

A Handbook of Web-based Environmental Geospatial Data for Wisconsin's Planners

3rd edition

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This document is composed of information about environmental geospatial data and data sources that we expect planners and professionals in fields related to natural resources would be seeking. The information contained in this document primarily came from exercises in two classes (Planning for the Ecological City and GIS for Planners) in the Department of Urban and Regional Planning at the University of Wisconsin – Madison, offered by Prof. Aslı Göçmen between 2008 and 2012. Prof. Göçmen and two of her assistants, Amanda Jacobson and Karen Van Gilder, a master's student and previously a doctoral student in the Urban and Regional Planning Department respectively, further contributed to the document and edited the content.

While we sought to be comprehensive in this effort, we acknowledge that there are many other data sources and types of data that could have been included in this document. This document is the second in a series to aid in accessing environmental geospatial data, and we will be building on this document to provide information about other environmental geospatial data or additional information about what we have included. Please note that specific download and usage information is given for ArcGIS 10 software and that there may be different steps for other software before the data obtained could effectively be used.

We organized the document to reflect different themes related to environmental planning (Part I) and few important data sources (Part II). In the discussion of these themes in Part I, we provide information about data sources that one can access, characteristics of the data, and directions to download that data. In Part II, we provide some information about a specific data source and data available through them. We define “access” broadly to mean both viewing and downloading. Please note that there are many more options to view geospatial data than to download.

We hope this handbook will be useful to planners in Wisconsin. Please direct any questions and suggestions to Aslı Göçmen (gocmen@wisc.edu, 608-265-0789).

Aslı Göçmen, Amanda Jacobson and Karen Van Gilder

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PART I – GEOSPATIAL DATA

Catchments

Catchment data can be downloaded for free from the National Hydrography Dataset Plus (NHDPlus) website which is a joint project of the U.S. EPA Office of Water and USGS. Horizon Systems, a private data management and information systems consulting firm, hosts the site.

NHD Plus

<http://www.horizon-systems.com/nhdplus/index.php>

About the Data

NHDPlus data are divided by hydrologic region, and available at 1:100K resolution. NHDPlus offers value-added attributes to enhance stream network analysis; an elevation-based catchment for each flowline in the stream network; catchments with attributes; headwater node areas; cumulative drainage area characteristics; flow direction (fdr) and flow accumulation (fac) grids contain a count of the number of upstream cells that drain into each cell, whether the flow moves to either of the eight cells sharing an edge or corner with the cell; and flow volume and velocity estimates for each flowline in the stream network.

NHDPlus catchment data is derived from a modified digital elevation model (DEM). The process includes joining the 1:100K NHD data layer to the National Elevation Data (NED) layer and ensuring the boundaries match the 12 digit subwatersheds. The resulting DEM was used to produce stream catchments built using 30 meter grids. NHDPlus catchment data is projected in GCS North American 1983. The raster data comes in 30x30 meter cells, which can limit its uses, and is projected in GCS NAD 1983 Albers.

The catchment data itself does not come with any value-added attributes, headwaters, flowlines etc. The attribute data can be combined easily through joining a database file (.dbs) or adding a shapefile.

How to Download Data

1. Go to <http://www.horizon-systems.com/NHDPlus/>
2. Click on NHDPlus Version 2 in the left hand menu. Once expanded click on Data.
3. Look at the basin map to determine from which area(s) of the United States you would like to download data. Wisconsin is divided into two geographic basin areas, the “Upper Mississippi” (Region 7) basin and the “Great Lakes” basin (Region 4); select one.
4. Select one file at a time from the download list for the data of interest. Above the download links there is a Filename Key, use it to determine which files contain your data of interest. At the top of the screen, you can find a hydrologic region map that shows the raster and vector processing units (RPU and VPU, respectively). You can use this map to determine what files you need to download for your area of interest by finding the code in the file name. Catchment data’s component name is “NHDPlusCatchment” and is located

toward the bottom of the downloads list. FTP downloads may be faster than HTTP downloads.

5. Attribute data is available in the file containing “NHDPlusAttributes” in the name. The rest of the file name will vary depending on what Region you are downloading information about.
6. All data will be compressed when downloaded. NHDPlusV2 uses a special compression format that requires a zipping program that recognizes “.7z” files. The site recommends using 7-Zip, available for download at www.7-zip.org/download.html. Extracting files with 7-zip is similar to any other program, simply right click on the file, navigate to 7-zip and select “Extract files”.

Climate

The type of climate data that is publicly available is precipitation and temperature data.

Geospatial Data Gateway

<http://datagateway.nrcs.usda.gov/>

Example 1: Precipitation Data

The precipitation data available at the Geospatial Data Gateway are from the Oregon Climate Service at Oregon State University and can be accessed through the Geospatial Data Gateway at: <http://datagateway.nrcs.usda.gov/>

About the Data

The data are limited to average monthly and average annual precipitation from 1971 to 2000. In the case of Wisconsin, this is relatively uniform across the state. The maps were created from 30 arc-seconds (~800m) PRISM derived grids. Therefore, you will need to accept the use of prisms when you open the data.

How to Download Data

1. Go to <http://datagateway.nrcs.usda.gov/>
2. Navigate to the green 'Get Data' button near the upper right corner of the screen.
3. In the middle box, select Wisconsin from the state dropdown menu and then select the county of your choice, (e.g., Dane). After selecting counties, click 'Submit Selected Counties'. Note you can change the method for selecting data from county (the default) to state, place, latitude and longitude, or create a custom area of interest by clicking "here" under the "Where" heading. (Please note that the first three steps will be the same for any data layer you obtain from Geospatial Data Gateway).
4. Scroll down and check the boxes next to "Annual Average Precipitation by State" and "Monthly Average Precipitation by State" under climate-precipitation. These selections are available for 1961-1990, 1971-2000 or 1981-2010, choose the time period of interest. Select "Continue"
5. Make sure the format guidelines will work for you, and choose your method of delivery by selecting 'FTP Download, CD ROM or DVD'. (It is free to use the FTP site). Select "Continue."
6. Fill in your contact information and then place order.
7. Confirm and place order.
8. Look for file in your inbox. The time that it takes to arrive depends on the size of the file. The file will need to be downloaded within four days.
9. Follow link to zipped file and extract your files. You will have to cut and paste the URL from the email into your browser, if it is not shown as a hot link.

Ecological Landscapes

Wisconsin Department of Natural Resources (WDNR) FTP Site

<http://dnr.wi.gov/maps/gis/>

About the Data

Ecological landscapes of Wisconsin are critical data to implement ecosystem management, since they provide information about classification, characteristics and distribution of ecosystems. According to the metadata, they are “aggregations of NHFEU (National Hierarchical Framework of Ecological Units) subsections that have been assigned descriptive names”, and “are represented on a May, 1999 map prepared under the direction of the DNR Division of Land Ecosystem Management Planning Team”. The data of Wisconsin ecological landscapes are complete and updated on an as needed basis. The projected Coordinate System is “NAD_1983_HARN_Transverse_Mercator”.

According to the ecological landscape data Wisconsin is classified into 16 ecological landscapes, which have significant and similar ecological characteristics and identify specific ecosystem management opportunities. The shapefile attribute table has eight fields: “FID”, “SHAPE”, “AREA”, “PERIMETER”, “ECO_”, “ECO_ID”, “ECO_ID_1” and “ECO_NAME”. The information provided does not include the criteria of ecological classification and characteristics of different landscapes in the metadata. The lack of information makes it difficult for users to understand how the data is calculated and what the data represents.

The WDNR website provides information about attributes and management guidance of every ecological landscape. You can choose an ecological landscape area in the map at <http://dnr.wi.gov/topic/landscapes/index.asp?mode=Choose> and get related information. The map provides a detailed explanation of physical and biotic environment conditions (size, climate, bedrock, geology & landforms, soils, hydrology, current land cover and species) and related socioeconomic conditions (population, population density, per capita income, important economic sectors and public ownerships) of each ecological landscape. More detailed information is available in the Ecological Landscapes of Wisconsin Handbook online at <http://dnr.wi.gov/topic/landscapes/handbook.html>.

How to Download Data

1. Go to WDNR GIS and Geospatial Data Metadata and Download <http://dnr.wi.gov/maps/gis/metadata.html> for list of available data.
2. Scroll down to Metadata Listing. Click on desired data title to view metadata to determine contents of download.
3. To download, return to Metadata and Download site. Within “Download Data from the DNR FTP Site,” click on “DNR Public GIS FTP Site”
4. Click on “ecological_landscapes.”
5. Click on “Ecological_Landscapes_WI.ZIP.” to download the ZIP file to your computer.
6. Extract files and add layer.

Elevation

Topographical data can be found in the National Elevation Dataset (NED), which is produced by and easily accessed from USGS. It is part of the USGS National Map Viewer (<http://nationalmap.gov/viewer.html>). Elevation data can also be located at Wisconsin Department of Natural Resources (WDNR).

US Geological Survey – National Map Viewer

<http://nationalmap.gov/viewer.html>

Example 1: National Elevation Data from USGS

The National Map Viewer is a database providing free downloads of national base layers, as well as other geospatial data layers. It also allows visualization and identification queries, but not downloads, of other featured data. It is run by the U.S. Geological Survey (USGS) and the EROS Data Center (EDC), both federal agencies. The viewer platform is extended upon the National Geospatial Intelligence Agency's (NGA) Palanterra x3 Viewer.

About the Data

National Elevation Data (NED) data are available nationally at resolutions of 1 arc-second (approx. 30 meters) and 1/3 arc-second (approx. 10 meters), and in limited areas at 1/9 arc-second (approx. 3 meters). DEM (Digital Elevation Model) could refer to the representation of continuous elevation values and are typically used to represent terrain relief.

Please note that you will need to project your NED raster data if you would like to use them for any analytical purposes such as creating hillshades and slope surfaces. We would like to provide another caution with the efforts of creating such different surfaces that you need to have the projected and output files in a file path with no spaces.

How to Download Data

Note: You may have trouble downloading the data if you have a pop-up blocker or security system that prevents automatic downloads.

