GIS Data Acquisition

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Soil Data Mart - SSURGO

Background

The Natural Resources Conservation Service – National Cartography and Geospatial Center developed the Soil Survey Geographic Database (SSURGO) to archive and distribute soil data for the United States, its territories, and a few selected countries. The original database had a very limited amount of information that could be accessed, so to increase the functionality of SSURGO the Soil Data Mart web application was released at the end of 2003. The Soil Data Mart provides a way to access data real time by generating the data as a request is made. The mapping scale in SSURGO ranges from 1:12,000 to 1:63,360 and is the most detailed mapping done by the Natural Resources Conservation Service. The SSURGO data is distributed as complete coverage for a soil survey area. The information that can be gathered from the database includes water capacity, soil reaction, electrical conductivity, cropland development, woodland development, recreational development, etc. The SSURGO datasets consist not only of the map data but also contain the attribute data and metadata. The SSURGO map data is presented in various formats including ArcView shapefile, ArcInfo coverage, and ArcInfo Interchange file formats. The various coordinate systems include Geographic, Universal Transverse Mercator, and State Plane. The data can also be imported in Microsoft Access.

Data Collection

1) Go to the website http://soildatamart.nrcs.usda.gov/

2) Click Select a State. Scroll to the desired state and highlight the state by clicking on the state name.

3) You now have the options of Select County or Select Survey Area. By selecting a county, you are able to limit the survey area that is viewed. This consolidates all of the survey areas for the county into one file. If you originally select a survey area, then all of the survey areas for that state will appear. They will not be consolidated by counties, so it will take numerous downloads to get the same information. For our example, we are going to select the state of Texas and the select Brazos County. You can select Brazos County by clicking on the name and clicking Select Survey Area.

4) You are now able to see the consolidated survey areas for Brazos County. This window gives you numerous opens. You can begin to download the data, view the metadata, select a different state, select a different county, or generate reports. The Generate Reports option is going to give you the meaning of all the symbols
and terminology in the Soil Data Mart. It also summarizes the information that can be viewed on the map. This is very helpful when trying to understand the downloaded information.

5) The screen shots below shows the Generate Reports option and an example of a report that can be generated. All of the soil types were selected under the Map Unit Symbol column and the Acreage and Proportionate Extent of Soils by County was selected under the type of report to generate drop down menu. The report generated shows all the different soil types, the amount of acreage they cover in Brazos County, and the percentage of Brazos County they cover. This is only one example of the numerous reports you can generate using the Generate Reports option.
### Acreage and Proportionate Extent of the Soils by County

**Brazos County, Texas**

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<thead>
<tr>
<th>Map symbol</th>
<th>Map unit name</th>
<th>Brazos, TX</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Acres</td>
<td>Acres</td>
</tr>
<tr>
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<tr>
<td>D1H</td>
<td>D1H</td>
<td>15,118</td>
<td>15,118</td>
</tr>
</tbody>
</table>
6) We are now ready to download the data. After highlighting **Brazos County** under the selected survey area option, click **Download Data**. The screen will come up for you to select the information to download.

7) The first option you have to decide on is whether you would like the tabular data, the spatial data, either the tabular and spatial data, or the template database only. For our example, we are going to select the **Tabular and Spatial Data** option.

8) You must then decide in what format you would like the information to be delivered in. As previously stated the available spatial formats include ArcView shapefile, ArcInfo Coverage, and ArcInfo Interchange. For our example, we are going to select the **ArcView shapefile** option.

9) You must then decide the coordinate system you would like to receive the information in. The coordinate system that we are going to use is the **Geographic Coordinate System**, because if any information is outside of the UTM zones or the State plans then the data will be greatly distorted.

10) You must then select the template database you would like to receive when you download the data. We are going to select the first template in the list because it is the most updated version, and there is not a customized template for Texas. To get the description of the individual templates, you can click on the template name and a description will appear below the template selection box.
11) After choosing all of these options, you need to enter your email address and then click on **Submit Request**. You will receive a message box that indicates the number of requests that still must be filled in front of your request, and it tells you that you will receive an email when your request has been completed. This may take a few days, so be patient with **Soil Data Mart**.

12) When your data is ready, you will receive an email that gives you an **ftp** address. Copy the **ftp** address and paste it as an internet address. After pasting the address, hit enter and file download wizard will appear. Click **Save**, scroll to your working folder, and click **Save** again.

