text

Domain: "coordinate pair" "distance and bearing" "row and column"

Short Name: plance

4.1.2.4.2 Coordinate Representation -- the method of encoding the position of a point by measuring its distance from perpendicular reference axes (the "coordinate pair" and "row and column" methods).

Type: compound

Short Name: coordrep

4.1.2.4.2.1 Abscissa Resolution -- the (nominal) minimum distance between the "x" or column values of two adjacent points, expressed in Planar Distance Units of measure.

Type: real

Domain: Abscissa Resolution > 0.0

Short Name: absres

4.1.2.4.2.2 Ordinate Resolution -- the (nominal) minimum distance between the "y" or row values of two adjacent points, expressed in Planar Distance Units of measure.

Type: real

Domain: Ordinate Resolution > 0.0

Short Name: ordres

FAQ: What is meant by coordinate resolution?

The coordinate resolution is the smallest difference that can be encoded between the adjacent coordinate values in the data set. In raster data sets, these values normally are the dimensions of

the pixel or grid cell. In vector data sets, the resolution is the shortest line that can be encoded in the data set.

4.1.2.4.3 Distance and Bearing Representation -- a method of encoding the position of a point by measuring its distance and direction (azimuth angle) from another point.

Type: compound

Short Name: distbrep

4.1.2.4.3.1 Distance Resolution -- the minimum distance measurable between two points, expressed Planar Distance Units of measure.

Type: real

Domain: Distance Resolution > 0.0

Short Name: distres

4.1.2.4.3.2 Bearing Resolution -- the minimum angle measurable between two points, expressed in Bearing Units of measure.

Type: real

Domain: Bearing Resolution > 0.0

Short Name: bearres

4.1.2.4.3.3 Bearing Units -- units of measure used for angles.

Type: text

Domain: "Decimal degrees" "Decimal minutes" "Decimal seconds"
"Degrees and decimal minutes" "Degrees, minutes, and
decimal seconds" "Radians" "Grads"

Short Name: bearunit

4.1.2.4.3.4 Bearing Reference Direction -- direction from which the bearing is measured.

Type: text

Domain: "North" "South"

Short Name: bearrefd

4.1.2.4.3.5 Bearing Reference Meridian -- axis from which the bearing is measured.

Type: text

Domain: "Assumed" "Grid" "Magnetic" "Astronomic" "Geodetic"

Short Name: bearrefm

4.1.2.4.4 Planar Distance Units -- units of measure used for distances.

Type: text

Domain: "meters" "international feet" "survey feet" free text

Short Name: plandu

4.1.3 Local -- a description of any coordinate system that is not aligned with the surface of the Earth.

Type: compound

Short Name: local

FAQ: What is the "local" system?

A local coordinate system in any non-planar, non-geographic coordinate system. Examples include oblique photography and unrectified satellite images. In these cases, the standards ask the producer to describe the coordinate system and any means that can be used to link the local system to geographic coordinates.

4.1.3.1 Local Description -- a description of the coordinate system and its orientation to the surface of the Earth.

Type: text
Domain: free text
Short Name: localdes

4.1.3.2 Local Georeference Information -- a description of the information provided to register the local system to the Earth (e.g. control points, satellite ephemerical data, inertial navigation data).

Type: text
Domain: free text
Short Name: localgeo

4.1.4 Geodetic Model -- parameters for the shape of the earth.

Type: compound
Short Name: geodetic

4.1.4.1 Horizontal Datum Name -- the identification given to the reference system used for defining the coordinates of points.

Type: text
Domain: "North American Datum of 1927" "North American Datum of 1983" free text
Short Name: horizdn

4.1.4.2 Ellipsoid Name -- identification given to established representations of the Earth's shape.

Type: text
Domain: "Clarke 1866" "Geodetic Reference System 80" free text
Short Name: ellips

FAQ: Is there a relationship between horizontal datums and ellipsoids?

A horizontal datum is defined in part by the parameters of a reference ellipsoid.

FAQ: What are the ellipsoids associated with the horizontal datums listed in the domain of the "Horizontal Datum Name" element?

<u>Horizontal Datum</u>	<u>Ellipsoid</u>
North American Datum of 1927	Clarke 1866
North American Datum of 1983	Geodetic Reference System 80

4.1.4.3 Semi-major Axis -- radius of the equatorial axis of the ellipsoid.

Type: real
Domain: Semi-major Axis > 0.0
Short Name: semiaxis

4.1.4.4 Denominator of Flattening Ratio -- the denominator of the ratio of the difference between the equatorial and polar radii of the ellipsoid when the numerator is set to 1.

Type: real
Domain: Denominator of Flattening > 0.0
Short Name: denflat

FAQ: What are the values for the semi-major axis and denominator of flattening ratio for some commonly used ellipsoids?

The table below provides the values for some commonly used ellipsoids. Note, however, that it is important that you record the values that were used in your computer software with your data, and not merely those that are available in a reference book.

Name	Date	Semi-major (equatorial) axis, meters	Denominator of Flattening Ratio	Source
Geodetic Reference System 80	1980	6,378,137*	298.257	Snyder 1987**
			298.25722210088***	Department of Commerce 1989
World Geodetic System 72	1972	6,378,135 *	298.26	Snyder 1987****
Clarke	1866	6,378,206.4 *	294.98	Snyder 1987

* - Taken as exact values.

** - "Ellipsoid derived from adopted model of Earth. World Geodetic System 84 has same dimensions within accuracy shown." (Snyder 1987).

*** - To 14 significant digits by computation.

**** - Ellipsoid derived from adopted model of Earth.

4.2 Vertical Coordinate System Definition -- the reference frame or system from which vertical distances (altitudes or depths) are measured.

Type: compound

Short Name: vertdef

4.2.1 Altitude System Definition -- the reference frame or system from which altitudes (elevations) are measured. The term "altitude" is used instead of the common term "elevation" to conform to the terminology in Federal Information Processing Standards 70-1 and 173.

Type: compound

Short Name: altsys

4.2.1.1 Altitude Datum Name -- the identification given to the surface taken as the surface of reference from which altitudes are measured.

Type: text

Domain: "National Geodetic Vertical Datum of 1929" "North American Vertical Datum of 1988" free text

Short Name: altdatum

4.2.1.2 Altitude Resolution -- the minimum distance possible between two adjacent altitude values, expressed in Altitude Distance Units of measure.

Type: real

Domain: Altitude Resolution > 0.0

Short Name: altres

4.2.1.3 Altitude Distance Units -- units in which altitudes are recorded.

Type: text

Domain: "meters" "feet" free text

Short Name: altunits

4.2.1.4 Altitude Encoding Method -- the means used to encode the altitudes.

Type: text

Domain: "Explicit elevation coordinate included with horizontal coordinates"
"Implicit coordinate" "Attribute values"

Short Name: altenc

4.2.2 Depth System Definition -- the reference frame or system from which depths are measured.

Type: compound

Short Name: depthsys

4.2.2.1 Depth Datum Name -- the identification given to surface of reference from which depths are measured.

Type: text

Domain: "Local surface" "Chart datum; datum for sounding reduction"
"Lowest astronomical tide" "Highest astronomical tide" "Mean low water"
"Mean high water" "Mean sea level" "Land survey datum" "Mean low water springs"
"Mean high water springs" "Mean low water neap" "Mean high water neap"
"Mean lower low water" "Mean lower low water springs" "Mean higher high water"
"Mean higher low water" "Mean lower high water" "Spring tide" "Tropic low water"
"Neap tide" "High water" "Higher high water" "Low water"
"Low-water datum" "Lowest low water" "Lower low water" "Lowest normal low water"
"Mean tide level" "Indian spring low water" "High-water full and charge"
"Low-water full and charge" "Columbia River datum" "Gulf Coast low water datum"
"Equatorial springs low water" "Approximate lowest astronomical tide" "No correction" free text

Short Name: depthdn

4.2.2.2 Depth Resolution -- the minimum distance possible between two adjacent depth values, expressed in Depth Distance Units of measure.

Type: real

Domain: Depth Resolution > 0.0

Short Name: depthres

4.2.2.3 Depth Distance Units -- units in which depths are recorded.

Type: text

Domain: "meters" "feet" free text

Short Name: depthdu

4.2.2.4 Depth Encoding Method -- the means used to encode depths.

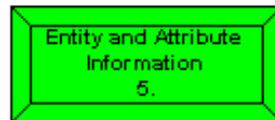
Type: text

Domain: "Explicit depth coordinate included with horizontal coordinates"
"Implicit coordinate" "Attribute values"

Short Name: depthem

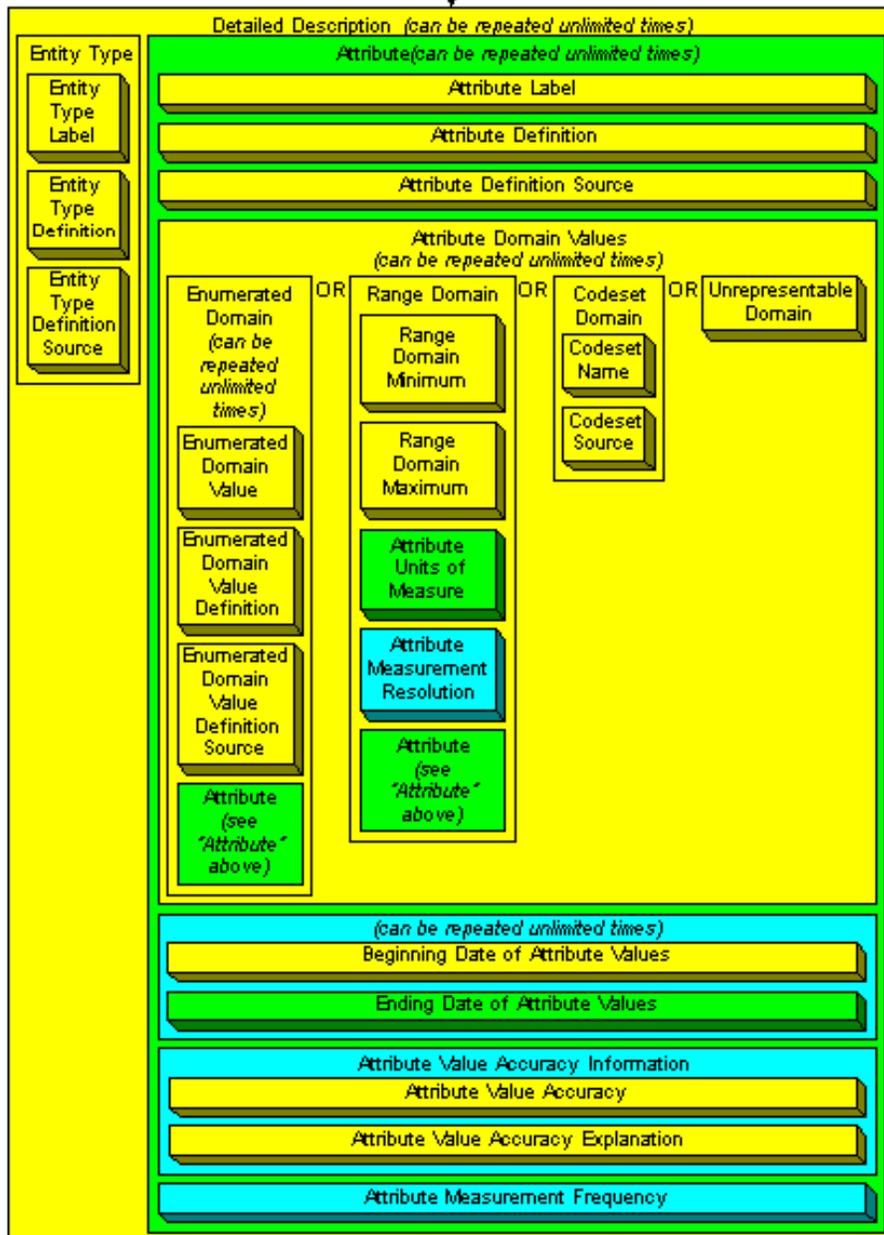
Section 5

Entity and Attribute Information

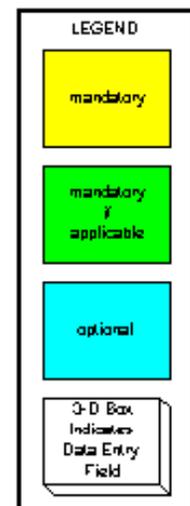
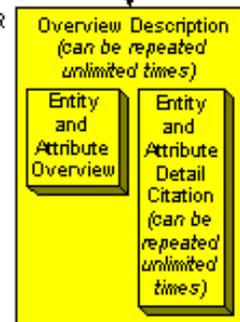


5.1

5.2



AND / OR



Entity and Attribute Information

5 Entity and Attribute Information -- details about the information content of the data set, including the entity types, their attributes, and the domains from which attribute values may be assigned.

Type: compound
Short Name: eainfo

FAQ: What is the purpose of the Entity and Attribute Information section?

Users of a data set need to know the meaning of entity, attribute, and attribute value information associated with the spatial information. For example, a data set might include the entity "road". A "road" might have the attribute "road type," which can be assigned the attribute values of "heavy duty," "medium duty," "light duty," or "trail." The producer of the data set may have different definitions for "road," "road type," "heavy duty," "medium duty," "light duty," or "trail" than a user. The Entity and Attribute Information section provides the way for a producer to describe the meaning of this nonspatial entity, attribute, and attribute value information so a user can understand the information content of a data set and use the data appropriately.