1. Go to: <http://viewer.nationalmap.gov/viewer/>
2. You can search for the area of interest, such as Dane County, Wisconsin in the search bar at the top of the screen. Alternatively, zoom in by clicking the “zoom” button (magnifying glass) on the toolbar near the top of the screen, and then draw a box around the area of interest in the United States. Continue drawing boxes around the area of interest until it is zoomed to the desired level.
3. On the top right corner of the screen, click on “Download Data”. You will be able to choose what geographic area you download data for from several options in the dropdown menu that appears (e.g. states, counties, incorporated places).
4. After choosing what reference area you want to download data for (e.g. state, county, incorporated places) click on the map in the area of interest. This will select the entire area that fits in your selected boundaries (e.g. if you chose “State” then all of Wisconsin would

be selected by clicking anywhere in the state's boundaries). You can see exactly what you have selected in the menu on the left hand side of the screen.

5. Click "Download" in the left hand menu to bring up the list of available data and formats.
6. Choose Elevation as the theme and click "Next."
7. Now select data for your desired resolution (e.g. 1 arc second) and format, likely ArcGrid. Click "Next". Note that the data are only available as staged data in a pre-packaged 1x1 degree cell; however, National Map Viewer no longer automatically selects all of the pre-packaged downloads that fit within your chosen geographic area. You will need to select any relevant downloads from the list. For example, if you selected Dane County, four downloads in the same resolution and format are available.
8. When loaded, the cart menu will appear on the left of the screen. Here you will review your order and Checkout.
9. After choosing Checkout you will be prompted to enter your e-mail. Click "Place Order". A link containing your download will be sent to you. It will be necessary to extract the zipped files after downloading.
10. When adding the raster data to you GIS program select "yes" if asked whether you'd like to create pyramids.

Emissions

Geocommons

<http://www.geocommons.com/>

About the Data

The dataset for emissions was contributed to Geocommons by Data Team, who compiled the data set from an organization called CARMA (Carbon Monitoring for Action). For more information regarding CARMA, visit their website at <http://www.carma.org>.

The dataset is location/point oriented and shows the geographic locations of all the power plants within the State of Wisconsin. There is a related excel spreadsheet with more detailed information. Provided information includes the name, company, parent company, city, state, zip, county, metro area, latitude/longitude, and plant ID for each individual power plant. Three attribute fields need more extensive description to be readily understood,

1. Intensity: pounds of CO2 emitted per megawatt-hour of electricity produced
2. Energy: annual megawatt hours of electricity produced
3. Carbon: Annual carbon dioxide emissions

How to Download Data

1. Go to <http://www.geocommons.com/>
2. In the middle of the webpage there is a “Search for Maps and Data” textbox. Search for “Wisconsin power plants.”
3. One result should be returned, “Power Plant Emissions, Wisconsin”
4. Click on Download. In the dropdown menu you have the option to download the Shapefile, Excel file, and .KML the file format used by Google Earth. After downloading the data must be extracted to be used.

Floodplains

The only definitive source regarding floodplains for flood insurance purposes is the Federal Emergency Management Agency (FEMA). However, WDNR also includes the information in its Surface Water Data Viewer (page 35).

Federal Emergency Management Agency

<http://www.fema.gov/business/nfip/mscjumppage.shtm>

Example 1: DFIRM for County Area

The Digital Flood Insurance Rate Maps (DFIRMs) are available at the Map Service Center in the Disaster Information section of the website. FEMA prepares the Flood Insurance Rate Maps (FIRM) that depict the spatial extent of Special Flood Hazard Areas (SFHAs) and other thematic issues associated with flood risk assessment. In addition, the risk zones depicted on FIRMs provide a basis for determining flood insurance coverage premium rates offered through the National Flood Insurance Program (NFIP). FEMA established the assessment of flood risk for more than 20,400 communities nationwide and the publication of more than 80,000 individual FIRM panels. FEMA is slowly converting these paper maps to georeferenced data in the form of seamless DFIRMs.

About the Data

FIRM Data contain a variety of information as follows:

- Common physical features, such as major highways, secondary roads, lakes, railroads, and other waterways.
- Special Flood Hazard Areas
- Base (1 percent annual chance) flood elevations or depths
- Flood insurance risk zones
- Areas subject to inundation by the 0.2 percent annual change flood
- Areas designated as regulatory floodways
- Undeveloped coastal barriers

How to Download Data

To obtain DFIRMs, users need to order maps and pay a fee.

1. Go to Map Service Center at <http://msc.fema.gov>
2. On the navigation menu at the top of the screen click on “Product Catalog.”
3. From the Product Catalog menu you can select either “Effective FIRMs/FHBMs” or “Future FIRMs” depending on your needs. Directions are the same for either selection.
4. Select desired state, county, and community from the dropdown menus. For instance, for Dane County, you could select specific communities or Dane County Incorporated and Unincorporated areas. Click on “Get [Future/Current] FEMA Issued Flood Maps.”
Note: Not all of the state or counties are currently available in geospatial data. It is possible to download images of the paper-based FIRMs through the “Flood Maps” link in the Map Service Center. You can order the digital images by regional kit or by panel number, which can be determined by looking at the index maps for the area.

5. On the next screen you can select the relevant FIRM. You have the option to view an image of the FIRM before purchasing to verify it is the correct area of interest.
6. Pay fee. Since we have not paid the fee, we are not sure what the next steps are!

Geology

Geology layers include information about bedrock and mineral resources. This can include information about earthquake and landslide hazards, as well as coastal geology. For Wisconsin data, UW Extensions' Geologic and Natural History Survey provides some of the data they have collected for public download. For national level data, the US Geological Survey (USGS) is the best place to look.

Wisconsin Geologic and Natural History Survey

www.uwex.edu/wgnhs

Example 1: Statewide Bedrock Map

About the Data

The Statewide Bedrock Map found on this website is derived from published maps (original presentation scale: 1:100,000). The dataset includes vector and point information showing geologic units. The data includes Federal Geographic Data Committee compliant metadata. In addition, for most data sets a PDF file of a map and any accompanying report can be downloaded. This is particularly useful because the attribute data does not include meaningful labels. Using this data effectively, would require transferring a lot of data from the “.pdf” files of the original maps. In addition, the process of converting the data to useable files is onerous.

How to Download Data

1. Go to www.uwex.edu/wgnhs/gis.htm
2. Click on “coverage” next to “Statewide: Bedrock Geologic Map of Wisconsin”.
3. Select location to save zipped files and click save. It may be helpful at this time to select a file location without spaces or characters in the name (see conversion instructions below). In some cases, this may require you to use an external drive.
4. Open the zip file and extract all files. The data will be located in “data” folder in the “Map18” folder as .e00 files and must be converted before they can be used with ArcGIS.
5. To convert the data files from .e00 format in ArcGIS 10, open ArcToolbox in ArcCatalog or ArcMap. Navigate to Conversion Tools > To Coverage > Import from E00. Select one .e00 file and run the Import tool. It is a good practice not to have any spaces in the file path or the name of the file; the software may give you trouble when saving in a path or a name with spaces and unusual characters. Follow these steps for each .e00 file in the data folder. Notice that the polygon file is named wis_geol_pl.e00
6. In ArcMap, click on “add data” and locate the converted files.

Groundwater

Groundwater information is difficult to gather and map. Very few organizations have actually mapped this information, but many websites offer information about groundwater quality and flows in table form.

Wisconsin Water Science Center (USGS)

<http://wi.water.usgs.gov/data/groundwater.html>

About the Data

Information on groundwater levels available are Real-time, Active, and Climate response. No information about Wisconsin is available for Real-time, and Climate response data is not available as a GIS download. The Active layer has GIS download and includes identifying and location information as well as the most recent well water level values available. This data is in NAD83 and is a national level dataset.

How to Download Data

1. Go to <http://wi.water.usgs.gov/data/groundwater.html>.
2. Under “Current ground-water-level conditions” click on the “U.S. current conditions” link under the “Active ground-water-level network” map in the middle.
3. Under the map there are four links, click “Download GIS Shape File” to begin download.
4. The files will need to be extracted before you can add the shapefile to ArcMap.

Capital Area Regional Planning Commission (CARPC)

<http://www.capitalarearpc.org>

If you are working in Dane County, the Capital Area Regional Planning Commission has completed a series of PDF Infiltration Maps available at www.capitalarearpc.org/infiltration.html

CARPC, in conjunction with Dane County Planning Department, also maintains PDF maps regarding groundwater contamination risk available at www.capitalarearpc.org/Map_Gallery.html

Wisconsin Geologic and Natural History Survey

<http://www.uwex.edu/wgnhs>

The Wisconsin Geologic and Natural History Survey (WGNHS) has groundwater related layers for a Calumet, Sauk, and Trempealeau Counties in Wisconsin publicly available. The instructions for download are essentially the same as those for the Statewide Bedrock Map described in the [Geology](#) section (page 14). Simply click on the desired county map in step 2.

In addition, the WGNHS has other groundwater layers that are available upon request. To inquire about the availability of the data you require, contact the Map and Publication Sales office at mapsales@uwex.edu or 608/263.7389. Please note that not all of the data available in this form has proper metadata.

Habitats and Endangered Resources

The best places to get wildlife and habitat information is through the WDNR, at both its FTP site or through the Aquatic and Terrestrial Resources Inventory Interactive Map, and US Fish and Wildlife Service.

Wisconsin Department of Natural Resources (WDNR) FTP Site

<http://dnr.wi.gov/maps/gis/>

About the Data

WDNR's wildlife and habitat related geospatial data include forestry, wetlands, and wildlife management (e.g., bear, deer, turkey) data sets. WDNR also maintains layers of County Forests and the USGS Wisconsin GAP Stewardship data, which includes the boundaries of many lands conserved by state and federal agencies combined with land cover and habitat information. For information about wetlands, see the dedicated [wetlands](#) section on page 43.

Example 1: Bear Management Areas

How to Download Data

1. Go to WDNR GIS and Geospatial Data Metadata and Download (<http://dnr.wi.gov/maps/gis/metadata.html>) for list of available data.
2. Scroll down to Metadata Listing. Click on desired data title to view metadata to determine contents of download.
3. To download, return to Metadata and Download site. Within "Download Data from the DNR FTP Site," click on "DNR Public GIS FTP Site"
4. Click on "wildlife_mgmt."
5. Click on "bear_mgmt_zones.ZIP."
6. Download desired zip file and save it to your computer.
7. Extract files and add layer.

US Fish and Wildlife Service

<http://www.fws.gov/data/>

Example 2: Wildlife Refuge Boundaries

The U.S. Fish & Wildlife Service maintains geospatial data related to their mission of conserving and protecting fish, plants, wildlife and habitat for the future. Among their datasets are refuge boundaries, trails, and wetlands. The data are organized by region (Wisconsin is in the Great Lakes Region) or nationally (<http://www.fws.gov/gis/data/national/index.html>).

