

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

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February 2010

University of Wisconsin – Madison / Extension  
(<http://urpl.wisc.edu/extension/reports/environmentalgeospatialdata.pdf>)

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

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 in 2008 and 2009. Prof. Göçmen and Karen Van Gilder, a doctoral student in the Urban and Regional Planning Department and a project assistant with the University of Wisconsin – Extension 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 first 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 9 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.

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We thank Andrew Bernhardt for his efforts in assuring the data access directions were clear and up-to-date.

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

Aslı Göçmen and Karen Van Gilder

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# PART I – GEOSPATIAL DATA

## 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 'Get Data' along toolbar at top.
3. On the left side, click on "Quick County" and type the name of the county of your choice (e.g., Dane) and select Wisconsin. (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. Select "Continue to Step 3"
5. Make sure the format guidelines will work for you. If so, select "Continue to Step 4."
6. Fill in your contact information and then place order. Choose the method of delivery by selecting 'FTP Download, CD ROM or DVD'. (It is free to use the FTP site).
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 five 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.

# 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 Seamless Server (<http://seamless.usgs.gov/website/seamless/>). Elevation data can also be located at Wisconsin Department of Natural Resources (WiDNR).

## **US Geological Survey – National Map Seamless Server**

<http://seamless.usgs.gov/website/seamless>

### *Example 1: National Elevation Data from USFS*

The National Map Seamless Server is a database providing free downloads of national base layers, as well as other geospatial data layers. It is run by the U.S. Geological Survey (USGS) and the EROS Data Center (EDC), both federal agencies.

### **About 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 the 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://seamless.usgs.gov/website/seamless>
2. Click on View and Download US Data or View and Download International Data depending on which data you are planning to use.
3. Zoom in by clicking the “zoom” button (magnifying glass) in the toolbox on the left-hand side of the screen, 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. You will be able to orient yourself using roads or by turning on the labels in the right hand menu. County names are under “Boundaries.” City names are under “Places.”
4. In the toolbar on the left-hand side of the screen under download, click on the “define download area by template” button (under downloads, upper level, far right). This allows you to download only the desired part of the entire nation.

5. On the bottom of the screen, choose template “county boundaries” or any other boundary/grid that you may want to use.
6. In order to download data, be careful to make sure the “download” feature in the right-hand side of the screen is activated by clicking on it. One way to be sure is once it is activated, the font becomes bold in a blue background.
7. The default selection is the 1 inch National Elevation Dataset (1” NED, under the “Elevation” category. If it is not selected, click 1” NED under the Elevation data category. This is for 1 arc second data set, but you could select a different option as well. Please note that since the 1” NED is the default data layer for download, you may want to check this layer off, if you want a different data layer within or in another category, . . .
8. Click on the map anywhere within the desired county.
9. The Request Summary page will pop up. Click on the download button.
10. Wait for your data to be extracted and returned. If computer blocks download, you may have to click on the error link to see a window allowing you to save the file.
11. Save file.
12. Add the raster data and if prompted whether you’d like create pyramids, say “yes”.

# 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.

## **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 its 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.

Here are specific directions to downloading DFIRMs (georeferenced data):

1. Go to Map Service Center at  
<http://www.msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1>
2. Click on DFIRM Databases.
3. Enter desired state, county, and community. For instance, for Dane County, you could select specific communities or Dane County Incorporated and Unincorporated areas. Click on "Get DFIRM Data."

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.

4. Pay fee. Since we have not paid the fee, we are not sure what the next steps are!

# Groundwater

Groundwater information is difficult to gather and map. Many websites offer information about groundwater quality and flows in table form, such as the Wisconsin Water Science Center (USGS) at <http://wi.water.usgs.gov/data/index.html>. Very few organizations have actually mapped this information.

If you are working in Dane County, the Capital Area Regional Planning Commission has completed a series of Infiltration Maps.

[http://www.capitalarearpc.org/gis\\_infiltration\\_maps.htm](http://www.capitalarearpc.org/gis_infiltration_maps.htm)

In addition, CARPC in conjunction with Dane County Planning Department maintains maps regarding groundwater contamination risk.

