

Getting Started



Acquiring Geodata



with

TNTmips®
and **TNTedit™**

Welcome to Acquiring Geodata

As a user of TNTmips® or TNTlite, you have at your command a powerful set of tools that let you create, display, enhance, and analyze varied types of geospatial data. You also probably have many ideas about what projects you would like to undertake using TNT. However, any project must start with data. Assembling an appropriate set of digital geospatial data can be a critical, time-consuming, and costly process.

Fortunately, recent developments can make this task much easier. Many government agencies have recognized the importance of digital geospatial data to modern research and commerce and have begun to make data available to the public in digital form. You can acquire vector base maps, digital elevation models, satellite imagery, and demographic and other attribute data for many areas. A lively market in commercial (and in some cases inexpensive) GIS data has also developed. At the same time, the development of the Internet and World Wide Web has revolutionized the way in which digital data is distributed.

These new sources of geospatial and attribute data are the focus of this *Getting Started* guide. The main emphasis is on datasets of global or U.S. national scope. Data from a number of these sources can be downloaded at no cost using a Web browser or via FTP (File Transfer Protocol). Other data described here can be ordered on CD-ROM at a cost of a few hundred dollars or less.

Pages 3 - 12 of this booklet cover readily available sources of free and low-cost geospatial data for the United States, including data from government and commercial sources. Pages 13 - 17 discuss selected datasets with global coverage. World Wide Web contact information for these datasets is included on each page, with additional contact information on page 18. A list of GIS gateway Web sites, which provide links to additional sources of geospatial data, can be found on page 19. Links to all of the Web sites mentioned in this booklet can be found at MicroImages' Web site.

For instructions on importing your data into TNTmips, consult the booklet *Getting Started: Importing Geospatial Data*.

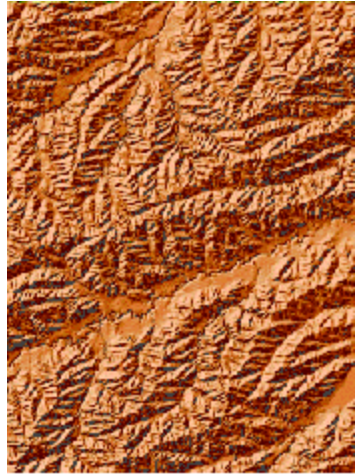
Randall B. Smith, Ph.D., 17 September 2001

It may be difficult to identify the important points in some illustrations without a color copy of this booklet. You can print or read this booklet in color from MicroImages' web site. The web site is also your source for the newest *Getting Started* booklets on other topics. You can download an installation guide, sample data, and the latest version of TNTlite.

<http://www.microimages.com>

USGS Digital Elevation Model (DEM)

The U.S. Geological Survey's Digital Elevation Models (DEMs) are regularly-spaced arrays of sampled ground surface elevations in raster format. A DEM file corresponds to an individual topographic map quadrangle ranging in size from 7.5 minutes to 1 degree. The elevation samples are derived by interpolation from Digital Line Graph elevation contours or by photogrammetric analysis of aerial photographs. The sample spacing and projection vary with the size of the quadrangle.



1:250,000 DEM files correspond to the east half or west half of a USGS 1- by 2-degree (1:250,000-scale) quadrangle map. The elevation samples are referenced to the geographic (latitude / longitude) coordinate system using the World Geodetic System 1984 Datum. The sample spacing is 3 arc seconds, resulting in raster dimensions of 1201 lines by 1201 columns.

1:100,000 DEM data cover the east half or west half of a 30- by 60-minute (1:100,000-scale) quadrangle map. Each 30-minute unit is distributed as four 15- by 15-minute subunits. Cell locations are referenced to latitude / longitude using the North American Datum of 1927, with a spacing of 2 arc seconds.

1:24,000 DEM data correspond to a standard USGS 7.5-minute quadrangle. Elevation spacing is 30 meters in the Universal Transverse Mercator coordinate system. Newer, more accurate Level 2 DEMs for some areas have a 10-meter cell spacing. Most DEMs in this series are referenced to the North American Datum of 1927.

DEM displayed with relief shading (with vertical exaggeration) and color map.

DEM data can be used to generate slope, aspect, and shaded relief rasters; as elevation control in 3D display; in watershed or viewshed analysis; and in many other applications.

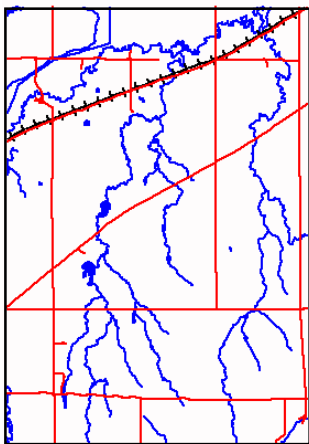
The 1-degree DEM data provide complete coverage of the contiguous United States, Hawaii, and most of Alaska. The 30-minute and 7.5- minute DEM data currently provide partial coverage for the contiguous United States, Alaska and Hawaii.

The 1:250,000 and 1:24,000 DEM files are available for free FTP download from the USGS Geographic Data Download web page:

<http://edcwww.cr.usgs.gov/doc/edchome/ndcddb/ndcddb.html>

All DEM files are also available on CD-Recordable disk or through Internet "at cost" FTP delivery. Call 1-888-ASK-USGS for further information.

USGS Digital Line Graph (DLG) Data



DLG hydrology, railroad, and road vector layers for part of the Crow Butte Quadrangle, Nebraska.

