Missouri Geographic Information System Advisory Committee

GEOSPATIAL METADATA STANDARD

Purpose

The growing use of spatially referenced digital data has necessitated the development of a statewide metadata standard. Metadata is a term that refers to data about data. Geospatial metadata provides information about data content, quality, spatial reference, etc. A metadata standard will help facilitate data capture, translation, exchange, and documentation. The purpose of this document is to establish a metadata standard for geographic information system (GIS) databases produced in the state of Missouri and served on the Missouri Spatial Data Information Service (MSDIS).

Need For a Metadata Standard

A metadata standard is needed to facilitate the exchange of data and to help ensure that users are aware of the limitations imposed by the methods and accuracy of its collection and the decisions made during its development. A geospatial metadata standard helps GIS developers describe the data they create which increases the data's value. Without a metadata standard, it is difficult to determine what spatial data exist, the quality of the data, how appropriate the data are for a given use, and who to contact about the data.

Background

The Federal Geographic Data Committee (see definitions section for information about the FGDC) developed a standard for digital geospatial metadata entitled the Content Standard for Digital Geospatial Metadata (CSDGM) in response to Executive Order 12906 signed by President William Clinton on April 11, 1994. Section 3 deals with the development of a national geospatial data clearinghouse. Section 3 of Executive Order 12906, paragraph B states: "…each agency shall document all new geospatial data it collects or produces, either directly or indirectly, using the standard under development by the FGDC, and make that standardized documentation electronically accessible through the Clearinghouse network."

According to the FGDC, the objectives of the standard are to provide a common set of terminology and definitions for the documentation of digital geospatial data. The standard establishes the names of data elements and compound elements (groups of data elements) to be used for these purposes, the definitions of these compound elements and data elements, and information about the values that are to be provided for the data elements. The standard was developed to help perspective users locate, evaluate, access, and obtain geospatial data. To provide the necessary information, the standard establishes both mandatory and voluntary data elements which data producers use to describe their data.

In addition, the International Organization for Standardization (ISO) Technical Committee 211 has been working on a metadata standard, referred to as Metadata Standard 19115 (formerly 15046-15). The FGDC, along with its many partners, plan to join the geospatial data community and adopt the ISO Metadata Standard upon its

approval. Therefore, in order to protect the significant existing metadata investment, all participating agencies and organizations are working to ensure that the proposed ISO Metadata Standard allows maximum compatibility with existing FGDC compliant metadata records.

Metadata Standard for Missouri

The Missouri GIS Advisory Committee (MGISAC) recognizes the need for a statewide metadata standard which specifies the kinds of documentation to be maintained about geospatial data so that data users may understand its lineage and quality. The FGDC's CSDGM published in 1994 has been generally well received and widely adopted by public and private GIS organizations.

The recommendations for a statewide metadata standard approved by the MGISAC on August 9, 2000 are:

1) The MGISAC recommends that Missouri adopt the FGDC's CSDGM as published on the FGDC Clearinghouse website as the state's metadata standard. (http://www.fgdc.gov/metadata/contstan.html)
2) The Committee recommends that a Geospatial Data Thesaurus be developed to promote the discovery and use of GIS data in Missouri.

Metadata File Transfer Standard

The FGDC's CSDGM has been hindered by the lack of standard file formats for the actual exchange of metadata among organizations. To address this issue, the FGDC issued the *DRAFT Encoding Guideline for FGDC Metadata*. This Guideline defines how metadata records can be encoded in three standard types of ASCII text files: Standard Generalized Markup Language (SGML), Hypertext Markup Language (HTML), and formatted text.

The recommendations for metadata file transfer approved by the Missouri GIS Advisory Committee on August 9, 2000 are:

1) The MGISAC recognizes the advantages of portable, platform-independent metadata.
2) The Committee recognizes that most of Missouri's organizations can create and use text-format data without significant investment.
3) The Committee encourages organizations creating geospatial data to establish a relationship with the National Spatial Data Infrastructure Clearinghouse (NSDI) for posting of standardized metadata records.
4) The Committee endorses the substance of the Draft Encoding Guideline for FGDC Metadata as published on the FGDC Clearinghouse web site (http:/www.fgdc.gov/clearinghouse/reference/encoding797.html).