[http://www.capitalarearpc.org/gis\\_map\\_gallery.htm](http://www.capitalarearpc.org/gis_map_gallery.htm)

The Wisconsin Geologic and Natural History Survey (WGNHS) at <http://www.uwex.edu/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 found below for the Statewide Bedrock Map described in the Geology section (page 11). 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](mailto:mapsales@uwex.edu) or 608/263.7389. Please note that not all of the data available in this form has proper metadata.

# 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](http://www.uwex.edu/wgnhs)

### Example 1: Statewide Bedrock Map

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 an Adobe® Acrobat® 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](http://www.uwex.edu/wgnhs/gis.htm) and click on Digital Datasets (Downloadable Data).
2. Scroll down and click on “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. Double click on the unzipped file and then click on file “disclaimer.exe” and agree to terms. Then click unzip in the window.
5. To convert the data files from .e00 format, open ArcCatalog and click on View menu. Within View, hover on “Toolbars” and select “ArcGis 8x Tools.”
6. A small box with a drop down menu will appear on top of the Catalog. In that drop down, select “Import from Interchange File.”
7. In the box that appears, click the browse file and locate unzipped files. As mentioned above, the import program will not allow you to import from a file path with any spaces, so make sure your path is labeled accordingly.
8. Likewise, when selecting the desired output path, be sure there are no spaces or characters in the path name.
9. Click OK. Follow these steps for each .e00 file in the data folder.
10. In ArcMap, click on “add data” and locate files.

# 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://www.dnr.state.wi.us/maps/gis/>

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 40.

Example 1: Bear Management Areas

## **How to Download Data**

1. Go to WDNR GIS and Geospatial Data Metadata and Download (<http://www.dnr.state.wi.us/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.
5. Click on "wildlife\_mgmt."
6. Click on "bear\_mgmt\_zones.ZIP."
7. Download desired zip file and save it to your computer.
8. 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). On their website (<http://www.fws.gov/data/NWRdata.htm>), each state has links

to different data that may be useful for the analysis of wildlife habitat from other sources, such as USGS or state agencies.

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/data/NWRdata.htm> to download National Wildlife Refuge Boundaries.
3. Click on FWS National Cadastral Data. Click on “FWS Cadastral” to download all three available layers.
4. Save the zipped file and extract files.
5. 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.

### **WDNR Aquatic and Terrestrial Resources Inventory Interactive Map**

<http://maps.wiatri.net/AtriDemo/index.htm>

#### Example 3: Obtaining Contact Information for Endangered Resources

Many of the layers used for the ATRI Mapping system are not publicly available for download, but the contact information can be obtained through the legend on the map. Information regarding Endangered Resources and forest lands can be obtained here.

#### **To obtain contact information:**

1. Go to <http://wiatri.net/maps/AtriDemo/index.htm>.
2. Click on “Go to Map”
3. Zoom into map enough for the layer of interest to be shown in list of Layers below the Legend.
4. Click on name of layer in list and metadata will appear.

Within metadata, contact information for obtaining layer can be found.

# 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

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

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

# Imagery

There are many different types of imagery that you may want to use. Which aerial image to download depends on how you are going to use it. The primary difference between NDOP and NAIP images is the time of year. NDOP images strive for “leaf off” images, so land use is visible. NAIP images are taken during the growing season and feature “leaf on” views. This can obscure land use but can make vegetation analysis easier.

The two types of images can be viewed at <http://gdw.apfo.usda.gov/naip/viewer/viewer.htm>.