FAQ: What is the difference between the Detailed Description and Overview Description elements?

As stated above, users must have access to the meanings of the entities, attributes, and attribute values in a data set. The Detailed Description provides the elements needed to describe these meanings.

In developing the metadata standards, reviewers noted that they often had complete data dictionaries for the entity, attribute, and attribute value information, and preferred to refer to the existing descriptions instead of duplicating them. The Overview Description provides the elements needed to give users a sense of the information content and a reference to the source(s) of the complete description. Note that the Overview Description does not relieve the producer of the responsibility to provide a complete description. The Overview Description elements refers to the source of the complete description, and do not allow a producer merely to summarize the information content.

The two approaches can be used together to document a data set. The Overview Description would be used to describe data for which a complete description is available elsewhere; the Detailed Description would be used to describe data for which a complete description has not been compiled elsewhere.

5.1 Detailed Description -- description of the entities, attributes, attribute values, and related characteristics encoded in the data set.

Type: compound
Short Name: detailed

5.1.1 Entity Type -- the definition and description of a set into which similar entity instances are classified.

Type: compound
Short Name: enttype

5.1.1.1 Entity Type Label -- the name of the entity type.

Type: text
Domain: free text
Short Name: enttyp1

5.1.1.2 Entity Type Definition -- the description of the entity type.

Type: text
Domain: free text
Short Name: enttypd

5.1.1.3 Entity Type Definition Source -- the authority of the definition.

Type: text

Domain: free text

Short Name: enttypds

5.1.2 Attribute -- a defined characteristic of an entity.

Type: compound

Short Name: attr

5.1.2.1 Attribute Label -- the name of the attribute.

Type: text

Domain: free text

Short Name: attrlabl

5.1.2.2 Attribute Definition -- the description of the attribute.

Type: text

Domain: free text

Short Name: attrdef

5.1.2.3 Attribute Definition Source -- the authority of the definition.

Type: text

Domain: free text

Short Name: attrdefs

5.1.2.4 Attribute Domain Values -- the valid values that can be assigned for an attribute.

Type: compound

Short Name: attrdomv

FAQ: What is a domain? an enumerated domain? a range domain? a codeset domain? an unrepresentable domain?

A domain is the set of possible data values of an attribute. From the example used above, the domain for the attribute "road type" consists of "heavy duty," "medium duty," "light duty," and "trail."

An enumerated domain is one comprised of a list of values. The "road type" attribute has an enumerated domain which contains the values "heavy duty," "medium duty," "light duty," and "trail." In this case, the list of possible values, the definitions of the values, and the sources of the definitions should be provided.

A range domain is one comprised of a sequence, series, or scale of (usually numeric) values between limits. For example, an attribute of age might have a range domain of integers from 0 to 100. In this case, the minimum and maximum values should be provided.

A codeset domain is one in which the data values are defined by a set of codes. Examples include the Federal Information Processing Standards that contain numeric codes for nations, States, and counties. In this case, the title of the publication containing the code set and the source of the codeset should be provided.

An unrepresentable domain is one for which the set of data values cannot be represented. Reasons include attributes whose values do not exist in a known, predefined set (for example, the values for an attribute of people's names), or attributes whose values cannot be depicted using the forms of representation (available character set, etc) used for the metadata. In these cases, the information content of the set of values should be provided.

FAQ: What is the purpose of the "Attribute" compound element at the end of the "Enumerated Domain" and "Range Domain" compound elements?

Comments provided during the public review requested the ability to document a construct named "attribute of attribute value." This construct allows additional information to be provided about an attribute value

assigned to an entity. For example, an entity "well" may have an attribute "product." The attribute values for "product" include "water" and other items.

Additional information about the water from the well may be known. Using the "attribute of attribute value" construct, the value "water" is assigned attributes (for example "water characteristics") that provide this information.

5.1.2.4.1 Enumerated Domain -- the members of an established set of valid values.

Type: compound
Short Name: edom

5.1.2.4.1.1 Enumerated Domain Value -- the name or label of a member of the set.

Type: text
Domain: free text
Short Name: edomv

5.1.2.4.1.2 Enumerated Domain Value Definition -- the description of the value.

Type: text
Domain: free text
Short Name: edomvd

5.1.2.4.1.3 Enumerated Domain Value Definition Source -- the authority of the definition.

Type: text
Domain: free text
Short Name: edomvds

5.1.2.4.2 Range Domain -- the minimum and maximum values of a continuum of valid values.

Type: compound
Short Name: rdom

5.1.2.4.2.1 Range Domain Minimum -- the least value that the attribute can be assigned.

Type: text
Domain: free text
Short Name: rdommin

5.1.2.4.2.2 Range Domain Maximum -- the greatest value that the attribute can be assigned.

Type: text
Domain: free text
Short Name: rdommax

5.1.2.4.3 Codeset Domain -- reference to a standard or list which contains the members of an established set of valid values.

Type: compound
Short Name: codesetd

5.1.2.4.3.1 Codeset Name -- the title of the codeset.

Type: text
Domain: free text
Short Name: codesetn

5.1.2.4.3.2 Codeset Source -- the authority for the codeset.

Type: text
Domain: free text
Short Name: codesets

5.1.2.4.4 Unrepresentable Domain -- description of the values and reasons why they cannot be represented.

Type: text
Domain: free text
Short Name: udom

5.1.2.5 Attribute Units of Measure -- the standard of measurement for an attribute value.

Type: text
Domain: free text
Short Name: attrunit

5.1.2.6 Attribute Measurement Resolution -- the smallest unit increment to which an attribute value is measured.

Type: real
Domain: Attribute Measurement Resolution > 0.0
Short Name: attrmres

5.1.2.7 Beginning Date of Attribute Values -- earliest or only date for which the attribute values are current. In cases when a range of dates are provided, this is the earliest date for which the information is valid.

Type: date
Domain: free date
Short Name: begdatea

5.1.2.8 Ending Date of Attribute Values -- latest date for which the information is current. Used in cases when a range of dates are provided.

Type: date
Domain: free date
Short Name: enddatea

5.1.2.9 Attribute Value Accuracy Information -- an assessment of the accuracy of the assignment of attribute values.

Type: compound
Short Name: attrvai

FAQ: What is the purpose of the Attribute Value Accuracy Information element? How does it relate to the Attribute Accuracy element in section 2?

In developing the metadata standards, reviewers asked for the ability to report the accuracy of the values assigned to an attribute with the definition of the attribute. The ability to summarize the accuracy was included as an option. The complete report of the accuracy should be included in the Attribute Accuracy element in section 2.

5.1.2.9.1 Attribute Value Accuracy -- an estimate of the accuracy of the assignment of attribute values.

Type: real
Domain: free real
Short Name: attrva

5.1.2.9.2 Attribute Value Accuracy Explanation -- the definition of the Attribute Value Accuracy measure and units, and a description of how the estimate was derived.

Type: text
Domain: free text
Short Name: attrvae

5.1.2.10 Attribute Measurement Frequency -- the frequency with which attribute values are added.

Type: real

Domain: "Unknown" "As needed" "Irregular" "None planned" free text

Short Name: attrmfrq

5.2 Overview Description -- summary of, and citation to detailed description of, the information content of the data set.

Type: compound

Short Name: overview

5.2.1 Entity and Attribute Overview -- detailed summary of the information contained in a data set.

Type: text

Domain: free text

Short Name: eaover

5.2.2 Entity and Attribute Detail Citation -- reference to the complete description of the entity types, attributes, and attribute values for the data set.

Type: text

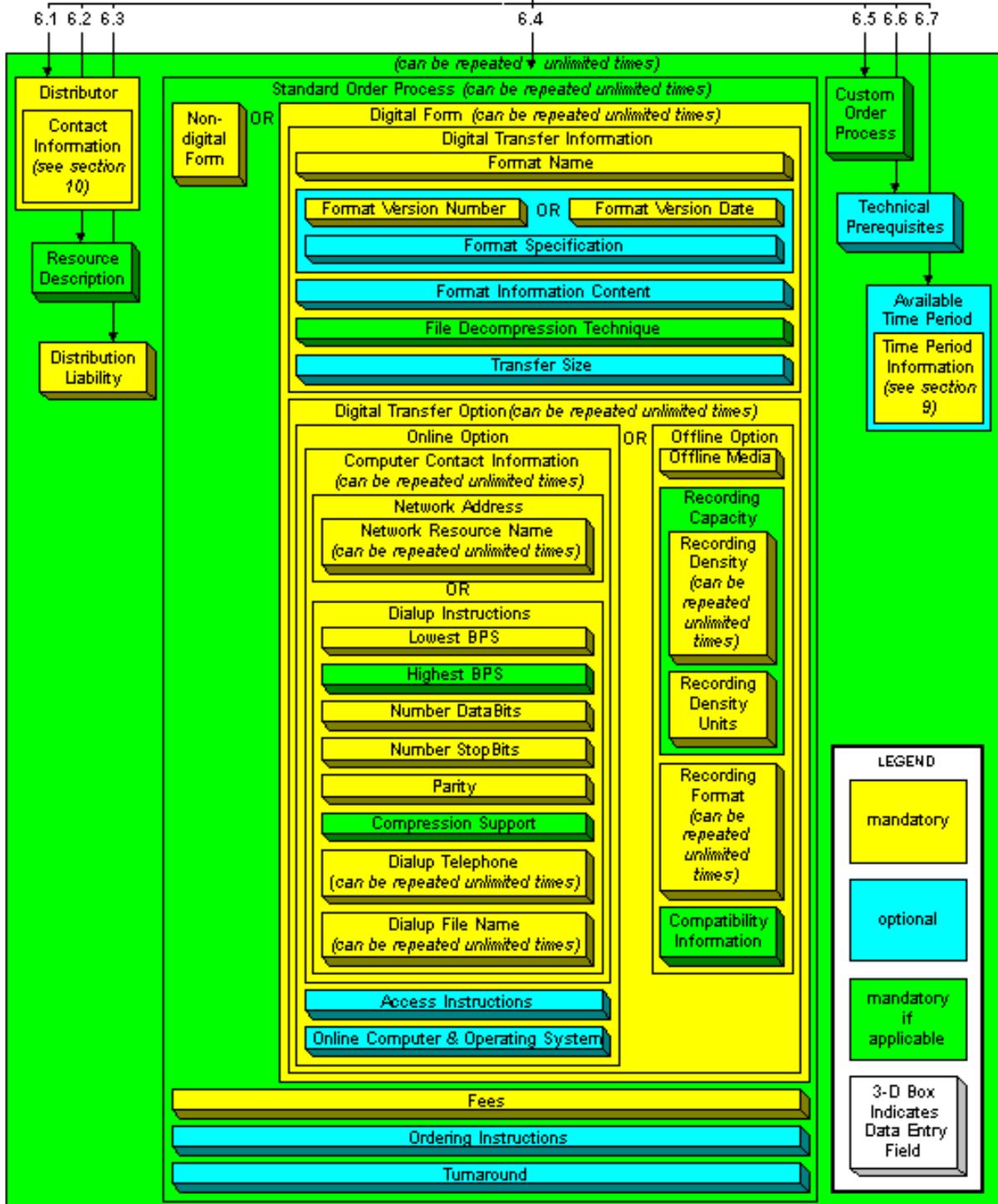
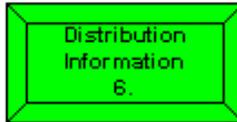
Domain: free text

Short Name: eadetcit

Section 6

CSDGM Version 2 - 1998
(FGDC-STD-001 June 1998)

Distribution Information



Distribution Information

6 Distribution Information -- information about the distributor of and options for obtaining the data set.

Type: compound

Short Name: distinfo

6.1 Distributor -- the party from whom the data set may be obtained.

Type: compound

Short Name: distrib

FAQ: Where are the data elements for the "Distributor" element?

Because the elements are required by another section, the elements were grouped in Section 10.

6.2 Resource Description -- the identifier by which the distributor knows the data set.

Type: text

Domain: free text

Short Name: resdesc

FAQ: What is an example of a Resource Description?

A Resource Description is a label by which a data set can be requested from a distributor. A catalog number is an example of a Resource Description.

6.3 Distribution Liability -- statement of the liability assumed by the distributor.

Type: text

Domain: free text

Short Name: distliab

6.4 Standard Order Process -- the common ways in which the data set may be obtained or received, and related instructions and fee information.

