Minnesota Geographic Data Catalog 2000

Many data sets now free online
Lower prices for custom delivery

Minnesota Planning is a state agency charged with developing a long-range plan for the state, stimulating public participation in Minnesota's future and coordinating public policy among all levels of government.

The Land Management Information Center at Minnesota Planning assists state and local government to effectively use geographic information in public policy-making and operations. To fulfill this mission in part, LMIC provides public access to the data sets listed in the *Minnesota Geographic Data Catalog 2000*.

The Land Management Information Center's homepage on the World Wide Web is http://www.lmic.state.mn.us. The site links to the data catalog, as well as to available online data sets, documentation and status maps, information about Datanet, EPPL7, documentation standards and the Minnesota Governor's Council on Geographic Information.

Upon request, the *Minnesota Geographic Data Catalog 2000* will be made available in an alternative format, such as Braille, large print or audio tape. For TTY, contact Minnesota Relay Service at (800) 627-3529 and ask for Minnesota Planning.

August 2000

For more information, paper or electronic copies of the *Minnesota Geographic Data Catalog 2000,* contact:

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Minnesota Geographic Data Catalog

Minnesota Geographic Data Catalog 2000 describes data available for analyzing and mapping Minnesota's natural environment, its people and public service systems. The data sets listed in the catalog are routinely used by the Land Management Information Center at Minnesota Planning and others for a wide range of purposes, from helping site pipelines and assessing the effects of power plant emissions to managing inventories. LMIC has prepared this catalog to help geographic data users identify and obtain the information they need.

Geographic data is information that can be mapped. Such data connects attributes that describe a certain condition, such as population, elevation or the width of a pipeline, to that condition's location on the surface of the Earth. This data can be used with software applications, called geographic information systems, for spatial analysis.

Many functions of government require accurate, complete and current information about the land. In response, a wide variety of public data has been developed and maintained by federal, state and local government agencies. This data also is used by academic institutions, businesses and nonprofit organizations, and the general public. When properly gathered and organized, this data can be readily shared, thereby minimizing the need for different organizations to invest in collecting the same information.

Minnesota Geographic Data Catalog 2000 organizes data into seven categories: administrative and political boundaries, census geography, physical and biological, remote sensing, transportation and utilities, U.S. Geological Survey base data and data collections. Each entry contains essential information about the data's source, its original map scale if applicable, file format, the area each file covers, how much of the state is covered and how the data may be obtained. An index is included on page 31.

CONSIDERATIONS WHEN USING GEOGRAPHIC DATA

Map projection, datum, coordinate system, precision, Y-coordinate shift and data format are important characteristics of geographic data sets that affect their appropriate and meaningful use. When more than one type of data is used to produce a map or to perform geographic analysis, results will be compromised if these characteristics are not matched in each data set. Each of these geographic data characteristics is briefly summarized here.

Map projection

It is impossible to represent the curved surface of the earth on the flat surface of a map without introducing some error. A *map projection* is a mathematical description of the transformation that allows cartographers to measure and control that error.

Because many of the data sets described in this catalog were derived from printed maps, characteristics of each map's projection are carried over into the electronic data. The two most common map projections found in Minnesota are the Lambert Conformal Conic Projection and the Transverse Mercator Projection. A special version of the latter, called the Universal Transverse Mercator, is possibly the most widely used projection for statewide mapping in Minnesota.

Nearly all the data available from LMIC is in this UTM projection. The UTM system divides the Earth into 60 north-south strips, called zones. Each zone is numbered and extends almost from the North to the South Pole. Each is 6-degrees longitude wide and centered around a line of longitude called the central meridian. For more information on the UTM system, see http://mapping.usgs.gov/mac/isb/pubs/factsheets/fs15799.html

Minnesota lies almost entirely within UTM Zone 15; its central meridian — 93 degrees west longitude — runs north and south roughly through Hibbing, St. Paul and Austin. Unfortunately, the east and west extremes of the state fall outside Zone 15: the tip of the Arrowhead re-

gion around Grand Portage is within UTM Zone 16, and a strip of western Minnesota from Kittson County down to Rock County falls within UTM Zone 14.

This three-zone partitioning creates continuity problems across the seams when data sets spanning zones are used together. To overcome this inconvenience, most data sets from LMIC have been reorganized into a single zone — UTM Zone 15 Extended — to cover the entire state.

Horizontal datum

Since the Earth is not a perfect sphere, distortions in its shape present knotty problems in accurately locating places. To solve this dilemma, cartographers measure location from a smooth mathematical surface — a reference ellipsoid — that closely fits the Earth's mean sea level. A variety of ellipsoids, customized to fit specific parts of the Earth, have been developed over time.

When a specific ellipsoid is accepted as the basis for mapping over all or a large portion of the Earth, it is referred to as the *horizontal datum*. An ellipsoid called Clarke 1866 had been accepted as the standard datum for detailed mapping in North America for most of the 20th century. This datum is referred to as the North American Datum of 1927, or NAD27. Almost all U.S. Geological Survey quadrangle maps for Minnesota are cast on the NAD27. When these maps are digitized, the geometric qualities of the datum are captured.

The advent of highly accurate measurement using satellites has allowed for further refinement of the Earth's horizontal datum. A modern ellipsoid, the Geodetic Reference System of 1980 — or GRS80 — capitalizes on advances in space technology. Based on GRS80, the North American Datum of 1983 — NAD83 — has become the standard for an increasing amount of new mapping in Minnesota. In digital form, data can be readily transformed between NAD27 and NAD83. Most data from LMIC is in NAD83.

Coordinate system

The most common way to describe the horizontal location of a point on any datum is by measuring its latitude and longitude. But, because they are designed to reference a sphere, latitude and longitude are sometimes difficult to work with on flat maps and in the computer files created from those maps. Thus, rectangular coordinate systems have been developed to store location information in geographic data sets. UTM Cartesian — x, y — coordinates are recorded in meters. The x-coordinate measures the number of meters east or west of a central meridian; the y-coordinate measures the number of meters north or south of the Equator. Most data available from LMIC is in UTM coordinates. Other examples of rectangular coordinate systems include State Plane coordinates and county coordinates. For more information on converting coordinates between UTM, Minnesota State Plane and Minnesota county coordinates, see http://rocky.dot.state.mn.us/LIS/

lis.html or contact the Minnesota Department of Transportation Geodetic Unit at 651-296-8804.

Precision

How accurately a point can be recorded in a data file depends on how much space in the file is allocated to store the x and y coordinates for that point. Precision refers to the number of digits reserved to store location coordinates in a geographic data set. Higher precision does not necessarily mean higher accuracy; rather, it simply means that space is available to store more accu-

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WHAT'S NEW IN THE 2000 CATALOG

Visit the Minnesota clearinghouse for catalog updates at http://www.lmic.state.mn.us/chouse.html

Many more data sets are free online. In most cases, the link to the free data is provided in the documentation record listed for the data set entry.

Lower prices for custom delivery and for data that is not online. See page 5.

Direct links to documentation are provided for most data sets.

Finding Data section describes the GeoGateway, an Internet site to search for GIS data in the state (p. 3)

New data sets
Minnesota.data CD collection (p. 25)
1990s Census of the Land, a simplified eight-category view of statewide land use and land cover (free online p. 15)
1997 land use for Twin Cities (free online p. 14)
Statewide geology layers (free online p. 12)
SSURGO soils complete for 14 counties (free online p. 17)
Public land ownership, the mid-1980s (free online p. 6)
Public Land Survey data from DNR's Control Point Inventory (free online p. 7)
Most Datanet databases accessible via web interface (free online p. 27)

New maps and applications
Land use maps by county (p. 16)
School district maps (p. 8)
EPIC2000 software, an update to EPPL7's Windows interface (p. 26)
EPPL7 viewer extension for ArcView (free online p. 25)
Census tract finder currently covering the metropolitan area (free online p. 27)
DataLogr documentation software available free to many Minnesota organizations (p. 3)

Improvements to existing data sets
Agricultural and transition area land use available by county (free online p. 14)
Public Land Survey data to the section level available in one statewide file (free online p. 7)
Digital orthophotos complete statewide (p. 20)
Digital raster graphics available clipped and in the NAD83 datum (free online p. 23)
Digital elevation data (from DEMs) available in raster format and standardized in NAD83 (free online p. 11)
Telecommunications service area boundary maps updated June 2000 (p. 22)

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rate values, if careful measurements are taken. Two levels of precision are common in geographic data sets: single precision coordinates store up to seven significant digits, while double precision coordinates can store up to 15. Some GIS software can use only single precision data. Coordinate precision will be an important consideration if data is to be processed with this type of software.

Y-coordinate shift

The UTM coordinate system records y-coordinate values between 4 million and 5 million meters in Minnesota. Their size requires that more than seven digits be used to maintain accuracy. To accommodate GIS software that can only use single precision files, a fixed number is often subtracted from each y-coordinate, producing a controlled shift or offset in the data. The standard offset in Minnesota is 4.7 million meters. The need for y-coordinate shifted data is diminishing as more robust software is developed. Most data sets from LMIC are in double precision, unshifted form.

Data formats

Data sets may be available as vector or raster files. Vector means that geographic features are represented by x,y coordinates. Features can be symbolized by points, lines or polygons (areas). Raster means that data values are assigned to grid cells. A group of grid cells with the same value represents a feature, for example, a lake. Most vector data sets from LMIC are available in ARC/INFO export or shapefile formats, and most raster data sets are in EPPL7, ERDAS or GeoTIFF formats. Each data set description in this catalog lists all available formats. *Note: ArcView users can now download a free extension from LMIC to view EPPL7 format files directly in ArcView. See http://www.mnplan.state.mn.us/EPPL7/whatsnew/arcview.htm*

DOCUMENTING DATA

An integral part of any geographic data set is a well-organized description of its content. This type of explanatory information is called metadata — a written record of the most important facts about a data set. Metadata is critical to data creators who need to organize data and keep track of when it was created and what it contains. Metadata is equally important to those sharing data who need clear and complete information about data they are considering using. Well-designed metadata answers seven questions:

■ What is this data about; where did it come from; when was it gathered?
■ What is its quality?
■ How is it organized?
■ Where is the data set located on the earth's surface?
■ What kind of features does this data set describe; in how much detail?
■ How is this data set distributed?
■ Who put this documentation together?

The Land Management Information Center has contributed to the work of the Minnesota Governor's Council on Geographic Information to help develop a metadata format specifically designed for geographic data. The *Minnesota Geographic Metadata Guidelines* provide a convenient template to help anyone working with GIS to document their own data. A copy of these guidelines can be found at http://www.lmic.state.mn.us/gc/stds/metadata.htm or by calling LMIC at 651-296-1211.

To help make it easier for data creators to gather metadata, many software tools have been developed that allow users to concentrate on the content of their documentation rather than on format. *DataLogr* is one of those helpful tools. A Windows-based metadata entry tool, DataLogr is simple to operate and does not require additional software. It produces structured files that follow the Minnesota Geographic Metadata Guidelines and that can be output in a variety of formats, including HTML that can be viewed on-screen, printed out or put on a web site.

DataLogr was developed by IMAGIN, a nonprofit consortium of Michigan agencies, and is available from LMIC at no charge to government, academic and nonprofit organizations within Minnesota. This offering is made possible through the generous contributions of the Metropolitan Council, the Forest Resources Council through the Minnesota Department of Natural Resources and LMIC. For-profit organizations in Minnesota can obtain the software for $85. The software is shipped with an output file formatting utility, detailed users guide and helpful information about data documentation with examples.

To obtain more information or a copy of DataLogr, see http://www.lmic.state.mn.us/chouse/datalogr.html or contact LMIC at 651-296-1211 or clearinghouse@mnplan.state.mn.us.

FINDING DATA

Today, finding a library book located in a neighboring county or across the country is almost as easy as finding a book on a shelf of your neighborhood library. This convenience is made possible through an automated catalog that allows patrons to search for and find library resources electronically. The online catalog contains descriptive information — metadata — about the title, author, subject and location of millions of publications. A simple search at a library computer terminal can quickly locate the closest copy of a particular book or article. In some cases, an order to have the book delivered to the local library can be placed immediately, or an electronic version of the article can be instantaneously delivered.

Wouldn't it be convenient if GIS professionals could find the data they need as easily as they can find a book? A new Internet service — *GeoGateway,* the search tool of the Minnesota Geographic Data Clearinghouse — attempts to do just that. The GeoGateway uses structured meta-

data, such as that produced through DataLogr, as its electronic catalog. Users of the GeoGateway identify the geographic area they are interested in, the theme of data they desire and the individual data libraries they would like to search. Information is returned identifying available data and how it may be obtained. In many cases, users can immediately download the data they discover. Data libraries at the Land Management Information Center, Minnesota Department of Natural Resources, Arrowhead Regional Development Commission, U.S. Geological Survey, Natural Resources Conservation Service and U.S. Bureau of the Census are only a few sources for the hundreds of data sets that can be found about Minnesota and the Upper Midwest region through the GeoGateway.