DLG data are available in two file formats: Optional format and the more recent SDTS (Spatial Data Transfer Standard) format. The intermediate-scale data are available on-line in both formats. The small-scale and large-scale data are available on-line only in the SDTS format.

Map coordinates in DLG files are in meters for the large-scale and intermediate-scale data (Universal Transverse Mercator projection) and decimal degrees of Latitude and Longitude for the small-scale data (Albers Equal-Area Conic projection).

The U.S. Geological Survey's Digital Line Graph (DLG) data files are vector representations of thematic map information derived from USGS topographic maps. The component point, line, and polygon elements have associated major and minor DLG attribute codes. Topology and attribute accuracy of the digital files are checked during production. The types of map data available vary depending on the map scale of the source data, but may include hydrography, transportation, political and administrative boundaries, hypsography (elevation contours), and Public Land Survey System data. Different thematic layers for each map area are stored in separate files. Small-scale,

Intermediate-scale, and Large-scale DLG data are available.

Small-Scale Small-scale DLG data files organized by U.S. state or territory are produced from 1:2,000,000 scale maps and provide complete national coverage.

Intermediate-Scale DLG files at intermediate-scale are derived from 30- by 60-minute quadrangle maps at a scale of 1:100,000. The available hydrography and transportation data provide complete coverage of the contiguous United States and Hawaii, and other categories are available for some map areas.

Large-Scale Large-scale DLG files are produced from the largest-scale topographic quadrangle maps available for an area, which are usually 1:24,000-scale 7.5-minute quadrangle maps. Large-scale DLG files for Alaska are produced from 1:25,000 and 1:63,360-scale maps, and from 1:30,000-scale maps for Puerto Rico.

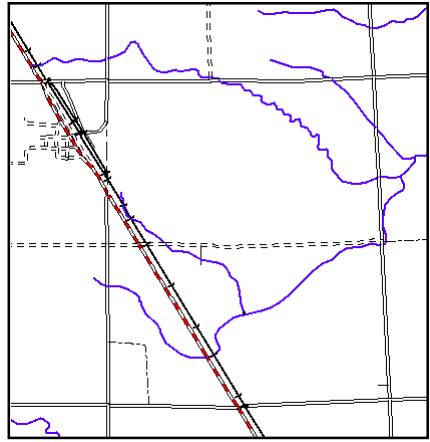
DLG files at all three scales are available for free download via anonymous FTP from the USGS US GeoData web page:

<http://edcwww.cr.usgs.gov/doc/edchome/ndcddb/ndcddb.html>

TIGER / Line Data

TIGER / Line files contain vector map data for individual counties in the United States. The U.S. Census Bureau's master TIGER (Topologically Integrated Geographic Encoding and Referencing) dataset was first created to provide seamless 1:100,000-scale geographic coverage of the entire United States in support of the 1990 census. The map data in the extracted TIGER / Line files consist of line segments that represent natural and manmade physical features such as streams, streets, and railroads, along with governmental and census boundaries that do not coincide with physical features. Lines of all types are integrated into a single topologically structured network with location specified in Latitude / Longitude coordinates. The accompanying attribute data for each line segment include a feature class code and codes for the state, county, census tract, and census block to the left and right of each line. These line attributes can be used to extract boundary lines of census tracts or other administrative units. Zip-code and address range information is also included.

TIGER / Line files are updated periodically. All files from the 1998 version are available for free download from the U.S. Census Bureau web site. The 1998 version is also distributed by the Census Bureau in compressed form on seven CD-ROM discs, with a single disc including county files for the states in a geographic region. The cost is \$70 per disc, or \$490 for the entire set. The 1999 version of the TIGER / Line files are currently in production, and the 2000 version is scheduled for release beginning in early 2001.



Sample TIGER / Line data for several square miles in western Nebraska. Line styles for the railroad, highway, roads, and streams are keyed to feature class codes in the associated line database.

The 1994 and earlier versions of TIGER / Line files referenced geographic coordinates for the contiguous 48 states to the North American Datum 1927. Coordinates for the 1995 and later versions are based on the North American Datum 1983.

1998 version TIGER / Line files can be downloaded free from the US Census Bureau's TIGER web page:

<http://www.census.gov/geo/www/tiger>

USGS Digital Orthophoto Quad (DOQ)



Portion of a DOQ image of a residential area near Lincoln, Nebraska.

The USGS Global Land Information System (GLIS) Web site at the EROS Data Center provides an online catalog of compressed DOQ county coverage sets. You can search this database using state, county, and quadrangle name.

Some state governments have made the DOQ files covering their state available for free FTP download.

The U.S. Geological Survey's Digital Orthophoto Quadrangle (DOQ) files are orthophoto images covering one-quarter of a standard 7.5-minute map quadrangle (3.75 minutes by 3.75 minutes). Standard photogrammetric techniques have been used to process the images to remove distortions resulting from camera tilt and terrain relief. The resulting image combines the visual characteristics of an aerial photograph with the spatial accuracy of a topographic map.

Digital orthophoto quadrangles are produced from black-and-white or color-infrared photographs. The ground resolution of a raster cell is 1 meter, with the data presented in the Universal Trans-

verse Mercator (UTM) projection referenced to the North American Datum of 1983. Each DOQ file includes 50 to 300 meters of image beyond the nominal quadrangle boundaries. A DOQ can provide an excellent cartographic base for creating or modifying vector or CAD map data and can be used as a source of georeference control points for other large-scale imagery. DOQ production is in progress, with coverage for most states ranging from 50 to 100% complete..