Type: compound

Short Name: stdorder

6.4.1 Non-digital Form -- the description of options for obtaining the data set on non-computer-compatible media.

Type: text

Domain: free text

Short Name: nondig

6.4.2 Digital Form -- the description of options for obtaining the data set on computer-compatible media.

Type: compound

Short Name: digform

6.4.2.1 Digital Transfer Information - description of the form of the data to be distributed.

Type: compound

Short Name: digtinfo

6.4.2.1.1 Format Name -- the name of the data transfer format.

Type: text

Domain: domain values from the table below; free text

Short Name: formname

Domain

<u>Value</u>	<u>Definition</u>
"ARCE"	ARC/INFO Export format
"ARCG"	ARC/INFO Generate format
"ASCII"	ASCII file, formatted for text attributes, declared format
"BIL"	Imagery, band interleaved by line
"BIP"	Imagery, band interleaved by pixel
"BSQ"	Imagery, band interleaved sequential
"CDF"	Common Data Format
"CFF"	Cartographic Feature File (U.S. Forest Service)
"COORD"	User-created coordinate file, declared format
"DEM"	Digital Elevation Model format (U.S. Geological Survey)
"DFAD"	Digital Feature Analysis Data (National Imagery and Mapping Agency)
"DGN"	Microstation format (Intergraph Corporation)
"DIGEST"	Digital Geographic Information Exchange Standard
"DLG"	Digital Line Graph (U.S. Geological Survey)
"DTED"	Digital Terrain Elevation Data (MIL-D-89020)
"DWG"	AutoCAD Drawing format
"DX90"	Data Exchange '90
"DXF"	AutoCAD Drawing Exchange Format
"ERDAS"	ERDAS image files (ERDAS Corporation)
"GRASS"	Geographic Resources Analysis Support System
"HDF"	Hierarchical Data Format
"IGDS"	Interactive Graphic Design System format (Intergraph Corporation)
"IGES"	Initial Graphics Exchange Standard
"MOSS"	Multiple Overlay Statistical System export file
"netCDF"	network Common Data Format
"NITF"	National Imagery Transfer Format
"RPF"	Raster Product Format (National Imagery and Mapping Agency)
"RVC"	Raster Vector Converted format (MicroImages)
"RVF"	Raster Vector Format (MicroImages)
"SDTS"	Spatial Data Transfer Standard (Federal Information Processing Standard 173)
"SIF"	Standard Interchange Format (DOD Project 2851)
"SLF"	Standard Linear Format (National Imagery and Mapping Agency)
"TIFF"	Tagged Image File Format
"TGRLN"	Topologically Integrated Geographic Encoding and Referencing (TIGER) Line format (Bureau of the Census)
"VPF"	Vector Product Format (National Imagery and Mapping Agency)

FAQ: The format I use isn't included in the list! What should I do?

As described in the domain, users can add items to the list (the domain allows "free text"). Please use a character string different from those in the list. Consider using the full name of the format.

6.4.2.1.2 Format Version Number -- version number of the format.

Type: text

Domain: free text

Short Name: formvern

6.4.2.1.3 Format Version Date -- date of the version of the format.

Type: date
Domain: free date
Short Name: formverd

6.4.2.1.4 Format Specification -- name of a subset, profile, or product specification of the format.

Type: text
Domain: free text
Short Name: formspec

6.4.2.1.5 Format Information Content -- description of the content of the data encoded in a format.

Type: text
Domain: free text
Short Name: formcont

FAQ: What is the purpose of the Format Information Content Element?

In developing the metadata standards, some reviewers noted that their data are distributed in a series of files, each of which has a different format and information content. For example, the spatial data might be distributed in format x, and the attribute data in format y. The reviewers asked for the ability to describe which data are encoded in which format. The Format Information Content element provides this capability:

Digital Form

Digital Transfer Information

Format Name: x

Format Information Content: spatial objects with unique identifies and coordinate data

Digital Transfer Information

Format Name: y

Format Information Content: attribute data and the unique identifiers of the spatial objects. The identifiers are used to link the spatial objects and attributes.

6.4.2.1.6 File Decompression Technique -- recommendations of algorithms or processes (including means of obtaining these algorithms or processes) that can be applied to read or expand data sets to which data compression techniques have been applied.

Type: text
Domain: "No compression applied", free text
Short Name: filedec

6.4.2.1.7 Transfer Size -- the size, or estimated size, of the transferred data set in megabytes.

Type: real
Domain: Transfer Size > 0.0
Short Name: transize

6.4.2.2 Digital Transfer Option -- the means and media by which a data set is obtained from the distributor.

Type: compound
Short Name: digtopt

6.4.2.2.1 Online Option -- information required to directly obtain the data set electronically.

Type: compound
Short Name: onlinopt

6.4.2.2.1.1 Computer Contact Information -- instructions for establishing communications with the distribution computer.

Type: compound

Short Name: computer

6.4.2.2.1.1.1 Network Address -- the electronic address from which the data set can be obtained from the distribution computer.

Type: compound

Short Name: networka

6.4.2.2.1.1.1.1 Network Resource Name -- the name of the file or service from which the data set can be obtained.

Type: text

Domain: free text

Short Name: networkr

FAQ: What is a Network Resource Name?

The name of the data set on the network. When appropriate, Uniform Resource Locators (URL) should be provided.

FAQ: What is the difference between the Network Resource Name and the Online Linkage (8.10) data element?

The Network Resource Name is the name of the file or service from which the data set can be obtained *from a distributor*. Different distributors that provide online access to a data set probably would do so from different sites. The Online Linkage is the name of the file or service maintained by the originator (when used with "Citation" (1.1)) or the name of the file or service from which the data set was obtained (when used with "Source Citation" (2.5.5.1)).

6.4.2.2.1.1.2 Dialup Instructions -- information required to access the distribution computer remotely through telephone lines.

Type: compound

Short Name: dialinst

6.4.2.2.1.1.2.1 Lowest BPS -- lowest or only speed for the connection's communication, expressed in bits per second.

Type: integer

Domain: Lowest BPS ≥ 110

Short Name: lowbps

6.4.2.2.1.1.2.2 Highest BPS -- highest speed for the connection's communication, expressed in bits per second. Used in cases when a range of rates are provided.

Type: integer

Domain: Highest BPS $>$ Lowest BPS

Short Name: highbps

6.4.2.2.1.1.2.3 Number DataBits -- number of data bits in each character exchanged in the communication.

Type: integer

Domain: $7 \leq$ Number DataBits ≤ 8

Short Name: numdata

6.4.2.2.1.1.2.4 Number StopBits -- number of stop bits in each character exchanged in the communication.

Type: integer

Domain: $1 \leq$ Number StopBits ≤ 2

Short Name: numstop

6.4.2.2.1.1.2.5 Parity -- parity error checking used in each character exchanged in the communication.

Type: text
Domain: "None" "Odd" "Even" "Mark" "Space"
Short Name: parity

6.4.2.2.1.1.2.6 Compression Support -- data compression available through the modem service to speed data transfer.

Type: text
Domain: "V.32" "V.32bis" "V.42" "V.42bis" free text
Short Name: compress

6.4.2.2.1.1.2.7 Dialup Telephone -- the telephone number of the distribution computer.

Type: text
Domain: free text
Short Name: dialtel

6.4.2.2.1.1.2.8 Dialup File Name -- the name of a file containing the data set on the distribution computer.

Type: text
Domain: free text
Short Name: dialfile

6.4.2.2.1.2 Access Instructions -- instructions on the steps required to access the data set.

Type: text
Domain: free text
Short Name: accinstr

6.4.2.2.1.3 Online Computer and Operating System -- the brand of distribution computer and its operating system.

Type: text
Domain: free text
Short Name: oncomp

6.4.2.2.2 Offline Option -- information about media-specific options for receiving the data set.

Type: compound
Short Name: offoptn

6.4.2.2.2.1 Offline Media -- name of the media on which the data set can be received.

Type: text
Domain: "CD-ROM" "3-1/2 inch floppy disk" "5-1/4 inch floppy
disk" "9-track tape" "4 mm cartridge tape" "8 mm cartridge tape"
"1/4-inch cartridge tape" free text
Short Name: offmedia

6.4.2.2.2.2 Recording Capacity -- the density of information to which data are written. Used in cases where different recording capacities are possible.

Type: compound
Short Name: reccap

6.4.2.2.2.2.1 Recording Density -- the density in which the data set can be recorded.

Type: real
Domain: Recording Density > 0.0
Short Name: recden

6.4.2.2.2.2.2 Recording Density Units -- the units of measure for the recording density.

Type: text
Domain: free text
Short Name: recdenu

6.4.2.2.2.3 Recording Format -- the options available or method used to write the data set to the medium.

Type: text

Domain: "cpio" "tar" "High Sierra" "ISO 9660"
"ISO 9660 with Rock Ridge extensions" "ISO 9660 with Apple
HFS extensions" free text
Short Name: recfmt

6.4.2.2.4 Compatibility Information -- description of other limitations or requirements for using the medium.

Type: text
Domain: free text
Short Name: compat

6.4.3 Fees -- the fees and terms for retrieving the data set.

Type: text
Domain: free text
Short Name: fees

6.4.4 Ordering Instructions -- general instructions and advice about, and special terms and services provided for, the data set by the distributor.

Type: text
Domain: free text
Short Name: ordering

6.4.5 Turnaround -- typical turnaround time for the filling of an order.

Type: text
Domain: free text
Short Name: turnarnd

6.5 Custom Order Process -- description of custom distribution services available, and the terms and conditions for obtaining these services.

Type: text
Domain: free text
Short Name: custom

6.6 Technical Prerequisites -- description of any technical capabilities that the consumer must have to use the data set in the form(s) provided by the distributor.

Type: text
Domain: free text
Short Name: techpreq

6.7 Available Time Period -- the time period when the data set will be available from the distributor.

Type: compound
Short Name: availabl

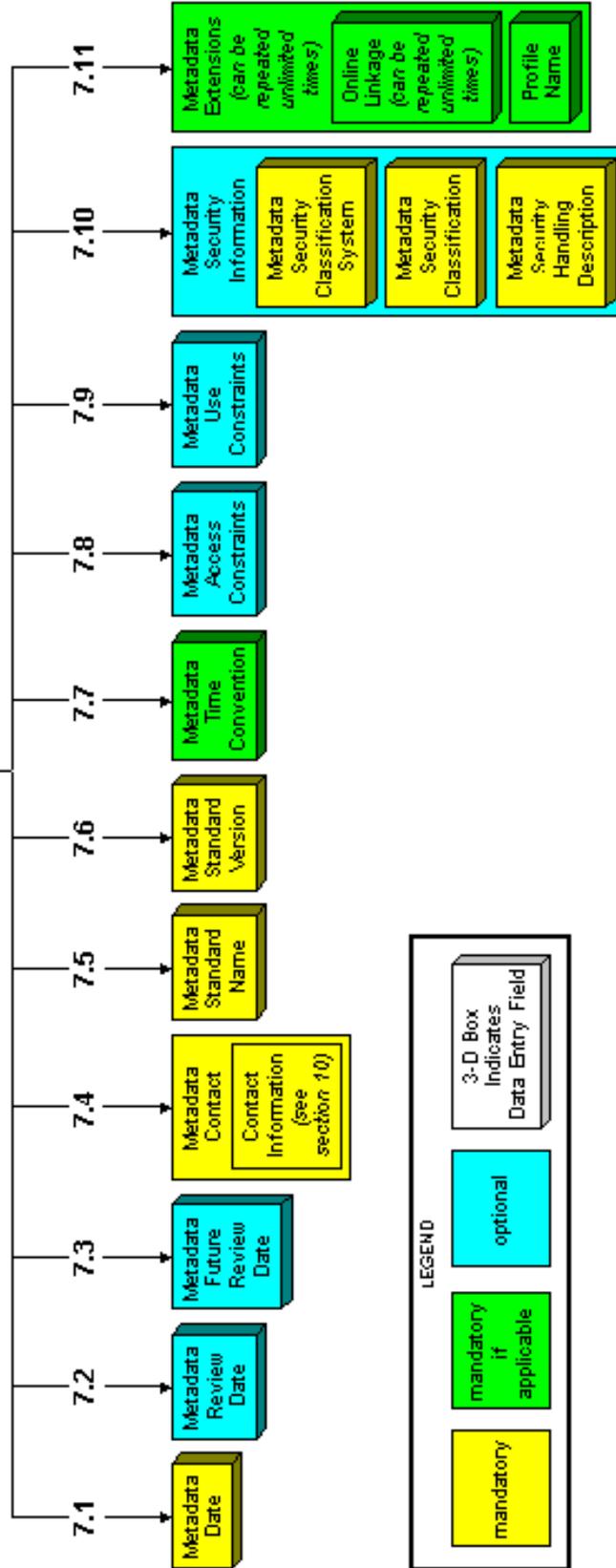
FAQ: Where are the data elements for the "Available Time Period" element?

Because the elements are required by another section, the elements were grouped in Section 9.

Metadata Reference Information

CSDGM Version 2 - 1998
(FGDC-STD-001 June 1998)

Section 7 Metadata Reference Information



- 7 Metadata Reference Information -- information on the currentness of the metadata information, and the responsible party.
Type: compound
Short Name: metainfo
- 7.1 Metadata Date -- the date that the metadata were created or last updated.
Type: date
Domain: free date
Short Name: metd
- 7.2 Metadata Review Date -- the date of the latest review of the metadata entry.
Type: date
Domain: free date; Metadata Review Date later than Metadata Date
Short Name: metrd
- 7.3 Metadata Future Review Date -- the date by which the metadata entry should be reviewed.
Type: date
Domain: free date; Metadata Future Review Date later than Metadata Review Date
Short Name: metfrd
- 7.4 Metadata Contact -- the party responsible for the metadata information.
Type: compound
Short Name: metc
-

FAQ: Where are the data elements for the "Metadata Contact" element?
Because the elements are required by another section, the elements were grouped in Section 10.