The standards and definitions relating to all USFW data are available online at <http://www.fws.gov/stand>. In addition, metadata are available as part of the download. The National Wildlife Refuge Boundaries are georeferenced to UTM Zones 14, 15, 16 and 17 with a DATUM of Nad83. The National Wildlife Refuge Boundaries must each be downloaded separately and the projection must be defined. In addition, these data include only shape files of

the refuges. You will need to use a base map for other boundaries, such as counties or states, and other geographical features.

How to Download Data

1. Go to <http://www.fws.gov/gis/data/national/index.html> to download National Wildlife Refuge Boundaries.
3. Scroll down to “National Wildlife Refuge System (NWRS) Boundary Data towards the bottom of the page and click on USFWS National Cadastral Data and Metadata.
4. Click on “USFWS Cadastral Geodatabase” to download all three available layers.
5. Save the zipped file and extract files.
6. To use the files, you will need to define the projection to match an underlying state or county map, such as the WDNR state outline map.

Historic and Prehistoric Sites

Historic and prehistoric sites are largely a state or local concern, so the best data comes from the state level at the Wisconsin Historical Society. The data is available for a fee only.

Wisconsin Historical Society

<http://www.wisconsinhistory.org/hp/whpd/custom.asp>

Layers are available for an annual fee through an online application at the Wisconsin Historical Society at <http://www.wisconsinhistory.org/hp/whpd/custom.asp>.

Available Layers:

Archaeological Sites

Archaeological Surveys

Historic Properties

The files are in ArcView shapefile format and are projected to WTM 83/91.

Layers are also viewable through the Wisconsin Historic Preservation Database for a fee.

Imagery

The National Digital Orthophoto Program (NDOP) was designed to provide complete coverage of the U.S. with data being released annually, biannually, or on a five year basis depending on the responsible agency and coverage to maintain data currency. NDOP is comprised of several Federal and State programs, including the National Agriculture Imagery Program (NAIP), the USGS National Orthoimagery Program, the National Digital Elevation Program (NDEP), and others.

Most of the images you may want to use will be available for download at the Geospatial Data Gateway. Wisconsin images are available at Wisconsin View.

Geospatial Data Gateway

<http://datagateway.nrcs.usda.gov>

Example 1: Ortho Imagery from NRCS

About the Data

The imagery available at the Geospatial Data Gateway is maintained by a variety of federal agencies. Ortho Imagery is produced by the National Digital Ortho Photo Program (NDOP) (<http://www.ndop.gov/maintenance.html>) and maintained by the National Resources Conservation Services (NRCS), a branch of the U.S. Department of Agriculture. Some may know the NRCS by its former name, the Soil Conservation Service. NDOP images are generally taken on a five year rolling basis across the entire country. The date of the image depends on the location. The image has a 1 meter ground resolution, and is in UTM (NAD83) coordinates. The use of orthoimages is pretty straightforward, and this is a quick and relatively user friendly place to obtain them. However, you cannot clip before you download, and consequently the files are very large.

How to Download Data

1. Go to <http://datagateway.nrcs.usda.gov/>
2. Navigate to the green 'Get Data' button near the upper right corner of the screen.
3. In the middle box, select Wisconsin from the state dropdown menu and then select the county of your choice, (e.g. Dane). After selecting counties, click 'Submit Selected Counties'. Note you can change the method for selecting data from county (the default) to state, place, latitude and longitude, or create a custom area of interest. (Please note that the first three steps will be the same for any data layer you obtain from Geospatial Data Gateway).
4. Scroll down to Ortho Imagery and check the boxes next to "Digital Ortho County Mosaic of 7.5' quads by APFO." Select "Continue"
5. Make sure the format guidelines will work for you, and choose your method of delivery by selecting 'FTP Download, CD ROM or DVD'. (It is free to use the FTP site). Select "Continue."
6. Fill in your contact information and then place order.
7. Confirm and place order
8. Look for file in your inbox. The time that it takes to arrive depends on the size of the file. The file will need to be downloaded within four days.

9. Follow link to zipped file and extract your files. You will have to cut and paste the URL from the email into your browser, if it is not shown as a hot link.

Example 2: NAIP (National Agricultural Imagery Program) from USDA

About the Data

If you are interested in using an image for agricultural purposes, we suggest that you access NAIP imagery. The program is administered by U.S. Department of Agriculture's Farm Service Agency (FSA). The program aims to acquire aerial imagery during the agricultural growing seasons in the U.S. at a fine resolution (one-meter ground sample distance). NAIP is available for WI for 2004, 2005, 2006, 2008, 2010, and 2013. More information about NAIP is available at

<http://www.fsa.usda.gov/FSA/apfoapp?area=home&subject=prog&topic=nai>.

How to Download Data

1. Go to <http://datagateway.nrcs.usda.gov/>
2. Navigate to the green 'Get Data' button near the upper right corner of the screen.
3. In the middle box, select Wisconsin from the state dropdown menu and then select the county of your choice, (e.g. Dane). After selecting counties, click 'Submit Selected Counties'. Note you can change the method for selecting data from county (the default) to state, place, latitude and longitude, or create a custom area of interest. (Please note that the first three steps will be the same for any data layer you obtain from Geospatial Data Gateway).
4. Scroll down to Ortho Imagery and check the boxes next to "2010 National Ag. Imagery Program Mosaic." Select "Continue"
5. Make sure the format guidelines will work for you, and choose your method of delivery by selecting 'FTP Download, CD ROM or DVD'. (It is free to use the FTP site). Select "Continue."
6. Fill in your contact information and then place order.
7. Confirm and place order
8. Look for file in your inbox. The time that it takes to arrive depends on the size of the file. The file will need to be downloaded within four days.
9. Follow link to zipped file and extract your files. You will have to cut and paste the URL from the email into your browser, if it is not shown as a hot link. .

Impervious Surfaces

The USGS National Map Viewer is the best place to get data about impervious surfaces, unless you decide to create your own data using orthoimages and local knowledge.

USGS National Map Viewer

<http://nationalmap.gov/viewer.html>

Example 1: NLCD 2006 Impervious Surface

About the Data

These data are somewhat dated, and users should account for the variability of imperviousness within the county as it may have changed over the intervening years. Availability of data varies throughout the national (and international) data sets, as does the accompanying metadata. The NLCD 2006 Impervious Surface raster data for Dane County (WI), for example, comes complete with the appropriate projection file and metadata.

This particular file describes the impervious surface throughout the county by percentage (min = 0, max = 100). By examining the properties of the file (or through reading the metadata), the user can find the cell resolution (30x30 meters). The 0-100 scale may be too detailed for efficient analysis, but reclassifying the data is not difficult.

How to Download Data

Note: You may have trouble downloading the data if you have a pop-up blocker or security system that prevents automatic downloads.

1. Go to: <http://viewer.nationalmap.gov/viewer/>
2. You can search for the area of interest, such as Dane County, Wisconsin, in the search bar at the top of the screen. Alternatively, zoom in by clicking the “zoom” button (magnifying glass) in the toolbox on the menu bar at the top of the map viewer, then click on the area of interest in the United States. Continue clicking on the area of interest until it is zoomed to the desired level.
3. In the top right corner of the screen, click on “Download Data”. You will be able to choose the geographic area for download from several options in the dropdown menu that appears (e.g. states, counties, incorporated places).
4. After choosing what reference area you want to download data for (e.g. state, county, incorporated places) click on the map in the area of interest. This will select the entire area that fits in your selected boundaries (e.g. if you chose “State” then all of Wisconsin would be selected by clicking anywhere in the state’s boundaries). You can see exactly what you have selected in the menu on the left hand side of the screen.
5. When finished selecting, click “Download” in the left hand menu to bring up the list of available data and formats.
6. After choosing the type of data you are interested in (e.g. land cover) select “Next”. On the following screen you will select more specifically which data you want. You will notice that impervious surface as a layer does not exist among the main categories; it is

located within land cover data. So first select “Land Cover” and then “National Land Cover Database 2006 – Impervious Surface Percentage. After selecting the data click “Next”.

7. When loaded, the cart menu will appear on the left of the screen. Here you will review your order and Checkout.
8. After choosing Checkout you will be prompted to enter your e-mail. Click “Place Order”. A link containing your download will be sent to you. It will be necessary to extract the zipped files after downloading.

When adding the raster data to you GIS program select “yes” if asked whether you’d like to create pyramids.

9. Note that the data may contain a much larger geographic extent than you had asked for because 1 and 1/3 arc-second data are only available as staged data in a pre-packaged 1x1 degree cell, so the download will include all cells that intersect your selection, and thus may require clipping to a smaller area.

Land Cover

There are two types of current land cover data for Wisconsin. The Wisconsin Initiative for Statewide Cooperation on Landscape Analysis Data (WISCLAND) layer is available at the WDNR FTP Site. Another is the National Land Cover Data (NLCD) which is available at the National Map Viewer. Both of these layers are quite dated, but at this point represent the best available data. WDNR also maintains an Original Vegetation Cover Map based on a survey from the mid-1800s.

USGS National Map Viewer

<http://nationalmap.gov/viewer.html>

Example 1: NLCD 2006 Land Cover

The NLCD land cover layer was produced through a cooperative project conducted by the Multi-Resolution Land Characteristics (MRLC) Consortium. The MRLC Consortium is a partnership of federal agencies (www.mrlc.gov), consisting of the U.S. Geological Survey (USGS), the National Oceanic and Atmospheric Administration (NOAA), the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture (USDA), the U.S. Forest Service (USFS), the National Park Service (NPS), the U.S. Fish and Wildlife Service (FWS), the Bureau of Land Management (BLM) and the USDA Natural Resources Conservation Service (NRCS). In addition, an interpretation of land cover change between 1992 and 2001 is also available, through MRLC, but not through USGS.

About the Data

The National Land Cover Data is an interpretation of the 2001 and 2006 Landsat images. Data are available for both years through USGS National Map Viewer.

How to Download Data

Note: You may have trouble downloading the data if you have a pop-up blocker or security system that prevents automatic downloads.