13) Extract the data from the zip file that was saved to your working folder. When you have extracted the data, open up a new **ArcMap** document and click the **Add Data** button.

14) Scroll to the spatial folder of the files that were extracted and add all of the shapefiles.
Confirming Projection

1) To check the projection of the data we just added, you can right click on the data layer which in our example is called Layers. Go to Properties/Coordinate System. This will confirm that our layers were downloaded with the Geographic NAD 83.
Helpful Hints for Soil Data Mart

1) Check the Status Map to make sure soil data is available for your area.
More Information

Metadata
To view metadata for a specific layer you are downloading, you must select the View Metadata button download page or the page in which you selected the survey area.

SSURGO Metadata

Status Map

Contacts

Help
Seamless

Background

The Seamless Data Distribution System is the ideal location to retrieve all data from USGS and EROS Data center. This data can be retrieved through the use of the National Map. This website allows free downloads for numerous layers that fall into the categories of places, structures, transportation, boundaries, hydrography, orthoimagery, land cover, and elevation. The National Map can also link you to tutorials for the website, information about the data, and links to information pages. This website tries to provide the user with as much information about an area as possible, and also gives you an international map to download data. Please check to see if the area you are interested in working with has data available before you proceed.

Data Collection

1) Go to the website http://seamless.usgs.gov/

2) Click on either View and Download United States Data or View and Download International Data. For this exercise, we are going to click on View and Download United States Data.

3) Zoom into the area you are interested in. This can be done with the Zoom In key on the left hand side of the screen. You can also use all the keys in the Zoom box to navigate to the area of interest.

4) For this exercise, we are going to zoom into Harris County to retrieve data. You must zoom into your area as much as possible to determine which layers are available for your area. You can view available layers by selecting the Display tab on the right side of the screen and scrolling though to find the layers that you desire. We are going to use 1992 Land Cover Data and National Atlas and NHD Streams for our example.

5) To make sure our area contains these data sets, we need to scroll through to find them and make them visible. 1992 Land Cover Data is under Layer Extent and National Atlas and NHD Streams is under Hydrography.

6) Both of these layers are available for our area, so now we are ready to download data. We begin by selecting the Download tab next to the Display tab on the
right hand side of the screen. The drop down menus are labeled slightly different under the **Download** tab, so it may take you a little time to find the data you would like to download. The 1992 Land Cover Data is under **Land Cover** and the National Atlas and NHD Streams is under **National Atlas**.

7) After these layers have been selected, we are ready to download the data. To begin, we need to locate the download options on the left hand side of the screen. We then need to click on **Define Download Area** which is the first box under the download options. Then, draw a box around your area of interest. As long as the box around the download area stays green you will able to download all the information. If the box turns red, then the area is too large to download all the desired information at one time.

8) After the area of interest has been boxed, and **SDDS Request Summary Page** will appear. This is the page that gives you a list of all the download information you have requested. It also gives you the format of the layer, the projection of the layer, and the size of the layer. The format of the layer and the projection of the layer can be found under the column **Output Parameters**. In our example, we see that the Land Cover layer is a tiff file and it is in the NAD 83 Geographic projection, the NED is in an ArcGRID format and it in the NAD 83 Geographic projection, and the National Atlas Streams is a shapefile in the NAD 83 Geographic projection.
9) To download the data, click the download button next to the layer and it will begin to extract the requested data for you. You may experience prompted security message when this is done which will result in an error in the data transfer. To prevent this prompt, you must adjust your internet security settings or contact your system administrator.

10) After the data has been extracted, the File Download wizard will open for you to save the zip file with the requested layer. Click Save, scroll to your working folder, and click Save again.

11) Scroll to your working folder, and extract all the data for the zip files.

12) Open a new ArcMap document to add your data. Click on the Add Data button, scroll to your working folder, and add all the layers that were just downloaded.
Confirming Projection

1) To check the projection of the data we just added, you can right click on the data layer which in our example is called Layers. Go to Properties/Coordinate System. This will confirm that our layers were downloaded with the Geographic NAD 83.
2) You can also confirm the projections of the individual layers using ArcCatalog. Open ArcCatalog and scroll to the location of the layers. Right click on the layer name and scroll to Properties. The Data Set Properties window will appear so scroll down to Spatial Reference to confirm the projection.
Tools and Functions in the program

Zoom In – This tool allows you to enlarge a portion of the map. You can use it by clicking on the tool and drawing a box around the area of interest, and it will zoom into the center point of that area.