FAQ: Who should be the metadata contact?
The metadata contact should be the organization or person that can answer questions about the metadata or can receive reports about errors in the metadata.

- 7.5 Metadata Standard Name -- the name of the metadata standard used to document the data set.
Type: text
Domain: "FGDC Content Standard for Digital Geospatial Metadata" free text
Short Name: metstdn
- 7.6 Metadata Standard Version -- identification of the version of the metadata standard used to document the data set.
Type: text
Domain: free text
Short Name: metstdv
- 7.7 Metadata Time Convention -- form used to convey time of day information in the metadata entry. Used if time of day information is included in the metadata for a data set.
Type: text
Domain: "local time" "local time with time differential factor" "universal time"
Short Name: mettc
- 7.8 Metadata Access Constraints -- restrictions and legal prerequisites for accessing the metadata. These include any access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the metadata.
Type: text
Domain: free text
Short Name: metac

- 7.9 Metadata Use Constraints -- restrictions and legal prerequisites for using the metadata after access is granted. These include any metadata use constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on using the metadata.
 Type: text
 Domain: free text
 Short Name: metuc
- 7.10 Metadata Security Information -- handling restrictions imposed on the metadata because of national security, privacy, or other concerns.
 Type: compound
 Short Name: metsi
- 7.10.1 Metadata Security Classification System -- name of the classification system for the metadata.
 Type: text
 Domain: free text
 Short Name: metscs
- 7.10.2 Metadata Security Classification -- name of the handling restrictions on the metadata.
 Type: text
 Domain: "Top secret" "Secret" "Confidential" "Restricted" "Unclassified" "Sensitive"
 free text
 Short Name: metsc
- 7.10.3 Metadata Security Handling Description -- additional information about the restrictions on handling the metadata.
 Type: text
 Domain: free text
 Short Name: metshd
- 7.11 Metadata Extensions -- a reference to extended elements to the standard which may be defined by a metadata producer or a user community. Extended elements are elements outside the Standard, but needed by the metadata producer. If extended elements are created, they must follow the guidelines in Appendix D, Guidelines for Creating Extended Elements to the Content Standard for Digital Geospatial Metadata.
 Type: compound
 Short Name: metextns
- 7.11.1 Online Linkage -- the name of an online computer resource that contains the metadata extension information for the data set. Entries should follow the Uniform Resource Locator convention of the Internet.
 Type: text
 Domain: free text
 Short Name: onlink
- 7.11.2 Profile Name -- the name given to a document that describes the application of the Standard to a specific user community.
 Type: text
 Domain: free text
 Short Name: metprof

Section 8

Citation Information

Citation Information	
Originator <i>(can be repeated unlimited times)</i>	3-D Box
Publication Date	3-D Box
Publication Time	3-D Box
Title	3-D Box
Edition	3-D Box
Geospatial Data Presentation Form	3-D Box
Series Information	
Series Name	3-D Box
Issue Identification	3-D Box
Publication Information	
Publication Place	3-D Box
Publisher	3-D Box
Other Citation Details	
Online Linkage <i>(can be repeated unlimited times)</i>	3-D Box
Larger Work Citation	
Citation Information <i>(see Section 8)</i>	3-D Box

Section 9

Time Period Information

Time Period Information	
Single Date / Time	
Calendar Date	3-D Box
Time of Day	3-D Box
OR	
Multiple Dates / Times	
Single Date / Time <i>(2 or more repetitions)</i>	
Calendar Date	3-D Box
Time of Day	3-D Box
OR	
Range of Dates / Times	
Beginning Date	3-D Box
Beginning Time	3-D Box
Ending Date	3-D Box
Ending Time	3-D Box

Section 10

Contact Information

Contact Information	
Contact Person Primary	
Contact Person	3-D Box
Contact Organization	3-D Box
OR	
Contact Organization Primary	
Contact Organization	3-D Box
Contact Person	3-D Box
Contact Position	3-D Box
Contact Address <i>(can be repeated unlimited times)</i>	
Address Type	3-D Box
Address <i>(can be repeated unlimited times)</i>	3-D Box
City	3-D Box
State or Province	3-D Box
Postal Code	3-D Box
Country	3-D Box
Contact Voice Telephone <i>(can be repeated unlimited times)</i>	
Contact TDD/TTY Telephone <i>(can be repeated unlimited times)</i>	3-D Box
Contact Facsimile Telephone <i>(can be repeated unlimited times)</i>	3-D Box
Contact Electronic Mail Address <i>(can be repeated unlimited times)</i>	3-D Box
Hours of Service	3-D Box
Contact Instructions	3-D Box

LEGEND			
mandatory	mandatory if applicable	optional	3-D Box Indicates Data Entry Field

Citation Information

8 Citation Information -- the recommended reference to be used for the data set. (Note: this section provides a means of stating the citation of a data set, and is used by other sections of the metadata standard. This section is never used alone.)

Type: compound
Short Name: citeinfo

8.1 Originator -- the name of an organization or individual that developed the data set. If the name of editors or compilers are provided, the name must be followed by "(ed.)" or "(comp.)" respectively.

Type: text
Domain: "Unknown" free text
Short Name: origin

8.2 Publication Date -- the date when the data set is published or otherwise made available for release.

Type: date
Domain: "Unknown" "Unpublished material" free date
Short Name: pubdate

8.3 Publication Time -- the time of day when the data set is published or otherwise made available for release.

Type: time
Domain: "Unknown" free time
Short Name: pubtime

8.4 Title -- the name by which the data set is known.

Type: text
Domain: free text
Short Name: title

8.5 Edition -- the version of the title.

Type: text
Domain: free text
Short Name: edition

8.6 Geospatial Data Presentation Form -- the mode in which the geospatial data are represented.

Type: text
Domain: (the listed domain is partially from pp. 88-91 in Anglo-American Committee on Cataloguing of Cartographic Materials, 1982, Cartographic materials: A manual of interpretation for AACR2: Chicago, American Library Association):
"atlas" "audio" "diagram" "document" "globe" "map" "model" "multimedia presentation" "profile" "raster digital data" "remote-sensing image" "section" "spreadsheet" "tabular digital data" "vector digital data" "video" "view" free text
Short Name: geoform

FAQ: When is the Geospatial Data Presentation Form element used?

The Geospatial Data Presentation Form is to identify the (usually "cartographic") style (if any) with which the originator intended that the information be presented to the user. For example, a paper map would have a "map" geospatial presentation form. A scanned image of a map also has "map" as the geospatial presentation form. Vector data digitized from a map would not have a presentation form if no particular method of presenting the data to users was intended by the originator.

FAQ: What are some examples for the values in the domain of the Geospatial Data Presentation element?

Most of the examples are taken from *Cartographic Material: A Manual of Interpretation for AACR2*

(Anglo-American Committee on Cataloguing of Cartographic Materials 1982):

<u>Domain Value</u>	<u>Examples</u>
atlas	boundary atlas; geological atlas; historical atlas; plat book; road atlas; statistical atlas (collections of maps, geospatial illustrations, and other information)
diagram	block diagram; fence diagram; reliability diagram; triangulation diagram (illustrations of specific relationships)
globe	terrestrial globe; celestial globe (physical models of celestial bodies)
map	aeronautical chart; base map; cadastral map; chart; index map; orthophotomap; plan; plat; relief map; thematic map
model	relief model (other physical models of geospatial data)
profile	(an illustration showing a vertical section of the ground)remote-sensing image, aerial photograph; photomosaic; infrared scanning image; multispectral scanning image; Sidelooking Airborne Radar (SLAR) image; SPOT image
section	geologic section
view	panorama; perspective view

8.7 Series Information -- the identification of the series publication of which the data set is a part.

Type: compound
Short Name: serinfo

8.7.1 Series Name -- the name of the series publication of which the data set is a part.

Type: text
Domain: free text
Short Name: sername

8.7.2 Issue Identification -- information identifying the issue of the series publication of which the data set is a part.

Type: text
Domain: free text
Short Name: issue

FAQ: What is a series?

A series is a succession of volumes or issues published with related subjects or authors, similar format and price, or continuous numbering.

8.8 Publication Information -- publication details for published data sets.

Type: compound
Short Name: pubinfo

8.8.1 Publication Place -- the name of the city (and state or province, and country, if needed to identify the city) where the data set was published or released.

Type: text
Domain: free text
Short Name: pubplace

8.8.2 Publisher -- the name of the individual or organization that published the data set.

Type: text
Domain: free text
Short Name: publish

8.9 Other Citation Details -- other information required to complete the citation.

Type: text

Domain: free text

Short Name: othercit

8.10 Online Linkage -- the name of an online computer resource that contains the data set. Entries should follow the Uniform Resource Locator convention of the Internet.

Type: text

Domain: free text

Short Name: onlink

8.11 Larger Work Citation -- the information identifying a larger work in which the data set is included.

Type: compound

Short Name: lworkcit

FAQ: When is the Larger Work Citation element used?

Sometimes an item is published as part of a larger volume. For example, a map or article originated by John Jones might be published in a book compiled by Charlene Smith. The citation for the map or article item would include Jones as the originator, the date of the item, the title of the item, etc.

To obtain a copy of the item, however, one would need to find the published book. The citation of the book would include Smith as the compiler, the publication date of the book, the title of the book, etc. This information about the book in which the item was published is the Larger Work Citation.

Time Period Information

9 Time Period Information -- information about the date and time of an event. (Note: this section provides a means of stating temporal information, and is used by other sections of the metadata standard. This section is never used alone.)

Type: compound
Short Name: timeinfo

9.1 Single Date/Time -- means of encoding a single date and time.

Type: compound
Short Name: sngdate

9.1.1 Calendar Date -- the year (and optionally month, or month and day).

Type: date
Domain: "Unknown" free date
Short Name: caldate

9.1.2 Time of Day -- the hour (and optionally minute, or minute and second) of the day.

Type: time
Domain: "Unknown" free time
Short Name: time

9.2 Multiple Dates/Times -- means of encoding multiple individual dates and times.

Type: compound
Short Name: mdattim

9.3 Range of Dates/Times -- means of encoding a range of dates and times.

Type: compound
Short Name: rngdates

9.3.1 Beginning Date -- the first year (and optionally month, or month and day) of the event.

Type: date
Domain: "Unknown" free date
Short Name: begdate

9.3.2 Beginning Time -- the first hour (and optionally minute, or minute and second) of the day for the event.

Type: time
Domain: "Unknown" free time
Short Name: begtime

9.3.3 Ending Date -- the last year (and optionally month, or month and day) for the event.

Type: date
Domain: "Unknown" "Present" free date
Short Name: enddate

9.3.4 Ending Time -- the last hour (and optionally minute, or minute and second) of the day for the event.

Type: time
Domain: "Unknown" free time
Short Name: endtime

Contact Information

10 Contact Information -- Identity of, and means to communicate with, person(s) and organization(s) associated with the data set. (Note: this section provides a means of identifying individuals and organizations, and is used by other sections of the metadata standard. This section is never used alone.)

Type: compound
Short Name: cntinfo

10.1 Contact Person Primary -- the person, and the affiliation of the person, associated with the data set. Used in cases where the association of the person to the data set is more significant than the association of the organization to the data set.

Type: compound
Short Name: cntperp

FAQ: What is the difference between the Contact Person Primary and Contact Organization Primary elements?

In developing the metadata standard, reviewers asked for a way to distinguish cases in which the primary contact was a person, whose organizational affiliation was incidental, versus those in which the primary contact was an organization, whose personnel were incidental. The Contact Person Primary element is for the first case; the Contact Organization Primary is for the second. Both are comprised of the same elements; the difference is which elements are mandatory and which are optional.

10.1.1 Contact Person -- the name of the individual to which the contact type applies.

Type: text
Domain: free text
Short Name: cntper

10.1.2 Contact Organization -- the name of the organization to which the contact type applies.

Type: text
Domain: free text
Short Name: cntorg

10.2 Contact Organization Primary -- the organization, and the member of the organization, associated with the data set. Used in cases where the association of the organization to the data set is more significant than the association of the person to the data set.

Type: compound
Short Name: cntorgp

10.3 Contact Position -- the title of individual.

Type: text
Domain: free text
Short Name: cntpos

10.4 Contact Address -- the address for the organization or individual.

Type: compound
Short Name: cntaddr

10.4.1 Address Type -- the information provided by the address.

Type: text
Domain: "mailing" "physical" "mailing and physical", free text
Short Name: addrtype

10.4.2 Address -- an address line for the address.

Type: text
Domain: free text
Short Name: address

10.4.3 City -- the city of the address.

Type: text
Domain: free text
Short Name: city

10.4.4 State or Province -- the state or province of the address.

Type: text
Domain: free text
Short Name: state

10.4.5 Postal Code -- the ZIP or other postal code of the address.

Type: text
Domain: free text
Short Name: postal

10.4.6 Country -- the country of the address.

Type: text
Domain: free text
Short Name: country

10.5 Contact Voice Telephone -- the telephone number by which individuals can speak to the organization or individual.

Type: text
Domain: free text
Short Name: cntvoice

10.6 Contact TDD/TTY Telephone -- the telephone number by which hearing-impaired individuals can contact the organization or individual.