Uncompressed DOQ files (up to 55 megabytes in size) are available from any USGS Earth Science Information Center on a variety of media, including several tape formats and CD-Recordable (CD-R) discs. The USGS recently announced plans to make the files available online in the near future. Sets of JPEG-compressed DOQ files for individual counties are also distributed on CD-R and CD-ROM.

For additional information and ordering instructions, consult the USGS EROS Data Center Products web page:

<http://edcwww.cr.usgs.gov/dsprod/prod.html>

National Aerial Photography Program

The National Aerial Photography Program (NAPP) maintains an archive of recent, cloud-free aerial photographs covering the conterminous United States. These high-quality aerial photographs can be integrated with digital spatial datasets through high-resolution scanning.

Each square NAPP photograph covers an area of about 5 miles on a side at an approximate scale of 1:40,000, providing sufficient resolution to discern buildings, land cover, minor drainage patterns, and various other features not visible on traditional maps. The photographs are acquired along north-south flight lines centered on quarter-quadrangles in the USGS 7.5-minute map quadrangle series. The ongoing NAPP program has provided repeat coverage for each state on a cycle of five to seven years beginning in 1987. Most of the photographs are in black-and-white, with some areas available in color-infrared. Photographic prints can be purchased at a standard size of 9 x 9 inches, or enlarged to 18 or 36 inches square.

You can now search the NAPP archive using the U.S. Geological Survey's Global Land Information (GLIS) Web site. You designate a search area by drawing on a map display, by entering latitude / longitude coordinates, or by entering a U.S. Place names feature name. You can also specify an acquisition date and film type. The search produces a list of all photographs meeting the entered criteria. Customers placing orders using GLIS will be contacted for credit card information.



NAPP color-infrared photo of Washington, D.C., acquired 1988.

The price of a 9 x 9 inch black-and-white paper print of a NAPP photo is \$10. Color 9 x 9 inch prints of color-infrared photos are \$16 each.

The NAPP was preceded by the National High Altitude Photography (NHAP) program, initiated in 1980. NHAP flight lines were centered on 7.5-minute quadrangles, and were acquired at approximate scales of 1:80,000 for black-and-white photos and 1:58,000 for color-infrared photos. Submit search requests for NHAP photos by mail or fax to the EROS Data Center.

For additional information and ordering instructions, consult the USGS EROS Data Center Products web page:

<http://edcwww.cr.usgs.gov/dsprod/prod.html>

U.S. Geographic Names Information

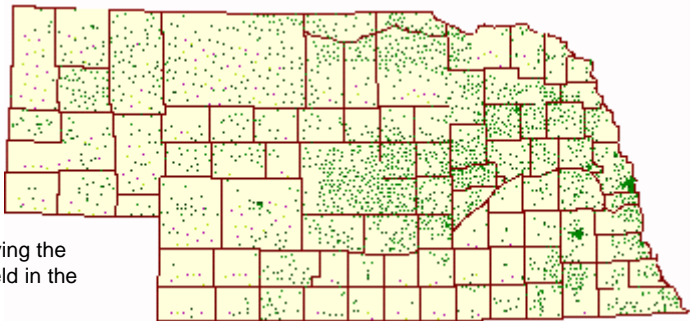
A second phase of data compilation is adding map features from current and historical maps produced by states, local governments, and private sources. The second phase compilation is complete or underway for about 65 percent of the United States.

All of the GNIS files are in ASCII text format with fixed-width data fields. You can import the GNIS files directly into Project File format, or use a spreadsheet program to view and reformat the data first (to .csv or .dbf format, for example). Coordinates are specified in integer degrees, minutes, and seconds; keep the numeric string for each coordinate in a single field. To map the point data, import the data to a vector object, with the Projection set to Latitude / Longitude and the Coordinate Format set to DDDMMSS.

The Geographic Names Information System (GNIS), maintained by the U.S. Geological Survey, contains the names and latitude-longitude coordinates of almost two million physical and cultural geographic features in the United States. The record for each feature also contains the feature type (such as populated place, school, park, or reservoir), the state and county in which the feature is located, and the elevation (if available). Data are available for all states and territories, compiled from USGS large-scale topographic maps and other federal map sources.

The GNIS database is organized into individual State and Territory files. Two thematic extracts of the database are also available. The U.S. Populated Places File lists information about all recognized cities and towns throughout the United States, including the estimated 1994 population for each. The U.S. Concise File contains an abbreviated set of attributes for major physical and cultural features. All of the files are available for free FTP download from the USGS Mapping Information Web site. The December 1996 version of the database files is also available from the USGS on CD-ROM at a cost of \$57 plus \$3.50 handling.

This Nebraska map shows locations of schools selected for display by querying the Feature Type field in the GNIS database.