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*

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 ortho images 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 ‘Get Data’ along toolbar at top.
3. On the left side, click on “Quick County” and type the name of the county of your choice (e.g., Dane) and select Wisconsin. (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 “Digital Ortho Quad County Mosaic by NRCS” within ortho\_imagery. Select “Continue to Step 3”
5. Make sure the format guidelines will work for you. If so, select “Continue to Step 4.”
6. Fill in your contact information and then place order. Choose the method of delivery by selecting ‘FTP Download, CD ROM or DVD’. (It is free to use the FTP site).
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 five 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*

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 2005, 2006 and 2008. 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 'Get Data' along toolbar at top.
3. On the left side, click on "Quick County" and type the name of the county of your choice (e.g., Dane) and select Wisconsin. (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 "2008 National Ag. Imagery Program Mosaic" within ortho\_imagery. Select "Continue to Step 3"
5. Make sure the format guidelines will work for you. If so, select "Continue to Step 4."
6. Fill in your contact information and then place order. Choose the method of delivery by selecting 'FTP Download, CD ROM or DVD'. (It is free to use the FTP site).
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 five 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 Seamless Server is the best place to get data about impervious surfaces, unless you decide to create your own data using ortho images and local knowledge.

## USGS National Map Seamless Server

<http://seamless.usgs.gov/website/seamless/>

### *Example 1: NLCD 2001 Impervious Surface*

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 eight years. Availability of data varies throughout the national (and international) data sets, as does the accompanying metadata. The NLCD 2001 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), and is displayed in bi-colored choropleth format (gray-to-red, respectively). 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. As this image is not as recent as other data available on the USGS site,.

## How to Download the Data

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

Selecting and downloading data:

1. Go to: <http://seamless.usgs.gov/website/seamless>
2. Click on View and Download US Data or View and Download International Data depending on which data you are planning to use.
3. Zoom in by clicking the “zoom” button (magnifying glass) in the toolbox on the left-hand side of the screen, 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. You will be able to orient yourself using roads or by turning on the labels in the right hand menu. County names are under “Boundaries.” City names are under “Places.”
4. In the toolbar on the left-hand side of the screen under download, click on the “define download area by template” button (under downloads, upper level, far right). This allows you to download only the desired part of the entire nation.

5. On the bottom of the screen, choose template “county boundaries” or any other boundary/grid that you may want to use.
6. In order to download data, be careful to make sure the “download” feature in the right-hand side of the screen is activated by clicking on it. One way to be sure is once it is activated, the font becomes bold in a blue background.
7. Under the Land Cover data set, select NLCD 2001 Impervious Surface. Turn off any other layers. The default selection is the 1 inch National Elevation Dataset (1” NED, under the “Elevation” category), which is likely to be the only data other than Impervious Surface to be checked.
8. Click on the map anywhere within the desired county.
9. The Request Summary page will pop up. Click on the download button.
10. Wait for your data to be extracted and returned. If computer blocks download, you may have to click on the error link to see a window allowing you to save the file.
11. Save file.
12. Add the raster data and if prompted whether you’d like create pyramids, say “yes”.

# 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 Seamless Server. Both of these layers are quite dated 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 Seamless Server**

**<http://seamless.usgs.gov/website/seamless/>**

*Example 1: NLCD 2001 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](http://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 1992 and 2001 Landsat images. Data are available for both years through USGS seamless data server. Please note that 1992 and 2001 data do not line up as data were collected and interpreted with slightly different methods.

## **How to Download the Data**

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

Selecting and downloading data:

1. Go to: <http://seamless.usgs.gov/website/seamless>
2. Click on View and Download US Data or View and Download International Data depending on which data you are planning to use.
3. Zoom in by clicking the “zoom” button (magnifying glass) in the toolbox on the left-hand side of the screen, 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. You will be able to

orient yourself using roads or by turning on the labels in the right hand menu. County names are under “Boundaries.” City names are under “Places.”