1. Go to: <http://viewer.nationalmap.gov/viewer/>
2. You can search for the area of interest, such as Dane County, Wisconsin in the search bar at the top of the screen. Alternatively, zoom in by clicking the “zoom” button (magnifying glass) in the toolbox on the menu bar at the top of the map viewer, then click on the area of interest in the United States. Continue clicking on the area of interest until it is zoomed to the desired level.
3. In the top right corner of the screen, click on “Download Data”. You will be able to choose what geographic area you download data for from several options in the dropdown menu that appears (e.g. states, counties, incorporated places).
4. After choosing what reference area you want to download data for (e.g. state, county, incorporated places) click on the map in the area of interest. This will select the entire area that fits in your selected boundaries (e.g. if you chose “State” then all of Wisconsin would be selected by clicking anywhere in the state’s boundaries). You can see exactly

what you have selected in the menu on the left hand side of the screen. When finished selecting, click “Download” in the left hand menu to bring up the list of available data and formats.

5. After choosing the type of data you are interested in (i.e., Land Cover) select “Next”. On the following screen you will select more specifically which data you want (e.g. NLCD 2006 Land Cover). After selecting the data click “Next”.
6. When loaded, the cart menu will appear on the left of the screen. Here you will review your order and Checkout.
7. After choosing Checkout you will be prompted to enter your e-mail. Click “Place Order”. A link containing your download will be sent to you. It will be necessary to extract the zipped files after downloading.
8. When adding the raster data to you GIS program select “yes” if asked whether you’d like to create pyramids.

Note that the data may contain a much larger geographic extent than you had asked for because 1 and 1/3 arc-second data are only available as staged data in a pre-packaged 1x1 degree cell, so the download will include all cells that intersect your selection, and thus may require clipping to a smaller area.

Wisconsin Department of Natural Resources (WDNR) FTP Site

<http://dnr.wi.gov/maps/gis/>

Example 2: WISCLAND Land Cover

Land cover data for Wisconsin could be obtained from WISCLAND as well, which is the Wisconsin Initiative for Statewide Cooperation on Landscape Analysis Data. The Land Cover Data described here are made available by WDNR, but the initiative includes a variety of state and private organizations. The layer is an interpretation of the state’s land cover from satellite images primarily from 1992. Of the many environmental geospatial datasets that the WISCLAND group has been working on (e.g., land use mapping, analysis, elevation models, wetlands mapping), land cover maps are the most publicly accessible. Compared to NLCD data from USGS, the WISCLAND layer is easier to understand (the symbology / legend are already created) but the data is older and the resolution is lower.

About the Data

This land cover data set is a raster representation of land cover for the state of Wisconsin. These data are usable for landscape scale analysis in various disciplines such as land use planning, forestry, wildlife ecology and they are compatible with the spatial analyst extension to ArcView GIS, ArcInfo’s GRID module, or ERDAS Imagine remote sensing software.

DNR GIS data are provided in the DNR’s standard coordinate reference system, Wisconsin Transverse Mercator coordinate system, which is based on the adjustment to North American Datum of 1983 (WTM83, NAD83 (1991)). The land cover data are in ArcInfo Grid format and have a minimum mapping unit of 5 acres. State boundary data (shapefile) must be downloaded separately from WDNR's public FTP site.

How to Download Data I

WISCLAND Data can be accessed from WDNR two ways. The first takes you to more information about WISCLAND specifically.

1. Go to: <http://dnr.wi.gov/maps/gis/data/landcover.html>
2. At the bottom of page, download landcover map ([WLC_GRID.ZIP](#)).
3. Extract the files.
4. In ArcMap, add the raster data and select “class” in symbology to display detailed land cover types.

How to Download Data II

1. Go to WDNR GIS and Geospatial Data Metadata and Download (<http://dnr.wi.gov/maps/gis/metadata.html>) for list of available data.
2. Scroll down to Metadata Listing. Click on desired data title to view metadata to determine contents of download.
3. To download, return to Metadata and Download site. Within “Download Data from the DNR FTP Site,” click on “DNR Public GIS FTP Site”
4. Click on “landcover.”
5. Click on “wiscland_landcover.zip.”
6. Download desired zip file and save it to your computer.
7. Extract files and add layer.

Example 3: Original Vegetation Cover

About the Data

The original vegetation cover data are in a polygon shapefile, derived from a 1:500,000-scale map that shows the original Wisconsin pre-settlement vegetation cover. The data were digitized from a 1976 map created from land survey notes written when Wisconsin was first surveyed in the mid-1800s. Digitizing was carried out by UW-Madison students under the direction of Professor Steve Ventura. Line work representing lakes and other hydrographic areas were added by the WDNR GIS Services Section using land use and land cover data of a 1:250,000 scale

According to the metadata, the original vegetation data are “not intended for landscape-scale analysis.” The shapefile is derived from a map with a scale of 1:500,000 and so wouldn’t be appropriate for site-level or detailed analysis either. Instead, the original vegetation cover data are best for identifying regional changes in land cover since the mid-1800s (WDNR Enterprise Data Management Section, 2006). In addition, the cover classes are numerically coded in the attribute table and the code definitions can only be found in the metadata. Users have to spend additional time looking up the definitions and would have to transfer the information to create a meaningful legend (ftp://gomapout.dnr.state.wi.us/geodata/metadata/orig_veg_cover.pdf).

How to Download Data

1. Go to WDNR GIS and Geospatial Data Metadata and Download (<http://dnr.wi.gov/maps/gis/metadata.html>) for list of available data.
2. Scroll down to Metadata Listing. Click on desired data title to view metadata to determine contents of download.
3. To download, return to Metadata and Download site. Within “Download Data from the DNR FTP Site,” click on “DNR Public GIS FTP Site”
4. Click on “orig_veg_cover.”
5. Click on “orig_veg_cover.zip.”
6. Download desired zip file and save it to your computer.
7. Extract files and add layer.

Parks and Trails

The National Park Service (NPS) provides national and regional data. For Wisconsin, NPS has North Country National Scenic Trails and Ice Age National Scenic Trail. Trail information is also available by request from the Ice Age and Trail Foundation and Wisconsin State Park System. Please note that in this document we do not have specific download instructions and information about these two data sources, however we do provide contact information. Independent organizations can submit data to be included on the NPS site.

US National Park Service

<https://irma.nps.gov/App/Portal/Home>

How to Download Data

1. Go to the NPS Integrated Resource Management Applications (IRMA) Portal
<https://irma.nps.gov/App/Portal/Home>
2. Enter the geographic area or name of park you are interested in finding data for into the search bar, i.e. if you are interested in any data about Wisconsin search “Wisconsin”.
3. You can sort the search results by file type by clicking on Type under Results to easily find the data you are looking for. File types include things such as aerial photographs, books and book chapters, conference papers, thesis, geospatial datasets, and vector datasets.
4. Clicking on the title of the dataset will open a new window with information about the data.
5. To download scroll down to Holdings on the newly opened window and click Download.
6. The downloaded file will be zipped, so you will need to extract it before it can be used.

Ice Age Park and Trail Foundation

<http://www.iceagetrail.org/>

The Foundation will provide a layer with the Ice Age Trail route by request.

Contact Information:

Contact Person: Tiffany Stram

Organization: Ice Age Park and Trail Foundation

Title: GIS Specialist

Phone: 608-798-4453

Email: tiffany@iceagetrail.org

Wisconsin State Park System

<http://dnr.wi.gov/topic/parks/>

The State Park System has a layer of the State Trails System, including the 41 trails listed at dnr.wi.gov/topic/parks/trails/pdfs/state_trail_system_facts.pdf

Contact:

Brigit Brown, State Parks System

Brigit.Brown@wisconsin.gov

Political Boundaries

Political boundaries are not exactly environmental data, but much of the data that can be downloaded from the internet does not include any boundary lines. In many cases, there is not even a state outline. Political boundaries are very helpful for orienting viewers and analysis. ESRI is a very user friendly site from which to obtain political boundaries. Many of the other websites profiled in this document include boundaries that are often already in the same projection as the environmental data. Check the contents of the profiled sites to locate the boundaries you need.

Wisconsin Department of Natural Resources (WDNR) FTP Site <http://dnr.wi.gov/maps/gis/>

Example 1: Wisconsin State Outline

The WDNR FTP Site includes state and county boundaries and the Public Land Survey System (PLSS) boundaries. The PLSS, which is a way of subdividing land in the United States, includes townships, sections, quarter sections and quarter-quarter sections. The data are provided in the DNR's standard geo-referencing system - Wisconsin Transverse Mercator based on the 1991 adjustment to the North American Datum of 1983 (WTM83, NAD83(1991)).

How to Download Data

1. Go to WDNR GIS and Geospatial Data Metadata and Download <http://dnr.wi.gov/maps/gis/metadata.html> for list of available data.
2. Scroll down to Metadata Listing. Click on desired data title to view metadata to determine contents of download.
3. To download, return to Metadata and Download site. Within "Download Data from the DNR FTP Site," click on "DNR Public GIS FTP Site"
4. Click on "WI_state_outline."
5. Click on "WI_state_outline.ZIP."
6. Download desired zip file and save it to your computer.
7. Extract files and add layer.

United States Census Bureau <http://www.census.gov/cgi-bin/geo/shapefiles2010/main>

TIGER files are available for download from The United State Census Bureau where you can find the most recent boundary data.

How to Download Data

1. Go to <http://www.census.gov/cgi-bin/geo/shapefiles2010/main>
2. Select the desired layer (e.g., County Subdivision) from the dropdown menu and click submit

3. Select the state of interest from either the 2000 or 2010 dropdown menu and click submit. If you want to join census data from American Fact Finder you will want to use the files for the year that corresponds to your data because boundaries change.
4. [Select the county of interest from the dropdown menu and click Download](#)

Example 3: Wisconsin Neighborhood Associations – Madison & Milwaukee

About the data

Published in 2008 by real estate website zillow.com, this is the only readily available source of geospatial data on Madison's neighborhood boundaries. The shapefile is georeferenced in NAD 1983. The data has been drawn from the publically available Milwaukee neighborhood boundary shapefile as well as a recreation of Madison's neighborhood association map which is not available publically as a shapefile, but can be viewed on the City of Madison's website.

How to Download Data

1. Go to <http://www.zillow.com/howto/api/neighborhood-boundaries.htm>
2. Scroll down to the state list and click on "Wisconsin Neighborhood Boundaries"
3. Once downloaded, extract the Zip folder to use the data in ArcGIS

Public Lands

Public lands range from county forests to state lands managed by WDNR to lands within federal jurisdiction such as the National Park Service, Bureau of Land Management, US Forest Service, military installations, US Fish & Wildlife. The federal land boundaries can be found at the various agency websites. WDNR maintains the GAP Stewardship layer that includes county, state, tribal, federal and private easement information.