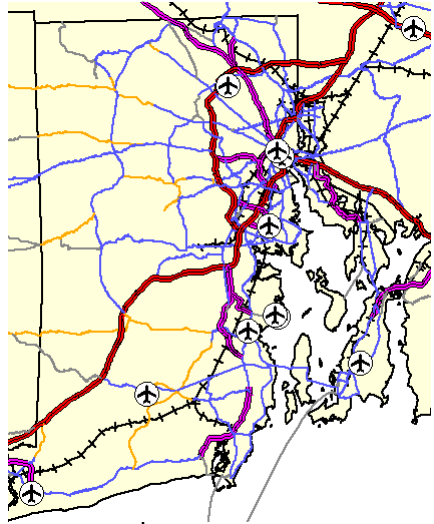


All of the GNIS files are available for free download via anonymous FTP from the USGS Geographic Names Information System web page:

<http://mapping.usgs.gov/www/gnis>

North American Transportation Atlas

The North American Transportation Atlas Data (NORTAD) is a set of geospatial data for transportation networks and facilities in the North American countries. Compiled and distributed by the U.S. Department of Transportation's Bureau of Transportation Statistics, the set includes geospatial data files, associated attributes, metadata, and descriptions of the file formats. The metadata files are available in English, French, and Spanish versions. All data are available in either UNIX format or DOS/Windows format.



The NORTAD atlas is organized by country. The geospatial data sets for the United States were compiled at a base scale of 1:100,000, while those for Canada and Mexico were compiled at a scale of 1:1,000,000. Each set includes a polygon dataset representing state or province boundaries, including coastlines. The core data are national highway and rail networks (lines), and airport and port facilities (points). Additional point datasets identify highway and rail border crossing facilities. Attribute files are supplied in dBase and ASCII text format. All other files are in standard ASCII text format. All geographic coordinates are in Latitude / Longitude.

The NORTAD atlas follows essentially the same file structure as the National Transportation Atlas Database (NTAD), also produced and distributed by the Bureau of Transportation Statistics. The latter atlas includes the data noted above for the United States, along with county polygons, navigable waterway network, and additional transportation facilities.

Legend

- Interstate Highway
- Freeway
- Principal Arterial
- Other Highways
- + + + Railroad
- ✈ Airport

Map of Rhode Island and surroundings from the North American Transportation Atlas Database. The map includes a state outline polygon layer, highway and railroad layers (line data), and airport layer (point data).

Use the NTAD vector import option to import NORTAD and NTAD datasets into TNTmips.

NORTAD and NTAD files are available for free download or can be ordered for free on CD-ROM from the BTS Geo-Spatial Data web page:

<http://www.bts.gov/gis/ntatlas>

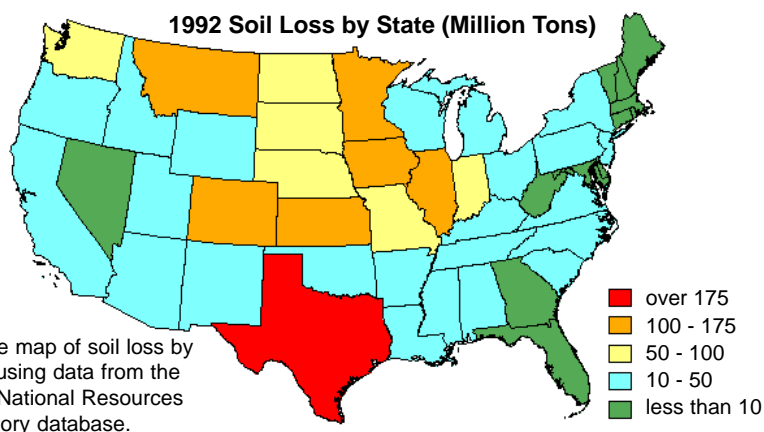
NRCS Natural Resources Inventory

All Natural Resources Inventory data files are ASCII text files that can be imported as database objects. Data are organized into files on a state-by-state basis.

The spatial datasets for each state include vector boundaries of counties, Major Land Resource Areas, and hydrologic units at various scales. All spatial datasets are in Arc/Info Export (e00) format. The attached polygon and point databases contain the same spatial identifiers used in the National Resources Inventory database, allowing NRI records to be related to map elements.

The National Resources Inventory database is available from the Natural Resources Conservation Service (NRCS). The inventory is a statistically-based survey of land use and natural resource conditions in the United States. It includes data on land cover and use, cropping history, soils and soil erosion, irrigation, wetlands, and other natural resource characteristics on non-federal rural land in the United States. Data were collected by field inspection and remote sensing at over 800,000 sample sites within randomized sample units. The data are considered statistically reliable for national, regional, state, and substate analysis. Data are available from the 1997, 1992, 1987, and 1982 inventories, allowing analysis of 5- and 10-year trends in resource conditions.

The NRI data files and geographic data are available from the NRCS. In addition, the NRCS has analyzed the inventory data and presented the results in a series of maps that are available as GIF images or Postscript files.



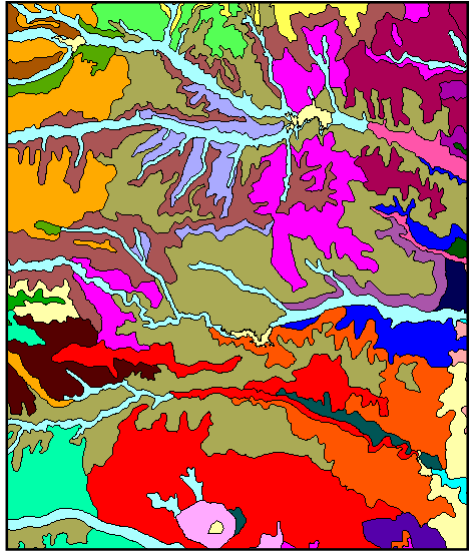
Theme map of soil loss by state using data from the 1992 National Resources Inventory database.