4. In the toolbar on the left-hand side of the screen under download, click on the “define download area by template” button (under downloads, upper level, far right). This allows you to download only the desired part of the entire nation.
5. On the bottom of the screen, choose template “county boundaries” or any other boundary/grid that you may want to use.
6. In order to download data, be careful to make sure the “download” feature in the right-hand side of the screen is activated by clicking on it. One way to be sure is once it is activated, the font becomes bold in a blue background.
7. Under the Land Cover data set, select “NLCD 2001 Land Cover.” Turn off any other layers. The default selection is the 1 inch National Elevation Dataset (1” NED, under the “Elevation” category), which is likely to be the only data other than Impervious Surface to be checked.
8. Click on the map anywhere within the desired county.
9. The Request Summary page will pop up. Click on the download button.
10. Wait for your data to be extracted and returned. If computer blocks download, you may have to click on the error link to see a window allowing you to save the file.
11. Save file.
12. Add the raster data and if prompted whether you’d like create pyramids, say “yes”.

**Wisconsin Department of Natural Resources (WDNR) FTP Site**

<http://www.dnr.state.wi.us/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.

### **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://www.dnr.state.wi.us/maps/gis/datalandcover.html>
2. In table at bottom of page, download landcover map ([WLC GRID.ZIP](#)).
3. Extract the files
4. 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://www.dnr.state.wi.us/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 2: Original Vegetation Cover*

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](ftp://gomapout.dnr.state.wi.us/geodata/metadata/orig_veg_cover.pdf)).

## **How to Download Data**

### **How to Download Data II**

1. Go to WDNR GIS and Geospatial Data Metadata and Download (<http://www.dnr.state.wi.us/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 the data sources.

## **US National Park Service**

[http://www.nps.gov/gis/data\\_info/park\\_gisdata/wi.htm](http://www.nps.gov/gis/data_info/park_gisdata/wi.htm)

In order to access these datasets that NPS provides, please visit:

[http://www.nps.gov/gis/data\\_info/park\\_gisdata/wi.htm](http://www.nps.gov/gis/data_info/park_gisdata/wi.htm)

## **Ice Age Park and Trail Foundation**

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

The Ice Age Park and Trail 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://www.dnr.state.wi.us/org/land/parks/>

A layer including the 42 trails listed at

[http://dnr.wi.gov/org/land/parks/trails/state\\_trail\\_system\\_facts.pdf](http://dnr.wi.gov/org/land/parks/trails/state_trail_system_facts.pdf) is available by contacting the State Park System directly.

Contact:

Brigit Brown, State Parks System

[Brigit.Brown@Wisconsin.gov](mailto: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 also 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://www.dnr.state.wi.us/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://www.dnr.state.wi.us/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.

## **Environmental Systems Resources Institute (ESRI)**

[http://www.esri.com/data/download/census2000\\_tigerline/](http://www.esri.com/data/download/census2000_tigerline/)

### *Example 2: TIGER County Boundaries*

The United State Census Bureau has developed their own data file format (TIGER files) that allows users to apply the census statistics to GIS applications. These data are also useful for

environmental analysis and map making. The data are easily available through ESRI, the private company that created and maintains the ArcGIS software.

### **About the Data**

Most census data are collected every ten years by the Census Bureau. In the case of county boundaries, not much has changed in 10 years. However, be aware that congressional districts and census-related boundaries do change. Data relating to the natural and the built environment are very limited in the census data and are most often created by digitizing 1:25,000 scale local and regional maps. Census data layers are in a TIGER (Topologically Integrated Geographic Encoding and Referencing) format and available in shapefile or ArcInfo export file formats. Because these file formats are topological, they are ready to be used for spatial analysis once they are downloaded, added to GIS projects, and are provided spatial referencing. The shapefiles for Wisconsin are in geographic coordinate systems and use the North American Datum from 1983.