Full Extent – By clicking on this tool, it will allow you to zoom to the original extent of the map.

Zoom Out – This tool allows you to zoom to a larger area by drawing a box around the area you would like to zoom out of. The centerpoint of the area in your box will be the center when you are zooming out.

Zoom to Region or Area – This tool allows you to zoom into a specific Region, State, or Locale by clicking on the tool and selecting what you want to zoom into which is given in drop down boxes below the map.

Zoom to Previous Extent – This tool allows you to zoom to the last extent you were viewing.

Zoom into Coordinate – This tool allows you to zoom into a specific coordinate. You can do this by clicking on the tool, entering the longitude and latitude in decimal degrees, and clicking OK.

Identify – This tool allows you to obtain more information about a point by clicking on the tool and then clicking on the point of interest.

Find – This tool allows you to search for a location by typing in the name of the location. After clicking this tool, an Explorer Prompt appears that allows you to type in the name of the place you are searching for.

Elevation Point Query – This tool allows you to determine the elevation at a certain location. You can do this by clicking on the tool and then clicking on the location of interest. It will return the elevation, latitude, and longitude under the map.

US National Grid Conversion – This tool allows you to determine the US National Grid coordinate, latitude, and longitude. You can do this by clicking on the tool and then clicking on the location of interest. It will return the information below the map.
**Elevation Profile** – This tool allows you to develop and elevation profile between two points on the map. You can do this by clicking on the tool, clicking on the first point of interest, and then clicking on the second point of interest. The profile options appear below the map and you just specify what you want and click Generate Profile for 2 Points.

The description of other tools can be found under the User Instructions (Help) tool.

**Helpful Hints for Seamless**

1) If your computer has difficulty producing the map, check the Web Requirements and set the computer display screen resolution to 1280x1024. Remember thousands of people are using this website at a time because of the high quality, free data that can be collection, so if it is running slow or does not want to come up that could be the reason. You also need to check the system status before attempting to use the map, and this can be found on the original website under the News headline.

2) You need to make sure your security settings for the internet are modified to download the data. After downloading the required data, make sure to restore your security settings to their original settings for your computer’s protection.

**More Information**

**Map Information and Metadata**
You can get to this information by clicking on the Map Information and Metadata tool on the left hand side of the original website.

**Legend**
You can get legend information by clicking on the Legend tool on the left hand side of the original website.

**Background**
http://seamless.usgs.gov/website/seamless/about.asp

**Tutorial**
http://gisdata.usgs.gov/Website/Seamless/tutorial.asp

**Help**
You can get this information by clicking on the User Instructions (Help) tool on the left hand side of the original website.
NHD Viewer

Background

The National Hydrography Dataset provides hydrographic data for the United States. The NHD data was part of a cumulative effort from the United States Environmental Protection Agency and the United States Geological Survey to combine the USGS digital line group hydrography files the EPA Reach file to created updated and flexible data. This effort has combined features including water bodies (lakes and ponds), linear features (streams and rivers), and point features (springs and wells) with reach codes and hydrographic sequencing. The innovative combination of this data provides very comprehensive coverage of hydrographic data for the United States. The scale of NHD data is 1:100,000, but development of higher resolution data is being strongly encouraged to get more accurate data. The higher resolution data will be incorporated by the participation of users on the national, state, and local. Currently, the most common use of NHD data is multiuse hydrographic modeling and water-quality studies.

Data Collection

1) Go to the website nhd.usgs.gov and click on the Data tab on the left-hand side of the screen. (This is the site most desirable website for collecting any hydrography data from across the United States.)

2) There are two ways to obtain the NHD data and we will start with the NHD viewer, so click on the yellow box that says Go to the NHD viewer.

3) You will then be linked to the NHD Geodatabase screen.

4) Zoom into your desired area by clicking on the Zoom In key on the left hand side of the screen.

5) If you are not sure of your region and subregion, you can click on the Identify key on the left hand side of the screen. After clicking on Identify, click on the identification numbers and the name of the data layer will appear.
6) To extract data, start by clicking on the **Polygon Extract** key on the left hand side of the screen.