National Resources Inventory data files and base maps are available for free download from the National Resources Inventory web site:

<http://www.nhq.nrcs.usda.gov/NRI>

STATSGO Soils Information

The STATSGO (State Soil Geographic) database, produced by the U.S. Department of Agriculture's National Resources Conservation Service, consists of generalized vector soil maps and attribute data designed for planning and management uses covering state, regional, and multi-state areas. STATSGO soil maps are compiled by generalizing county soils survey data. The map data are collected in 1- by 2-degree quadrangle units (1:250,000 scale) and merged to form statewide maps. Soil boundaries and attributes for map units that cross state lines are edge-matched between states.



Map units in a STATSGO map are collections of spatially related soil types. Each map is linked to the Soil Interpretations Record attribute database, which gives the proportionate extent of the component soils and their properties for each map unit. The database includes over 25 physical and chemical soil properties, interpretative data, and crop productivity data. Examples of information that can be queried from the database include available water capacity, salinity, flooding, water table, bedrock, and interpretations for engineering uses, cropland, woodland, rangeland, wildlife, and recreation development.

The STATSGO data provide nationwide coverage for U.S. states and Puerto Rico, excluding Alaska.

Portion of STATSGO map for Kansas, covering the north-central part of the state. Each map unit includes a collection of related soils units.

STATSGO data are available in three vector file formats: USGS DLG-3 Optional, ArcInfo 7.0 coverage, and GRASS 4.13 format.

STATSGO files and other soils data are available online for free download from the National Soil Data Access Facility:

<http://www.statlab.iastate.edu/soils/nsdaf>

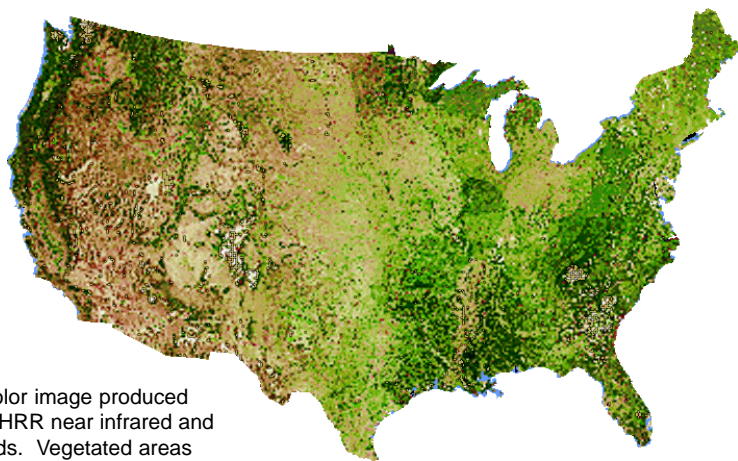
U.S. AVHRR Bi-Weekly Composites

NDVI is the difference between near infrared (AVHRR Band 2) and red (AVHRR Band 1) brightness divided by the sum of these spectral bands. The raw NDVI values (with a possible range from -1 to +1) are rescaled to the range 0-200 for storage as 8-bit unsigned integer values.

A bi-weekly composite NDVI image is created from the highest daily NDVI observation for each raster cell (after radiometric calibration and registration to a common equal-area map projection). The compositing process effectively eliminates sensor noise and the obscuring effects of clouds.

The Conterminous U.S. AVHRR project has compiled a comprehensive time series of calibrated, georeferenced, Normalized Difference Vegetation Index (NDVI) two-week composite images for the United States growing season (March to October). The AVHRR (Advanced Very High Resolution Radiometer) sensor operates aboard U.S. National Oceanographic and Atmospheric Administration (NOAA) weather satellites, providing 1-km ground resolution with bands in the visible, near infrared, and thermal infrared spectral regions. NDVI provides a quantitative measure of the degree of vegetative cover and is thus an important tool for regional environmental monitoring and assessing global change.

The bi-weekly compilations for each year are included on a multi-disc CD-ROM set (five to seven discs), available from the U.S. Geological Survey's EROS Data Center. Sets are available for the years 1990 through 1995 at a cost of \$32 each.



False-color image produced from AVHRR near infrared and red bands. Vegetated areas are shown in shades of green.

For additional information and ordering instructions, consult the USGS EROS Data Center Products web page:

<http://edcwww.cr.usgs.gov/dsprod/prod.html>

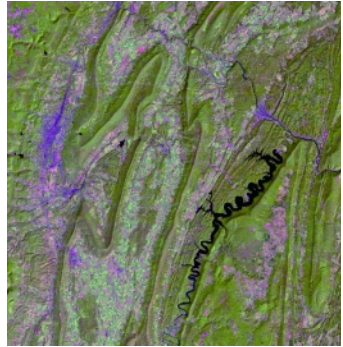
Archive Landsat TM and MSS

Archival satellite images from the Landsat Thematic Mapper and Multispectral Scanner can be obtained from the U.S. Geological Survey's EROS Data Center at relatively low cost. Qualifying images are at least 10 years old and provide useful historical views at a local to regional scale.

Full Landsat Thematic Mapper (TM) scenes measure 185 km across track by 170 km along track. The TM sensor records six bands of reflected radiation in visible and infrared wavelengths and one thermal-infrared band. The reflective bands include three visible bands (blue, green, and red), one near-infrared band, and two middle-infrared bands, all of which have a ground resolution of 30 meters. The thermal infrared band has a ground resolution of 120 meters.

Landsat Multispectral Scanner (MSS) scenes measure 185 km across track by 185 km along track. The MSS sensor recorded four bands of reflected radiation, including two visible bands (green and red) and two near-infrared bands. All MSS bands have a ground resolution of approximately 80 meters.