### **How to Download the Data**

1. Go to ESRI [http://www.esri.com/data/download/census2000\\_tigerline/](http://www.esri.com/data/download/census2000_tigerline/).
2. Select preview and download (if at this point you do not get a page where you can “preview and download” or find that the link is broken, search for “downloadable census data” in the main ESRI site: [www.esri.com](http://www.esri.com). ESRI website is reorganized from time to time, but free census data for download has always been available).
3. Select State “Wisconsin.”
4. Select county of your choice or select by layer.
5. If you choose by “county,” “Available Data Layers” in the following lists refers to boundaries and geographic features for the county. “Available Statewide Layers” refers to data layers that include demographic information collected by the US Census Bureau. Click the box next to the geographic layers, in this case “County 2000.”
6. Download and save the shapefiles.
7. Once you save the files, the shapefiles will be in a “zipped” format. You will need to extract these files. Please notice that you will need to extract the files twice in most cases.
8. Once you add this data layer to your project, you will receive a warning message suggesting that the spatial reference system is unknown. This will mean that you will be able to display the layer but will be unable to do any spatial analysis. This warning can easily be corrected by defining the coordinate systems (found under: ArcToolbox’s Data Management Tools, Projections and Transformations. The specific function you want is

“define,” The TIGER files are in Geographic Coordinates, North American Datum 1983).

# 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://www.dnr.state.wi.us/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\(1991\)](#)).

## **How to Download the Data**

1. Go to WDNR GIS and Geospatial Data Metadata and Download (<http://www.dnr.state.wi.us/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.”
5. Click on “USGS\_WI\_GAP\_Stewardship.ZIP.”
6. Download desired zip file and save it to your computer.
7. 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 12-13).

**WDNR Aquatic and Terrestrial Resources Inventory Interactive Map**  
<http://maps.wiatri.net/AtriDemo/index.htm>

*Example 3: Obtaining Contact Information for Public Lands*

See description and instructions in Habitat and Endangered Resources section (page 13).

# 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://soildataviewer.nrcs.usda.gov/default.aspx>

### *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 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://soildataviewer.nrcs.usda.gov/download52.aspx#Platform>

### **How to Download the Data**

#### Downloading Soil Data

1. Go to: <http://soildatamart.nrcs.usda.gov> Click on the Select State tab
2. Select state and click on Wisconsin
3. Click on the “Select County” tab at the bottom and select Dane County
4. Click on the “Select Survey Area” tab.
5. Click download data.

6. You will be prompted to view the information on your selection before you download. Notice that you have spatial and attribute data as well as a template database that area available to you. At the top of the page, select the “Tabular and spatial data” option, and click on “Download Data.” Note that the “spatial and attribute data” option also encompasses the “template database.”
7. Type your e-mail address and then submit request. NRCS will send you a notice when it is ready for download. Unfortunately, this is not an instantaneous download; your request will be entered in a queue. It may take up to a couple of hours for the data to be ready.
8. Once your files are ready for download, notice that they will be zipped. Extract your files. Make sure that you extract every file including the zipped ones within the extracted file folder.

#### Downloading and installing Soils Data Viewer

1. The soil data viewer can be found at a different NRCS web page:  
<http://soildataviewer.nrcs.usda.gov/>
2. On the right hand side, click on “Download and Install Soil Data Viewer”
3. Click on download soil data viewer 5.2
4. Scroll down to the middle of the page and click “Download Soil Data Viewer for non-USDA CEE Platforms”
5. Download the viewer into the ArcGIS Program Files
6. Notice that this is a Zip file
7. Extract the soil data viewer files to c:\Program Files\ArcGIS (or where ArcGIS is residing). Run the installer by double clicking it.

#### Activating Soils Data Viewer in ArcGIS

1. Start ArcMap
2. Click on View pulldown menu and select Toolbars
3. A new option should be available for you: Soil Data Viewer Tools. Click this to activate it.
4. Notice that a new icon appears. Place it on the top bar.

#### 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: “The database you have selected appears to contain the tables required by Soil Data Viewer, but one or more of these tables are empty. Please import soil data in SSURGO 2.2 or later format before attempting to use this database with Soil Data Viewer. 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 will receive an error message in Access 2007 that the action failed. Stop all macros. Then,

click on “Options” on the bar where it says: “Security Warning: Certain content in the database has been disabled.” Finally, enable the macros you just disabled by selecting “Enable this content.”

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 (copying and pasting will work perfectly).
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 work now.)
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.
11. Explore and have fun!

# 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 Hydrography Dataset** <http://nhd.usgs.gov/data.html>

*Example 1: National Hydrography Dataset at 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 viewable at the Geospatial Data Gateway on page 43, but to download you must go to the NHD website as described below.