To search for data using the GeoGateway, visit the LMIC web site at http://www.lmic.state.mn.us/chouse.html and click on the GeoGateway link. Detailed metadata describing most of the data sets listed in this catalog is now available. LMIC's web site also contains links to the *National Geospatial Data Clearinghouse,* for users who wish to find digital geographic data from all over the world; to *Data Finder,* a similar search tool focused on data within the Twin Cities metropolitan area; and to the *Data Deli,* a data delivery site developed by the Minnesota DNR. For assistance in using these new services, call LMIC.

ORDERING DATA

Free online data

LMIC's goal is to provide as much free online data as possible. When data can be downloaded over the Internet at no cost, the description in this catalog includes a web address for the data set. The data set can be downloaded

Graphic can be found at http://www.lmic.state.mn.us/catalog/images/

The GeoGateway allows users to search a number of sources for data about Minnesota and the Upper Midwest region.

by clicking on the highlighted "Online Linkage" field in the documentation.

Pre-packaged CDs

Sometimes it is more efficient to package large amounts of data on CD. Prices for these prepackaged data sets are generally $25 per disk plus a $25 handling fee per order. Pre-packaged CDs are kept in stock and will be mailed the next business day. The ordering procedure is the same as for custom delivery (see box at right).

Other sources

Some data sets described in this catalog may be obtained from sources other than LMIC. When this is the case, contact information is provided in the data set description. For this data, pricing policies are established by the source organization. A list of all sources of geographic information included in this catalog can be found on page 29.

Custom services

For special processing, complex format conversions, assembly of data in nonstandard geographic regions, development of new data sets and new maps, and other custom services, contact the LMIC project services office at 651-296-1202.

Distribution conditions

All geographic data has limitations due to the scale, resolution, date and interpretation of the original source materials. The Land Management Information Center is not responsible for any interpretation or conclusions, based on this data, made by those who acquire or use it. LMIC distributes data, but does not necessarily participate in creating it. Any known limitations or problems with particular data sets are noted in the documentation. Data creators will be notified of all errors reported to LMIC in writing. See the Appendix for the complete text of LMIC's distribution liability statement.

CUSTOM DELIVERY

Data delivery services are available for users who require or prefer custom requests and for those who would like data sets that are not currently online. Prices are set to cover distribution costs only. The charge for custom data orders from LMIC has been significantly reduced:

$25 order fee + $25 media fee + $5 per file + special processing fee, if applicable

The media fee does not apply to file transfer protocol delivery. For example, the fee for soils data covering three counties is $65 if delivered on custom CD or $40 (no $25 media fee) if delivered via FTP.

Depending on the data set, a file may include data for a county, a quadrangle or for the entire state. The file unit is noted within each data set description in this catalog. There is no charge for regular shipping or tax. Express mailing requires an additional charge. If special processing is required (for example, file format conversion), a charge for staff time will be estimated before the order is confirmed.

Custom orders may be placed by sending an e-mail to: clearinghouse@mnplan.state.mn.us or by calling LMIC at 651-296-1211 and asking to speak to a data services staff person. This person can answer questions about data limitations, formats and other details. Orders will be sent with an invoice payable within 30 days by check or purchase order. Credit cards cannot be accepted. Please allow two weeks for an order to be filled.

Data can be delivered on CD-ROM, 8-mm magnetic tape cartridge as UNIX TAR files or, depending on file size, 3.5-inch DOS-readable diskette, zip disk or via FTP.

Administrative and Political Boundaries

The locations of administrative and political boundaries often profoundly influence public policy. Data describing boundaries of state agency administrative regions, the federal system of land surveys and other politically administered areas are included in this section. Boundaries derived from U.S. Bureau of the Census data can be found in the Census Geography section.

Administrative Regions

Minnesota Department of Natural Resources. This file identifies DNR's six administrative regions.

Source: DNR's hybrid county boundaries
Scale: 1:24,000
State coverage: Full
Format: ARC/INFO export
File unit: State
Documentation: http://deli.dnr.state.mn.us/metadata/full/dnrrgne2.html
Price: Free via online link in documentation

Minnesota Pollution Control Agency. This file identifies PCA's six administrative regions.

Source: Mn/DOT BaseMap county boundaries
Scale: 1:24,000
State coverage: Full
Format: ARC/INFO export
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/pca_regs.html
Price: Free via online link in documentation

County Boundaries

To date, no single county boundary file has been accepted as a common standard for use by Minnesota state agencies. Boundary files exist at different scales and levels of line generalization and are used for different purposes. It is advisable to choose a file that most closely matches the other data being used in a project. For example, use the file from the U.S. Census to match other census data; use DNR's hybrid boundaries to match county files that DNR distributes. Four commonly used county boundary files are:

Mn/DOT BaseMap. 1:24,000-scale, see page 22.

DNR hybrid boundaries. 1:24,000-scale, see http://deli.dnr.state.mn.us/metadata/full/ctybdne2.html

U.S. Census 1990. 1:100,000-scale, see page 9.

TRS or TRSQ. 1:100,000-scale, see page 7.

Legislative and Congressional Districts, 1994

Minnesota's legislative and congressional district boundaries were most recently established by law in 1994 by the Minnesota Legislative GIS Office based on the U.S. Bureau of the Census 1992 TIGER/Line files. For more information about the redistricting process, see the LGO website at http://www.commissions.leg.state.mn.us/gis/index.html. The website also contains the Legislative District Finder, a mapping application that helps users locate a particular legislative district and identify its house and senate representatives.

Source: U.S. Bureau of the Census 1992 TIGER/Line files
Scale: 1:100,000
State coverage: Full
Format: ARC/INFO export or shapefile
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/sen94.html and http://lucy.lmic.state.mn.us/metadata/hse94.html
Price: Free via online link in documentation.

Publicly Administered Lands — Federal and State

GAP Stewardship. This data set contains land ownership and administration information for Minnesota by 40-acre parcel. BRW, Inc. recorded information for a number of federal, state and tribal organizations. Date of the source material ranges from 1976 to 1998, although the material is predominantly from 1983 to 1985.

Source: Multiple
Scale: 1:100,000
Resolution: 40-acre
State coverage: Full
Format: ARC/INFO export
File unit: County
Documentation: http://deli.dnr.state.mn.us/metadata/full/gapstpy2.html
Price: Free via online link in documentation

Minnesota Public Lands, 1983. This data set records publicly administered lands in Minnesota by 40-acre parcel: federal, state, metropolitan commission and tax-forfeited. Data was compiled by the Land Management Information Center as part of a legislatively supported project. The project report, *Minnesota Public Lands, 1983*, is available from LMIC at no charge. *Note: Much of the data is older than 1983.*

Source: Multiple
Resolution: 40-acre
State coverage: Full
Format: ASCII table file, INFO database file (EPPL7 see page 26)
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/pub_own.html
Price: See page 5 for custom delivery

Public Land Survey System

Control Point Generated. The Minnesota Department of Natural Resources, Division of Lands and Minerals constructed this data set using section corner coordinates from the DNR's Control Point Inventory as well as information from the original Government Land Office surveyors' notes and plat maps. Quarter-quarter sections, government lot boundaries and meander corners are calculated, and meander lines are added using the bearings and distances from the original survey notes. Section lines and Indian reservation boundaries are extended across water bodies, but smaller subdivision lines are not. Polygon and line attribute coding is included.

Source: DNR Control Point Inventory and Government Land
  Office surveyors' notes and plat maps
Scale: 1:24,000
State coverage: Partial (most nonmetropolitan counties are
  complete)
Format: ARC/INFO export
File unit: County
Documentation: http://deli.dnr.state.mn.us/metadata/full/
  pls40ne3.html
Price: Free via online link in documentation

TRS (Township Range Section). All public land survey section, township and county boundaries as recorded on the source are included. LMIC used stable-base mylars in order to maintain a high level of accuracy and consistency. Public land survey boundaries extend through water bodies to form a complete polygon coverage. Polygon attributes are included.

Source: U.S. Geological Survey quadrangles
Scale: 1:100,000
State coverage: Full
Format: ARC/INFO export, shapefile
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/trs.html
Price: Free via online link in documentation

TRSQ (Township Range Section Quarter-quarter). LMIC calculated boundaries for quarter-quarter sections (40-acre parcels) based on section corners derived from several sources of varying accuracy. County, section and township boundaries are included. All boundaries extend through water bodies to form a complete polygon coverage. Polygon attributes are included. *Note: Users who need data only to the section level should choose the TRS data set.*

Source: U.S. Geological Survey quadrangles
Scale: 1:100,000
State coverage: Full
Format: ARC/INFO export, shapefile
File unit: County or 30 minutes latitude x 60 minutes longitude
Documentation: http://lucy.lmic.state.mn.us/metadata/trsq.html
Price: See page 5 for custom delivery

Straight-line Sections. The Minnesota Department of Natural Resources generated a section level coverage by connecting the SECTIC-24K section corners (described below) with straight lines. In contrast, the TRS data set contains section lines as they appear on the source maps, including many lines that are not straight. Polygon attributes are included.

Source: SECTIC-24K
Scale: 1:24,000
State coverage: Full
Format: ARC/INFO export
File unit: County
Documentation: http://deli.dnr.state.mn.us/metadata/full/
  plsscne3.html
Price: Free via online link in documentation

Section Corners (SECTIC - 24K). LMIC created and packaged together data and associated DOS-compatible software that include 1) a public land survey section corner coordinates database, 2) software to translate between survey, UTM and latitude/longitude coordinate systems, and between NAD27 and NAD83 horizontal datums, and 3) software that creates a dBase file of section corners. Section corners can be extracted by county, township or quadrangle. Instructions are included for a method to convert the file of extracted corners to shapefile format.

Source: U.S. Geological Survey quadrangles
Scale: 1:24,000
State coverage: Full
Format: See description above
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/
  sectic.html
Price: Free via online link in documentation

Mn/DOT BaseMap. Includes 1:24,000-scale public land survey township and section coverages. These are lines, not polygons, and do not contain attributes. Also includes a 1:24,000-scale section corner coverage, which does not have attributes. See page 22.

Regional Development Commission Boundaries

LMIC created this file that identifies the boundaries of Minnesota's 13 regional development commission areas.

Source: 1990 U.S. Bureau of the Census TIGER/Line files
  processed by the Minnesota Legislative GIS Office
Scale: 1:100,000
State coverage: Full
Format: ARC/INFO export
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/
  rdc.html
Price: Free via online link in documentation

School Districts (1990, 1997, 1998 or 1999)

Digital files. School district boundaries were originally extracted from U.S. Bureau of the Census 1990 TIGER/Line files by the Legislative GIS Office. They have since been updated to reflect district consolidations. *Note: The 1990 version is required to match 1990 census statistics.* The LGO website, http://www.commissions.leg.state.mn.us/gis/index.html, also contains the School District Finder, a mapping application that helps users locate a particular

school district and identify its house and senate representatives and estimated 1990 population.

Source: 1990 U.S. Bureau of the Census TIGER/Line files
Scale: 1:100,000
State coverage: Full
Format: ARC/INFO export or shapefile
File unit: State
Documentation: 1990 version, http://lucy.lmic.state.mn.us/metadata/sd90.html. 1997, 1998 and 1999 versions, http://lucy.lmic.state.mn.us/metadata/sd99.html
Price: Free via online link in documentation

MAP In cooperation with the Minnesota Department of Children, Families & Learning, LMIC created a series of school district maps (one per district) using data from the 1997-98 school year. The printed color maps show the district boundary; school attendance areas (elementary, middle and high schools); location of educational facilities (preschool, elementary, middle, high schools, K-12, administration buildings; private, charter, magnet, alternative schools and community, learning, truant centers); and reference information (roads, railroads, lakes and streams, 1994 minor civil divisions and public land survey sections).

Source: Multiple
Scale: Variable
Size: 33" x 51"
State coverage: Full
Map unit: School district
Price: *For orders placed by school districts:* $15 for first map; $10 for each additional map ordered at the same time. *For all other orders:* $50 for first map; $10 for each additional map ordered at the same time. Lamination is available for an additional $25 per map.

Zip Code Boundaries

LMIC gathered this information from U.S. Postal Service field sites in 1985 and updated it in 1991.