The EROS Data Center's WebGLIS (Global Land Information System) provides online capability to search the Landsat archive using a variety of search parameters, including geographic coordinates, place names, acquisition date, and scene quality. Landsat TM and MSS scenes are provided on CD-Recordable discs or 8-mm cartridge tapes. The price per scene is \$425 for TM data and \$200 for MSS data.



Portion of an archival Landsat Thematic Mapper scene of central Pennsylvania with TM Band 5 (Middle Infrared), Band 4 (Near Infrared), and Band 3 (Red) displayed as red, green, and blue, respectively.



Portion of a Landsat MSS scene of Lake Tahoe region, California and Nevada (USA). MSS Band 6 (Near Infrared), Band 5, and Band 4 are displayed as red, green, and blue, respectively.

For additional information and ordering instructions, consult the USGS EROS Data Center Products web page:

<http://edcwww.cr.usgs.gov/dsprod/prod.html>

Digital Chart of the World

The original Digital Chart of the World CD-ROM series, distributed by the U.S. Geological Survey, is no longer available for purchase.

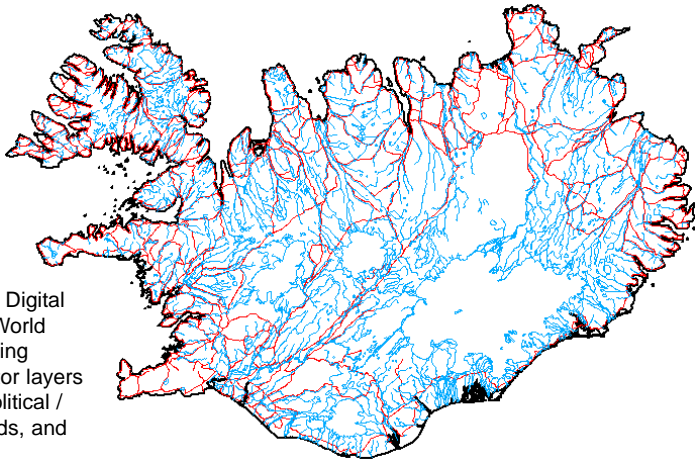
Map locations in the Digital Chart of the World dataset are stored in Latitude / Longitude coordinates.

The Digital Chart of the World was originally produced by the U.S. Defense Mapping Agency (now the National Imagery and Mapping Agency [NIMA]). The primary source of the map data is the DMA Operational Navigational Chart series.

The Digital Chart of the World is a 1:1,000,000-scale vector map of the world. The map data are stored as 17 geographic themes, including political boundaries and ocean coastlines, outlines of cities and towns, roads, railroads, land cover, elevation contours, and drainage. Each theme has an associated attribute database. The Digital Chart of the World is suitable for use as a basemap for geographic analyses at regional, continental, or global scales.

MicroImages can provide the Digital Chart of the World data on CD-Recordable disc in the Project File (*.RVC) format. Each disc stores complete data for one of four regions: Europe / Northern Asia, North America, South America / Africa / Antarctica, and Southern Asia / Australia. The cost of a single CD is \$100. You may order all four CDs (complete global coverage) for \$200. Shipping and handling for either product is an additional \$10 within the United States and Canada and \$40 to any other nation.

Portion of the Digital Chart of the World dataset covering Iceland. Vector layers shown are Political / Oceans, Roads, and Drainage.

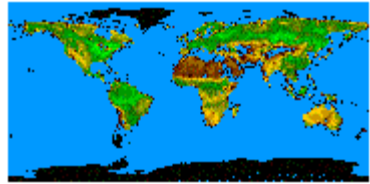


For additional information and ordering instructions, consult the MicroImages Digital Chart of the World web page:

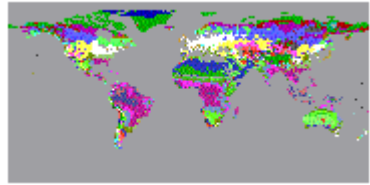
<http://www.microimages.com/data/dcw.htm>

Global Ecosystems Data from NGDC

The Global Ecosystems Database Version-II (2000) includes thirty datasets intended for use in global and regional biogeographical modeling and global change studies. The datasets were contributed by many scientific laboratories and individuals, and were assembled by the U.S. National Geophysical Data Center (NGDC) in cooperation with the U.S. Environmental Protection Agency. Each dataset consists of raster map layers registered to a common coordinate system, with grid spacing ranging from 2 degrees to 2 minutes for different thematic layers.

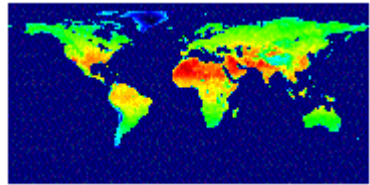


Monthly Vegetation Index



Life Zone Classification

The raster datasets map ecosystems, climate data, land use, soils, surface slope, and vegetation (including several types of monthly satellite-derived vegetation index for intervals between 1985 and 1990). Some datasets have global extent (referenced to cartesian latitude / longitude coordinates); other data are presented for the United States and for central and southeast Asia. Vector data for coastlines and certain other features are also included. All of the data are completely within the public domain by agreement with the contributors of each set.