### About the Data

The NHD, which is available through The National Map at USGS, is a dataset for the surface water hydrography. The dataset has extensive spatial information, 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. Click on "[Go to NHD Viewer NHD Geodatabase](#)" to select by interaction with a map. The other available search option "Go to Pre-Staged Subregions" requires knowing the 4-digit subregion numbers. You may need to allow pop-ups from the site.
3. In the menu to the left, click on "How to Extract" and follow the instructions. The data will be available at an FTP site which will be emailed to you.

## **Wisconsin Department of Natural Resources – Surface Water Viewer** [http://dnr.wi.gov/org/water/data\\_viewer.htm](http://dnr.wi.gov/org/water/data_viewer.htm)

*Example 2: Streaming from Surface Water Viewer*

Surface Water Data Viewer ([http://dnr.wi.gov/org/water/data\\_viewer.htm](http://dnr.wi.gov/org/water/data_viewer.htm)) is a good source to view and stream hydrology data from the Wisconsin Department of Natural Resources (WiDNR).

### 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.

Surface Water Viewer can be streamed into ArcGIS and some layers can be accessed through the DNR’s ftp site.

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

- Wetlands
- Dam Safety
- Floodplains
- Designated Waters

### **How to Access Data**

1. In ArcView, click on the plus sign to add data (alternatively, click on File|Add Data)
2. When prompted to add data, click on GIS Servers. This option will be available to you towards the bottom of the drop down menu.
3. Click on Add ArcIMS Server
4. Enter the URL of server: <http://maps.dnr.state.wi.us> Press OK
5. DNR’s map server will be added to your list of GIS Servers. Select it and click Add.
6. Select WiDNR\_SurfaceWaterViewer, and click Add.

Click on the + sign next to WiDNR\_SurfaceWaterViewer and explore the numerous datasets included in the Viewer. Please note that most these layers will not display at small scales; if you realize that any layer cannot be turned on / off, try zooming in and then turning on the layer of interest.

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://www.dnr.state.wi.us/maps/gis/metadata.html>

### **ESRI TIGER Files**

[http://www.esri.com/data/download/census2000\\_tigerline/](http://www.esri.com/data/download/census2000_tigerline/)

*Example 3: TIGER Hydrography Layer from ESRI*

Simple hydrology data can be obtained from TIGER files (Topologically Integrated Geographic and Encoding Referencing), public files that are produced by the Census Bureau. The easiest location to download is from ESRI.

### **About Data**

See description in Political Boundaries section (page 24-26)

### **How to Download the Data**

1. Go to ESRI [http://www.esri.com/data/download/census2000\\_tigerline/](http://www.esri.com/data/download/census2000_tigerline/).
2. Select preview and download (if at this point you do not get a page where you can “preview and download” or find that the link is broken, search for “downloadable census data” in the main ESRI site: [www.esri.com](http://www.esri.com). ESRI website is reorganized from time to time, but free census data for download has always been available).
3. Select State “Wisconsin.”
4. Select county of your choice or select by layer.
5. If you choose by “county,” “Available Data Layers” in the following lists refers to boundaries and geographic features for the county. “Available Statewide Layers” refers to data layers that include demographic information collected by the US Census Bureau. Click the box next to the geographic layers, in this case “Hydrography.”
6. Download and save the shapefiles.
7. Once you save the files, the shapefiles will be in a “zipped” format. You will need to extract these files. Please notice that you will need to extract the files twice in most cases.

### **WDNR FTP Site**

<http://www.dnr.state.wi.us/maps/gis/metadata.html>

*Example 4: Islands and Uplands on WDNR*

To locate boundaries and information regarding rivers, shorelines, open water, islands and uplands, and a cartographic base for hydrography within the State of Wisconsin, go to the Department of Natural Resources (WDNR).