Source: U.S. Postal Service information, delineated on Minnesota Department of Transportation county highway maps
Scale: 1:63,360 or 1:126,720
State coverage: Full
Format: ARC/INFO export
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/mnzip.html
Price: Free via online link in documentation

Census Geography

The U.S. Bureau of the Census provides a wealth of information about the make-up of Minnesota's population and about patterns in the state's social and economic characteristics. This data is particularly useful for analyzing issues within geographic areas, such as political jurisdictions, school and legislative districts.

CENSUS DATA

Census data can be organized into two main categories: 1) information about the location and shape of areas; such as counties, tracts and blocks, and 2) information about demographic and economic characteristics of those areas; such as population, housing and income. These two categories may be thought of as *census geography* and *census statistics.*

Within a state, the U.S. Bureau of the Census delineates four units of census geography: *counties* are divided into *census tracts,* which are made up of *block groups.* Block groups are further subdivided into individual *blocks* (see diagram on page 10). All census geography areas lie completely within a single county.

A different type of area, the minor civil division, is often related to census geography. In Minnesota, MCDs refer to townships and cities. They can cross county boundaries and can contain a number of census blocks, block groups and, if large enough, census tracts.

The U.S. Bureau of the Census provides a single vector data set composed of a variety of geographic features — roads, streams, railroads — together with boundaries for all census geography areas. That collection is called a TIGER/Line file. TIGER stands for topologically integrated geographic encoding and referencing.

Although filled with an assortment of valuable information, TIGER/Line files are quite large and can be difficult to work with. As a convenience to GIS users, Minnesota's Legislative GIS Office and the Land Management Information Center have refined the TIGER/Line files prepared for the 1990 decennial census by creating separate data files for each level of census geography. In addition, files for MCDs, school districts and legislative and congressional districts within Minnesota are also available.

Below are descriptions of TIGER/Line files, census geography data separated by area and sources for census statistics. For information on raster versions of census geography, see page 26.

Census Geography — TIGER/Line Files

A TIGER/Line file is a *single layer* that contains lines for all census data collection areas. Lines are assigned codes that indicate the type of boundary or boundaries they represent and the type of feature they portray. For example,

a single line could be coded as a county and census tract boundary, and also as a river. Using these line codes, GIS users can select features they want to analyze.

The census distributes these files in TIGER format, and publishes a data users' guide that explains format and translates codes. Although line files can be complicated, they are sometimes the only source for geocode address information. *Note: Many areas, particularly rural parts of the state, do not have complete address information.*

Private vendors may also be a valuable alternate source for this data since many of them have repackaged the data to make it easier to use.

Source: U.S. Geological Survey quadrangles, census DIME files, field transcriptions
Scale: 1:100,000 and various
State coverage: Full
Format: TIGER/Line
File unit: County
Distributor: U.S. Bureau of the Census Customer Services Office, http://www.census.gov or 301-457-4100

The Land Management Information Center distributes a version of the data set described above in ARC/INFO format that includes 1992 file updates and corrections, primarily additional address range information. The U.S. Bureau of the Census has prepared more recent updates, but these have not been incorporated into LMIC files.

Format: ARC/INFO export
File unit: County
Price: See page 5 for custom delivery

Census Geography — Separated by Area

Source: 1990 U.S. Bureau of the Census TIGER/Line files processed by the Minnesota Legislative GIS Office
Scale: 1:100,000
State coverage: Full
Format: ARC/INFO export or shapefile

1990 County Boundaries
See page 6 for other county boundary files

File unit: State
Price: Free via ftp://www.commissions.leg.state.mn.us/pub/gis

1990 Tracts
File unit: State or county
Price: See page 5 for custom delivery

1990 Block Groups
File unit: State or county
Price: See page 5 for custom delivery

1990 Blocks
File unit: County
Price: See page 5 for custom delivery

1990, 1995 or 1998 Minor Civil Divisions
MCD is available in two versions: with or without county boundaries. *Note: The 1990 county boundary version is required to match 1990 census statistics.*

File unit: State
Documentation: 1990 files, http://lucy.lmic.state.mn.us/
  metadata/mcd90.html
Price: The 1990 files are free via online link in documentation.
  The 1995 and 1998 files are free via ftp://
  www.commissioners.leg.state.mn.us/pub/gis

Census Statistics

The Land Management Information Center's Datanet system provides online viewing and downloading of selected census statistics. See page 27 for more information.

The U.S. Bureau of the Census Customer Services Office provides a wide range of census products and maintains a list of private vendors who have repackaged census data at http://www.census.gov or 301-457-4100.

Another valuable source of census information is the University of Minnesota's Machine Readable Data Center. The center is a coordinating member of the Minnesota State Data Center and serves as the tape depository for that network. Located on the University's Minneapolis campus, the center provides assistance in using its extensive collection, as well as customized consulting on a fee-for-service basis. It is open to the general public. For more information, contact the center at mrdc@mrdc.lib.umn.edu or 612-624-4389.
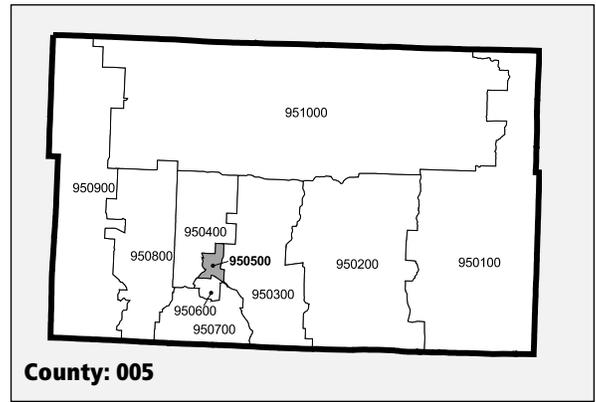
County: 005
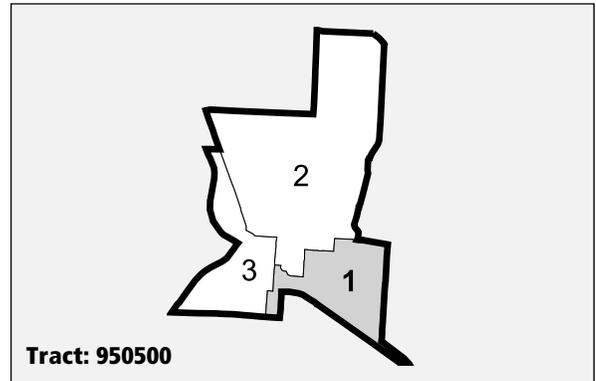
Tract: 950500
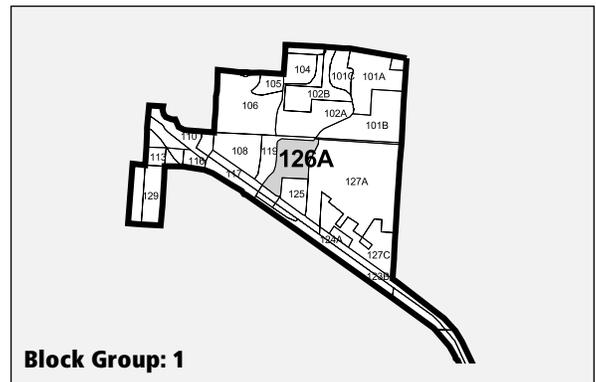
Block Group: 1

Block: 126A

Hierarchy of census geography. Census statistics are collected and aggregated at four levels: county, census tract, block group and block.

Physical and Biological

Minnesota's greatest investment in public geographic data concerns the natural environment. In this section, environmental data is subdivided into six categories: ECOLOGICAL REGIONS lists state areas with similar natural resource characteristics. ELEVATION describes Minnesota's topography. GEOLOGY and HYDROGEOLOGY includes geological structures and associated subsurface water features. LAND USE shows how agriculture, urbanization, forests and other land characteristics are distributed. SOILS describes the state's wide variety. SURFACE WATER lists locations of streams, lakes, wetlands and watersheds.

ECOLOGICAL REGIONS

Aquatic Ecoregion Boundaries — Minnesota Pollution Control Agency

The national Aquatic Ecoregion map by Omernik of the U.S. Environmental Protection Agency is based on land use, soils, land surface form and potential natural vegetation. Aquatic ecoregions are used to categorize stream and lake characteristics. The Pollution Control Agency recompiled Minnesota's ecoregions based on Minnesota Department of Natural Resources minor watershed boundaries. Based on the results, the Land Management Information Center created the ecoregion file.

Source: EPA Aquatic Ecoregion map, 1989
Scale: 1:500,000
State coverage: Full
Format: ARC/INFO export
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/ ecoreg.html
Price: Free via online link in documentation

Ecological Classification System to Level 3 — Minnesota Department of Natural Resources

The ecological classification system is a method to identify, describe and map units of land with different capabilities to support natural resources. This grouping of lands into major ecologically significant zones in Minnesota is based upon climatic, geologic, hydrologic, topographic, soil and vegetation characteristics. Classification will ultimately be divided into six levels of detail; the current coverage from the Department of Natural Resources, substantially revised in 1999, represents the first three levels: province, section and subsection. See http://www.iic.state.mn.us/finfo/ecs/ecs2.htm for an extensive description of the ecological classification system.

Source: Multiple
Scale: 1:250,000
State coverage: Full
Format: ARC/INFO export
File unit: State
Documentation: http://deli.dnr.state.mn.us/metadata/full/ ecssbne2.html
Price: Free via online link in documentation

ELEVATION

Digital Elevation Models

A digital elevation model is a regular array or grid of surface elevation sample points. Sample points for DEMs at the 1:250,000-scale are separated by 3 seconds of latitude and longitude. Points at the 1:24,000-scale are separated by 30 meters along the UTM grid. More information is available at http://www.lmic.state.mn.us/bmap90/dem/dem.htm

U.S. Geological Survey DEMs contain only elevation values associated with a series of x and y coordinates and header information. The user will need additional software to create viewable products such as contour maps, triangulated irregular networks (TIN) or shaded relief views.

For LMIC's statewide raster version of the 1:250,000-scale DEMs in EPPL7 format, see page 26. For DNR's ARC GRID format, see http://deli.dnr.state.mn.us/metadata/full/dem25im1.html

Digital raster graphics include contours as depicted on U.S. Geological Survey topographic maps. *Note: Only an image of contours is provided; DRGs do not offer a separate vector layer of elevation data.* See description on page 23.

Source: U.S. Geological Survey quadrangles
Scale: 1:250,000
State coverage: Full
Format: DEM
File unit: 1 degree latitude x 2 degrees longitude
Price: Free via ftp://edcftp.cr.usgs.gov/pub/data/DEM/250

Source: U.S. Geological Survey quadrangles
Scale: 1:24,000
State coverage: Full
Format: DEM
File unit: 7.5 minutes latitude and longitude
Price: Set-up fee $45 for CD or $30 for FTP delivery plus $1 per file plus $5 order fee through the Earth Science Information Center, 573-308-3500

Source: U.S. Geological Survey DEMs
Scale: 1:24,000
Resolution: 30-meter
State coverage: Full
Format: EPPL7, ERDAS or ARC GRID
File unit: State or county

Documentation: http://lucy.lmic.state.mn.us/metadata/
dem24ras.html (EPPL7 or ERDAS statewide file) or http://
deli.dnr.state.mn.us/metadata/full/dem30im3.html (ARC
GRID county files)
Price: Free via online link in documentation

GEOLOGY AND HYDROGEOLOGY

Statewide Data Sets

Except for geomorphology and wells, these data sets are
digital versions of statewide maps in the Minnesota Geo-
logical Survey's State Map Series. The earliest data sets
were created by grid-cell coding; later data sets were
created by digitizing or scanning the maps.

Bedrock Geology. This data set from the Minnesota
Geological Survey describes the bedrock geologic condi-
tions of Minnesota.

Source: MGS State Map Series S-20, *Geologic Map of
Minnesota: Bedrock Geology*, 1994, revised in 1996
Scale: 1:1,000,000
State coverage: Full
Format: ARC/INFO export
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/
stmaps20.html
Price: Free via online link in documentation

Bedrock Hydrogeology. This data set from the Land
Management Information Center describes the bedrock
hydrogeologic conditions of Minnesota.

Source: MGS State Map Series Map S-2, *Hydrogeologic Map of
Minnesota: Bedrock Hydrogeology*, 1978
Scale: 1:500,000
State coverage: Full
Format: ARC/INFO export
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/
bdrkhydr.html
Price: Free via online link in documentation

Depth to Bedrock. This data set from the Land Manage-
ment Information Center and Minnesota Pollution Control
Agency describes the depth to bedrock (based on 100-foot
contour intervals) and the areas of significant bedrock
outcrops in Minnesota. The original file was modified by
the PCA to create closed polygons where none existed on
the base map.