WDNR FTP Site

<http://dnr.wi.gov/maps/gis/metadata.html>

Example 1: GAP Stewardship on WDNR

GAP Stewardship data includes boundary and attribute information on lands that are owned or conserved by county, state, tribal and federal agencies and private land trusts. The data are provided in the DNR's standard geo-referencing system - Wisconsin Transverse Mercator based on the 1991 adjustment to the North American Datum of 1983 ([WTM83, NAD83\(1991\)](#)). Note that the shapefile is based on a grid file and that an aggregation of polygons may be needed to better illustrate the data presented.

How to Download Data

1. Go to WDNR GIS and Geospatial Data Metadata and Download (<http://dnr.wi.gov/maps/gis/metadata.html>) for list of available data.
2. Scroll down to Metadata Listing. Click on desired data title to view metadata to determine contents of download.
3. To download, return to Metadata and Download site. Within "Download Data from the DNR FTP Site," click on "DNR Public GIS FTP Site" (Alternatively, go to: <ftp://gomapout.dnr.state.wi.us/geodata/>).
4. Click on "managed_lands." In the folder you will find "Readme-for-DNR_Mgd_Lands_Data.txt" that contains the link to find the download for DNR-Managed Lands.
5. Copy and paste the link from the Readme into your browser. Download the zipped file that starts with DML and follows with six digit date information. In order to understand the codes in the attribute table, you will also need to download `dnr_mgd_land.doc`
6. Extract files and add layer.

U.S. Fish and Wildlife Service

<http://www.fws.gov/data/>

Example 2: Wildlife Refuge Boundaries at U.S. Fish & Wildlife Service

See description and instructions in [Habitat and Endangered Resources](#) section (pages 16).

Renewable Energy

The National Renewable Energy Laboratory (NREL)

NREL is a federal laboratory researching the development, commercialization and deployment of renewable energy and energy efficiency technologies operated by the Alliance for Sustainable Energy, LLC for the U.S. Department of Energy. NREL provides downloadable GIS shapefiles of areas of the country that have potential for different types of renewable energy systems, including biomass, geothermal, hydrogen, marine and hydrokinetic, solar, and wind.

About the data

Each type of renewable energy data from NREL has its own specifications based on the relevant data. Currency of the data varies, with some being updated as recently as 2012. Coordinate systems used vary based on the type of energy. For instance, the wind data was created by the Pacific Northwest Laboratory in 1986 and is available at 50-Meter Resolution (50-meter height above the surface) for each state in GCS_WGS_1984. There is also offshore wind data available at 90-Meter Resolution. Wind data was derived from the original raster format which varied in resolution from 200-meter to 1,000-meter cell sizes, so vector accuracy is limited by this process. Background information for all of the download categories can be found out http://www.nrel.gov/gis/data_analysis_background.html.

How to Download Data

1. Go to <http://www.nrel.gov/gis/>
2. Select “Data Resources” in the left hand menu and click on Wind (or any other type of energy you are interested in)
3. Scroll down to the Wisconsin Wind 50m Resolution under “Coverage” and click on Zip 3.5 MB
4. Once the Zip file has downloaded, you will need to extract the data to use it in ArcGIS

Soils

Soil data are collected and produced by the Natural Resources Conservation Service (NRCS), a division of the U.S. Department of Agriculture.

Natural Resources Conservation Service

<http://dnr.wi.gov/maps/gis/metadata.html>

Example 1: Soils Data from NRCS

The Natural Resources Conservation Service (NRCS) gathers and analyzes data about soils across the country. To facilitate the use of the data, NRCS has created a tool, “Soil Data Viewer,” to be used in viewing and analyzing their soil surveys.

About the Data

Data from soil surveys could come in different formats. STATSGO is the general soil map or the state soil geographic database. The dataset is created from the detailed soil survey maps, but is a generalization of the data. SSURGO (soil survey geographic database), on the other hand, provides the detailed soil survey. SSRUGO database contains many important attributes for analysis relevant to environmental planning such as restrictions for building dwellings, water capacity, cropland characteristics, and flood risk. Choosing among the different soil data depends a lot on what the user wants to do. If the user is working on a regional analysis encompassing several counties or the state as a whole, we recommend that they use STATSGO. However, if the user is interested in a much smaller region (e.g., a county), we recommend SSURGO.

To be able to use soils data efficiently in ArcGIS, you need to download and install Soil Data Viewer and a template database. The process of downloading these tools and populating with information is rather involved; the steps are provided below. Please make sure that you have the appropriate Microsoft.NET framework installed on the computer you will be using (and that the framework was installed prior to the installment of ArcGIS). In addition to ArcGIS, your computer must have Microsoft Access 2000 or greater in order to use this tool. For further information, please see:

http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/geo/?cid=nrcs142p2_053614

How to Download Data

Downloading Soil Data

1. Go to <http://datagateway.nrcs.usda.gov/>
2. Navigate to the green ‘Get Data’ button near the upper right corner of the screen.
3. In the middle box, select Wisconsin from the state dropdown menu and then select the county of your choice, (e.g., Dane) and click ‘Submit Selected Counties’. Note you can change the method for selecting data from county (the default) to state, place, latitude and longitude, or create a custom area of interest by clicking “here” under the “Where” heading. (Please note that the first three steps will be the same for any data layer you obtain from Geospatial Data Gateway).

4. Scroll down to the “Soils” heading and check the box “Soil Survey Spatial and Tabular Data (SSURGO 2.2)”. Click “Continue” at the bottom of the screen.
5. Recently there has been a change in soils data and now only one option for format and projection is available. You will only need to choose your method of delivery; it is free to use the FTP site and a link will be emailed to you. Select “Continue.”
6. Fill in your contact information and click “Continue.”
7. On the review screen confirm your information is correct and click “Place Order.”
8. Look for an email with the download link in your inbox. The time that it takes for the email to arrive depends on the size of the file and how many pending downloads are ahead of you. The file will need to be downloaded within four days before the link expires.
9. Follow link to zipped file and extract your files. If you cannot click the link, copy and paste the URL from the email into your browser.
10. Open the extracted soils data folder. You will also need to extract the files within the soil data download folder under the ‘soils’ subfolder. Open the newest extracted folder and you should now see a ‘spatial’ and ‘tabular’ folder.

Downloading and installing Soils Data Viewer

1. Even if you have previously installed SDV 6.0 you will need to uninstall it and reinstall SDV 6.1 to work with any of the current soil files. The soil data viewer can be found at a different NRCS web page:
http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/geo/?cid=nrcs142p2_053614
2. On the right hand side, click on “Download and Install Soil Data Viewer”
3. Click on download soil data viewer 6.1
4. Scroll down to the middle of the page and click “DOWNLOAD: Soil Data Viewer for non-USDA CEE Platforms”
5. Notice that this is a Zip file. Extract the soil data viewer files to c:\Program Files\ArcGIS (or where ArcGIS is residing). If the system you are using has a 64-bit operating system you will need to extract the soil data viewer files to c:\Program Files (x86)\ArcGIS.
6. Run the installer by double clicking it.

Activating Soils Data Viewer in ArcGIS

1. Start ArcMap
2. In ArcGIS 10 you will have to manually register Soil Data Viewer as an add-in. To do so you will need to navigate to C:\Program Files (x86)\USDA\Soil Data Viewer 6.1 and run SDVArcMapAddin.esriAddIn.
3. After running SDVArcMapAddin.esriAddIn you should see the toolbar in ArcMap. If it is not visible click on Customize pull-down menu and select Toolbars then scroll through the list and find Soil Data Viewer Toolbar. If you have problems, more detailed directions can be found at
http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/geo/?cid=nrcs142p2_053619

Putting it all together and viewing attribute and spatial information in ArcMap

1. First, to make sure that the spatial data is working properly, load the shapefile. The one you need to use is called “soilmu_a_wi025.shp” and can be found within the spatial

folder of the soils dataset. (Please see the “readme” file for further information on different files or visit soil data mart.)

2. Click on the Soil Data Viewer icon.
3. Select the access database. At this point, you should be getting an error message: “In the database you have selected, one or more of the tables required by Soil Data Viewer is empty. Please select another database.” You are getting this error message because we have not yet related the access database to the text files; the access database is empty. Therefore, go to Microsoft explorer and open the access database file by double clicking on it. You may receive an error message in Access that the action failed. Stop all macros. Then, click on “Enable Content” on the bar where it says: “Security Warning: Certain content in the database has been disabled.”
4. You will be prompted to give the path to the attribute / text files for the soil data. Remember that attribute files are within the Tabular folder. Write the path as precisely as it appears or copy and paste it from the address bar in Windows Explorer.
5. It will take a couple of minutes for the computer to process and populate this information. One way of confirming that this process is working smoothly is the import progress bar at the bottom right hand side. Once the database is populated, exit Microsoft Access.
6. Now, you are ready to work with the soil data viewer! Click the soil data viewer icon in ArcGIS.
7. You will be prompted to select the access database to work with. (Since you have the access database set correctly, the following should now work.)
8. You will see different attribute folders that you can work with. You can expand these folders to see further attributes.
9. To get definitions, rating, and report options, click on any one of the attributes and modify the tabs on the top right side.
10. To make a thematic map, click on “map” on the bottom right.

Surface Water

There is vast amount of spatial data on Wisconsin's hydrology on the internet. The geospatial data can take the form of simple feature information (length and area) of geographic features through the TIGER files to much more comprehensive and complex datasets such as WDNR's Surface Water Viewer or EPA's classification of impaired waters. In Wisconsin, the Great Lakes and inland lakes are also often very important features. Below are six sources for hydrology data that we think might be useful for you.

US Geological Survey - National Map Viewer

<http://nhd.usgs.gov/data.html>

Example 1: National Hydrography Dataset from USGS

The USGS National Hydrography Dataset is a definitive source for surface water and hydrology data (<http://nhd.usgs.gov/data.html>). The NHD is available at the [Geospatial Data Gateway](#) on page 48 and also at the [National Map Viewer](#) on page 54.

About the Data

The NHD, which is available through The National Map at USGS, has extensive spatial information on surface water hydrography, which can be obtained at different resolutions and for different units of analysis (e.g., basins, subbasins). The data can be downloaded as a shapefile or geodatabase. The NHD includes common features such as lakes, ponds, streams, rivers, canals, and oceans.