Monthly Mean Temperature

The Global Ecosystems Database was originally produced by the NGDC as two separate components on CD-ROM disks: GED Disk A, released in 1992, and GED Disk B, released in 1997. These products have now been combined into a single product with digital documentation. The integrated database is now available on-line for free download or can be ordered on CD-ROM at a cost of \$150.00 plus shipping.



Soil Type and Texture

For additional information, on-line access, and ordering instructions, consult the National Geophysical Data Center Global Ecosystems Database Version-II web page:

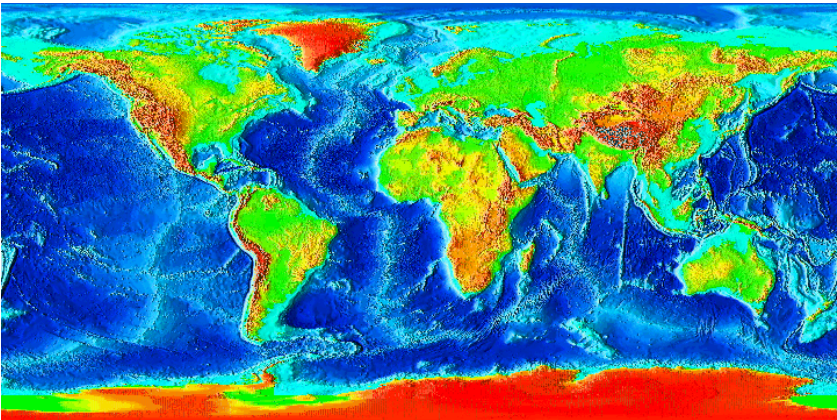
<http://www.ngdc.noaa.gov/seg/fliers/se-2006.shtml>

TerrainBase Global Relief Data

The TerrainBase data collection contains improved versions of the relief data included on the earlier NGDC Global Relief CD-ROM disc. Additional geologic data found only on the Global Relief CD include gridded oceanic gravity anomalies, locations of significant earthquake epicenters (magnitude greater than 4.5) for 1980 to 1990, and images of oceanic fracture zones and crustal plate boundaries. The Global Relief CD is still available from the NGDC at a cost of \$75 plus shipping.

Color shaded relief image of the world to 80 degrees north and south latitude, derived from the 5-minute gridded elevation / bathymetry data.

The U.S. National Geophysical Data Center (NGDC) maintains a collection of research-quality, public domain digital terrain models with regional and global coverage. The TerrainBase global model contains a complete grid of land surface elevation and ocean depth values (in meters) at 5-minute (latitude-longitude) intervals. The size of the resulting raster is 2160 lines by 4320 columns. Additional terrain model coverage for the United States includes a 30-second DEM for the 48 contiguous states and gridded bathymetry data files for coastal areas, including Alaska, Hawaii, and Puerto Rico. Separate regional elevation models are included for North America, Europe, Italy, Africa, Australia, Japan, and several other countries. Values in the data files are in 16-bit binary integer format in PC byte order. All of the terrain models are available online for free FTP download and are also included on the TerrainBase CD-ROM, which is available from the NGDC (cost \$120 plus shipping).



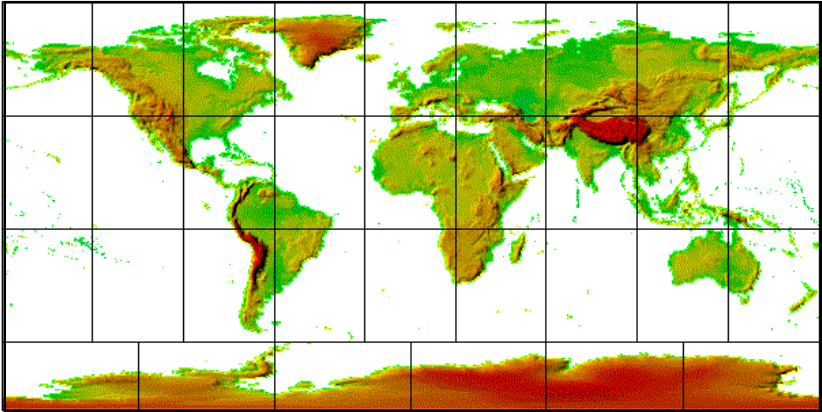
For additional information and access to free download via anonymous FTP, consult the National Geophysical Data Center TerrainBase web page:

<http://www.ngdc.noaa.gov/seg/fliers/se-1104.html>

GTOPO30 Global Elevation Data Set

GTOPO30 is a global digital elevation model for land areas with a horizontal grid spacing of 30 arc-seconds (latitude-longitude), or about 1 km at the equator. The USGS EROS Data Center led the collaborative development of the dataset, which was completed in late 1996. Source data included both raster and vector datasets. The DEM is in 16-bit signed integer format, with ocean areas assigned a "null" value of -9999. A color shaded relief image in GIF format is also included, along with supporting files. The full global DEM has dimensions of 21,600 lines and 43,200 columns, requiring 1.74 gigabytes of storage.

The main sources of elevation data for GTOPO30 are the DTED (Digital Terrain Elevation Data) raster data and the Digital Chart of the World elevation contours. Both datasets were produced by the U.S. Defense Mapping Agency (now the National Imagery and Mapping Agency [NIMA]).



The GTOPO30 DEM has been divided into rectangular tiles for easier distribution. The tile outlines are shown on the accompanying color relief image. The full set of files for each tile can be obtained in compressed form at no cost through FTP download from the EROS Data Center. An uncompressed set of files for each tile can also be ordered on CD-ROM or 8-mm tape from the same source.