Source: MGS State Map Series Map S-14, *Geologic Map of
Minnesota: Depth to Bedrock*, 1982
Scale: 1:1,000,000
State coverage: Full
Format: ARC/INFO export
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/
dpthbdrk.html
Price: Free via online link in documentation

Geomorphology. This data set describes a wide variety
of conditions related to surficial geology: geomorphic
association, glacial phase, ice margin association or
phase, general topographic expression, sedimentary
association or rock type and landform qualifiers.

Source: Various, including NHAP air photos and USGS
1:100,000 and 1:24,000 scale topographic maps
Scale: 1:100,000
State coverage: Full
Format: ARC/INFO export
File unit: County
Documentation: http://deli.dnr.state.mn.us/metadata/full/
landfne2.html
Price: Free via online link in documentation

Quaternary (Surficial) Geology. This data set from
the Land Management Information Center describes the
general distribution of surficial sediments in Minnesota.

Source: MGS State Map Series Map, S-1, *Geologic Map of
Minnesota: Quaternary Geology*, 1982
Scale: 1:500,000
State coverage: Full
Format: ARC/INFO export
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/
quatgeo.html
Price: Free via online link in documentation

Quaternary (Surficial) Hydrogeology. This data set
from the Land Management Information Center describes
the geologic classification of the hydrogeologic, or water-
bearing, units for the Quaternary (surficial, unconsolidated)
deposits in Minnesota. Three separate coverages describe
the basic geologic formation, materials and water yield.

Source: MGS State Map Series Map, S-3, *Hydrogeologic Map
of Minnesota: Quaternary Hydrogeology*, 1979
Scale: 1:500,000
State coverage: Full
Format: ARC/INFO export
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/
hydqgeo.html
Price: Free via online link in documentation

Wells — from County Well Index

Water well drillers are required by law to report informa-
tion on new wells constructed to the Minnesota Department
of Health, using the Water Well Driller Log form. The
Minnesota Geological Survey has entered much of this
information into its County Well Index database. Two
well location point coverages are currently derived from
the County Well Index. MGS created the first file (wwpt)
consisting of wells which have had their locations field-
verified and digitized. LMIC created the second file
(wwptcalc) consisting of wells for which a point location
has been calculated based upon the unverified Public
Land Survey location reported by the well driller. The well
location files and an associated data table from County
Well Index are available for download from LMIC.

Source: County Well Index
Scale: Various
State coverage: Full
Format: ARC/INFO export, shapefile
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/
wwpt.html and http://lucy.lmic.state.mn.us/metadata/
wwptcalc.html
Price: Free via online link in documentation

The full County Well Index data set and the CWI data entry and query tool are available directly from MGS.

Source: Water well driller logs
State coverage: Full
Format: Tabular
File unit: County
Price: $6 for the manual and $5 per diskette plus tax and shipping. More than one diskette may be required for some counties. Contact Minnesota Geological Survey at http://www.geo.umn.edu/mgs/cwi.html or 612-627-4780.

County and Regional Data Sets

These digital data sets are companions to paper geologic atlas and hydrogeologic assessment maps and reports available for purchase from the Minnesota Geological Survey. Base layer data — roads, hydrography and political boundaries — is provided largely from TIGER/Line files. See page 9.

Most Geologic Atlas and Regional Hydrogeologic Assessment projects are done in two parts. The Minnesota Geological Survey covers basic geology and creates databases of information such as wells and soil borings in Part A. The Minnesota Department of Natural Resources creates hydrogeology and ground water sensitivity layers in Part B. Completion of a project's two parts is staggered: Part A is completed about two years before Part B.

Anoka Sand Plain Regional Hydrogeologic Assessment.
Data set includes surficial geology; surficial aquifer water table contours; pollution sensitivity; and base layers. The area covers Anoka, Chisago, Isanti and Sherburne counties.

Source: Anoka Sand Plain Regional Hydrogeologic Assessment, Map RHA-1, 1993
Scale: 1:200,000
State coverage: Partial
Format: ARC/INFO export
File unit: Four-county study area
Price: See page 5 for custom delivery

Fillmore County Geologic Atlas.
PART A includes bedrock geology; bedrock topography; surficial geology; watersheds, springs, wells, sinkholes, dye trace paths; sinkhole probability; geologic resources; water wells and base layers.

PART B, ground water and sensitivity data set, includes hydrology for the Prairie du Chien-Jordan, Franconia-Ironton-Galesville and Upper Carbonate aquifers; sinkhole probability; springsheds; and base layers.

Source: Geologic Atlas of Fillmore County, Minnesota, Map C8, Part A (1995) and Part B (1996)
Scale: 1:100,000
State coverage: Partial
Format: ARC/INFO export
File unit: County
Documentation: Part A, http://lucy.lmic.state.mn.us/metadata/c08afill.html
Price: Part A, free via online link in documentation. Part B, see page 5 for custom delivery

Red River Valley Regional Hydrogeologic Assessment.
PART A includes two different areas used to generate maps for the Red River Valley Hydrogeologic Assessment.

Red River Valley, Minnesota only: contains all of Clay, Norman and Wilkin counties, and portions — some small — of Traverse, Grant, Otter Tail, Becker and Mahnomen counties. Geologic layers include surficial geology (line and polygon), ice margins and cross-section lines.

Red River Valley extended: contains the above-listed area, plus portions of Polk, Red Lake and Pennington counties in Minnesota; all of Cass, Traill and Steele counties in North Dakota; and portions of Richland, Sargent, Ransom, Barnes, Griggs, Grand Forks and Nelson counties in North Dakota. Geologic layers include quaternary stratigraphy, ice margins and cross-section lines.

Source: Quaternary Geology — Southern Red River Valley, Minnesota, Map RHA-3, Part A, 1995
Scale: 1:200,000
State coverage: Partial
Format: ARC/INFO export
File unit: Multi-county study area (Red River Valley extended)
Documentation: http://lucy.lmic.state.mn.us/metadata/rrv.html
Price: Free via online link in documentation

Rice County Geologic Atlas.
PART A includes bedrock geology, surficial geology, bedrock topography, geologic resources, quaternary stratigraphy, database (wells, soil borings and other drill holes), and base layers.

PART B includes water table contours, water table flow direction, and water table sensitivity to contamination; potentiometric surface contours, thickness and sensitivity for the St. Peter, Prairie du Chien and Jordan aquifers; and potentiometric surface contours, thickness and sensitivity for the St. Lawrence-Franconia formations.

Source: Geologic Atlas of Rice County, Minnesota, Map C-9, Part A (1995) and Part B (1997)
Scale: 1:100,000
State coverage: Partial
Format: ARC/INFO export
File unit: County
Documentation: Part B, http://lucy.lmic.state.mn.us/metadata/c09brice.html
Price: Part A, see page 5 for custom delivery. Part B, free via online link in documentation

Southwestern Minnesota Regional Hydrogeologic Assessment.
Data set contains the significant coverages used to generate maps for the Southwestern Minnesota Regional Hydrogeologic Assessment. The study area includes all of Pipestone, Murray, Rock and Nobles counties, and portions of Lincoln, Lyon, Redwood, Cottonwood and Jackson counties.

PART A includes base layers, surficial geology, sand and gravel pits and quarries, point sampling sites and outcrops, seismic lines and bedrock topographic contours.

PART B includes base layers, ground water and sensitivity information.

Source: Quaternary Geology — southwestern Minnesota and Regional Hydrologic Assessment — southwestern Minnesota, Map RHA-2, Part A (1995) and Part B (1997)
Scale: 1:200,000
State coverage: Partial
Format: ARC/INFO export
File unit: Multi-county study area
Price: See page 5 for custom delivery

Stearns County Geologic Atlas. PART A includes bedrock geology, surficial geology, quaternary stratigraphy, bedrock topography and drift thickness, mineral resources, database (wells, soil borings and other drill holes), and base layers.

PART B includes ground water level, flow and sensitivity information.

Source: Geologic Atlas of Stearns County, Minnesota, Map C-10, Part A (1995) and Part B (1998)
Scale: Western Stearns County at 1:200,000; eastern Stearns County at 1:100,000
State coverage: Partial
Format: ARC/INFO export
Documentation: Part A, http://lucy.lmic.state.mn.us/metadata/ c10astea.html; Part B, http://lucy.lmic.state.mn.us/metadata/ c10bstea.html
Price: Free via online link in documentation

LAND USE

Land Use — Agricultural and Transition Areas

The International Coalition categorized land use in 17 classes from a variety of late 1980s source materials to produce a vector data set. The area covered includes all Minnesota counties except: the seven-county Twin Cities metropolitan area, Beltrami, Clearwater, Olmsted and the counties covered by the forested areas data set described in this section.

Source: Multiple
Scale: 1:24,000
State coverage: Partial
Format: ARC/INFO export, shapefile
File unit: County
Documentation: http://lucy.lmic.state.mn.us/metadata/ luse89.html
Price: Export format is free via online link in documentation. For shapefile format, see page 5 for custom delivery.

Land Use — Beltrami and Clearwater Counties

The original statewide 1969 land use classification for these counties was updated by the Beltrami and Clearwater Soil and Water Conservation Districts and Bemidji State University.

Source: 1969 Statewide Land Use and 1986 aerial photography
Resolution: 100-meter
State coverage: Beltrami and Clearwater counties
Format: EPPL7, ERDAS
File unit: County
Documentation: http://lucy.lmic.state.mn.us/metadata/ bsuluse.html.
Price: Free via online link in documentation

Land Use — Camp Ripley and Beltrami Island State Forest

The Minnesota Department of Natural Resources created this data set to cover two areas of Minnesota that had not been included in other recent land use inventories. Camp Ripley is a military reservation in northern Morrison County and Beltrami Island State Forest is in southeastern Roseau County.

Source: Landsat TM imagery from 1992-93, 1996
Resolution: 30-meter
State coverage: Camp Ripley and Beltrami Island State Forest
Format: ARC/INFO export
Documentation: http://lucy.lmic.state.mn.us/metadata/ ripbisf.html.
Price: Free via online link in documentation

Land Use — Forested Areas

The Manitoba Remote Sensing Centre interpreted Landsat Thematic Mapper imagery to create a 16-category land use data set in raster (grid cell) format for the following predominantly forested counties: Aitkin, Carlton, Cass, Cook, Crow Wing, Hubbard, Itasca, Koochiching, Lake, Lake of the Woods, Mille Lacs, Pine, St. Louis and Wadena.

Source: Landsat TM imagery, 1991-96
Resolution: 30-meter
State coverage: Partial
Format: ERDAS, EPPL7, ARC/INFO export
File unit: County
Documentation: http://lucy.lmic.state.mn.us/metadata/ mrsc_lu.html
Price: Export format is free via online link in documentation. For other formats, see page 5 for custom delivery.

Land Use — Olmsted County

This county vector data set, updated in 1992, was created primarily using aerial photo interpretation. The classification system provides detailed information about rural areas, particularly agricultural land uses. For more information, contact the Olmsted County Planning Department at 507-285-8628 or chezick.janice@co.olmsted.mn.us.

Land Use — Statewide, 1969

This raster file was one of the first statewide land use data sets created in the United States. The University of Minnesota interpreted a 1968-69 statewide air photo flight using a nine-category classification system.

Source: 1:90,000-scale black and white air photos
Resolution: 40-acre
State coverage: Full
Format: ERDAS, GeoTIFF, EPPL7
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/ luse69.html
Price: Free via online link in documentation

Land Use — Twin Cities Metropolitan Area

The Metropolitan Council created this seven-county vector data set interpreting air photos taken in 1997, using a 15-category classification system. For more information, see documentation at http://www.datafinder.org/metadata/

metc0009.htm or contact the Metropolitan Council's Regional Data Center at 651-602-1140. Data set is free via online link in documentation.

Land Use and Land Cover — 1990s Census of the Land

This data set integrates six different source data sets to provide a generalized statewide view of Minnesota's land use and cover. The source data sets covered different parts of the state, were from varying time periods and used different land use and cover definitions, data collection techniques and data resolutions. The Minnesota Department of Natural Resources developed a simplified eight-category legend and translated each source data set's original detailed classification into the eight-category system. The DNR also standardized the data to 30-meter grid cells. The data set was used to produce a 43-inch by 50-inch wall map of the same title. The data set can be used for general statewide analysis. For studies at the regional, county or more local level, users are encouraged to go back to the original data sets which contain more spatial and attribute detail.

Source: Six different data sets: agricultural and transition areas; forested areas; Twin Cities metropolitan area satellite-interpreted; Beltrami and Clearwater counties; Olmsted County; and Camp Ripley and Beltrami Island State Forest.
Resolution: 30-meter
State coverage: Full
Format: EPPL7, ARC GRID
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/luse8.html
Price: Free via online link in documentation. Printed map is available from the Minnesota Science Museum, 651-221-9414.