Type: text
Domain: free text
Short Name: cnttdd

10.7 Contact Facsimile Telephone -- the telephone number of a facsimile machine of the organization or individual.

Type: text
Domain: free text
Short Name: cntfax

10.8 Contact Electronic Mail Address -- the address of the electronic mailbox of the organization or individual.

Type: text
Domain: free text
Short Name: cntemail

10.9 Hours of Service -- time period when individuals can speak to the organization or individual.

Type: text
Domain: free text
Short Name: hours

10.10 Contact Instructions -- supplemental instructions on how or when to contact the individual or organization.

Type: text
Domain: free text
Short Name: cntinst

Profiles

One of the significant enhancements of the FGDC Content Standard for Digital Geospatial Metadata (FGDC-STD-001-1998) is the ability of the metadata producer to "profile" the base standard by defining a subset of the metadata entities and/or elements that are used by a specific discipline or organization. The official requirements and rules for the development of Profiles are documented in Appendix E of the FGDC Content Standard for Digital Geospatial Metadata (FGDC-STD-001-1998).

A profile is subset of the metadata entities and elements of the base standard that describes the application of the CSDGM Standard to a specific user community. A Profile permits the modifications to the optionality or repeatability of non-mandatory elements and domains, where permitted, in the Standard. Profiles may also contain extended elements.

Profiles are formalized through the FGDC standards process or may be used informally by a user community. The FGDC is the approval authority for profiles. To become recognized by the FGDC, a metadata profile must go through the FGDC standards review and approval process

There are 5 basic requirements of a profile. A profile must include:

- the basic, minimum set of metadata collected to the specification of this Standard
- all mandatory elements in all mandatory sections.
- all mandatory- if-applicable elements in all mandatory sections, if the data set has the characteristic documented in the element
- all mandatory elements in all mandatory-if-applicable sections if the data set has the characteristic documented in the section
- all mandatory-if-applicable elements in all mandatory-if-applicable sections, if the data set has the characteristic documented in the section

The guidelines for creating a profile are:

- A profile must not change the name, definition, or data type of a standard element.
- A profile may impose more stringent conditionality on standard elements than the Standard requires. (Elements that are optional in the Standard may be mandatory in a profile.)
- A profile may contain elements with domains that are more restrictive than the Standard. (Elements whose domains have free text in the Standard may have a closed list of appropriate values in the profile.)
- A profile may restrict the use of domain values allowed by the Standard. For example, if the Standard contains five domain values for a standard element, the profile may specify that its domain consist of three domain values identified in the profile. The profile may require that the user select a value from the three domain values.)
- A profile will not permit anything not allowed by the Standard. (If the Standard element has a domain of three values, without a free text element, the profile will not allow a user to enter anything other than those 3 values.)
- Before creating a profile, the metadata producer will check existing registered profiles.
- A profile must be made available to anyone receiving metadata that was collected according to that profile.
- The profile document submitted to the FGDC for formal approval shall contain the same six sections as the introduction section of this Standard.

User Defined Extensions

One of the significant enhancements of the FGDC Content Standard for Digital Geospatial Metadata (FGDC-STD-001-1998) is the ability of the metadata producer to extend the base standard, through User Defined Extensions, by defining a set of metadata entities and/or elements that are used by a specific discipline or organization. The official requirements and rules for the development of User Defined Extensions are documented in Appendix D of the FGDC Content Standard for Digital Geospatial Metadata (FGDC-STD-001-1998).

Extended elements to the Standard may be defined by a data set producer or a user community. Extended elements are elements outside the Standard, but needed by the data set producer. If extended elements are created, they must follow the guidelines.

The following rules must be followed when defining extended elements:

- Extended elements must be formally documented within the hierarchical structure of the Standard (Section 0 - "Metadata"). When metadata extended elements are used, their existence must be documented in the Metadata Reference Information, element Metadata_Extensions. Every effort should be made to logically organize extended elements within the existing sections and structure. Where there is no logical or natural "fit", new section(s) and/or subsections may be defined.
- Extended elements must not be used to change the name, definition, type, or domain of a standard element. In particular, an extended element cannot be nested under a data element.
- Extended elements may be defined as compound and may include extended and standard elements as components. If a standard element is included in an extended compound element, no components of the standard element are changed.
- Extended elements, like the standard element "Single_Date/Time" may appear in multiple places in the metadata set.

The basic semantic elements for required for describing a user defined extension are:

Extended_Element_Name -- (Mandatory) -- the name of the element. The name given to the element must not be the name of any other element in the Standard.
Domain: free text (Do not duplicate any other Standard element name.)

Definition -- (Mandatory) -- the definition of the element.
Domain: free text

Rationale -- (Optional) -- the reason for creating the Extended element, and its expected uses.
Domain: free text

Source -- (Mandatory) -- the name of the entity creating the Extended element.
Domain: free text

Type -- (Mandatory) -- the kind of value to be provided, or "compound" if the Extended element contains other elements.
Domain: integer, real, text, date, time, compound

Domain -- (Mandatory) -- valid values that can be assigned to the data element. The same rules as those for Standard elements are applied here.
Domain: free text

Short Name -- (Mandatory) -- a unique short name consisting of eight alphabetic characters or less.
Domain: free text (Do not duplicate another short name used by the Standard or any other short name in the Extension Registry.)

Parent -- (Mandatory) -- The name of the element(s) under which this element may appear. The name(s) may be standard or other extended element(s).

Domain: none, free text (Must be the name of an existing standard or extended element. If the extended element is not part of any other compound element, its parent is the section name as defined by the Standard. If the extended element is defining a whole new section, then its parent is Section 0 - "Metadata".)

Child -- (Mandatory-if-applicable) -- The name of the element(s) which may appear under this element. The name(s) may be standard or other extended element(s).

Domain: none, free text (Must be the name of an existing Standard or extended element.)

Rule: production rule for the element, specified using the form given in this Standard.

Below is an example for User Defined Metadata Entities and elements as documented in the FGDC Biological Data Profile of the Content Standard for Digital Geospatial Metadata, FGDC-STD-001.1-1999.

Extension_Information:

Name: Bounding_Altitudes

Short_Name: boundalt

Type: compound

Child: Altitude_Minimum

Child: Altitude_Maximum

Child: Altitude_Distance_Units

Parent: Bounding_Coordinates

Optionality: optional

Definition: The limits of coverage of a data set expressed by altitude.

Rationale: To be able to locate the vertical extent of a data set in association with its horizontal extent. The term "altitude" is used instead of the common term "elevation" to conform to the terminology in Federal Information Processing Standards 70-1 and 173.

Source: National Biological Information Infrastructure (NBII), USGS Biological Resources Division, FGDC Biological Data Working Group

Extension_Information:

Name: Altitude_Minimum

Short_Name: altmin

Type: real

Domain: free real

Parent: Bounding_Altitudes

Optionality: mandatory

Definition: The minimum altitude extent of coverage.

Rationale: To be able to locate the vertical extent of a data set in association with its horizontal extent.

Source: National Biological Information Infrastructure (NBII), USGS Biological Resources Division, FGDC Biological Data Working Group

Extension_Information:

Name: Altitude_Maximum

Short_Name: altmax

Type: real

Domain: free real

Parent: Bounding_Altitudes

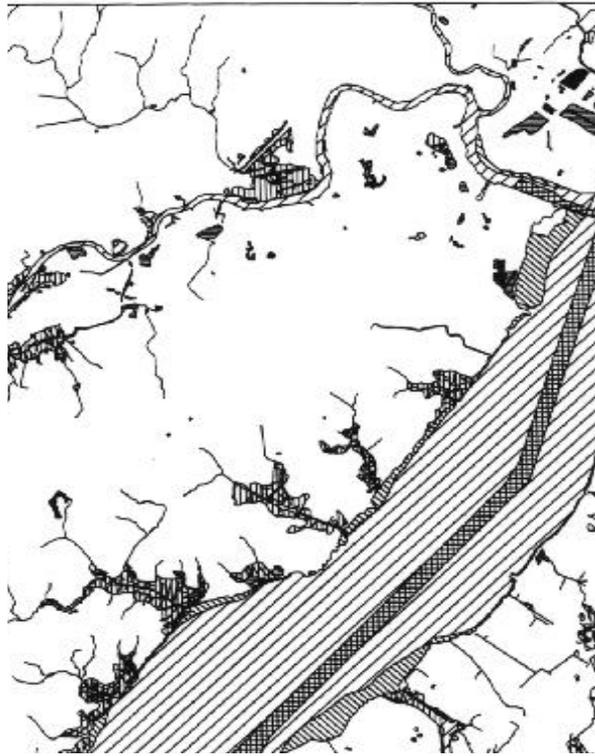
Optionality: mandatory

Definition: The maximum elevation extent of coverage.

Rationale: To be able to locate the vertical extent of a data set in association with its horizontal extent.

Source: National Biological Information Infrastructure (NBII), USGS Biological Resources Division, FGDC Biological Data Working Group

Example: U.S. Geological Survey Digital Line Graph file



The map is a reduced-scale plot of the hydrography overlay from the SDTS-encoded Digital Line Graph data set for Wilmington South, Delaware-New Jersey. The data were digitized from a 1:24,000-scale topographic map quadrangle.

Notes:

This example makes use of "blanket" statements that describe all activities that might have happened to the data. This approach was needed because the data were developed several years ago, and the processes applied to these data are not known.

How could the example be changed? Some improvements might include:

- Reporting only those processes applied to these data.

- Providing several 'processing steps' to describe the development of the data set.

- Providing more optional metadata elements.

This example is provided only to illustrate metadata that are 'compliant' with the standard (mandatory and applicable 'mandatory if applicable' elements are provided). It is not meant to provide guidance on formatting reports or details of information to be provided.

Identification Information

Citation

Originator: U.S. Geological Survey
Publication Date: 1990
Title: Wilmington South
Publication Information

Publication Place: Reston, Virginia

Publisher: U.S. Geological Survey

Description

Abstract: This data set is a digital line graph (DLG), or line map information. DLG's contain selected base categories of geographic features, and characteristics of these features, in digital form. The information was collected by digitizing maps, or by compiling new information or revising digitized maps using remotely sensed and other information.

The data structure for DLG's is based on graph theory, in which a two-dimensional diagram is expressed as a set of spatial objects in a manner that explicitly expresses logical relationships. Applied to a map, this concept is used to encode the spatial relationships between the objects, including such concepts as adjacency and connectivity between objects. A topologically structured data file can support graphic applications, as well as computations and analyses involving the spatial objects and their spatial relationships.

Purpose: DLG's depict information about geographic features on or near the surface of the Earth, terrain, and political and administrative units. These data were collected as part of the National Mapping Program.

Time Period of Content

Single Date/Time

Calendar Date: 1987

Currentness Reference: publication date

Status

Progress: Complete

Maintenance and Update Frequency: Irregular

Spatial Domain

Bounding Coordinates

West Bounding Coordinate: -75.625

East Bounding Coordinate: -75.5

North Bounding Coordinate: 39.75

South Bounding Coordinate: 39.625

Keywords

Theme

Theme Keyword Thesaurus: None

Theme Keyword: digital line graph

Theme Keyword: DLG

Theme Keyword: hydrography

Theme Keyword: standing water

Theme Keyword: flowing water

Theme Keyword: rocks and reefs

Theme Keyword: wetlands

Theme Keyword: navigable

Place

Place Keyword Thesaurus: None

Place Keyword: Delaware

Place Keyword: New Jersey

Access Constraints: none

Use Constraints: none. Acknowledgement of the U.S. Geological Survey would be appreciated in products derived from these data.

Data Quality Information

Attribute Accuracy

Attribute Accuracy Report: Attribute accuracy is tested by manual comparison of the source with hard copy plots and/or symbolized display of the digital line graph on an interactive computer graphic system; selected attributes that cannot be visually verified on plots or on screen, are interactively queried and verified on screen. In addition, PROSYS software (USGS) tests the attributes against a master set of valid attributes for the hydrography category; it also checks for selected valid attribute combinations, and for valid attributes relative to topology and dimensionality. All

attribute data conform to the attribute codes current as of the date of digitizing as described in Part 3: Attribute Codes in "Standards for Digital Line Graphs", National Mapping Program Technical Instructions, USGS. Accuracy is estimated to be 98.5 percent. Certain attributes and/or entities, e.g. BEST_ESTIMATE, convey data quality information; for details refer to the SDTS Data Dictionary Modules.