7) Move to the **Geodatabase** screen and place a box around the area or areas in which you would like to obtain the data. You can only select up to 10 subbasins for medium resolution and 5 for high or local resolution. If too many subbasins are selected, the error message below will appear and you will be forced to reselect your area.

![Error Message]

8) A screen will appear with the areas that you have selected. If you have selected the wrong area or would like to select additional data, go back to the NHD Geodatabase screen and select **Clear** which is located on the left hand side of the screen. This will clear the selection you made so it can be modified or changed.

9) After selecting the desired area or areas of the map, select the appropriate resolution on the **National Geodatabase Extract** screen. (Medium resolution data is available for the entire county, but the best data for your area is desired. You need to make sure you have higher resolution data by going back to the NHD Geodatabase screen, zoom into on your area, and clicking the arrow next to high or local resolution. After zooming in very close into your desired area if no data shows up under the higher resolutions, then no data is available for that area.)

10) Then you need to select the format in which you would like to receive the data. You many select to receive it in a Geodatabase, an ArcInfo Coverage, or a Shapefile. With an ArcInfo Coverage, you can only download the information for one subbasin at a time. With a shapefile, each of the subbasins has a separate
shapefile for each data layer that is being downloaded, so when they are put into GIS they will have to be merged together. The Geodatabase delivers all the data together in one shapefile, so there is no merging required.

11) After entering your email address and clicking **Extract**, you will receive a box telling you that you will be emailed when the data is ready. This may take a few days, so give the database a chance to catch up to the demand for data.

12) When you receive the email telling you the data is ready, click on the link provided in the email and save the zip file to your working folder. After saving it to your working folder, extract the files or Geodatabase.
13) To add the newly extracted data, open a new **ArcMap**, click on the **Add Data** button, scroll to your working folder, locate and select the shapefile, geodatabase, or coverage, and then click **Add**. The screen shot is all of the NHD flowlines for the selected area.

14) The second way to obtain NHD data is to use the existing ftp files. These can be located by going to the website [http://nhd.usgs.gov/data.html](http://nhd.usgs.gov/data.html) and clicking on the link [ftp://nhdftp.usgs.gov/SubRegions/](ftp://nhdftp.usgs.gov/SubRegions/).

15) Then, you can select the type of resolution you would like for you desired location by clicking on High, Local, or Medium. This will give you a folder of zipped files that are cataloged by Hydrologic Units. Hydrologic Units are separated by regions, then subregions, then accounting units, and then cataloging units. You can find the hydrologic units for your area of interest by going to the website [http://water.usgs.gov/GIS/regions.html](http://water.usgs.gov/GIS/regions.html). You can click on the region
where your area of interest is located and it will take you to more detailed code to identify the specific code for your area.

**Determining Projections**

1) To check the projection of the data we just added, you can right click on the data layer which in our example is called **Layers**. Go to **Properties/Coordinate System**. This tells us that our layers were downloaded with the **Geographic NAD 83** projection.
2) You can also confirm the projections of the individual layers using ArcCatalog. Open ArcCatalog and scroll to the location of the geodatabase. Open the geodatabase and locate the feature dataset **Hydrography**. Right click on the feature dataset name and scroll to **Properties**. The **Feature Dataset Properties** window will appear and this will give you the spatial reference under description.
Resolution Differences

Medium resolution

The medium resolution in NHD is based on the 1:100,000 scale Digital Line Graph hydrography data from USGS which is integrated with reach information from the EPA Reach File. The medium resolution data contains reach codes for networked features and isolated lakes as well as flow direction, names, stream level, and centerline representation for water bodies.

High resolution

The high resolution NHD was developed at 1:24,000/1:12,000 scale and adds detail to the 1:100,000 scale NHD data. This data also includes reach codes for networked features and flow direction, names, and centerline representations for water bodies.

Local resolution

The local resolution is a work in progress and is being developed where partners in the private and public sector exist. This is a feature based dataset that interconnects and helps uniquely identify stream segments and reaches that make up the surface water drainage system in this county.

Accurate descriptions of all the NHD data layers are contained in the metadata files for each layer which are located at http://nhdgeo.usgs.gov/help/Layers.html.

Helpful Hints for NHD Viewer

1) When attempting to download data, the Subbasins Hydrologic Unit must be Active. You can confirm this by clicking on the arrow to the left of Hydrologic Unit and making sure the dot is in the circle next to Subbasins. This is the case because all of the other Hydrologic Units are too large and all the information for these areas can not be downloaded at one time.