How to Download Data

1. Go to <http://nhd.usgs.gov/data.html>.
2. If you want information for the entire state click on "Go to NHD Extracts by State" option 3 under "Quick Links for data download".
3. Open FileGDB/. Within this folder Wisconsin information can be found under HighResolution/. Look under the "Date Modified" column to determine which download is the most up to date for Wisconsin.
4. If you want information not for individual states click on "Go to NHD Viewer" which will open the National Map Viewer under "Quick Links for data download". (Please note that you may need to allow pop-ups from the site.) The other available search option "Go to Pre-Stage Subregions" requires knowing the 4-digit subregion numbers.
5. Click on Download Data in the upper right corner. You will be able to choose the geographic area of download from several options in the dropdown menu that appears. Bulk downloads are not available, so the selection area must be smaller than the state level.
6. After choosing what reference area you want to download data for (e.g. county, incorporated places) click on the map in the area of interest. This will select the entire area that fits in your selected boundaries.

7. You can see exactly what you have selected in the menu on the left hand side of the screen. When finished selecting, click “Download” in the left hand menu to bring up the list of available data and formats.
8. After choosing the type of data you are interested in (e.g. Hydrography) select “Next”. On the following screen you will select more specifically which data you want (e.g. Staged Subregion). After selecting the data click “Next”.
9. You should see a window letting you know the data is being added to the cart. When loaded, the cart menu will appear on the left of the screen. Here you will review your order and Checkout.
10. After choosing Checkout you will be prompted to enter your e-mail. Click “Place Order”. A link containing your download will be sent to you. It will be necessary to extract the zipped files after downloading.
11. When adding the raster data to you GIS program select “yes” if asked whether you’d like to create pyramids.

Wisconsin Department of Natural Resources – Surface Water Viewer

<http://dnr.wi.gov/topic/surfacewater/swdv/>

Example 2: Streaming from Surface Water Viewer

Surface Water Data Viewer (<http://dnrmaps.wi.gov/sl/?Viewer=SWDV>) is a good source to view and stream hydrology data from the Wisconsin Department of Natural Resources (WDNR).

About the Data Viewer

As the name suggests, this website is for viewing geospatial data, not downloading. However, the name is rather misleading as it suggests that it is only about surface water, but in fact, the data displayed goes significantly beyond “surface water” as the extent of geospatial data. It includes many other features such as habitats, invasive species locations, ecological landscapes, and elevation. In terms of hydrology, it includes information such as impaired waters, SWIMS (Surface Water Integrated Monitoring System – for chemical, physical, and biological data) monitoring locations, and (restorable) wetlands. The data included in the Surface Water Viewer are not all produced or maintained by the WDNR. Please note that the data included in the viewer are scale-dependent and that you need to zoom in to view the different data layers included in the Viewer.

The Surface Water Data Viewer allows you to view the following types of data:

- Wetlands
- Dam Safety
- Floodplains
- Designated Waters

Notes:

Two specific layers (watersheds and hydrology) from DNR are publicly available for download at their FTP site. While the FTP site contains many folders, most do not have descriptive titles; therefore, we cannot comment whether other environmental geospatial data are publicly available. In order to access them, you could do the following:

1. Access DNR’s server. <ftp://gomapout.dnr.state.wi.us/>

2. Click the geodata folder
3. Click on desired category of data.
4. Download desired zip file by saving it to your computer.
5. Extract files and add layer.

For more information about DNR data, please visit: <http://dnr.wi.gov/maps/gis/metadata.html>

United States Census Bureau

<http://www.census.gov/cgi-bin/geo/shapefiles2010/main>

TIGER/Line shapefiles can be downloaded from the U.S. Census Bureau

How to Download Data

1. Go to <http://www.census.gov/cgi-bin/geo/shapefiles2010/main>
2. Choose water under Features Subheading from the select a layer type dropdown menu and click submit.
3. Select the state of interest from the linear or area hydrography and click submit.
4. Select the county of interest from the dropdown menu and click download.

National Oceanic and Atmospheric Administration

<http://www.csc.noaa.gov/geospatial/>

Example 4: Medium-Resolution Shoreline at NOAA

The best place to download detailed coastlines for the entire US is the National Oceanic and Atmospheric Administration at <http://www.noaa.gov>. For Wisconsin coastlines (Great Lakes), visit the NOAA Shoreline Website at <http://shoreline.noaa.gov/>.

About the Data

The “medium-resolution shoreline” file is a detailed vector data set that outlines the United States Shoreline, including the Great Lakes, and is made available to the public at no cost. Metadata for the medium-resolution shoreline data is available at <http://shoreline.noaa.gov/data/datasheets/medres.html>. Traditional metadata conforming to the FGDC guidelines also downloads with each file.

How to Download Data

1. Go to <http://shoreline.noaa.gov/index.html>
2. Under “Download Shoreline Data” click on “NOAA’s Medium Resolution Shoreline” under the “By Name” tab.
3. Click “NOAA Medium Shoreline” in the blue “Data Access” box.
4. Save the file to your desired location.
5. Extract files and add layer to project.

Environmental Data Discovery and Transformation (EnDDaT)

<http://cida.usgs.gov/enddat/>

Though not a provider of data, EnDDaT is a service hosted by USGS that accesses data from a variety of publicly available sources, compiles and processes the data, and performs common transformations. The motivation for this resource was the ever increasing intricacies and comprehensiveness of environmental models which require more data to run. EnDDaT aims to make data discovery, aggregation and processing as efficient as possible so it will not be a significant barrier to environmental modeling efforts.

About the Data

Data accessed by EnDDaT is mostly related to water, and includes:

- National Water Information System Web
- National Water Information System WaterML2
- Great Lakes Coastal Forecasting System
- Water Quality Portal
- National Data Buoy Center
- National Climatic Data Center
- USGS Geo Data Portal
- National Precipitation Verification Unit

How to Download/Access Data

1. Go to <http://cida.usgs.gov/enddat/>
2. Click the blue “Begin Data Discovery” button.
3. Select the project location either by clicking an already existing triangle or creating a new market by clicking the ‘Create Project Location’ tab on the top menu bar.
4. Once a project location is chosen you must define the bounding box for the data search. Under the ‘Choose Data’ tab in the top menu bar set the bounding box distance as appropriate.
5. Check the boxes next to the data you want to ‘discover’ listed under the ‘Choose Data’ tab. This will send a query to each of the checked data providers and display available data.
6. Check the boxes next to the available data of interest in the Overview tab on the right hand display box. You can also click on individual points in the map to see specific data. Switch between tabs in the right hand display area to view data from different sources.
7. When ready, click the ‘Submit’ button at the bottom of the page.
8. On the new page you can edit the time range and other filter options. When ready click ‘Process Data.’
9. On the Process Data window you can run statistical analysis such as mean, minimum, maximum, and standard deviation, among others. When ready click “Get Data”.
10. For more detail about all the options and analysis possible with EnDDaT refer to their User Guide at <http://cida.usgs.gov/enddat/UserGuide.jsp>

Toxics

National Institutes of Health (NIH) National Library of Medicine (NLM) TOXMAP
<http://toxmap.nlm.nih.gov/toxmap/main/index.jsp>

About the data

The National Institutes of Health (NIH) National Library of Medicine (NLM) maintains TOXMAP which maps information from the Toxics Release Inventory (TRI). TRI does not cover all major point-sources of pollution, only those required to be reported by the EPA under the Emergency Planning and Community Right to Know Act of 1986. All values are reported in pounds except for dioxin which is reported in grams. Projection of locations of TRI facilities is available in North America Albers Equal-Area Conic.

How to Download Data

1. Go to <http://toxmap.nlm.nih.gov/toxmap/main/index.jsp>
2. Click on the map of the U.S.
3. Click Download, found on the top of the page
4. Under *Download the entire TOXMAP TRI data set* download “Download ESRI shapefile of TRI facilities” and “Download facilities data and aggregate on-site release amounts”. Extract both folders once downloaded.
5. Note that you can display the shapefile, but without some additional steps it has no attributes of toxic release.
6. In order to join the shapefile locations to the release data open the facilities.txt located within the “facilities” folder with Excel. In order to do so you may have to open the file within Excel after displaying all file types.
7. If the Text Import Wizard opens set it as follows
 - Step 1: select Delimited, click Next.
 - Step 2: under Delimiters check only Comma (uncheck Tab), click Next.
 - Step 3: leave Column Data Format as General, click Finish.
8. Using the “State” Column select all WI facilities. ArcGIS may have trouble opening the entire file correctly because there are so many entries. Isolating only the state of interest makes this process easier.
9. ArcGIS will open the table as “null” values if you save right now because there is one space before each column heading. In order to have ArcGIS recognize the values you need to delete the space before each heading before saving. You can do this with the Replace function. Under “Find What” put a space, and leave “Replace with” blank.
10. Save the Excel workbook as an Excel Workbook 97-2003. ArcGIS is not yet compatible with newer versions of Excel.
11. In order to isolate Wisconsin data you will need a shapefile of the state boundary (for information about downloading [political boundaries](#) refer to page 28). You may have to project or reproject the boundary to line up appropriately to the North American Albers Equal-Area Conic projection used by TRI.
12. To isolate points in ArcMap you will add the Wisconsin state boundary and use the Select by Location tool with the following specifications.
 - a. Selection method: select features from

- b. Target layer(s): facilities_all
 - c. Source layer: Wisconsin
 - d. Spatial selection method: Target layer(s) features are within the Source layer feature
13. Click Apply and close the Select by Location window.
 14. Right click on facilities_all in the Table of Contents and navigate to Data > Export Data and export the selected features as a new shapefile. Once the Wisconsin points are saved you can remove the other points from your map if desired.
 15. Finally you can join the release data to the shapefile by adding the excel file you saved earlier to ArcMap. Once added, right click on your Wisconsin facilities shapefile in the Table of Contents and navigate to Joins and Relates > Joins. You will use field FACN to join the release information to the shapefile.

Transportation

Transportation data can be used in two different ways. It is often useful to have roads on maps as reference points, but there is also a wealth of data about the condition of roads available. It may also be important to label scenic byways for some planning efforts.

Basic transportation layers are available in a number of places. These will not be described here in detail because many have been profiled in other sections.

United States Census Bureau

<http://www.census.gov/cgi-bin/geo/shapefiles2010/main>

TIGER files are available from the U.S. Census Bureau

How to Download Data

1. Go to <http://www.census.gov/cgi-bin/geo/shapefiles2010/main>
2. Under Features, choose roads or rail from the select a layer type dropdown menu and click submit.
3. If you select rails you will download a national file. If you select roads you will choose to download a national file for primary roads or choose roads by state and click Download.