Logical Consistency Report: Certain node/geometry and topology (GT)-polygon/chain relationships are collected or generated to satisfy topological requirements. (The GT-polygon corresponds to the DLG area). Some of these requirements include: chains must begin and end at nodes, chains must connect to each other at nodes, chains do not extend through nodes, left and right GT-polygons are defined for each chain element and are consistent throughout the transfer, and the chains representing the limits of the file (neatline) are free of gaps. The tests of logical consistency are performed by PROSYS (USGS) program. The neatline is generated by connecting the four corners of the digital file, as established during initialization of the digital file. All data outside the enclosed region are ignored and all data crossing these geographically straight lines are clipped at the neatline. (Exception: Early files may have area pointings outside of the neatline, for those areas which were too small to place the area pointing within, given software constraints at the time of collection.) Data within a specified tolerance of the neatline are snapped to the neatline. Neatline straightening aligns the digitized edges of the digital data with the generated neatline, that is, with the longitude/latitude lines in geographic coordinates. All internal polygons are tested for closure; early files were checked using plots, later files were checked using PROSYS. Certain attributes and/or entities, e.g. closure line, convey data quality information; for details refer to the SDTS Data Dictionary Modules. Throughout the transfer, null values are denoted by adjacent delimiters. When a subfield, either user-defined in Attribute Primary and Attribute Secondary Module records, or in other SDTS Module records, is implemented as fixed-length, the following null scheme is used: (a) when information to be encoded in the subfield is known to be not applicable (undefined, not relevant), then the subfield is valued by a string of spaces; and (b) when the information to be encoded is relevant but unknown (or missing), then the subfield is valued by a string of question marks "?".

Completeness Report: Data completeness for unrevised digital files reflects the content of the source graphic. Features may have been eliminated or generalized on the source graphic, due to scale and legibility constraints. If the digital data underwent limited update revision, then the content will include only (1) those features that are photoidentifiable on monoscopic source, supplemented with limited ancillary source, and (2) those features that can not be reliably photoidentified but that are not considered particularly prone to change. If the digital data underwent standard update revision, then the data meets NMD standards for feature content. For information on collection/inclusion criteria, see NMD Product Standards for DLG and Quadrangle Maps, published as the Technical Instructions.

Positional Accuracy

Horizontal Positional Accuracy

Horizontal Positional Accuracy Report: Accuracy of these digital data (if not digitally revised), is based upon the use of source graphics which are compiled to meet National Map Accuracy Standards. NMAS horizontal accuracy requires that at least 90 percent of points tested are within 0.02 inches of the true position. The digital data are estimated to contain a horizontal positional error of less than or equal to 0.003 inches standard error in the two component directions relative to the source graphic. NMAS vertical accuracy requires that at least 90% of well defined points tested be within one half contour interval of the correct value. Comparison to the graphic source is used as control to assess digital positional accuracy. Cartographic offsets may be present on the graphic source, due to scale and legibility constraints. Digital map elements require edge alignment between data sets. Data along each quadrangle edge are tested against the data set for the adjacent quadrangle; tests check for positional accuracy between data sets within a 0.02 inches tolerance. Features with like dimensionality, and with or without like attribution, that are within the tolerance are adjusted by moving the feature equally in both data sets. Features outside the tolerance are not moved. All disconnects are identified by edge matching flags that document the mismatch. These edge matching flags are located in the SDTS AHDR Attribute Primary Module in subfields EDGEWS, EDGEWR, EDGENS, EDGENR, EDGEES, EDGEER, EDGESS, and EDGESR. If the digital data underwent limited

update revision, then the data meet at least the class 2 positional accuracy specification in the draft "United States National Cartographic Standards for Spatial Accuracy". If the digital data underwent standard update revision, then the data meet the class 1 positional accuracy specifications. Certain attributes and/or entities, e.g. BEST_ESTIMATE, convey data accuracy information; for details refer to the SDTS Data Dictionary Modules.

Lineage

Source Information

Source Citation

Originator: U.S. Geological Survey

Publication Date: 1987

Title: Wilmington South

Geospatial Data Presentation Form: map

Publication Information

Publication Place: Reston, Virginia

Publisher: U.S. Geological Survey

Source Scale Denominator: 24000

Type of Source Media: stable-base material

Source Time Period of Content

Single Date/Time

Calendar Date: 1987

Source Currentness Reference: publication date

Source Citation Abbreviation: USGS1

Source Contribution: spatial and attribute information

Process Step

Process Description: This Digital Line Graph, (if not digitally revised), was digitized from a standard U.S. Geological Survey (USGS) quadrangle (name, date and scale of quadrangle indicated in SDTS Identification Module), and was archived in the National Digital Cartographic Data Base (NDCDB). Quadrangles were referenced to one of the following horizontal datums: the North American Datum of 1927 (NAD 27), NAD 83, Puerto Rico Datum 1940 adjustment, Old Hawaiian Datum, 1963 Guam Datum, or various local datums. Quadrangles were referenced to one of the following vertical datums: National Geodetic Vertical Datum of 1929, the International Great Lakes Datum of 1955, or mean sea level. Datum information is contained in the SDTS External Spatial Reference Module. The digital data were produced by either scanning or manually digitizing a stable-based copy of the graphic materials. The scanning process captured the digital data at a scanning resolution of at least 0.001 inches; the resulting raster data were vectorized and then attributed on an interactive editing station. Manual digitizing used a digitizing table to capture the digital data at a resolution of at least 0.001 inches; attribution was performed either as the data were digitized, or on an interactive edit station after the digitizing was completed. The determination of the DLG production method was based on various criteria, including feature density, feature symbology, and availability of production systems. Four control points corresponding to the four corners of the quadrangle were used for registration during data collection. An eight parameter projective transformation was performed on the coordinates used in the data collection and editing systems to register the digital data to the internal coordinates used in the USGS Production System (PROSYS), and a four parameter linear transformation was performed from the PROSYS internal coordinates to Universal Transverse Mercator (UTM) grid coordinates. These four control points are stored as point objects in the "NP" Point-Node Module, and their latitude and longitude are stored in the SDTS AHDR Attribute Primary Module. The DLG data were checked for position by comparing plots of the digital data to the graphic source. DLG data classification was checked by comparing plots of the digital data to the graphic source and/or using PROSYS verification software. The revision status and category of revision of this digital file (limited update or standard update) is indicated in the SDTS AHDR Attribute Primary Module. Limited update revision uses monoscopic imagery and limited ancillary source, with no field verification; standard update revision uses stereoscopic imagery as needed, in addition to monoscopic imagery and field verification. Certain attributes and/or entities, e.g. PHOTOREVISED, convey data quality

information; for details refer to the SDTS Data Dictionary Modules. The DLG outside area is converted to the SDTS Universe Polygon object. The Universe Polygon can be identified by the object representation code "PW"; the Universe Polygon does not reference any attributes. DLG areas coded as "void area" are converted to the SDTS Void Polygon object. Void Polygons can be identified by the object representation code of "PX"; Void Polygons do not reference any attributes. Information on the PROSYS program, the attribute standard, and the NDCDB is available from USGS.

Source Used Citation Abbreviation: USGS1

Process Date: 1990

Spatial Data Organization Information

Direct Spatial Reference Method: Vector

Spatial Reference Information

Horizontal Coordinate System Definition

Planar

Grid Coordinate System

Grid Coordinate System Name: Universal Transverse Mercator

Universal Transverse Mercator

UTM Zone Number: 18

Transverse Mercator

Scale Factor at Central Meridian: 0.9996

Longitude of Central Meridian: -75.0

Latitude of Projection Origin: 0.0

False Easting: 500000.

False Northing: 0.0

Planar Coordinate Information

Planar Coordinate Encoding Method: coordinate pair

Coordinate Representation

Abscissa Resolution: 0.61

Ordinate Resolution: 0.61

Planar Distance Units: meters

Geodetic Model

Horizontal Datum Name: North American Datum of 1927

Ellipsoid Name: Clarke 1866

Semi-major Axis: 6378206.4

Denominator of Flattening Ratio: 294.98

Entity and Attribute Information

Overview Description

Entity and Attribute Overview: The DLG-3 scheme assigns any number of attribute codes to spatial objects.

Some DLG-3 attribute codes identify real world entities, other codes represent attributes of those entities. Hydrography (major code: 050) contains information about streams, bodies of water, wetlands, coastal waters, and water used for transportation. Vegetative features, which are associated with wetlands or submerged areas, are included, as are manmade hydrologic features. The direction of the water flow is captured. This information is not collected for specific hydrologic studies or for navigational assistance. The SDTS model of spatial phenomena describes the real world as consisting of entities which are characterized by attributes which have attribute values. DLG-3 does not explicitly use this entity-attribute-attribute value model. The SDTS implementation of DLG-3 identifies which DLG-3 attribute codes identify entities and which identify attributes of those entities.

Entity and Attribute Detail Citation: The USGS document Standards for Digital Line Graphs, Part 3:

Attribute Codes, contains a detailed description of each attribute code and a reference to the associated map symbols on the map source materials. The document is available as:

ftp://nmdpow9.er.usgs.gov./public/stdlg/stpt3-HY.asc. The DLG-3 SDTS Transfer Description is available from ftp://sdts.er.usgs.gov/sdts/datasets/tvp/dlg3/dlg3.wp.

Distribution Information

Distributor

Contact Organization Primary

Contact Organization: Earth Science Information Center, U.S. Geological Survey

Contact Address

Address Type: mailing address

Address: 507 National Center

City: Reston

State or Province: Virginia

Postal Code: 20192

Contact Voice Telephone: 1 888 ASK USGS

Contact Voice Telephone: 1 703 648 6045

Distribution Liability: Although these data have been processed successfully on a computer system at the U.S. Geological Survey, no warranty expressed or implied is made by the USGS regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. The Geological Survey will warrant the delivery of this product in computer-readable format, and will offer appropriate adjustment of credit when the product is determined unreadable by correctly adjusted computer input peripherals, or when the physical medium is delivered in damaged condition. Requests for adjustment of credit must be made within 90 days from the date of this shipment from the ordering site.

Standard Order Process

Digital Form

Digital Transfer Information

Format Name: SDTS

Format Version Date: 1992

Format Specification: Topological Vector Profile

Digital Transfer Option

Online Option

Computer Contact Information

Network Address

Network Resource Name:

ftp://sdts.er.usgs.gov/pub/sdts/datasets/tvp/dlg3/WilmingtonHY/

Offline Option

Offline Media: 9-track tape

Recording Capacity

Recording Density: 1600

Recording Density: 6250

Recording Density Units: characters per inch

Recording Format: ASCII; available unlabelled or with ANSI-standard labels; available block sizes are 2048 and 30720 characters.

Digital Form

Digital Transfer Information

Format Name: DLG

Format Version Date: 1988

Format Specification: Optional

Digital Transfer Option

Offline Option

Offline Media: 9-track tape

Recording Capacity

Recording Density: 1600

Recording Density: 6250

Recording Density Units: characters per inch

Recording Format: ASCII; available unlabelled or with ANSI-standard labels;

available block sizes are multiples of 80 characters ranging from 8000 to 32720 characters.

Digital Form

Digital Transfer Information

Format Name: DLG

Format Version Date: 1988

Format Specification: Standard

Digital Transfer Option

Offline Option

Offline Media: 9-track tape

Recording Capacity

Recording Density: 1600

Recording Density: 6250

Recording Density Units: characters per inch

Recording Format: ASCII; available unlabelled or with ANSI-standard labels; available block sizes are multiples of 144 characters ranging from 8064 to 32688 characters.

Fees: The online copy of the data set may be accessed without charge. For delivery on magnetic tape, the charge for one data set is \$40; for 2 data sets is \$60, for 3 data sets is \$80, for 4 data sets is \$100, and for 5 data sets is \$120. When ordered in groups of 6 or more data sets, the charge is \$7 per data set plus a \$90 base fee.

Metadata Reference Information

Metadata Date: 19940610

Metadata Contact

Contact Organization Primary

Contact Organization: U.S. Geological Survey

Contact Address

Address Type: mailing address

Address: 590 National Center

City: Reston

State or Province: Virginia

Postal Code: 20192

Contact Voice Telephone: 1 703 648 5514

Contact Facsimile Telephone: 1 703 648 5755

Contact Electronic Mail Address: gdc@usgs.gov

Metadata Standard Name: Content Standards for Digital Geospatial Metadata

Metadata Standard Version: FGDC-STD-001-1998

Example: National Wetlands Inventory (NWI) wetlands data

Note: This example is provided only to illustrate metadata that are 'compliant' with the standard (mandatory and applicable 'mandatory if applicable' elements are provided). It is not meant to provide guidance on formatting reports or details of information to be provided.

Identification Information

Citation

Originator: U.S. Fish & Wildlife Service, National Wetlands Inventory

Publication Date: 1992

Title: Hickory

Publication Information

Publication Place: St. Petersburg, Florida

Publisher: U.S. Fish & Wildlife Service, National Wetlands Inventory

Description

Abstract: NWI digital data files are records of wetlands location and classification as defined by the U.S. Fish & Wildlife Service. This dataset is one of a series available in 7.5 minute by 7.5 minute blocks containing ground planimetric coordinates of wetlands point, line, and area features and wetlands attributes. When completed, the series will provide coverage for all of the contiguous United States, Hawaii, Alaska, and U.S. protectorates in the Pacific and Caribbean. The digital data as well as the hardcopy maps that were used as the source for the digital data are produced and distributed by the U.S. Fish & Wildlife Service's National Wetlands Inventory project.

Purpose: The data provide consultants, planners, and resource managers with information on wetland location and type. The data were collected to meet U.S. Fish & Wildlife Service's mandate to map the wetland and deepwater habitats of the United States.