2) After making other layers visible on the map by clicking the box next to the name of the layer, you must hit Redraw Map to see them. The Redraw Map key is located under all the layer names.

3) Do not be discouraged when you download your data and you do not get anything for Regions, Subregion, Basins, and Watersheds. This is due to the fact that your download area was not larger enough to capture any of those areas. To get data to this extent, it will take numerous downloads.
4) If any questions arise about the **NHD Viewer**, USGS has put together a tutorial that you can get to by clicking on the Help button. The web address is given below.

**More Information**

**Metadata**

**Background for NHD**
http://nhd.usgs.gov/

**Tutorial**
http://nhdgeo.usgs.gov/viewer.htm

**NHD QuickStart**
http://nhd.usgs.gov/NHD_QuickStart_Sept_05.pdf
TNRIS

Background

The establishment of TNRIS occurred in 1968 and was originally called the Texas Water-Oriented Data Bank. It evolved into the Texas Natural Resources Information System in 1972, and its goal was to provide a place to locate all the natural resources data and data collected by other agencies. TNRIS also has a number of different roles including Geographic Names Coordinator for Texas, State Data Center, an Earth Science Information Center, a sponsor of the Texas GIS Forum and Training Conference, and a sponsor for numerous other technical workshops. TNRIS supplies data to the government, academia, the private sector, and the public sector. TNRIS is a division of the Texas Water Development Board and its main purpose is to maintain a library of digital and paper data and to provide information about that data. TNRIS is organized in four sections which include Information Services, the Research and Data Center, the Texas Strategic Mapping Program, and the Texas/Mexico Borderlands Information Center. The Information Services group is responsible for acquisition, storing, and distributing the digital geospatial information. The geospatial data that they distribute is distributed over the internet or by CD-ROM. The Research and Distribution Center is responsible for distributing current maps and data and it also provides access to historical information. The Texas Strategic Mapping Program is responsible for the cost-sharing program for the development of digital geographic data layers in partnership with the public and private sector. The Texas/Mexico Borderlands Data and Information Center is a referral center for information regarding both side of the Texas/Mexico border. All of these functions are vital in the maintenance of accurate data for Texas.

Data Collection

1) Go to the website http://www.tnris.state.tx.us/Digital.htm

2) The TNRIS website has numerous types of data available for every county in Texas. Under Type in County Name, type Brazos and click Submit. You will then be redirected to the Data Search Page, and you will be able to view 18 different DEM files for Brazos County, 19 different DRG files, a Brazos TxDOT file in three formats (DWG, EOO, and DGN), a hillshades file, and a NED file. The DWG version of the Brazos TxDOT file can be viewed in Microstation, the e00 version can be imported into ArcGIS, and DGN version can be viewed in Solid Works.

3) Start the download process by clicking on the e00 link for the Brazos TxDOT file and downloading the zip file to your working folder.
4) Unzip the file and open a new ArcMap document. The file you have unzipped contained a feature class with numerous layers.

5) Add the data by clicking on the Add Data button, scrolling to your working folder, opening up the urban feature class, highlighting all the layers and then clicking add.

![Image of ArcMap interface]

**Determining Projections**

1) To check the projection of the data we just added, you can right click on the data layer which in our example is called Layers. Go to Properties/Coordinate System. This tells us that our layers were downloaded with the Geographic NAD 83 projection.
2) You can also confirm the projections of the individual layers using ArcCatalog. Open ArcCatalog and scroll to the location of the layers. Right click on the the coverage name which is *urban* and scroll to *Properties*. The Coverage Properties window will appear so click on the *Projection* tab and you will see the spatial reference.
**Other Methods for Locating Data**

1) When you went to the website given in the first part, there were many different ways to search for the data you desired. You could click on the Texas map to get to a county, insert a Quad name, or type in the degree by Latitude-Longitude. Quads are formed by breaking Texas up into squares. These quads can be viewed by clicking on USGS Quad Sheet Indices. After clicking on the desired quad, you can locate the area of that quad that you would like to obtain data for, go back to the original website and type in the quad name. (Both of these screens are shown below) It will not link you directly to the downloading of shapefiles from the quad sheet. These areas are smaller areas than the counties and most of the time you will have to download numerous shapefiles for one quad.