Graphic can be found at http://www.lmic.state.mn.us/catalog/images/

An interactive mapping tool at http://mapserver.lmic.state.mn.us/landuse displays the 1990s Census of the Land data and can generate statistical reports of land use by county or by groups of counties. The map is in color.

County Land Use and Land Cover

MAP LMIC has created a series of county land use maps from the most recent and detailed data sources available. The original land use classifications are used rather than the generalized eight-category legend described for the 1990s Census of the Land data set. The maps are color-coded by land use category and contain reference information (roads, cities and public land survey sections). Each map also includes a table showing percentage and acreage of each land use category in the county.

Source: Six different land use data sets: agricultural and transition; forested areas; Twin Cities metropolitan area; Beltrami and Clearwater counties; Olmsted County; and Camp Ripley and Beltrami Island State Forest.
Scale: Variable
Size: 36" x 56"
State coverage: Full
Map unit: County
Price: If pre-paid,$15 per map, plus a $10 handling fee per order. If not pre-paid, there is an additional $25 fee to cover invoicing costs. Lamination is available for an additional $25 per map. Order form at: http://www.lmic.state.mn.us/projects/landusemap.html

Land Use and Land Cover — U.S. Geological Survey

The data set is derived from thematic overlays registered to 1:250,000-scale base maps processed by the U.S. Geological Survey through its Geographic Information Retrieval and Analysis System. Data represents conditions from the mid-1970s.

Source: U.S. Geological Survey quadrangles
Scale: 1:250,000
State coverage: Full
Format: GIRAS
File unit: 1 degree latitude x 2 degrees longitude
Documentation: http://edcwww.cr.usgs.gov/glis/hyper/guide/1_250_lulc
Price: Free via online link in documentation

The GIRAS data set was converted by the Environmental Protection Agency to ARC/INFO format.

Source: U.S. Geological Survey quadrangles
Scale: 1:250,000
State coverage: Full
Format: ARC/INFO export
File unit: 1 degree latitude x 2 degrees longitude
Price: Free via ftp://ftp.epa.gov/pub/EPAGIRAS

National Resources Inventory

The National Resources Inventory is a statistically based survey that has been designed to assess conditions and trends of soil, water and related resources on non-Federal lands in the United States. The NRI is conducted by the Natural Resources Conservation Service in cooperation with the Iowa State University Statistical Laboratory.

The 1997 NRI captures data on land cover and use, soil erosion, prime farmland soils, wetlands, habitat diversity, selected conservation practices, and related resource attributes at more than 800,000 scientifically selected sample sites (more than 8,100 of which are in Minnesota). NRI data is statistically reliable for national, regional, state and substate analysis. Generally, however, interpretations at the local level may be misleading.

For more information, including an OnLine Analysis System that produces statistical tables from the NRI database for 1982, 1987, 1992 and 1997, see: http://www.nhq.nrcs.usda.gov/CCS/NRIrlse.html. For summaries of Minnesota's NRI data, see http://www.mn.nrcs.usda.gov/nri.

SOILS

The following data sets are primarily derived from hardcopy maps contained in county soil surveys produced by the Natural Resources Conservation Service, formerly the Soil Conservation Service. For more information, see *County Soil Surveys: Guidelines for Digitizing,* at http://www.mnplan.state.mn.us/press/soilsrpt.html or by calling the Land Management Information Center. Information on NRCS soils data, including documentation, status maps, a data order form and FTP sites for downloadable data, is available at: http://www.ftw.nrcs.usda.gov/soils_data or at 800-672-5559. Information is also available from the state soil scientist's office: http://mn.nrcs.usda.gov/soils/soils.html or 651-602-7891.

Statewide Data Sets

Minnesota Soils Atlas. The University of Minnesota, Department of Soil Science, coded soil landscape units and geomorphic regions in the mid-1970s to mid-1980s through the state's Soil Atlas Project. Data from available county soil surveys and field surveys was generalized and transcribed onto base maps.

Source: Natural Resources Conservation Service county soil surveys and field surveys
Scale: 1:125,000
State coverage: Full
Format: EPPL7, ERDAS
File unit: State or county
Price: State file is available on EPIC2000 and MGC100 data collection CDs, see page 26.

STATSGO. This data set from NRCS represents generalized soil survey data at the soil association level, designed for broad planning and management uses covering state, regional and multi-state areas.

Source: Natural Resources Conservation Service county soil surveys
Scale: 1:250,000
State coverage: Full (for entire United States and Puerto Rico)
Format: ARC/INFO coverage, DLG, GRASS
Projection: Albers Equal-Area Conic
File unit: State
Price: Free via http://www.ftw.nrcs.usda.gov/stat_data.html or $50 for CD from Natural Resources Conservation Service at 800-672-5559

County Data Sets

SSURGO. This data set duplicates original printed maps to the soil series level and is the most detailed soil data offered by the Natural Resources Conservation Service. This data is designed for use by landowners, townships and county natural resource planning and management organizations.

Source: Natural Resources Conservation Service county soil surveys
Scale: 1:20,000 or 1:15,840
State coverage: Partial (Becker, Clearwater, Hubbard, Lac qui Parle, Mahnomen, Martin, Nicollet, Polk, Renville, Rice, Sherburne, Sibley, Watonwan and Wright counties)
Format: DLG, ARC/INFO export, ARC/INFO coverage
File unit: 7.5 minutes latitude and longitude. *Note: ARC/INFO formats are also available by county in geographic decimal degree coordinates.*
Price: Free via http://www.ftw.nrcs.usda.gov/ssur_data.html or $50 for CD from Natural Resources Conservation Service at 800-672-5559

Twin Cities metropolitan area. The seven metropolitan counties have been completed as separate projects.

Source: Natural Resources Conservation Service county soil surveys
Scale: 1:20,000 or 1:15,840
State coverage: Partial
Format: ARC/INFO export; shapefile
File unit: County
Documentation:
  Anoka: http://www.datafinder.org/metadata/soilanok.htm
  Carver: http://www.datafinder.org/metadata/soilcarv.htm
  Hennepin: http://www.datafinder.org/metadata/soilhenn.htm
  Ramsey: http://www.datafinder.org/metadata/soilrams.html
  Scott: http://www.datafinder.org/metadata/soilscot.html
Price: Free via online links in documentation. For availability of Dakota and Washington counties, contact LMIC.

SSIS. This raster data was originally produced by the University of Minnesota for its Soil Survey Information System. Early versions represented each public land survey section as one square mile, which introduced spatial referencing errors in some files. Since 1992, however, files have been more accurately geo-referenced and much of the data has been converted to EPPL7 format. The data is intended to be used for township- or county-level analysis, not for site-specific analysis.

Source: Natural Resources Conservation Service county soil surveys
Scale: 1:20,000 or 1:15,840
Resolution: 5-meter
State coverage: Partial
Format: EPPL7 (several counties also in ARC/INFO export)
File unit: Township (distributed by county)
Documentation: http://lucy.lmic.state.mn.us/metadata/soilssis.html
Price: See page 5 for custom delivery

SURFACE WATER

Floodways

The Federal Emergency Management Agency digitized its Flood Insurance Rate Maps to create Q3 Flood Data files. The maps show general flood risk areas and are the basis for floodplain management, mitigation and insurance activities for the National Flood Insurance Program.

Source: Q3 Flood Data created from the Federal Emergency Management Agency's Flood Insurance Rate Maps
Scale: 1:24,000
State coverage: Partial (60 counties)
Format: ARC/INFO export
File unit: County
Documentation: http://deli.dnr.state.mn.us/metadata/full/fldwypy3.html
Price: Free via online link in documentation

Hydrography — U. S. Geological Survey

This file contains all water-related features as recorded on source maps.

Source: U.S. Geological Survey quadrangles
Scale: 1:100,000
State coverage: Full
Format: DLG
File unit: 7.5 minutes latitude and longitude
Price: Documentation and files available at http://edcwww.cr.usgs.gov/glis/hyper/guide/usgs_dlg or call the Earth Science Information Center at 573-308-3500

The Land Management Information Center has converted all data to ARC/INFO format, edge-matched the original files stored by U.S. Geological Survey 7.5-minute map sheet, attached flow directions to all river arcs, and corrected obvious coding errors. It also attached Department of Natural Resources Common Stream and Watershed (CSAW) numbers to streams, and DNR Division of Waters lake basin numbers to lakes and wetlands. These enhancements enable users to present information, normally stored in tables, in a map format.

Format: ARC/INFO export
File unit: 30 minutes latitude x 60 minutes longitude
Documentation: http://lucy.lmic.state.mn.us/metadata/dlg_hy.html
Price: See page 5 for custom delivery

The Department of Natural Resources has modified several of the attributes on the hydrography files that LMIC created.

Format: ARC/INFO export
File unit: County
Documentation: http://lucy.lmic.state.mn.us/metadata/dlghyne2.html
Price: Free via online link in documentation

File unit: State
Price: Free via FTP address provided in documentation

Hydrography — Alternate Sources

Mn/DOT BaseMap. Includes layers containing intermittent and perennial streams, ditches and lakes as captured from the USGS 1:24,000-scale quad map series. The features are lines, not polygons, and contain minimal attributes. See page 22.

Enhancements to Mn/DOT BaseMap 1:24,000 Hydrography

DNR has enhanced the Mn/DOT BaseMap hydrography data layers in many areas of the state to improve lake data capture, add river connectivity and feature coding.

Source: Mn/DOT BaseMap
Scale: 1:24,000
State coverage: Partial (all of state, except Minnesota River Basin)
Format: ARC/INFO export
File unit: 7.5 minutes latitude and longitude
Documentation: http://deli.dnr.state.mn.us/metadata/full/dnrstln3.html (rivers and streams) and http://deli.dnr.state.mn.us/metadata/full/dnrlkpy3.html (lakes).
Price: Free via online link in documentation

The Water Resources Center at Minnesota State University, Mankato, has enhanced the Mn/DOT BaseMap hydrography data layers in the Minnesota River Basin. Improvements include digitizing lakes and rivers not on the Mn/DOT BaseMap files, and adding names and connectivity.

Source: Mn/DOT BaseMap
Scale: 1:24,000
State coverage: Minnesota River Basin
Format: ARC/INFO export
File unit: DNR major watershed
Documentation: Available from the Minnesota River Basin Data Center at http://mrbdc.mankato.msus.edu/gis/indexgis.html
Price: Free via online link in documentation

Hydrography — River Kilometer Index Stream Trace Files

The Department of Natural Resources created a data set in which stream center lines, or traces, for each major river basin are stored separately. Major rivers encompassing more than one major watershed (Mississippi, Minnesota, Red, Rainy and St. Croix) are stored as individual files. River distance point markers are also available. Some major river traces do not capture all the river sinuosity as it appears on the maps.

Source: U.S. Geological Survey quandrangles
Scale: 1:24,000 or 1:62,500
State coverage: Full
Format: ARC/INFO export
File Units: Department of Natural Resources Major Watersheds or Major River Trace
Documentation: http://lucy.lmic.state.mn.us/metadata/rki.html and rkip.html
Price: See page 5 for custom delivery

Hydrography — Major Rivers File

LMIC created this file from the River Kilometer Index by extracting major river traces from 81 major watershed files into a single statewide file. In all, 52 rivers are represented.

Source: River Kilometer Index
Scale: 1:24,000 or 1:62,500
State coverage: Full
Format: ARC/INFO export
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/mnrivers.html
Price: Free via online link in documentation

Common Stream and Watershed Numbering Tables

The Department of Natural Resources linked stream numbers with DNR major and minor watershed numbers, identifying the hydrologic order of rivers and minor watersheds. LMIC periodically updates the tables.

Source: Department of Natural Resources 1979 Watershed Mapping Project
State coverage: Full
Format: INFO export, ASCII
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/csaw.html
Price: Free via online link in documentation

Lake and Wetland Inventory List — Minnesota Department of Natural Resources

This table from the DNR contains information about 24,427 Minnesota lakes and wetlands, as extracted from the LAKES-DB database. Information includes the official DNR Division of Waters lake number, lake name, alternate lake name, protected waters status, shoreland classification, lake basin area and DNR's Bulletin 25 location description, where available. Only wetlands which have been designated as protected waters are included in the table. The lake numbers are consistent with the Land Management Information Center's ARC/INFO version of the U.S. Geological Survey's 1:100,000-scale DLG Hydrography files (see page 17). *Note: Protected Water Inventory maps may be viewed online at http://www.dnr.state.mn.us/waters/wetlands/pwi/index.html.*

Source: LAKES-DB, 1997
State coverage: Full
Format: INFO export, dBase, ASCII
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/dowlakes.html
Price: Free via online link in documentation

Watershed Boundaries — Minnesota Department of Natural Resources

This file contains major and minor watershed boundaries as defined in the DNR's 1979 Watershed Mapping Project. The DNR, U.S. Geological Survey and Water Resources Center at Minnesota State University, Mankato updated the file in 1995.