Time Period of Content

Multiple Dates/Times

Single_Date/Time

Calendar Date: 198811

Single Date/Time

Calendar Date: 199010

Currentness Reference: source photography date

Status

Progress: Complete

Maintenance and Update Frequency: Irregular

Spatial Domain

Bounding Coordinates

West Bounding Coordinate: -89.875

East Bounding Coordinate: -89.75

North Bounding Coordinate: 30.5

South Bounding Coordinate: 30.375

Keywords

Theme

Theme Keyword Thesaurus: None

Theme Keyword: wetlands

Theme Keyword: hydrologic

Theme Keyword: land cover

Theme Keyword: surface and manmade features

Place

Place Keyword Thesaurus: None

Place Keyword: Louisiana

Place Keyword: Mississippi

Access Constraints: none

Use Constraints: Federal, State, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, State, or

local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, State, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Point of Contact

Contact Organization Primary

Contact Organization: U.S. Fish & Wildlife Service, National Wetlands Inventory

Contact Position: Chief Cartographer

Contact Address

Address Type: mailing and physical address

Address: 9720 Executive Center Drive

City: St. Petersburg

State or Province: Florida

Postal Code: 33702

Contact Voice Telephone: 1 813 570 5411

Native Data Set Environment: NWI uses Wetlands Analytical Mapping System (WAMS) software version 4.06 running under the SUNOS 4.x operating system to digitize wetlands information.

Data Quality Information

Attribute Accuracy

Attribute Accuracy Report: Attribute accuracy is tested by manual comparison of the source with hard copy printouts and/or symbolized display of the digital wetlands data on an interactive computer graphic system. In addition, WAMS software (USFWS-NWI) tests the attributes against a master set of valid wetland attributes.

Logical Consistency Report: Polygons intersecting the neatline are closed along the border. Segments making up the outer and inner boundaries of a polygon tie end-to-end to completely enclose the area. Line segments are a set of sequentially numbered coordinate pairs. No duplicate features exist nor duplicate points in a data string. Intersecting lines are separated into individual line segments at the point of intersection. Point data are represented by two sets of coordinate pairs, each with the same coordinate values. All nodes are represented by a single coordinate pair which indicates the beginning or end of a line segment. The neatline is generated by connecting the four corners of the digital file, as established during initialization of the digital file. All data crossing the neatline are clipped to the neatline and data within a specified tolerance of the neatline are snapped to the neatline. Tests for logical consistency are performed by WAMS verification software (USFWS-NWI).

Completeness Report: All photo-interpretable wetlands are mapped. In the treeless prairies, 1/4 acre wetlands are mapped. In forested areas, small open water and emergent wetlands are mapped. In general, the minimum mapping unit is from 1 to 3 acres depending on the wetland type and the scale and emulsion of the source aerial photography. In regions of the country where evergreen forested wetlands predominate, wetlands smaller than 3 acres may not be mapped. Thus, a detailed on-the-ground and historical analysis of a single site may result in a revision of the wetland boundaries established through photographic interpretation. In addition, some small wetlands and those obscured by dense forest cover may not be included in this dataset.

Positional Accuracy

Horizontal Positional Accuracy

Horizontal Positional Accuracy Report: Horizontal positional accuracy for the digital data is tested by visual comparison of the source with hard copy plots.

Lineage

Source Information

Source Citation

Originator: U.S. Geological Survey

Publication Date: 198811

Title: National High Altitude Program (NHAP)

Geospatial Data Presentation Form: remote-sensing image

Source Scale Denominator: 65000

Type of Source Media: black and white aerial photograph film transparency

Source Time Period of Content

Single Date/Time

Calendar Date: 198811

Source Currentness Reference: source photography date

Source Citation Abbreviation: NWI1a

Source Contribution: aerial photo from which wetlands spatial and attribute information are interpreted

Source Information

Source Citation

Originator: U.S. Geological Survey

Publication Date: 199010

Title: National Aerial Photography Program (NAPP)

Geospatial Data Presentation Form: remote-sensing image

Source Scale Denominator: 40000

Type of Source Media: black and white aerial photograph film transparency

Source Time Period of Content

Single Date/Time

Calendar Date: 199010

Source Currentness Reference: source photography date

Source Citation Abbreviation: NWI1b

Source Contribution: aerial photo from which wetlands spatial and attribute information are interpreted

Source Information

Source Citation

Originator: U.S. Geological Survey

Publication Date: 1979

Title: Hickory

Geospatial Data Presentation Form: map

Publication Information

Publication Place: Reston, Virginia

Publisher: U.S. Geological Survey

Source Scale Denominator: 24000

Type of Source Media: stable-base material

Source Time Period of Content

Single Date/Time

Calendar Date: 1979

Source Currentness Reference: publication date

Source Citation Abbreviation: NWI2

Source Contribution: base map on which wetlands delineations are registered.

Source Information

Source Citation

Originator: U.S. Fish & Wildlife Service, National Wetlands Inventory

Publication Date: 1992

Title: Hickory NWI map

Geospatial Data Presentation Form: map

Publication Information

Publication Place: St. Petersburg, Florida

Publisher: U.S. Fish & Wildlife Service, National Wetlands Inventory

Source Scale Denominator: 24000

Type of Source Media: stable-base material

Source Time Period of Content

Single Date/Time

Calendar Date: 1992

Source Currentness Reference: publication date

Source Citation Abbreviation: NWI3

Source Contribution: source material from which compiled wetlands location and classification are digitized

Process Step

Process Description: NWI maps are compiled through manual photointerpretation of NHAP or NAPP aerial photography, supplemented by soil surveys and field checking of wetland photo signatures. Delineated wetland boundaries are manually transferred from interpreted photos to USGS 7.5 minute topographic quadrangle maps and then manually labeled. Quality control steps occur throughout the photointerpretation, map compilation, and map reproduction processes.

Source Used Citation Abbreviation: NWI1a

Source Used Citation Abbreviation: NWI1b

Source Used Citation Abbreviation: NWI2

Process Date: 1992

Source Produced Citation Abbreviation: NWI3

Process Step

Process Description: Digital wetlands data were manually digitized from stable-base copies of the 1:24,000 scale wetlands overlays registered to the standard U.S. Geological Survey (USGS) 7.5 minute quadrangles into topologically correct data files using Wetlands Analytical Mapping System (WAMS) software. Files contain ground planimetric coordinates and wetland attributes. The quadrangles were referenced to the North American Datum of 1927 (NAD27) horizontal datum. Manual digitizing used a digitizing table to capture the digital data at a resolution of at least 0.005 inches; attribution was performed as the data were digitized. The data were checked for position by comparing plots of the digital data to the source material.

Source Used Citation Abbreviation: NWI3

Process Date: 199210

Spatial Data Organization Information

Direct Spatial Reference Method: Vector

Spatial Reference Information

Horizontal Coordinate System Definition

Planar

Grid Coordinate System

Grid Coordinate System Name: Universal Transverse Mercator

Universal Transverse Mercator

UTM Zone Number: 16

Transverse Mercator

Scale Factor at Central Meridian: 0.9996

Longitude of Central Meridian: -87.0

Latitude of Projection Origin: 0.0

False Easting: 500000.0

False Northing: 0.0

Planar Coordinate Information

Planar Coordinate Encoding Method: coordinate pair

Coordinate Representation

Abscissa Resolution: 0.61

Ordinate Resolution: 0.61

Planar Distance Units: meters

Geodetic Model

Horizontal Datum Name: North American Datum of 1927

Ellipsoid Name: Clarke 1866

Semi-major Axis: 6378206.4

Denominator of Flattening Ratio: 294.9787

Entity and Attribute Information

Detailed Description

Entity Type

Entity Type Label: wetland

Entity Type Definition: Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following three attributes: 1) at least periodically, the land supports predominantly hydrophytes; 2) the substrate is predominantly undrained hydric soil; and 3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

Entity Type Definition Source: Cowardin, L.M., V. Carter, F. Golet, and E. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish Wildlife Service. 103 pp.

Attribute

Attribute label: wetland classification

Attribute Definition: The wetland classification system is hierarchical, with wetlands and deepwater habitats divided among five major systems at the broadest level. The five systems include Marine (open ocean and associated coastline), Estuarine (salt marshes and brackish tidal water), Riverine (rivers, creeks, and streams), Lacustrine (lakes and deep ponds), and Palustrine (shallow ponds, marshes, swamps, sloughs). Systems are further subdivided into subsystems which reflect hydrologic conditions. Below the subsystem is the class which describes the appearance of the wetland in terms of vegetation or substrate. Each class is further subdivided into subclasses; vegetated subclasses are described in terms of life form and substrate subclasses in terms of composition. The classification system also includes modifiers to describe hydrology (water regime), soils, water chemistry (pH, salinity), and special modifiers relating to man's activities (e.g., impounded, partly drained).

Attribute Definition Source: Cowardin, L.M., V. Carter, F. Golet, and E. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish Wildlife Service. 103 pp.

Attribute Domain Values

Codeset Domain

Codeset Name: USFWS-NWI wetland classification code set

Codeset Source: Photointerpretation Conventions for the National Wetlands Inventory, March 1990

Distribution Information

Distributor

Contact Organization Primary

Contact Organization: USGS-Earth Science Information Center

Contact Address

Address Type: mailing address

Address: 507 National Center

City: Reston

State or Province: Virginia

Postal Code: 20192

Contact Voice Telephone: 1 888 ASK USGS

Contact Voice Telephone: 1 703 648 6045

Distribution Liability: none

Standard Order Process

Digital Form

Digital Transfer Information

Format Name: DLG

Format Version Number: 3

Format Specification: Optional

Digital Transfer Option

Online Option

Computer Contact Information

Network Address

Network Resource Name: ftp://192.189.43.33/dlgdata/mobile/

Access Instructions: Anyone with access to the Internet may connect to NWI's server via anonymous ftp and download available NWI digital wetlands data in DLG3-Optional format. Indexes for NWI hardcopy maps and digital data are also available as well as digital wetlands data in a variety of other formats (MOSS Export, GRASS vector, DXF, and ARC Export) for 14 sample 7.5 minute quadrangles throughout the USA. To access: ftp to the NWI server, login as anonymous, enter your e-mail address at the password prompt, change to the dlgdata directory for DLG data, change to the maps directory for indexes, change to the samples directory for a sampling of digital data files in formats other than DLG. Use the ftp 'get' command to transfer readme file for further instructions.

Online Computer and Operating System: Sun Model 690MP Unix server. SunOS 4.X operating system.

Offline Option

Offline Media: 8mm cartridge tape

Recording Capacity

Recording Density: 2

Recording Density: 5

Recording Density: 10

Recording Density Units: gigabytes

Recording Format: tar

Recording Format: ASCII recording mode available with no internal labels; the logical record length is 80 bytes; the block size is a multiple of 80 up to 8000 bytes

Offline Option

Offline Media: 1/4-inch cartridge tape

Recording Capacity

Recording Density: 150

Recording Density Units: megabytes

Recording Format: tar

Offline Option

Offline Media: 9-track tape

Recording Capacity

Recording Density: 1600

Recording Density: 6250

Recording Density Units: characters per inch

Recording Format: tar

Recording Format: ASCII recording mode available with no internal labels; the logical record length is 80 bytes; the block size is a multiple of 80 up to 8000 bytes

Offline Option

Offline Media: 3-1/2 inch floppy disk

Recording Capacity

Recording Density: 1.44

Recording Density Units: megabytes

Recording Format: tar

Recording Format: MS-DOS

Digital Form

Digital Transfer Information

Format Name: MOSS

Format Version Number: none

Format Specification: Export

Digital Transfer Option

Offline Option

Offline Media: 8mm cartridge tape

Recording Capacity

Recording Density: 2

Recording Density: 5

Recording Density: 10

Recording Density Units: gigabytes

Recording Format: tar

Recording Format: ASCII recording mode available with no internal labels; the logical record length is 80 bytes; the block size is a multiple of 80 up to 8000 bytes

Offline Option

Offline Media: 1/4-inch cartridge tape

Recording Capacity

Recording Density: 150

Recording Density Units: megabytes

Recording Format: tar

Offline Option

Offline Media: 9-track tape

Recording Capacity

Recording Density: 1600

Recording Density: 6250

Recording Density Units: characters per inch

Recording Format: tar

Recording Format: ASCII recording mode available with no internal labels; the logical record length is 80 bytes; the block size is a multiple of 80 up to 8000 bytes

Offline Option

Offline Media: 3-1/2 inch floppy disk

Recording Capacity

Recording Density: 1.44

Recording Density Units: megabytes

Recording Format: tar

Recording Format: MS-DOS

Digital Form

Digital Transfer Information

Format Name: GRASS

Format Version Number: 3.0

Format Specification: Vector

Digital Transfer Option

Offline Option

Offline Media: 8mm cartridge tape

Recording Capacity

Recording Density: 2

Recording Density: 5

Recording Density: 10

Recording Density Units: gigabytes

Recording Format: tar

Recording Format: ASCII recording mode available with no internal labels; the logical record length is 80 bytes; the block size is a multiple of 80 up to 8000 bytes

Offline Option

Offline Media: 1/4-inch cartridge tape

Recording Capacity

Recording Density: 150

Recording Density Units: megabytes

Recording Format: tar

Offline Option

Offline Media: 9-track tape

Recording Capacity

Recording Density: 1600

Recording Density: 6250

Recording Density Units: characters per inch

Recording Format: tar

Recording Format: ASCII recording mode available with no internal labels; the logical record length is 80 bytes; the block size is a multiple of 80 up to 8000 bytes

Offline Option

Offline Media: 3-1/2 inch floppy disk

Recording Capacity

Recording Density: 1.44

Recording Density Units: megabytes

Recording Format: tar

Recording Format: MS-DOS

Fees: Digital Form - The online copy of the DLG data set may be retrieved via ftp at no charge. For delivery of digital data on magnetic tape, the prices are: purchased by single 7.5 minute quad unit: \$40 per dataset; purchased in groups of 2 to 6: \$20 per dataset; purchased in groups of 7 or more: \$90 base fee plus \$7 per dataset. Non-digital Form - \$3.50 per diazo paper map; \$5.25 per diazo mylar map.