2) The degree block number can also be used to find the desired area. This is done by doing Latitude-Longitude. For example, Houston would be degree block 2994 because of its latitude and longitude coordinates.
**Data Types Available on TNRIS website**

**DOQQ**

*Digital orthophoto quarter quadrangle* or **DOQQ** is a mapping product that has the ability to combine the details of an aerial photo with the geometric qualities of a map. They are formed from scanned aerial photos that have been enhanced to remove the effects of the camera, and calculations of quantities like area can be done on them just as easily as any other GIS data. **DOQQs** are primarily designed, though, to use as basemaps under other data. The **DOQQs** have numerous formats which include black and white, natural color, and color infrared images. **DOQQs** are available on the **TNRIS** website in 1 meter statewide and 2.5 meters for two-thirds of the state.

**TxDOT Urban Files**

The **TxDOT Urban** files are files containing county-wide transportation data that also include geographic names and water features. They can be downloaded as a DGN, E00, or and DWG.
DEM

*Digital Elevation Models* are a USGS digital data product that shows topographic relief. The DEM data available on [TNRIS](http://www.tnris.state.tx.us) is in a 30 meter resolution.

DRG

*Digital Raster Graphics* are geo-referenced tiff files and are available in collared and seamless. Collared includes map border and legends while seamless can be tied together for a continuous view. These files are also very useful as a background layer, but they can also merge with DEMs to produce a hybrid digital file.

Hypsography data

*Hypsography* data can only be downloaded by quad at the [TNRIS](http://www.tnris.state.tx.us) website. This data gives you contour elevation data.

Hillshades

*Hillshades* are raster data of large elevation that completely cover a 64 quad block.

NED

*National Elevation Dataset* is an elevation model that covers a 64 quad area, and has a 30 meter resolution. These data is very large so it requires a very fast internet connection to download.

More Information

**Metadata**
http://www.tnris.state.tx.us/metadata.htm

**Information Services**
http://www.tnris.state.tx.us/informat.htm

**Help and Tutorials**
http://www.tnris.state.tx.us/datadeliverytemplateHelp/WebHelp/welcome.htm
GLO

Background

The General Land Office of Texas began using Geographic Information Systems in 1988 for land surveys and redistricting. Their GIS capabilities have greatly expanded since that time and now include in addition to the original capabilities lease sales, oil spill response, management of coastal resources and much more. The General Land Office website has about 100 layers of GIS data, and this number continues to grow with the increased use of GIS. The five major areas GIS is primarily used include asset inspection, energy resources, oil spill response, surveying, and coastal resources. In asset inspection, GIS is used for the management of non-mineral leases by creating maps of the lease locations. The state keeps up with all the lease contracts not only to make sure the land is being used for an authorized purpose but also as support for pipeline, transmission lines, docks, piers, shoreline protection, and dredging activities. In energy resources, GIS is used to keep track of quarterly lease sales, and to map the states mineral ownership boundaries and gas lease location. The lease sales raise money for the Permanent School Fund, so accurate data is very important. In oil spill response, GIS is used to report and map oil spill locations, predict spill movement, and to predict areas that will be impacted by a spill. This GIS development has been fundamental for the production of the Oil Spill Planning and Response Atlases for the Texas Coast. In coastal resources, GIS is used to identify Coastal Natural Resource Areas, to predict the effect of construction on state land, and to help manage the leasing of many state tracts. In surveying, GIS is used to record changes in state land like submerged bay and gulf tracts. All of these functions of GIS are essential to the management of land in Texas, so the development of accurate GIS information is very important.

Data Collection

1) Go to the website http://www.glo.state.tx.us/gisdata/gisdata.html

2) We are going to begin by downloading numerous shapefiles for our desired area. The shapefiles we are going to download include County Boundaries, City Limits, Elevation, Topography, Roads/Highways, and Rainfall.

3) To download a shapefile, locate the desired shapefile’s name and look to the right hand side of the screen. On the right hand side, you will see that the data layer is given as a shapefile and an e00 file link. We are going to use the shapefile link because the e00 file requires importing into ArcGIS.
4) Locate the desired shapefile and click the .shp link. This will lead you to a page where you must accept that the General Land Office holds no responsibility for inaccurate data. Click Accept.

5) A file download window will appear so hit Save and save it to your working folder. Make sure that the folder name you are using to store all the data has no blanks in the title because this may result in an error when trying to bring the file up in GIS.

6) Save all of the zip files and then open the working folder you are in.