Source: U.S. Geological Survey quadrangles
Scale: 1:100,000
State coverage: Full
Format: ARC/INFO export

File unit: 7.5 minutes latitude and longitude
Price: See page 5 for custom delivery

File unit: 30 minutes latitude x 60 minutes longitude
Price: See page 5 for custom delivery

File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/
   wshed95.html and major95.html
Price: Free via online link in documentation
Alternate Source: http://deli.dnr.state.mn.us

Watershed Boundaries — U.S. Natural Resources Conservation Service

Originally based on the 1967 Conservation Needs Inventory, these watersheds are aggregations of DNR minor watersheds. Digital files were created by the Land Management Information Center.

Source: Natural Resources Conservation Service, 1967
   Conservation Needs Inventory and Department of Natural
   Resources 1979 Watershed Mapping Project
Scale: 1:100,000
State coverage: Full
Format: ARC/INFO export
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/
   nrcsws95.html
Price: Free via online link in documentation

Watershed Boundaries — U.S. Geological Survey Hydrologic Units

These watersheds represent major drainage divides in Minnesota based on the USGS 2-digit and 4-digit Hydrologic Unit Boundaries. There are four basins in Minnesota at the 2-digit level (Lake Superior, Mississippi, Red-Rainy and Missouri), and 12 basins at the 4-digit level. LMIC aggregated these delineations from DNR major and minor watershed boundaries to maintain consistency with other state watershed map products.

Source: Department of Natural Resources 1979 Watershed
   Mapping Project, 1995 update
Scale: 1:100,000
State coverage: Full
Format: ARC/INFO export
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/
   huc2_95.html or http://lucy.lmic.state.mn.us/metadata/
   huc4_95.html
Price: Free via online link in documentation
Alternate Source: Versions of these files are available from
   USGS at 1:250,000 and 1:2,000,000 scale. These files may
   not match more detailed state watershed boundary files.

Wetlands

The National Wetlands Inventory provides wetlands information for the nation and is administered by the U.S. Fish and Wildlife Service. NWI wetland types are categorized by plant and soil type, and frequency of flooding characteristics as defined in the *Classification of Wetlands and Deepwater Habitats of the United States,* 1979, available at http://www.nwi.fws.gov/classman.html. Wetlands were interpreted by the Fish and Wildlife Service using aerial photography and transferred to standard 7.5-minute U.S. Geological Survey quadrangle maps. Digitization from those maps was performed by private contractors. *Note: These files do not contain the enhancements described below.*

Source: Aerial photographs, 1974-84
Scale: 1:24,000
State coverage: Full
Format: DLG
File unit: 7.5 minutes latitude and longitude
Distributor: U.S. Fish and Wildlife Service at http://
   www.nwi.fws.gov or call 888-ASK-USGS. Printed maps are
   also available from Minnesota's Bookstore at 651-297-3000
   or 800-657-3757.

Same as previous entry, but the Land Management Information Center has converted files to ARC/INFO format and has edge-matched the files. In cooperation with the Department of Natural Resources and the U.S. Fish and Wildlife Service, LMIC has also extensively revised the legend to correct errors; it now contains the original wetland map codes, revised wetland codes and DNR translations to the Circular 39 classification system. In addition, the legend now allows a user to select wetlands of different characteristics based on individual portions of the entire National Wetland Inventory code. The DNR created the ARC/INFO shapefile version.

Format: ARC/INFO export
Documentation: http://deli.dnr.state.mn.us/metadata/full/
   nwixxpy3.html, nwixxln3.html and nwixxpt.html
Price: Free via online link in documentation

State coverage: Full, on 3 CD set (north, central and south portions
   of the state)
Format: ARC/INFO coverage
Documentation: http://lucy.lmic.state.mn.us/metadata/
   mnwimeta.html
Price: $25 for each CD; $25 order fee

State coverage: Full, on 3 CD set (grouped by DNR administrative
   region)
Format: Shapefile
Price: $25 for each CD; $25 order fee

Wetlands Interactive Mapper Tool. The U.S. Fish and Wildlife Service has developed an online application that allows the general public to view NWI data. Users can zoom to their area of interest, choose to add several reference layers and print a map. They can also click on the map to find out specific information about individual wetlands and can view wetland acreage summaries. The mapper tool is accessed via http://www.nwi.fws.gov.

Remote Sensing

Digital images, created from aerial photographs and satellite sensors, have become widely used information resources on Minnesota geography.

Digital Orthophoto Quadrangles

DOQs are computer readable black-and-white aerial photographs processed to remove distortion caused by topography and camera angle. Each data file covers one-quarter the area of a standard 7.5-minute quadrangle map. Collections of files are formatted on CD by county and distributed through the U.S. Geological Survey. ArcView 3.x users will benefit from an extension written at the Department of Natural Resources that allows Minnesota DOQs to be displayed directly from CD without modifications to the header. A copy of this DOQ Reader extension is available without charge from http://www.dnr.state.mn.us/mis/gis/tools/arcview. All other ARC/INFO and ArcView users may find helpful a free DOQ header conversion program developed at LMIC to properly georeference their DOQ files. The program is available via ftp://ftp.lmic.state.mn.us/pub/software/doq or by calling LMIC.

Note: The software (DOQ.BAT) provided on the USGS DOQ CDs to decompress the DOQ files does not run on Windows NT. Instead, download the software DJPEG32.EXE from http://www.lmic.state.mn.us/bmap90/doqcd.doqcd.htm or call LMIC.

More information about DOQs may be found at http://www.lmic.state.mn.us/bmap90/bmap90.htm. DOQs may be viewed online at: http://www.terraserver.microsoft.com. See page 25 for information about EPPLviewer 2000, software that allows users to easily display DOQs.

Source: National aerial photography program, black and white
   photography taken in 1991-92
Scale: 1:40,000
Resolution: 1-meter
State coverage: Full
Format: DOQ
File unit: 3.75 minutes latitude and longitude

Graphic can be found at http://www.lmic.state.mn.us/catalog/images/

Portion of a digital orthophoto quadrangle from southeastern Minnesota along the Zumbro River in Olmsted County.

Documentation: http://lucy.lmic.state.mn.us/metadata/doq.html
Price: $32 per county, plus $5 ordering fee through the Earth
  Science Information Center, 573-308-3500. The charge for
  each additional CD is $10; counties that do not fit on one CD
  include 5 CDs: St. Louis; 3 CDs: Koochiching; 2 CDs: Aitkin,
  Beltrami, Cass, Cook, Itasca, Lake, Lake of the Woods,
  Marshall, Otter Tail, Polk and Roseau.

Resampled DOQs

10-meter. The Land Management Information Center
has resampled the 1-meter resolution DOQs to 10-meter
resolution and joined them into county files in UTM Zone
15. Resampling greatly reduces the file sizes; for many
applications, the loss of detail is minimal.

Source: U.S. Geological Survey DOQ CDs
Scale: 1:40,000
Resolution: 10-meter
State coverage: Full
Format: EPPL7 or GeoTIFF
File unit: County
Documentation: http://lucy.lmic.state.mn.us/metadata/
  doq10m.html
Price: See page 5 for custom delivery

3-meter. The Department of Natural Resources has
resampled the 1-meter DOQs to 3-meter resolution and
joined them into full quandrangle files in UTM Zone 15.

Source: U.S. Geological Survey DOQ CDs
Scale: 1:40,000
Resolution: 3-meter
State coverage: Full
Format: GeoTIFF
File unit: 7.5 minutes latitude and longitude
Documentation: http://deli.dnr.state.mn.us/metadata/full/
  doq03im4.html
Price: Free via onlink link in documentation

Aerial Photography

The Land Management Information Center does not
distribute any aerial photography, although it coordinates
the state's partnership programs with federal agencies
responsible for federal air photo programs and provides
information on state and federal air photo flights.

The National Aerial Photography Program has produced
photographs of Minnesota for two recent time periods.

NAPP coverage is complete for the spring 1991-92 flight,
offering both color-infrared and black and white images;
the latter were used to produce the statewide DOQ cover-
age discussed on page 20. A more recent flight started in
summer 1996 and was completed in summer 1998. This
coverage is black and white only, with no plans to pro-
duce digital orthophotos. The original images from both
flights are 10" x 10" and cover about 25 square miles at
a scale of 1:40,000. Enlargements to 36" x 36" can also
be ordered. Go to http://www.lmic.state.mn.us/bmap90/
napp/napp.htm to view flight status maps, documenta-
tion, frequently asked questions, pricing information,
detailed ordering information and sample photography.
Order products online using Photo Finder, accessible via
http://edcwww.cr.usgs.gov/srord-link.html. Photo Finder's
search methods include entering the name of a populated
place or a zip code or clicking on a map of the United
States. Products may also be ordered by contacting either
of the two federal air photo processing centers: the EROS
Data Center in Sioux Falls, South Dakota, 605-594-6151
or the U.S. Department of Agriculture in Salt Lake City,
Utah, 801-975-3503.

The Department of Natural Resource's Division of Forestry
Resource Assessment distributes infrared aerial photogra-
phy for the forested areas of northern, central and
southeastern Minnesota. Print coverage at 10" x 10" is
approximately 2.25 miles x 2.25 miles at a scale of ap-
proximately 1:15,840. For more information, contact the
DNR's Grand Rapids office at 218-327-4449 or go to
http://www.ra.dnr.state.mn.us/photos to view the photos
online or to order prints and enlargements.

The Metropolitan Council contracted aerial photography
of the seven-county Twin Cities metropolitan area in
1997, using NAPP photography specifications and follow-
ing 1991-92 USGS DOQ flight lines. DOQs were created
from this photography at a resolution of 0.6 meters. DOQs
and blueline prints are available by contacting the council's
Regional Data Center at data.center@metc.state.mn.us or
651-602-1140. For more information, see http://
www.datafinder.org/metadata/metc0016.htm

Remote Sensing

Transportation and Utilities

Data describing the location and characteristics of roads, railroads, transmission lines, pipelines and telephone exchange service areas are cataloged in this section.

BaseMap — Minnesota Department of Transportation

The Minnesota Department of Transportation has compiled multi-layered statewide base data on a single CD, focusing on the state's road system. Additional information from U.S. Geological Survey 1:24,000-scale maps is also included, for example, civil and political boundaries and surface waters. Documentation specifies which layers are lines, which are polygons, and which road layers contain names.

Source: U.S. Geological Survey quadrangles
Scale: 1:24,000
State coverage: Full
Format: ARC/INFO coverage
File unit: State
Price: Minimal. Contact: Mn/DOT Office of Right of Way and Surveys, Surveying and Mapping Section at 651-215-1973 or gisinfo@dot.state.mn.us

Telephone Exchange Service Area Boundaries

Digital files. In cooperation with the Minnesota Department of Commerce, the Land Management Information Center created updated statewide files of telephone exchange service areas in June 2000. This data set contains four layers: the boundaries of more than 700 telephone exchange service areas, county boundaries, area codes and LATA zones. Service area ownership changes are reflected only if they have been completely processed by

Graphic can be found at http://www.lmic.state.mn.us/catalog/images/
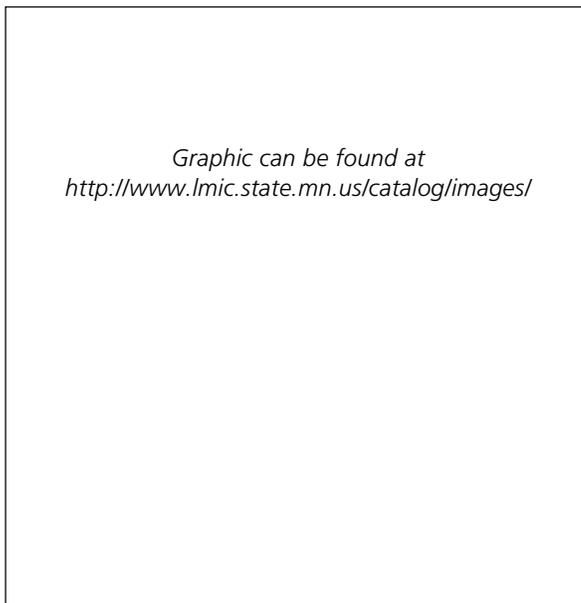
Detail of the telephone exchange service area boundary map. County names are in large type; exchange names are in smaller type. Printed maps are in color.

DOC. Area codes include the recent 651, 763 and 952 changes in the Twin Cities metropolitan area. LATA (Local Access and Transport Area) zones define the areas within which a call is local; calls between zones are long-distance. The data is intended to provide a statewide overview of telephone exchanges and is not to be used for detailed site analysis or as a legal document.