Ordering Instructions: For digital data orders on 3.5" floppy disk, a maximum order of 10 quads is allowed. Data may be ordered in latitude/longitude or State Plane Coordinate System coordinates (Universal Transverse Mercator coordinates are standard). Latitude/longitude coordinates are not available with GRASS format. For this service, the user must order data through USGS-ESIC for delivery on magnetic media. Please specify the desired coordinate system when ordering. Non-digital form: specify wetlands overlay or wetlands overlay composited with USGS base map.

Technical Prerequisites: Check NWI's ftp site, maps directory for an explanation of the wetland codes. Check NWI's ftp site, software directory for a program that will parse the wetland codes to fixed length format. Check NWI's ftp site, software directory for an AML to convert NWI DLG files to ARC/INFO coverages.

Metadata Reference Information

Metadata Date: 19940920

Metadata Contact

Contact Person Primary

Contact Person: Linda Shaffer

Contact Organization: U.S. Fish & Wildlife Service, National Wetlands Inventory

Contact Position: Chief Cartographer

Contact Address

Address Type: mailing and physical address

Address: 9720 Executive Center Drive

City: St. Petersburg

State or Province: Florida

Postal Code: 33702

Contact Voice Telephone: 1 813 570 5411

Contact Facsimile Telephone: 1 813 570 5420

Contact Electronic Mail Address: linda@enterprise.nwi.fws.gov

Metadata Standard Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata Standard Version: FGDC-STD-001-1998

Glossary

[Most of the terms and definitions are from Department of Commerce, 1992, Spatial Data Transfer Standard (SDTS) (Federal Information Processing Standard 173): Washington: Department of Commerce, National Institute of Standards and Technology.]

abscissa -- the coordinate of a point in a plane cartesian coordinate system obtained by measuring parallel to the x-axis ("the 'x' value").

accuracy -- the closeness of results of observations, computations or estimates to the true values or the values accepted as being true.

altitude -- elevation above or below a reference datum, as defined in Federal Information Processing Standard 70-1. See also elevation.

area -- a generic term for a bounded, continuous, two-dimensional object that may or may not include its boundary.

area chain -- a chain that explicitly references left and right polygons and not start and end nodes. It is a component of a two-dimensional manifold.

area point -- a representative point within an area usually carrying attribute information about that area.

arc -- a locus of points that forms a curve that is defined by a mathematical expression.

attribute -- a defined characteristic of an entity type (e.g. composition).

attribute value -- a specific quality or quantity assigned to an attribute (e.g., steel), for a specific entity instance.

chain -- a directed nonbranching sequence of nonintersecting line segments and (or) arcs bounded by nodes, not necessarily distinct, at each end. Area chain, complete chain, and network chain are special cases of chain, and share all characteristics of the general case as defined above.

clearinghouse -- see National Geospatial Data Clearinghouse.

complete chain -- a chain that explicitly references left and right polygons and start and end nodes. It is a component of a two-dimensional manifold.

compound element -- a group of data elements and other compound elements. Compound elements represent higher-level concepts that cannot be represented by individual data elements.

coordinates -- pairs of numbers expressing horizontal distances along orthogonal axes; alternatively, triplets of numbers measuring horizontal and vertical distances.

data element -- a logically primitive item of data.

data set -- a collection of related data.

depth -- perpendicular distance of an interior point from the surface of an object.

developable surface -- a surface that can be flattened to form a plane without compressing or stretching any part of it. Examples include cones and cylinders.

digital image -- a two-dimensional array of regularly spaced picture elements (pixels) constituting a picture.

digital volume -- a three-dimensional array of regularly spaced volume elements (voxels) constituting a volume.

domain -- in the definition of the elements in the metadata standard, the domain identifies valid values for a data element.

Edge, Topology Level 0 -- VPF term for a string.

Edge, Topology Level 1 -- VPF term for a network chain in a network (in SDTS, a "Network chain, non-planar graph").

Edge, Topology Level 2 -- VPF term for a network chain in a planar graph (in SDTS, a "Network chain, planar graph").

Edge, Topology Level 3 -- VPF term for a complete chain.

elevation -- conforming to Federal Information Processing Standard 70-1, the term "altitude" is used in this standard, rather than the common term elevation.

entity instance -- a spatial phenomenon of a defined type that is embedded in one or more phenomena of different type, or that has at least one key attribute value different from the corresponding attribute values of surrounding phenomena (e.g., the 10 Street Bridge).

entity point -- a point used for identifying the location of point features (or areal features collapsed to a point), such as towers, buoys, buildings, places, etc.

entity type -- the definition and description of a set into which similar entity instances are classified (e.g., bridge).

explicit -- method of identifying positions directly by pairs (for horizontal positions) or triplets (for horizontal and vertical positions) of numbers.

Face, Topology Level 3 -- VPF term for a GT-polygon composed of rings.

G-polygon -- an area consisting of an interior area, one outer G-ring and zero or more nonintersecting, nonnested inner G-rings. No ring, inner or outer, shall be collinear with or intersect any other ring of the same G-polygon.

G-ring -- a ring created from strings and (or) arcs.

geospatial data -- information that identifies the geographic location and characteristics of natural or constructed features and boundaries on the earth. This information may be derived from, among other things, remote sensing, mapping, and surveying technologies.

graph -- a set of topologically interrelated zero-dimensional (node), one-dimensional (link or chain), and some-times two-dimensional (GT-polygon) objects that conform to a set of defined constraint rules. Numerous rule sets can be used to distinguish different types of graphs. Three such types, planar graph, network, and two-dimensional manifold, are used in this standard. All three share the following rules: each link or chain is bounded by an ordered pair of nodes, not necessarily distinct; a node may bound one or more links or chains; and links or chains may only intersect at nodes. Planar graphs and networks are two specialized types of graphs, and a two-dimensional manifold is an even more specific type of planar graph.

grid -- (1) a set of grid cells forming a regular, or nearly regular, tessellation of a surface; (2) a set of points arrayed in a pattern that forms a regular, or nearly regular, tessellation of a surface. The tessellation is regular if formed by repeating the pattern of a regular polygon, such as a square, equilateral triangle, or regular hexagon. The tessellation is nearly regular if formed by repeating the pattern of an "almost" regular polygon such as a rectangle, non-square parallelogram, or non-equilateral triangle.

grid cell -- a two-dimensional object that represents the smallest nondivisible element of a grid.

GT-polygon -- an area that is an atomic two-dimensional component of one and only one two-dimensional manifold. The boundary of a GT-polygon may be defined by GT-rings created from its bounding chains. A GT-polygon may also be associated with its chains (either the bounding set, or the complete set) by direct reference to these chains. The complete set of chains associated with a GT-polygon may also be found by examining the polygon references on the chains.

GT-ring -- a ring created from complete and (or) area chains.

horizontal -- tangent to the geoid or parallel to a plane that is tangent to the geoid.

implicit -- method of identifying positions by a place in an array of values.

interior area -- an area not including its boundary.

label point -- a reference point used for displaying map and chart text (e.g., feature names) to assist in feature identification.

latitude -- angular distance measured on a meridian north or south from the equator.

layer -- an integrated, areally distributed, set of spatial data usually representing entity instances within one theme, or having one common attribute or attribute value in an association of spatial objects. In the context of raster data, a layer is specifically a two-dimensional array of scalar values associated with all of part of a grid or image.

line -- a generic term for a one-dimensional object.

line segment -- a direct line between two points.

link -- a topological connection between two nodes. A link may be directed by ordering its nodes.

longitude -- angular distance between the plane of a meridian east or west from the plane of the meridian of Greenwich.

map -- a spatial representation, usually graphic on a flat surface, of spatial phenomena.

media -- the physical devices used to record, store, and (or) transmit data.

meridian -- a great circle on the Earth that passes through the geographic poles.

metadata -- data about the content, quality, condition, and other characteristics of data.

National Geospatial Data Clearinghouse -- a distributed network of geospatial data producers, managers, and users linked electronically. Building on initiatives such as the national information infrastructure, the clearinghouse uses a distributed, electronically connected network, such as the Internet. Each data provider will describe available data in an electronic form, and provide these descriptions (or "metadata") using means that can be accessed over a communications network. Thus, the data for the clearinghouse are located at the sites of data producers (or, where more efficient, at the sites of intermediaries) throughout the country. Using the network, users will search these descriptions to locate data that are suitable for their applications.

network -- a graph without two dimensional objects. If projected onto a two-dimensional surface, a network can have either more than one node at a point and (or) intersecting links or chains without corresponding nodes.

network chain -- a chain that explicitly references start and end nodes and not left and right polygons. It is a component of a network.

node -- a zero-dimensional object that is a topological junction of two or more links or chains, or an end point of a link or chain.

Node, Topology Level 0 -- VPF term for a point (in SDTS, a "point").

Node, Topology Level 1 -- VPF term for a node on a network (in SDTS, a "node, network").

Node, Topology Level 2 -- VPF term for a node on a planar graph (in SDTS, a "node, planar graph").

Node, Topology Level 3 -- VPF term for a point used to represent isolated features. These are topologically linked to a containing face.

object -- a digital representation of all or part of an entity instance.

ordinate -- the coordinate of a point in a plane cartesian coordinate system obtained by measuring parallel to the y-axis ("the 'y' value").

phenomenon -- a fact, occurrence or circumstance. Route 10, George Washington National Forest, and Chesterfield County are all phenomena.

pixel -- two-dimensional picture element that is the smallest nondivisible element of a digital image.

planar graph -- the node and link or chain objects of the graph occur or can be represented as though they occur upon a planar surface. Not more than one node may exist at any given point on the surface. Links or chains may only intersect at nodes.

point -- a zero-dimensional object that specifies geometric location. One coordinate pair or triplet specifies the location. Area point, entity point, and label point are special implementations of the general case.

primitive -- the quality of not being subdivided; atomic.

quality -- an essential or distinguishing characteristic necessary for cartographic data to be fit for use.

raster -- one or more overlapping layers for the same grid or digital image.

raster object - one or more images and/or grids, each grid or image representing a layer, such that corresponding grid cells and/or pixels between layers are congruent and registered.

resolution -- the minimum difference between two independently measured or computed values which can be distinguished by the measurement or analytical method being considered or used.

ring -- sequence of nonintersecting chains or strings and (or) arcs, with closure. A ring represents a closed boundary, but not the interior area inside the closed boundary.

SDTS -- the Spatial Data Transfer Standard defined by Department of Commerce, 1992, Spatial Data Transfer Standard (SDTS) (Federal Information Processing Standard 173): Washington, Department of Commerce, National Institute of Standards and Technology.

spatial data -- see geospatial data.

stratum -- one of a series of layers, levels, or gradations in an ordered system. For this standard, the term is used in the sense of (1) a region of sea, atmosphere, or geology that is distinguished by natural or arbitrary limits; (2) a socioeconomic level of society comprised of persons of the same or similar status, especially with regard to education or culture; or (3) a layer of vegetation, usually of the same or similar height.

string -- a connected nonbranching sequence of line segments specified as the ordered sequence of points between those line segments. Note: A string may intersect itself or other strings.

two-dimensional manifold -- a planar graph and its associated two dimensional objects. Each chain bounds two and only two, not necessarily distinct, GT-polygons. The GT-polygons are mutually exclusive and completely exhaust the surface.

type -- in the definition of the elements in the metadata standard, a compound element has the type "compound" to provide a unique way to identify compound elements. For a data element, the type identifies the kind of value that can be assigned to the data element. The choices are "integer" for integer numbers, "real" for real

numbers, "text" for ASCII characters, "date" for day of the year, and "time" for time of the day.

universe polygon -- defines the part of the universe that is outside the perimeter of the area covered by other GT-polygons ("covered area") and completes the two-dimensional manifold. This polygon completes the adjacency relationships of the perimeter links. The boundary of the universe polygon is represented by one or more inner rings and no outer ring. Attribution of the universe polygon may not exist, or may be substantially different from the attribution of the covered area.

vector -- composed of directed lines.

vertical -- at right angles to the horizontal; includes altitude and depth.

VPF -- the Vector Product Format defined by Department of Defense, 1992, Vector Product Format (MIL-STD-600006): Philadelphia, Department of Defense, Defense Printing Service Detachment Office.

void polygon -- defines a part of the two-dimensional manifold that is bounded by other GT-polygons, but otherwise has the same characteristics as the universe polygon. The geometry and topology of a void polygon are those of a GT-polygon. Attribution of a void polygon may not exist, or may be substantially different from the attribution of the covered area.

voxel -- a three-dimensional element that is the smallest nondivisible element of a digital volume.

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