Wisconsin Department of Transportation

<http://www.dot.wisconsin.gov/business/econdev/maps-data.htm>

The DOT has layers regarding scenic byways and rustic roads available, but they are not publicly available for download.

Available Layers:

Rustic Roads

Scenic Byways

Contact:

Dan Thyges

dan.thyges@dot.wi.gov

In addition, the Wisconsin Information System for Local Roads (WISLR) includes layers regarding the status of local roads and planned improvements but is available only to municipal employees through online application.

<http://www.dot.wisconsin.gov/localgov/wislr/>

Watershed Boundaries

For the State of Wisconsin, WDNR is the best place to obtain watershed boundaries.

WDNR FTP Site

<http://dnr.wi.gov/maps/gis/metadata.html>

Example 1: Watershed Boundaries on WDNR

The WDNR defines watersheds as areas that drain into a common river system or lake. The data are gathered specifically by the WDNR's Bureau of Watershed Management. The data are intended primarily to be used for the preparation of base maps for the WDNR's Nonpoint Source Water Pollution Abatement Program. More information about WDNR watersheds, water management units, etc. can be found at the WDNR website.

About the Data

The data are compiled from 1:24,000 scale topographic maps. The shape file provides data for the entire state of Wisconsin. According to the attached metadata, the data are updated on an as needed basis. The data were published by the WDNR in 2002. The data carry no access or use restraints.

The DNR watershed boundary data is complete and includes useful boundaries and labels. For some purposes, however, it will have to be overlaid with other data. The data are provided in the DNR's standard geo-referencing system - Wisconsin Transverse Mercator based on the 1991 adjustment to the North American Datum of 1983 ([WTM83, NAD83\(1991\)](#)).

How to Download Data

1. Go to WDNR GIS and Geospatial Data Metadata and Download (<http://dnr.wi.gov/maps/gis/metadata.html>) for list of available data.
2. Scroll down to Metadata Listing. Click on desired data title to view metadata to determine contents of download.
3. To download, return to Metadata and Download site. Within "Download Data from the DNR FTP Site," click on "DNR Public GIS FTP Site."
4. Click on "watersheds."
5. Click on "DNR_Watersheds.zip."
6. Download desired zip file and save it to your computer.
7. Extract files and add layer.

Wetlands

Wetlands data are available from both the National Wetlands Inventory, a partnership between U.S. Fish & Wildlife Service and U.S. Geological Survey, and the WDNR Wetlands Inventory. The WDNR Wetlands Inventory is more detailed and more comprehensive. For example, the National Wetlands Inventory does not include parts of Dane County.

Example 1: National Wetlands Inventory

The National Wetlands Inventory is a joint partnership between the U.S. Fish & Wildlife Service and the U.S. Geological Survey. The Inventory collects information about the shape and extent of wetlands in the United States.

About the Data

The data in the wetlands inventory consists of only one layer, a vector layer of polygons stored in the ArcSDE geodatabase format. Raster images of the hardcopy maps for the areas for which vector data has not yet been produced are not available for download. The inventory also includes metadata that complies with FGDC standards, but that metadata cannot be viewed through ArcGIS after download. One significant limitation with this data is the size of area that can be downloaded at one time. The largest area that can be collected is USGS 1:24,000 or 1:100,000 topographic quadrangle so this data is more useful for local or county-level analysis rather than statewide or regional work. The wetlands information is coded. The codes can be found at <http://www.fws.gov/wetlands/Data/Wetland-Codes.html>. Also, data are extracted or downloaded in quadrangles, which requires the user to understand the quadrangle system.

How to Download Data via the Online Wetlands Mapper:

1. Go to <http://www.fws.gov/wetlands/data/Mapper.html> and click “Click here to Open the Wetlands Mapper”
2. Under the Tools menu on the top of the page, data is available for download by state, except for the state of Wisconsin due to a policy issue. Therefore Wisconsin wetland data is available only for limited download with the view extent option. Zoom into the area of your analysis. Wetland information is only available at scales of less than 1:100,000 so you have to be zoomed in beyond that in order to download data.
3. On the right side of the map you will see an ‘Available Layers’ dialog. Make sure you have the desired layer selected and click on OK. When you have loaded your area and can see wetland data, click on the Tools menu and select “Download data in current extent”.
4. You will be prompted to enter an email address for the ZIP file to be sent to.
5. When you have downloaded the .zip file, extract the contents into your project folder and then add the data into ArcGIS (the files will include a .shp file, in geographic coordinates, NAD 1983 datum). The data should span the entire extent of the map area that you were viewing in the Online Mapper.

WDNR FTP Site

<http://dnr.wi.gov/maps/gis/metadata.html>

About the data

The state of Wisconsin has data available about the Reed Canary Grass Wetlands that has been developed for inclusion in the Potentially Restorable Wetlands Project. It is suggested that this raster representation be used at scales smaller than 1:40,000, and no less than one-half acre minimum mapping unit.

How to Download Data

1. Go to WDNR GIS and Geospatial Data Metadata and Download (<http://dnr.wi.gov/maps/gis/metadata.html>) for list of available data.
2. Scroll down to Metadata Listing. Click on desired data title to view metadata to determine contents of download.
3. To download, return to Metadata and Download site. Within “Download Data from the DNR FTP Site,” click on “DNR Public GIS FTP Site.”
4. Click on “reed_canary_grass.”
5. Click on “reed_canary_grass.zip.”
6. Extract files and add layer.

PART II – DATA SOURCES

Environmental Data Discovery and Transformation (EnDDaT)

<http://cida.usgs.gov/enddat/>

About the Data Provider

EnDDaT is a service hosted by USGS that accesses data from a variety of publicly available sources, compiles and processes the data, and performs common transformations. EnDDaT is not the owner or provider of any data. The motivation for this resource was the ever increasing intricacies and comprehensiveness of environmental models which require more data to run. EnDDaT aims to make data discovery, aggregation and processing as efficient as possible so it will not be a significant barrier to environmental modeling efforts.

About the Data

Data accessed by EnDDaT includes,

- National Water Information System Web
- National Water Information System WaterML2
- Great Lakes Coastal Forecasting System
- Water Quality Portal
- National Data Buoy Center
- National Climatic Data Center
- USGS Geo Data Portal
- National Precipitation Verification Unit

Federal Emergency Management Agency

<http://www.fema.gov/>

About the Data Provider

FEMA website is operated by the Federal Emergency Management Agency to provide people with information about how to prevent, get through, and overcome a disaster. The webpage aims to make disaster assistance openly available to states, communities, businesses and individuals. Hence, it contains a variety of information regarding how to prepare for emergencies and disasters, respond to them when they occur, recover from disasters, mitigate their adverse impacts, reduce the risk of loss, and prevent disasters from occurring.

About the Data

DFIRM Data contain a variety of information as follows:

- Common physical features, such as major highways, secondary roads, lakes, railroads, and other waterways.
- Special Flood Hazard Areas
- Base (1 percent annual chance) flood elevations or depths
- Flood insurance risk zones
- Areas subject to inundation by the 0.2 percent annual change flood
- Areas designated as regulatory floodways
- Undeveloped coastal barriers

Use of Data and Site

The FEMA website enables users not only to get background information about disaster management, but also to download geospatial data. FEMA is only very slowly converting its paper maps to georeferenced data. Even though it costs to obtain actual geospatial data from here, DFIRMs are the only definitive source for floodplain information as it relates to FEMA's flood insurance policies.

Contents

Digital and paper flood maps including digital Flood Insurance Rate Maps

Geocommons

<http://www.geocommons.com/>

About the Data Provider

Geocommons is a data sharing service where users upload geospatial data for others to use in their research and planning related work. Geocommons has partnered with such companies as Google, Oracle, Intel, and Lockheed Martin to provide free geospatial data.

About the Data

Being contributed by users for users, Geocommons has many types of data and maps available. The homepage features several maps and datasets, but to browse by specific categories you need to create a free login for the site. Data categories include:

- Agriculture
- Business and Labor
- Demographics
- Economics and Financial
- Education
- Geographical Boundaries
- Government and Politics
- Health and Medicine
- Infrastructure
- Law Enforcement
- Military and Defense
- Real Estate
- Retail
- Science and Environment
- Sports and Culture
- Technology
- Travel
- Platial

Geospatial Data Gateway

<http://datagateway.nrcs.usda.gov>

About the Data Provider

This is a website run by the USDA compiling information from FEMA, US Census Bureau, Tele Atlas, NRCS, FSA, RD and other sources to provide “one-stop shopping” environmental and natural resource data. The data are also available on CD or DVD, for a very small fee. Basic data are available for no cost; premium data are available for a fee. You can search for data by geographical areas such as county or state, latitude or longitude or by “point and click” on provided maps. The data that are available at this site include: land use cover, soils, elevation, climate, precipitation, hydrologic units, transportation, and government boundaries.

About the Data

The data is available as shapefiles and orthophotos, and the related tabular data. These data come in a range of scales and viewing options. The datasets are broadly organized by three categories:

1. Critical Themes (including orthoimagery, soils, common land units, and cultural and demographic data),
2. Non-Critical Themes (including governmental units and place names, elevation, hydrography, cadastral, transportation, digital raster graphic scanned USGS quads, land cover/vegetation/plants, watershed boundaries, wetlands, wetland and floodplain easements, climate, flood hazards, USDA office information profile, applied conservation practices, and water control infrastructure/national inventory of dams),
3. Non-Geospatial Data Themes (soils, plants, and climate).

Use of Data and Site

Because this is a clearinghouse for data, it is hard to determine how often the data are collected and updated. Therefore, a primary limitation of these data is determining how current the information is. Similarly, the accuracy of the data is not easy to detect. Even though this site is a “one stop shop”, one would need to verify the information available at this site with the entities that have collected and are providing the information. This site also sets limits for how much and how often data can be requested.

Overall, the data available from this gateway are very accessible (free, easy to find, user friendly application), and thus we have minimal suggestions. The one challenge we found is that the data could be updated with more regularity and schedules for conducting updates could be made more predictable.

Also, though users can select a specific order area, the downloadable files are often only available at the state or county level, making for a large data download. This also takes time when importing, and requires the user to clip the file before making use of it (if possible).

Contents

Transportation

Governmental units
Census
Landmarks
Hydrography
Hydrologic units
Elevation and topographic images
Disaster events
Orthophotography
Land cover
Soils
Climate (precipitation and temperature)

NHD Plus

<http://www.horizon-systems.com/nhdplus/index.php>

About the Data Provider

NHDPlus, released in 2006 with collaboration between the EPA and USGS, offers a suite of application-ready geospatial data sets that integrate the National Hydrography Dataset (NHD) with the National Elevation Dataset (NED), the National Land Cover Dataset (NLCD), and the National Watershed Boundary Dataset (WBD). The site also offers a suite of seven downloadable tools to enable more detailed geospatial analysis, but these are only available for the archived NHDPlus Version 1.