Additional Information

Metadata Collection Tools

At the date of this document, evaluations of metadata collection tools may be found at the following web sites:

http://www.fgdc.gov/metadata/toollist/metatool.html
http://www.fgdc.gov/metadata/toollist/ogrip/met98ful.html
http://badger.state.wi.us/agencies/wlib/sco/metatool/mtools.htm#Toolbox

Raster Documentation

The distinction in how most GIS software packages handle raster and vector data is the way in which they represent spatial features. Whereas vector systems store data as a series of points that form line segments to describe spatial features (e.g. roads) or feature boundaries (e.g. watersheds), raster systems employ a grid of cells that overlay the spatial features in the area of study. Information about the spatial feature is recorded for each cell under which it lays. Common types of raster data sets are satellite data and aerial photographs.

Because the FGDC Metadata Standard does not address all aspects of raster data specifically, the following recommendations for raster data metadata were approved by the MGISAC on August 9, 2000 are:

1) Specify in the abstract section how the raster data was produced. For example, the following is a sample of the abstract section for a Digital Raster Graphic (DRG) in the abstract section:

   This Digital Raster Graphic (DRG) was produced by down sampling, georeferencing, and conversion of a 1000 dots-per-inch (dpi) composite image of revised map separates to a standard, USGS GeoTIFF format. This DRG includes collar information and is georeferenced to the UTM grid.

2) Specify in the purpose section how the raster data can be used. For example:

   Due to the georeferencing and high accuracy, this DRG is useful as a source or background layer in a GIS, as a means to perform quality assurance on other digital products, and as a source for the collection and revision of vector data. This DRG can also be merged with other digital data, such as Digital Elevation Models (DEMs) or Digital Orthophoto Quads (DOQs), to provide additional visual information for the extraction and revision of base cartographic information.

Metadata Workbook

The Content Standards for Digital Geospatial Metadata Workbook is very helpful in the creation of metadata. Copies can be obtained from the FGDC:

Federal Geographic Data Committee Secretariat
C/o U.S. Geological Survey
590 National Center
Reston, VA 20192
Telephone: (703) 648-5514
Facsimile: (703) 648-5755
Internet (electronic mail): gdc@usgs.gov
Anonymous FTP: fgdc.er.usgs.gov
WWW Home Page: http://www.fgdc.gov

Definitions

The *Federal Geographic Data Committee* was 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, or geospatial data. The FGDC is composed of representatives from the Departments of Agriculture, Commerce, Defense, Energy, Housing and Urban Development, the Interior, 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; and the Tennessee Valley Authority. Additional Federal agencies participate on FGDC subcommittees and working groups. The Department of the Interior chairs the committee.

GIS Databases are defined as those databases that are designed and developed for use with GIS software. These include all databases with locational, or geospatial components that may be used to link tabular data to location specific points, lines, and polygons.

The *Missouri GIS Advisory Committee* (MGISAC) was created in April 1995 by the governor of Missouri to foster cooperation among state agencies, local governments, private industry, educational institutions, and other organizations in the field of GIS. The members on the MGISAC are appointed by the Chief Information Officer of the Office of Information Technology from lists of candidates nominated by the Information Technology Planning Board, GIS user community, and technical groups.

The *National Spatial Data Information Clearinghouse* (NSDI) is a collection of over 100 spatial data servers, that have digital geographic data primarily for use in GIS, image processing systems, and other modeling software. These data collections can be searched through a single interface based on their description, or metadata. The NSDI encompasses policies, standards, and procedures for organizations to cooperatively produce and share geospatial data. The FGDC has assumed leadership in the evolution of the NSDI in cooperation with state and local governments, academia, and the private sector.