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 the Data**

1. Go to WDNR GIS and Geospatial Data Metadata and Download (<http://www.dnr.state.wi.us/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 "hydro\_24K."
5. Click on "islands\_uplands.zip."
6. Download desired zip file and save it to your computer.
7. Extract files and add layer.

### **National Oceanic and Atmospheric Administration**

<http://coastalgeospatial.noaa.gov/welcome.html>

#### *Example 5: 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 Coastal Geospatial Project at <http://coastalgeospatial.noaa.gov/welcome.html>.

### **About the Data**

The "medium-resolution shoreline" file is a detailed vector data set that outlines the Great Lakes and is made available to the public at no cost. The NOAA Coastal Geospatial Data Project website [<http://coastalgeospatial.noaa.gov/shoreline.html>] features an exhaustive review of the metadata for this file under "documentation." The overview lists ten categories of metadata: data caveats; documentation information; spatial references; current release status; data sources used in compilation; processing history; descriptive attribute data; data distribution; and file formats. Traditional metadata conforming to the FGDC guidelines also downloads with each file. Each category of metadata is thoroughly explained, although much of it is in very technical language.

### **How to Download Data**

1. Go to <http://coastalgeospatial.noaa.gov/shoreline.html>.

2. To download, click “download” in the middle of the page. Scroll down to “NOAA’s Medium Resolution Shoreline” and click on “Great Lakes”.
3. Click “save” in the window and save to the desired location.
4. Extract files and add layer to project.

# 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.

## ESRI – TIGER Files

[http://www.esri.com/data/download/census2000\\_tigerline/](http://www.esri.com/data/download/census2000_tigerline/)

*Example 1: TIGER Major Roads Layer from ESRI*

Major roads data can be obtained from TIGER files (Topologically Integrated Geographic and Encoding Referencing), public files that are produced by the Census Bureau. The easiest location to download is from ESRI.

## About Data

See description in Political Boundaries section (page 24-26)

## How to Download the Data

1. Go to ESRI [http://www.esri.com/data/download/census2000\\_tigerline/](http://www.esri.com/data/download/census2000_tigerline/).
2. Select preview and download (if at this point you do not get a page where you can “preview and download” or find that the link is broken, search for “downloadable census data” in the main ESRI site: [www.esri.com](http://www.esri.com). ESRI website is reorganized from time to time, but free census data for download has always been available).
3. Select State “Wisconsin.”
4. Select county of your choice or select by layer.
5. If you choose by “county,” “Available Data Layers” in the following lists refers to boundaries and geographic features for the county. “Available Statewide Layers” refers to data layers that include demographic information collected by the US Census Bureau. Click the box next to the geographic layers, in this case “Line Features - Roads.”
6. Download and save the shapefiles.
7. Once you save the files, the shapefiles will be in a “zipped” format. You will need to extract these files. Please notice that you will need to extract the files twice.

**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 Thyes

[dan.thyes@dot.wi.gov](mailto:dan.thyes@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://www.dnr.state.wi.us/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 (<http://dnr.wi.gov/org/gmu/>). 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 (<http://dnr.wi.gov/org/gmu/>).

## About the Data

The data are represented using an 11 MB polygon shape file 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 2003. 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 the Data

1. Go to WDNR GIS and Geospatial Data Metadata and Download (<http://www.dnr.state.wi.us/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 "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*

### **About the Data Provider**

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/wetlandcodes.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. Open the Wetlands Mapper at <http://www.fws.gov/wetlands/data/Mapper.html>
2. 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. When you have loaded your area and can see wetland data, click on the 'download data' icon at the top of the map (it's the little hard drive with an arrow pointing to it). On the right side of the map you will see an 'Extract Layer' dialog. Make sure you have the desired layer selected and click on OK.
4. The map will prepare a .zip file for you to download with your wetland information.
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.

# PART II – DATA SOURCES

## 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

# 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, and hydrologic units.

## About the Data

The format the data are provided are shape files 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).