Source: Minnesota Department of Commerce telephone exchange boundary maps
Scale: Variable
State coverage: Full
Format: ARC/INFO export; shapefile; graphics
File unit: State
Documentation: http://lucy.lmic.state.mn.us/metadata/ mntel00.html
Price: GIS formats are free via online link in documentation; CD containing all GIS and graphics formats is $50.

MAP LMIC created a printed statewide map from the digital files described in the previous entry. The major telecommunications companies are color-coded, the Twin Cities metropolitan area is enlarged on an inset map, all exchanges are listed by company and a version with roads is now available. As with the data, the map is intended to provide a statewide overview of telephone exchanges and is not to be used for detailed site analysis or as a legal document. To view official maps of particular exchanges, contact the Department of Commerce at 651-296-5120.

Size: 35" x 47"
Map unit: State
Price: $50 for the first map; $25 for each additional map ordered at the same time. Lamination is available for an additional $25 per map. An online order form is available at http://www.lmic.state.mn.us/projects/telecom.html.

Transportation

These U.S. Geological Survey files contain linework for roads, railroads, transmission and pipelines as recorded on source. *Note: The names of roads and other features are not included.*

Source: U.S. Geological Survey quadrangles
Scale: 1:100,000
State coverage: Full
Format: DLG
File unit: 7.5 minutes latitude and longitude
Price: Free via http://edcwww.cr.usgs.gov/glis/hyper/guide/ usgs_dlg

LMIC converted the DLG files to ARC/INFO format and edge-matched them.

Format: ARC/INFO export
File unit: 30 minutes latitude x 60 minutes longitude
Price: See page 5 for custom delivery

U.S. Geological Survey Base Data

The U.S. Geological Survey has been mapping the nation for nearly 120 years. For the past two decades, it has produced a variety of base maps in computer-readable formats. Minnesota's endowment of base map data is described below.

BaseMap — Minnesota Department of Transportation
See description on page 22.

Geographic Names
The Geographic Names Information System, developed by the U.S. Geological Survey in cooperation with the U.S. Board on Geographic Names, contains names information for places, features and areas in the United States that are identified by proper names. GNIS is composed of three databases, each providing different, but related, information that can be incorporated into other data bases. *Note: The names of roads, streets and railroads are not included.*

Source: U.S. Geological Survey and U.S. Forest Service maps
Scale: 1:24,000
State coverage: Full
Format: ASCII
File unit: State
Price: Free via http://mapping.usgs.gov/www/gnis; or call the Earth Science Information Center at 888-ASK-USGS to order CD for $57 or for more information on other available media and documentation. The Internet site also offers an online query system for information about user-selected geographic features.

LMIC has converted the Minnesota GNIS data described above to an ARC/INFO point coverage.

Documentation: http://lucy.lmic.state.mn.us/metadata/gnis.html
Price: Free via online link in documentation

National Atlas
The National Atlas of the United States of America™ provides a comprehensive view of data collected by the federal government. The atlas is being extensively revised from the original printed 1970 edition to update information and to deliver it electronically. In addition to high-quality, small-scale maps, the atlas includes digital national geospatial and geostatistical data sets. Examples of geospatial data include soils, boundaries, volcanoes and principal aquifers. Crime patterns, population distribution and incidence of disease are examples of geostastistical data. These data sets are being collected and integrated using a consistent set of standards to support analysis and, as completed, are available online for free download. Extensive data documentation is provided. The atlas also includes easy-to-use software for data display, query, custom information and map-making.

A wide variety of data is already available at the National Atlas website, http://www.usgs.gov/atlas, and new layers will be added as the site evolves. A map browser is pro-vided to make maps and to preview data sets. Many functions are available, such as "Zoom to State" and "Query." Several maps are animated to show, for example, active volcanoes, satellite images of vegetation growth and the spread of the zebra mussel. Users may download the data sets for free in either shapefile or SDTS format or may order on CD for a fee. *Note: Since the data sets cover the entire United States, they are generally created at smaller scales, such as 1:500,000 or 1:2,000,000.*

Topographic Maps

Digital raster graphics. DRGs are scanned images of published U.S. Geological Survey 1:24,000, 1:100,000 and 1:250,000-scale maps. Each file consists of a full-color 250 dpi raster file in GeoTIFF format and includes all legend information printed along the margins of the map.

Source: U.S. Geological Survey quadrangles
Scale: Various
State coverage: Full
Format: GeoTIFF
File unit: One file per scanned map
Price: Set-up fee $45 for CD or $30 for FTP delivery plus $1 per file plus $5 order fee through the Earth Science Information Center, 573-308-3500.

The Minnesota Department of Natural Resources has removed the collar information from the original USGS DRGs to allow seamless viewing of adjacent files. Where needed, DNR has also projected the files to UTM Zone 15 (extended across Minnesota) and to the NAD83 datum. DNR distributes individual files online at the 1:24,000, 1:100,000 and 1:250,000-scale. LMIC distributes the 1:24,000-scale files on the Minnesota.data CD set, Volume 3. See page 25 for information about EPPLviewer 2000 software that allows users to easily display the clipped DRGs on Volume 3.

Documentation: http://lucy.lmic.state.mn.us/metadata/drg24dnr.html
Price: Free via online link in documentation

MAP The Land Management Information Center does not distribute paper copies of U.S. Geological Survey topographic maps, although it managed a multi-year effort to complete statewide coverage. The 1:24,000-scale maps may be located and ordered using the USGS Map Finder application, accessed via http://edcwww.cr.usgs.gov/srord-link.html. Map Finder's search methods include entering the name of a populated place or a zip code or clicking on a map. Maps of all scales may also be ordered directly from private vendors (see *Maps* in

the yellow pages); from the Minnesota Geological Survey's Map Sales Office at http://www.geo.umn.edu/mgs or 612-627-4782; or by calling USGS at 888-ASK-USGS.

A fold-out map, *Index to Topographic and Other Map Coverage,* shows the state's quadrangle boundaries and names at standard USGS map series scales: 1:24,000; 1:100,000; 1:250,000. The index also describes a number of survey map products. Single copies are available at no charge from LMIC, or order free copies of any state's index from USGS either online at http://edcwww.cr.usgs.gov/Webglis/catindex.html or by calling 888-ASK-USGS.

Quadrangle map boundaries. LMIC generated three quadrangle boundary data files by calculating U.S. Geological Survey quadrangle corners based on the latitude/longitude calculating algorithm provided in ARC/INFO and casting them on the UTM Zone 15 extended projection. One file is available for each quadrangle delineation. *Note: Using these standard boundary files to create data or divide existing data into smaller file units will help users produce seamless data sets that register to other files available from LMIC and other Minnesota state agencies.*

Source: Calculated
Scale: Corresponding to U.S. Geological Survey quadrangles at 1:24,000, 1:100,000 and 1:250,000
State coverage: Full

Format: ARC/INFO export
File unit: State
Documentation: http://deli.dnr.state.mn.us/metadata/full/q024ine4html, q100ine4.html and q250ine4.html
Price: Free via online link in documentation

Quadrangle map codes. A variety of numeric coding systems have been developed to designate the U.S. Geological Survey topographic quadrangle maps that cover the state of Minnesota. The following files crossreference these codes and can be downloaded at no charge from: ftp://ftp.lmic.state.mn.us/pub/data/usgs_base, or call LMIC.

Legq024.exe. A .DBF database file that relates Minnesota's 1:24,000-scale topographic map quadrangle names to coding systems used by LMIC, DNR, the Minnesota Geological Survey and USGS, as well as LMIC's 1:100,000-scale quad codes.

Q024.exe. An INFO export file containing 1:24,000-scale quadrangle names, LMIC, DNR, Minnesota Geological Survey and USGS codes.

Q024.txt. A text list of 1:24,000-scale quadrangle names, LMIC and USGS codes.

Q100.txt. A text list of 1:100,000-scale quadrangle names and LMIC codes.

Graphic can be found at http://www.lmic.state.mn.us/catalog/images/

Portion of the St. Paul East digital raster graphic. DRG files are in color to match printed U.S. Geological Survey topographic maps.

Data Collections

The Land Management Information Center offers several collections of data on compact disk and via the Internet. CD collections conveniently group many individual data sets described in this catalog. Datanet offers online reports and maps of summarized social, economic and demographic statistics for Minnesota.

The following CD collections have been designed to be used with ArcView, EPIC2000 and EPPL7 GIS software. Other software packages may also be able to use the files that are in shapefile, ERDAS or GeoTIFF format. A free extension that allows ArcView users to directly display EPPL7 raster files may be downloaded from http://www.mnplan.state.mn.us/EPPL7. That site also contains information about EPPL7 and EPIC2000, the Windows-based interface to many of the spatial analysis capabilities of EPPL7. For more information on software or data layers, contact LMIC at 651-296-1201 or eppl7@lmic.state.mn.us.

Minnesota.data

The first three volumes of statewide data sets (Minnesota.data series) are now available on CD.

Volumes 1 and 2. In cooperation with LMIC, the Minnesota Department of Natural Resources has produced a two CD set that contains 56 statewide data layers. Source materials for most of the data sets are 1:24,000-scale U.S. Geological Survey topographic maps or aerial photography.

Source: Various
Scale: 1:24,000 or 1:100,000
State coverage: Full
Format: Vol 1, shapefile; Vol 2, EPPL7 (files are not zipped)
File unit: State
Price: $20, plus $10 postage and handling. A limited number of free CD sets are being distributed to government agencies and educational institutions while the supply lasts. Contact LMIC at 651-296-1211 or clearinghouse@mnplan.state.mn.us.

Volume 1 contains the following vector data themes in shapefile format:

Administrative Regions
DNR administrative areas
State forests, parks and scientific and natural areas
Voyageurs National Park and the Boundary Waters Canoe Area Wilderness
Military reservations
National forests, waterfowl production areas and wildlife refuges
Native American reservations
State, county and quadrangle boundaries
County seats

Census
Legislative districts, 1990
Minor civil divisions, 1990
Populated places (GNIS)

Transportation
State forest roads
Mn/DOT BaseMap 1999: Roads and railroads

Physical and Biological
Conservation Reserve Program, 1997
Soils: Cummings and Grygal map; STATSGO
Vegetation: Original vegetation as shown on Marschner map
Water: Lakes (USGS 1:100,000), major watersheds and rivers

Public Land Survey
Sections and townships

Public Ownership
Stewardship by administering agency

Volume 2 contains the following 30-meter raster data themes in EPPL7 format:

Elevation: 1:24,000-scale from Digital Elevation Models and 1:24,000-scale shaded relief
Land use / land cover: 1990s Census of the Land (generalized eight-class), see page 15
Wetlands:
   Original National Wetlands Inventory,
   1997 wetlands poster five-class generalized NWI,
   Circular 39 DNR classification, see page 19

Volume 3. The Land Management Information Center has compiled a five CD set that contains all 1:24,000-scale USGS digital raster graphics for Minnesota. The MnDNR processed these files, removing map legend information and standardizing on UTM Zone 15 extended, NAD83 (see DRG description on page 23). The Natural Resources Research Institute, University of Minnesota – Duluth organized the files into five geographic regions. Development of Volume 3 has been partially underwritten by Intergovernmental Information Systems Advisory Council Grant 172. This collection may be used with any software that displays GeoTIFF format.

Note: This data collection was specifically designed to work with **EPPLviewer 2000** *software. EPPLviewer is a free, easy-to-use tool for exploring Minnesota's natural and cultural environment. The software is especially useful for exploring DRGs, DOQs and generalized land use. EPPLviewer allows users to quickly assemble data from anywhere in the state, find the same location on multiple data sets, overlay roads, wetlands and other features, and print maps or paste them into other documents. For more information about EPPLviewer 2000 see http://www.mnplan.state.mn.us/EPPL7 or contact LMIC at: 651-296-1201 or eppl7@lmic.state.mn.us.*

Source: U.S. Geological Survey digital raster graphics
Scale: 1:24,000
State coverage: Full
Format: GeoTIFF (files are zipped)
File unit: 7.5 minutes latitude and longitude

Price: $50, plus $10 postage and handling. A limited number of free CD sets are being distributed to government agencies and educational institutions under funding terms established by IISAC. Contact LMIC at 651-296-1211 or clearinghouse@mnplan.state.mn.us.

EPIC2000

In addition to the EPIC2000 GIS software, this CD contains over 600 statewide and seven-county metropolitan area data sets. In addition to the approximately 400 other MGC100 data layers listed in this section, the collection includes: 1990s Census of the Land (generalized eight-class land use/land cover); Mn/DOT BaseMap98 road files; DNR state parks, forests, roads and trails; 1998 school districts; 1998 telecommunication service area boundaries; Minnesota Geological Survey well locations by depth and type; additional geologic data; digital elevation from 1:24,000-scale DEMs; ecological regions (revised in 1999); and updated forest health data.