Color shaded relief image in GIF format produced from the GTOPO30 elevation data.

For additional information and access to free download via anonymous FTP, consult the USGS GTOPO30 web page:

<http://edcwww.cr.usgs.gov/landdaac/gtopo30/gtopo30.html>

Additional Contact and Order Information

U.S. Geological Survey DEM, DLG, GNIS, DOQ:

Earth Science Information Center
U.S. Geological Survey
507 National Center
Reston, VA 20192

Toll Free Tel: (888) ASK-USGS
FAX: (703) 648-5548
E-mail: esicmail@usgs.gov

TIGER:

U.S. Dept. of Commerce
Bureau of the Census
P.O. Box 277943
Atlanta, GA 30384-7943
Tel: (301) 457-4100
FAX: (888) 249-7295

Bureau of Transportation Statistics:

U.S. Department of Transportation
400 Seventh Street, S.W., Suite 3430
Washington, DC 20590
Tel: (202) 366-3282
FAX: (202) 366-3640
E-mail: ntad@bts.gov

National Resources Inventory Database and STATSGO:

National Cartography and Geospatial Center
USDA - Natural Resources Conservation Service

P.O. Box 6567
Fort Worth, TX 76115

Toll Free Tel: (800) 679-5559
FAX: (817) 509-3469

National Aerial Photography Program, U.S. AVHRR Biweekly Composites, Archive Landsat data:

Customer Services
U.S. Geological Survey
EROS Data Center
Sioux Falls, SD 57198

Tel: (605) 594-6151
FAX: (605) 594-6589

TerrainBase and Global Ecosystems Database:

Karen Horan
National Geophysical Data Center
NOAA EGC/1
325 Broadway
Boulder, CO 80303
Tel: (303) 497-6277
FAX: (303) 497-6513
E-mail: khoran@ngdc.noaa.gov

GTOPO30:

EDC DAAC User Services
EROS Data Center
Sioux Falls, SD 57198
Tel: (605) 594-6116
FAX: (605) 594-6963
E-mail: edc@eos.nasa.gov

GIS Gateway Sites

The World Wide Web sites listed below provide information and links to additional sources of geospatial data ranging from local to global in scale. The source links include universities, private companies, the U.S. federal government, U.S. state government agencies, and government data sources outside the United States.

U.S. Army Topographic Engineering Center, Internet/WWW GIS resources page:
<http://www.tec.army.mil/gis/index.html>

U.S. Census Bureau's GIS Gateway:
http://www.census.gov/geo/www/gis_gateway.html

USGS node of the U.S. National Geospatial Data Clearinghouse:
<http://nsdi.usgs.gov>

USGS National Mapping Information:
<http://mapping.usgs.gov>

USGS Earth Science Information Centers Home page:
<http://ask.usgs.gov>

U.S. Federal Geographic Data Committee (FGDC) Home page:
<http://www.fgdc.gov>

U.S. FGDC Earth Cover Working Group, Key Sources of Earth Cover Data and Maps:
<http://www.fgdc.gov/ecwg/sources.html>

University of Edinburgh GIS WWW Resource List:
<http://www.geo.ed.ac.uk/home/giswww.html>

Bruce Gittings' Digital Elevation Data Catalogue (University of Edinburgh):
<http://www.geo.ed.ac.uk/home/ded.html>

Advanced Software for Geospatial Analysis

MicroImages, Inc. publishes a complete line of professional software for advanced geospatial data visualization, analysis, and publishing. Contact us or visit our web site for detailed product information.

TNTmips TNTmips is a professional system for fully integrated GIS, image analysis, CAD, TIN, desktop cartography, and geospatial database management.

TNTedit TNTedit provides interactive tools to create, georeference, and edit vector, image, CAD, TIN, and relational database project materials in a wide variety of formats.

TNTview TNTview has the same powerful display features as TNTmips and is perfect for those who do not need the technical processing and preparation features of TNTmips.

TNTatlas TNTatlas lets you publish and distribute your spatial project materials on CD-ROM at low cost. TNTatlas CDs can be used on any popular computing platform.

TNTserver TNTserver lets you publish TNTatlases on the Internet or on your intranet. Navigate through geodata atlases with your web browser and the TNTclient Java applet.

TNTlite TNTlite is a free version of TNTmips for students and professionals with small projects. You can download TNTlite from MicroImages' web site, or you can order TNTlite on CD-ROM.

Index

AVHRR.....	12	National Aerial Photography Program.....	7
Bureau of Transportation Statistics.....	9,18	National Geophysical Data Center...15-16,18	
Digital Chart of the World.....	14	Natural Resource	
Digital Line Graph.....	4	Conservation Service.....10-11,18	
digital elevation model		National Transportation Atlas Database.....	10
GTOPO30.....	17	Natural Resources Inventory.....	10
TerrainBase.....	16	North American Transportation Atlas.....	9
USGS.....	3	State Soil Geographic	
Digital Orthophoto Quadrangle.....	6	Database (STATSGO).....	3
Geographic Names Information System.....	8	TIGER / Line data.....	5
Global Ecosystem Database.....	15	U.S. Census Bureau.....	5,18
Landsat.....	13	U.S. Geological Survey.....	3-4,6-8,12-13,18



MicroImages, Inc.

11th Floor - Sharp Tower
206 South 13th Street
Lincoln, Nebraska 68508-2010 USA

Voice: (402) 477-9554
FAX: (402) 477-9559

email: info@microimages.com
internet: www.microimages.com