7) The first file we will work with is counties. Extract the file to the working folder.

8) To add the newly extracted data, open a new ArcMap, click on the Add Data button, scroll to your working folder, locate and select the shapefile, and then click Add. This will add all of the county data from the GLO website.

9) After downloading the zip files for City Limits, Elevation, Roads/Highways, and Rainfall from the GLO website, repeat steps 7 and 8 from part one with each zip file. The Topography is slightly different and will be discussed in the following steps. The figure below shows all of the added shapefiles excluding Topography.
10) The topography file must be unzipped and extracted to the working folder.

11) After the topography file is extracted, you will have an e00 file in your working folder. To import this into ArcMap, go to Programs/Courseware/ESRI/ArcGIS 3.x/Import71.

12) An Import71 Utility Wizard will appear. In the Export Filename box click browse and select the location of your e00 file and in the Output Data Source box locate your working folder and name the output folder topo.
13) Click **OK**. The topographic map consists of raster data which differs from all the shapefiles.

**Determining Projections**

1) To check the projection of the data we just added, you can right click on the data layer which in our example is called **Layers**. Go to **Properties/Coordinate System**. This tells us that our layers were downloaded with the **Geographic NAD 1927** projection.
More Information

Metadata

1) The Metadata information will give you more background about the file you just downloaded and about the attributes in that file. The metadata information for each shapefile is located by clicking on the blue “i” next to the .shp and .e00 links. The metadata file contains identification information, data quality information, spatial data organization information, spatial reference information, entity and attribute information, distribution information, and metadata reference information.

2) To find out more information about the attributes, you need to click on the Entity and Attribute Information link. This will lead you to the attribute description. Some of the attribute descriptions are missing for various shapefiles, and GLO has been contacted about a reference guide for those attributes.

Background for GLO and GIS
http://www.glo.state.tx.us/gisdata/about.html

GIS Contacts and Responsibilities at GLO
http://www.glo.state.tx.us/gisdata/contacts.html
National Atlas Data

Background

The National Atlas Raw Data site contains huge amounts of data that can be imported and used in GIS. The type of data it contains includes agriculture, biology, boundaries, climate, environment, geology, history, people, transportation, and water data. The transportation data includes things like airports, roads, railroads, and Amtrak stations. The water data includes things like aquifers, dams, hydrologic units, streams, water bodies, and water use. The data located on this site can be downloaded at no cost and is the most updated version of the data that exists.

Data Collection

1) Go to the website
   http://www.nationalatlas.gov/atlasftp.html?openChapters=chpwater%2Chptrans%2ChpHist#chptrans

2) Scroll to the category that you are interested in getting information for and click
   the arrow on the left-hand side of the name.
3) Each category has numerous data sets under it, and each data set can be downloaded in as many as four different formats. The format that we are going to use for the GIS data is the **shapefile format** because it is easily understood and incorporated into ArcGIS.
4) To download the desired data set, scroll down to the data set and locate the link under **Shapefile**. (For this example we will use the **Streams and Waterbodies** data set) Click on the link and download the file to your working folder.

5) Open up your working folder and extract the zipped file.

6) You are now ready to add the shapefiles to GIS. Open up **ArcMap** and click on the **Add Data** button. Scroll to the folder which contain the extracted shapefiles, highlight both shapefiles, and click **Add**. The shapefiles for **Streams and Waterbodies** can now be viewed in GIS.
7) To find out more about what each map layer shows and represents, go back to Raw Data Download site and click on the name Streams and Waterbodies. This will give you some background information about the data you are working with and what it is all about. The metadata information for each layer can be found by clicking the link in the column labeled Current Raw Data Documentation Release.
More information about the Data

The shapefiles and images that are downloaded from the National Atlas website are in geographic projection and the projection characteristics for each map layer can be viewed under the Properties for each layer by clicking on the Source tab. The other types of files available at this site are SDTS-TVP (Topological Vector Profile of the Spatial Data Transfer Standard which is another shapefile format), GeoTiff (georeferenced tagged image file format which is an image file), and DBF (data tables are distributed in this format). As previously stated, these downloads are very difficult to import and use in GIS.

More Information

Background for nationalatlas.gov
http://www.nationalatlas.gov/about.html

Downloading Help
http://www.nationalatlas.gov/help/downloads.html
http://www.nationalatlas.gov/help/downloads_det.html
References