Source: Various
Scale: Between 1:24,000 and 1:1,000,000
Resolution: 100-meter
State coverage: Full (some layers available only for the seven-county metropolitan area)
Format: EPPL7 or shapefile (files are zipped)
File unit: State or metro area
Price: $99. For more information see: http://www.mnplan.state.mn.us/EPPL7 or contact LMIC at 651-296-1201 or eppl7@lmic.state.mn.us.

MGC100

A set of statewide raster files is available on CD in EPPL7, GeoTIFF or ERDAS format. The data themes cover a wide range of physical and biological variables along with administrative, census, political and transportation data. The data collection unit for most of the variables is the 40-acre parcel. Files have been subdivided into 100-meter by 100-meter grid cells and spatially corrected to provide improved geographic reference; however, this processing step does not improve the original 40-acre resolution accuracy. The data set is designed for use in regional and statewide planning, not for site-specific decision-making. *Note: The original 40-acre variables comprise a data set called MLMIS (Minnesota Land Management Information System); the data set that includes spatially corrected variables was renamed MGC100 (Minnesota GeoCorrected to 100 meters).*

Source: Various
Scale: Between 1:24,000 and 1:1,000,000
Resolution: 100-meter (statewide); 30-meter (metro)
State coverage: Complete (several layers available only for the seven-county metropolitan area)
Format: EPPL7, ERDAS, GeoTIFF
File unit: State or metro area
Documentation: http://lucy.lmic.state.mn.us/metadata/metadata/mgc100old.html
Price: $50

MGC100 contains the following data themes:

Administrative and Political Boundaries

Administrative Regions
Counties (from Mn/DOT county highway maps)
Department of Natural Resources administrative regions
U.S. Geological Survey quadrangle boundaries: 1:24,000, 1:100,000, 1:250,000
Zip codes, 1995

Land Ownership
Administering agency, Department of Natural Resources and tax forfeit land (1992)
Basic ownership, 1983 (federal, state, county, private)
Department of Natural Resources ownership, 1992
Public ownership, 1983

Public Land Survey
Township numbers, range numbers, section numbers, 40-acre parcel, townships

Census Geography

1990 Census: minor civil divisions and tracts
Federal congressional districts, 1994
State senate and legislative districts, 1990
School districts, 1990 and 1995-96

Physical and Biological

Agricultural
Cropland potential productivity, 1979

Climate
Average precipitation: annual, monthly and growing season (May-Sept)
Average temperature: annual, monthly and seasonal
Frost: first fall, last spring
Growing degree and heating degree days, growing season
National Weather Service data zones
U.S. Forest Service homoclimes, 1984
Water balance: evapotranspiration, runoff, Palmer Index (8/12/95), shortfall (1987-89)

Ecological Regions
Ecological biomes (coniferous, deciduous, prairie)
Ecological Classification System: provinces, sections and 1995 subsections

Elevation
Elevation, aspect, slope (all derived from 1:250,000 scale U.S. Geological Survey Digital Elevation Models)

Geology and Hydrogeology
Aquifer materials
Depth to bedrock (includes rock outcrops)
Geomorphic regions
Ground water susceptibility to pollution
Quaternary geology
Recharge potential

Land Use
Land use, 1969

Soils
Minnesota Soils Atlas information: acidic soil, available phosphorous and potassium, available water to depth of five feet, depth to bedrock (does not include rock outcrops), drainage class, erodibility (K-factor), hydrologic groups, landform description, landscape position, permeability rate, pH, shrink-swell potential, slope class, soil type, texture
Nonatlas sources: engineering class, flood potential, sedimentation, water erosion, wind erosion
Pollution Control Agency data: soil materials, vadose zones materials

Vegetation
Forest cover, 1977 and 1990

Forest cover from LANDSAT imagery for Department of Natural Resources Region 6 (seven-county metropolitan area)
Forest health: aspen defoliator complex, blowdown, fall defoliator complex, forest tent caterpillar, gypsy moth, introduced pine sawfly, jack pine budworm, larch sawfly, large aspen tortrix, oak wilt, spruce budworm, variable oak leaf caterpillar, and white pine blister rust
Minnesota Society of Arboriculture tree rating zones
Native tree ranges: 90 different species
Presettlement vegetation (Marschner map)
Public land survey bearing trees
Vegetative zones: 7 categories
USDA hardiness zones, 1990

Water
Major and minor watersheds
Proximity to water
Rivers (U.S. Geological Survey, line data)

Transportation
Interstate highways (line data)
Proximity to highways
State highways (U.S. Geological Survey, line data)

Metropolitan Layers Only
Forest cover level 1, 1988
Forest cover level 2, 1996
Land cover from Landsat TM imagery, 1990
Metropolitan Urban Service Area boundary
Natural heritage resources identified by 40-acre parcel
Photo index of fall color infrared photography (CIR), 1994
Population density

DATANET
Datanet is an online information service that offers an extensive array of summarized, statistical information about Minnesota. Datanet integrates data about social, economic and demographic conditions in Minnesota in one location. It focuses on providing the summarized statistical information that is necessary for monitoring changing conditions, identifying emerging issues and measuring progress toward statewide goals. Information is presented in tables that integrate and enhance the value of the data, and menu options allow the user to create customized reports. Users can select from numerous geographic areas, time periods and data categories. The service is free.

Datanet has also developed two new mapping applications for census tract data and for reported crimes. The Census Tract Finder allows Internet users to generate a report of summary census statistics for any census tract within the seven-county Twin Cities metropolitan area. A map with reference features is provided to make it easier to locate a particular tract. By the time Census 2000 data is available, the map will cover more cities beyond the metro area. The Justice Database: Reported Crimes Mapping Interface is a prototype application that allows users to create statewide maps of a number of offense categories using county-level data.

Datanet Databases
The databases marked with an asterisk (*) are now available via Datanet's web interface at http://www.lmic.state.mn.us/dnet/datanet.htm. The remaining databases are available through an easy-to-use, menu-driven system accessible from the same web page.

1980 and 1990* Census — STF1A
Summary Tape File 1A information is from questions asked of every person and for every housing unit (the "short form").

Age
Contract rent
Group quarters
Households by type
Housing unit value
Occupancy and tenure
Population
Race and Hispanic origin

1980 and 1990* Census — STF3A
Summary Tape File 3A information is from a sample of housing units in the United States, approximately one in six or 17.7 million housing units (the "long form").

Educational attainment (1990 only)
Educational enrollment (1990 only)
Employment
Income level
Income type
Labor force
Occupation
Per capita income
Poverty status

1990* Census — Public Law 94-171
The following data is used to redraw Minnesota's legislative districts. This law requires the U.S. Bureau of the Census to provide redistricting data in a geographic format requested by state governments.

Hispanic origin
Housing units
Minority population
Population under and over age 18
Race

1990 School District Data Book
Age
Educational attainment
Enrollment by race
Gender
Households
Housing units
Income
Population
Poverty status
Relevant children

Children's Report Card*
More than 20 indicators concerning children's health, education and general welfare include poverty levels, rates of child abuse, prenatal care, graduation rates and risk behaviors. Data is available for 1994, 1996 and 1999.

County Business Patterns
Establishment by size class
Number of employees
Number of establishments
Total payroll

Early Childhood Screening Outcome*
Participation
Identification of potential problems
Referral to community services and programs

Education
District support services and
    administrative expenditures
Instruction expenditures
Other expenditures
Other measures per pupil unit
Professional staff
Pupil data
Pupil units
Resident average daily membership
Support services and operations expenditures

Employment
Civilian labor force
Percent unemployed
Unemployed

Health profiles*
Demographics and vital statistics
Morbidity and health care utilization
Chemical health
Environmental health
Maternal and child health

Justice*
Arrests and apprehensions
Expenditures
Homicides
Reported crimes
Probation

Lakes Profiles
Development characteristics
Fish report
Location
Permit characteristics
Physical characteristics
Watershed
Water clarity

Land Use and Cover (1990s)*
Urban and rural development
Cultivated land
Hay/pasture/grassland
Brushland
Forested
Water
Bog/marsh/fen
Mining

Population/Household Estimates*
Household
Population

Population Projections (2000-2025)*
Household
Labor force
Population

Retail Sales*
Apparel and accessory stores
Auto dealers and service stations
Building materials and garden supplies
Eating and drinking places
Food stores
Furniture and home furnishings stores
General merchandise stores
Miscellaneous retail

Substance Abuse Monitoring System (23 indicators)*
Community environment
Direct prevalence
Law enforcement
Service utilization
Youth risk factors

Datanet Text-Based Databases

Earth Day
Air quality
Chemical use
Energy use
Global warming
Hazardous waste
Recycling
Water
Wildlife

Grants and Loans
Community health services
Economic development and community improvement
Education
Environmental
Housing and homeowners
Public safety

Prevention and Intervention Programs
Chemical dependency prevention
Community crime and drug prevention
Community policing
Curfew
Family service collaboratives
Female offenders
High risk youth
Integrated services to targeted children and youth
Juvenile justice

Contacts for Geographic Data Referenced in this Catalog

FEDERAL

Federal Geographic Data Committee

http://www.fgdc.gov

National Spatial Data Clearinghouse
http://www.fgdc.gov/clearinghouse/clearinghouse.html

Natural Resources Conservation Service

Federal office: http://www.ncg.nrcs.usda.gov/nsdi_node.html
State Soil Scientist Office, 651-602-7891
http://www.mn.nrcs.usda.gov/soils/soils.html

U.S. Bureau of the Census Customer Services Office

301-457-4100
http://www.census.gov

U.S. Fish and Wildlife Service

National Wetland Inventory, 888-ASK-USGS
http://www.nwi.fws.gov

U.S. Geological Survey

Earth Science Information Centers

888-ASK-USGS
http://mapping.usgs.gov

Rolla, Missouri, 573-308-3500
http://mcmcweb.er.usgs.gov/esic

EROS Data Center, 605-594-6151
http://edcwww.cr.usgs.gov/dsprod/prod.html

Geographic Names Information System, 888-ASK-USGS
http://mapping.usgs.gov/www/gnis

STATE

Governor's Council on Geographic Information

651-296-1208
gc@mnplan.state.mn.us
http://www.gis.state.mn.us

Minnesota Geographic Metadata Guidelines, 651-296-1211
http://www.gis.state.mn.us/stds/metadata.htm

Land Management Information Center at Minnesota Planning

Information, 651-296-1211
clearinghouse@mnplan.state.mn.us
http://www.lmic.state.mn.us

Data Catalog
http://www.lmic.state.mn.us/catalog

Base maps
http://www.lmic.state.mn.us/bmap90/bmap90.htm

Clearinghouse and DataLogr
http://www.lmic.state.mn.us/chouse.html

Legislative GIS Office

651-296-0098
http://www.commissions.leg.state.mn.us/gis/index.html

Minnesota Department of Administration

Minnesota's Bookstore, 651-297-3000, 800-657-3757
http://www.comm.media.state.mn.us/bookstore/welcome.asp

Minnesota Geological Survey

612-627-4780
http://www.geo.umn.edu/mgs

Minnesota Department of Natural Resources

Information desk, 651-296-6157
Forestry, 651-296-4491
Management Information Systems, 651-297-2329
Minerals, 651-296-4807
Waters, 651-296-4800
http://www.dnr.state.mn.us
Data delivery, http://deli.dnr.state.mn.us

Forestry Resource Assessment, Grand Rapids, 218-327-4449
http://www.ra.dnr.state.mn.us

Minnesota Department of Transportation

Office of Land Management
Surveying and Mapping Section, 651-215-1973
gisinfo@dot.state.mn.us

Geodetic Unit, 651-296-8804
http://rocky.dot.state.mn.us/LIS/lis.html

Minnesota Board of Water and Soil Resources

651-296-3767
http://www.bwsr.state.mn.us

REGIONAL AND ACADEMIC

Borchert Map Library at the University of Minnesota

612-624-4549
http://www-map.lib.umn.edu

Machine Readable Data Center at the University of Minnesota

612-624-4389
mrdc@mrdc.lib.umn.edu
http://www.lib.umn.edu/mrdc

Metropolitan Council

Regional Data Center, 651-602-1140
http://www.metrocouncil.org

MetroGIS

Randall Johnson, 651-602-1638
http://www.metrogis.org
Data Finder, http://www.datafinder.org

Minnesota River Basin Data Center

507-389-5492
mrbdc@mankato.msus.edu
http://mrbdc.mankato.msus.edu/gis/indexgis.html

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