(Summarized from: <http://datagateway.nrcs.usda.gov/data.html>)

## 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)

# National Oceanic and Atmospheric Administration Coastal Geospatial Data Project

<http://coastalgeospatial.noaa.gov/welcome.html>

## About the Data Provider

The National Oceanic and Atmospheric Administration host a website with downloadable geospatial data for twenty different sections of the American coastline. The information is collected and disseminated by the Strategic Environmental Assessments (SEA) Division of NOAA's Office of Ocean Resources Conservation and Assessment, in concert with the National Oceanic Service's Office of Special Projects.

## 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. However, the Coastal Geospatial Data Project [<http://coastalgeospatial.noaa.gov/welcome.html>] provides limited links to other sources of information within NOAA.

## 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. Going to the Coastal Geospatial Data Project first (as described above), allows you to see much of the information available.

In terms of the data, the shapefile does not come with a projected coordinate system, but this can easily be corrected.. The data are not very current (1994), but the Great Lakes shoreline probably has not changed much since then. The metadata indicates that when projected to scale, this shapefile should meet the National Map Accuracy standards for accuracy. However, it also states that it is simply a representation of the coast and should not be used for navigation. ([http://coastalgeospatial.noaa.gov/gis\\_files/shoreline/shoreline\\_data\\_dictionary.html](http://coastalgeospatial.noaa.gov/gis_files/shoreline/shoreline_data_dictionary.html))

## Contents

Costal Assessment Framework

Salinity zones

Bathymetry

National marine sanctuaries

Tide stations

Shoreline

Shellfish growing areas

Rivers

Lakes  
Counties  
States  
Zip codes  
Land cover

# 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://soildataviewer.nrcs.usda.gov/download52.aspx#Platform>

## 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/data/NWRdata.htm>), 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.

Additional data are also available for different states at: <http://www.fws.gov/data/statdata/>. On this site, each state has links to different data that may be useful for the analysis of wildlife habitat from other sources, such as USGS or state agencies.

## 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 Seamless Server

<http://seamless.usgs.gov/>

## About the Data Providers

The National Map Seamless Server, as the name suggests, 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 (<http://seamless.usgs.gov/Website/Seamless/about.asp>):

- 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

### Places

- Cities

### Layer Extent

### Transportation

- Airports

- Parkways and scenic rivers

- Roads

### Boundaries

- Urban areas

- Congressional districts

- Countries

- Indian lands

- Territory acquisitions

### Hydrography

- Sea surface temperatures

- Dams

- Alluvial and glacial aquifers

- Hydrologic unit regions

- Principal aquifer

- Arsenic in groundwater

### Orthoimagery

- Orthoimagery

- NAIP (National Agricultural Imagery Program)

### Land Cover

- NLCD (National Land Cover Dataset) 1992

- NLCD 2001 land cover

- NLCD 2001 impervious surface

- National Atlas agriculture census

- National Atlas forest fragmentation causes

- National Atlas vegetation growth

### Elevation

- NED (National Elevation Dataset) shaded relief

- Color shaded relief

# Wisconsin Department of Natural Resources

<http://www.dnr.state.wi.us/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).

Data can be downloaded from the public FTP web site hosted by the DNR. The data were produced by DNR GIS Program in order to develop and maintain the GIS technology, tools, databases, and applications which provide spatial data analysis, and mapping. The data source is produced and used to support DNR policy evaluation, decision-making, and program operations in general.

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.

## 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://www.dnr.state.wi.us/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. This limitation can cause problems when DNR data are overlaid with non-DNR data that use other coordinate systems.

## **Contents**

### **Administrative and Political Boundaries**

- County boundaries
- WiDNR administrative regions
- WiDNR geographic management units
- State outline

### **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
- Land type associations
- Pre-settlement vegetation cover
- Land cover

### **Imagery and Base maps**

#### **Inland Water**

- Rivers and shorelines
- Open water
- Islands and uplands
- DNR watershed boundaries
- DNR water management units

### **Land Descriptions and cadastral**

- A range of PLSS layers

### **Map Indexes**

# Wisconsin Geologic and Natural History Survey

[www.uwex.edu/wgnhs](http://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](http://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.