Advantages of NHDPlus are that it offers raster and vector catchment data, as well as flowline attribute data, minimizing the time needed for independent calculations. Disadvantages include that it is not possible to separately analyze small catchment areas within the greater hydrologic region; it is not possible to easily preview data before downloading; and in some cases the data will be in a lower resolution than that provided by NHD, which offers some data in 1:24,000. In comparison to DNR data, NHDPlus flowline attributes are less detailed, showing only primary stream networks and excluding fluctuating, intermittent, and perennial features. Furthermore, the rivers and streams do show some differences between the two data sources.

About the Data

NHDPlus data are divided by hydrologic region, and available at 1:100,000 resolution. NHDPlus offers value-added attributes to enhance stream network analysis; an elevation-based catchment for each flowline in the stream network; catchments with attributes; headwater node areas; cumulative drainage area characteristics; flow direction (fdr) and flow accumulation (fac) grids contain a count of the number of upstream cells that drain into each cell, whether the flow moves to either of the eight cells sharing an edge or corner with the cell; and flow volume and velocity estimates for each flowline in the stream network.

NOAA Shoreline Website

<http://shoreline.noaa.gov>

About the Data Provider

The National Oceanic and Atmospheric Administration hosts a website with downloadable geospatial data of the American coastline. The information was derived from NOAA National Ocean service nautical charts and includes over 75,000 nautical miles of coastline. The data was created by the Strategic Environmental Assessments (SEA) Division of NOAA's Office of Ocean Resources Conservation and Assessment.

About the Data

NOAA's website is both data-rich and complex. NOAA is a large organization with many sub-agencies, and many of those also share geospatial data of one sort or another. The range of available data is diverse- you can find data on a wide variety of oceanic and atmospheric topics, and in a number of different formats.

Use of Data and Site

The range of options on the main NOAA website is almost overwhelming. Unless you approach the NOAA homepage with a specific agency or piece of information in mind, it would be difficult to navigate. An overall catalog of all of the resources available in the NOAA system does not appear to exist.

In terms of the data, the shapefile does not come with a projected coordinate system, but this can easily be corrected. The data are a compilation of information from many different navigation charts that meet or exceed current National Map Accuracy Standards, though the data has not been verified against real world conditions and should not be used for navigation.

USDA Natural Resources Conservation Service

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

About the Data Providers

The Natural Resources Conservation Service (NRCS), a division of the United States Department of Agriculture, is primarily concerned with conservation of soil, water, and other natural resources. Originally it was called the Soil Conservancy Service. While NRCS's primary efforts regarding geospatial data are in creating and maintaining soils-related data, the agency also provides regional and national statistical information about natural resource conditions on non-federal land in the U.S. through the National Resources Inventory (NRI)

About the Data

Data from soil surveys could come in different formats. STATSGO is the general soil map or the state soil geographic database. The dataset is created from the detailed soil survey maps, but is a generalization of the data. SSURGO (soil survey geographic database), on the other hand, provides the detailed soil survey. SSRUGO database contains many important attributes for analysis relevant to environmental planning such as restrictions for building dwellings, water capacity, cropland characteristics, and flood risk. Choosing among the different soil data depends a lot on what the user wants to do. If the user is working on a regional analysis encompassing several counties or the state as a whole, we recommend that they use STATSGO. However, if the user is interested in a much smaller region (e.g., a county), we recommend SSURGO.

Use of Data and Site

To be able to use soils data efficiently in ArcGIS, you need to download and install the "soils data viewer" and a template database. The process of downloading these tools and populating with information is rather involved; the steps are provided below. Please make sure that you have the appropriate Microsoft.NET framework installed on the computer you will be using (and that the framework was installed prior to the installment of ArcGIS). In addition to ArcGIS, your computer must have Microsoft Access 2000 or greater in order to use this tool. For further information, please see:

http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/geo/?cid=nrcs142p2_053619

Contents

Soils

Orthoimagery

NAIP (National Agricultural Imagery Program) Images

U.S. Fish & Wildlife Service

Data and Systems Services

<http://www.fws.gov/data/>

About the Data Provider

The U.S. Fish & Wildlife Service's mission is to conserve and protect fish, plants, wildlife and habitat for the future. In order to reach their mission, they maintain extensive related geospatial data. On their website (<http://www.fws.gov/gis/data/national/index.html>), one can obtain information such as refuge boundaries trails and public roads. The data are organized by region, and different types of information are available for each region.

About the Data

The standards and definitions relating to all USFW data are available online at <http://www.fws.gov/stand/>. In addition, metadata are available as part of the download. Most of the available data are georeferenced to UTM Zones 14, 15, 16 and 17 with a DATUM of NAD83.

USGS National Map Viewer

<http://viewer.nationalmap.gov/viewer/>

About the Data Providers

The National Map Viewer, provides geospatial data across boundaries in the United States without a seam, and as such provides easy download for regional analysis or any other analysis that go across boundaries. It is run by the U.S. Geological Survey (USGS) and the EROS Data Center (EDC), both federal agencies.

About the Data

These layers are divided into framework categories

- Places
- Structures
- Transportation
- Boundaries
- Hydrography
- Orthoimagery
- Land Cover
- Elevation

Use of Data and Site

While there are many data layers available for viewing, not all of them can in fact be downloaded. The only data layers that are publicly available for download are within orthoimagery, land cover, and elevation categories.

Contents

US Topo Quadrangles

Historical US Topo Maps

Structures

Physical form

Function

Name

Location

Transportation

Airports

Parkways and scenic rivers

Railroads

Roads

Boundaries

States

Counties

Federal

Native American lands

Incorporated places

Geographic Names

Hydrography

- Sea surface temperatures

- Dams

- Alluvial and glacial aquifers

- Hydrologic unit regions

- Principal aquifer

- Arsenic in groundwater

Contours

Land Cover

- NLCD 2001 land cover

- NLCD 2001 Canopy

- NLCD 2001 impervious surface

- NLCD 2006 land cover

- NLCD 2006 impervious surface

Elevation

- NED (National Elevation Dataset) shaded relief

- Color shaded relief

Orthoimagery

- NAIP (National Agricultural Imagery Program)

Wisconsin Department of Natural Resources

<http://dnr.wi.gov/maps/gis/>

About the Data Providers

The Wisconsin Department of Natural Resources (DNR) is the agency responsible for resource management and environmental conservation in Wisconsin. DNR collects information on the state's land, water, and air resources. Infrastructure and services for Geographic Information Systems (GIS) implementation at the Wisconsin DNR is managed by the Bureau of Technology Services (BTS).

DNR Bureau of Technology Services (BTS) provides data architecture for both tabular and spatial data. Data access and distribution is a free service to the general public. DNR/BTS also provides internet mapping and data consulting. Data can be downloaded from the public FTP web site hosted by the DNR.

About the Data

DNR provides metadata for each dataset. These are consistent with the Content Standards for Digital Geospatial Metadata developed by the U.S. Federal Geographic Data Committee. This metadata includes information about how the data are collected and in what format and who the authors were.

The data are provided in the DNR's standard geo-referencing system - Wisconsin Transverse Mercator based on the 1991 adjustment to the North American Datum of 1983 ([WTM83, NAD83\(1991\)](#)). For more information about DNR data, please visit: <http://dnr.wi.gov/maps/gis/metadata.html>

Use of Data and Site

There is an abundance of information on the WDNR's FTP site. Starting from the metadata index may help the user locate the data of interest. However, the file names on the FTP site can be cryptic and some trial and error may be necessary. Also, some datasets are available only through the custodian of the data listed in the metadata. In that case, the custodian must be contacted directly. DNR data have projection implications when DNR data are overlaid with non-DNR sources. DNR uses the Wisconsin Transverse Mercator coordinates, which is not always recognized by GIS software packages.

Contents

Administrative and Political Boundaries

- County boundaries
- WDNR administrative regions
- WDNR geographic management units
- State outline
- USGS Wisconsin GAP Stewardship Data

Biologic and Ecologic

- Bear management zones
- Deer management units

- Turkey management zones
- Elevation
 - Digital elevation model of WI
 - Shaded relief image of WI
- Forests and Land Cover
 - County forests
 - DNR fire occurrence
 - DNR fire protection areas
 - DNR fire response units
 - DNR forestry areas
 - DNR Forest Crop Law
 - DNR Managed Forest Law
 - Land type associations
 - Pre-settlement vegetation cover
 - Land cover
- Imagery and Base maps
 - 24K Digital Raster Graphics
 - 100K Digital Raster Graphics
 - 250K Digital Raster Graphics
- Surface Water (Hydrography)
 - 24K Hydro Geodatabase
 - DNR watershed boundaries
 - DNR water management units
- Land Descriptions and cadastral
 - A range of PLSS layers
- Map Indexes
 - 12, 24, 100, and 250K Quadrangle Index

Wisconsin Geologic and Natural History Survey

www.uwex.edu/wgnhs

About the Data Providers

The Wisconsin Geologic and Natural History Survey at the University of Wisconsin Extension, is an organization that was created by the Wisconsin State Legislature for the purpose of conducting natural resources surveys and research for use by people making decisions about land use. The information can help identify mineral resource areas, understand groundwater availability and supplies, and determine the suitability of soils for certain purposes. This type of information is important for planners involved in siting different types of development. The GIS portion of the website (www.uwex.edu/wgnhs/gis.htm) has easily accessible information for the public and public officials. It appears to have been created to allow one-step dissemination of the geospatial data the Survey has available.

About the Data

The data found on this website are limited to that collected by the Survey and cover a small selection of topics. However, the available data are clear and presumably accurate. The datasets are derived from published maps (original presentation scale: 1:100,000). Each dataset includes vector information showing geologic units and contacts and uses Federal Geographic Data Committee compliant metadata. In addition, for most data sets an Adobe® Acrobat® PDF file of a map and any accompanying report can be downloaded.

Use of Data and Site

This website is very clear and straightforward. The information is easily located and downloaded. However, the process of converting the data to useable files is onerous and once open, the features do not include understandable labels. Using this data effectively, would require transferring a lot of data from the .pdf files of the original maps. In addition, other than the statewide map, detailed information is only available for a few counties.