

GIS I: Organizing Principles Considering Spatial Data Exercise

*** Files needed for exercise: *MN_Tract10_prj_carto.shp*, *MN_Trct_Census2010.dbf*, *Minnesota_env.gdb*, *MN_hospitals.zip*, *cb_2013_us_county_5m.kmz*, and *USDA_FoodEnvironment.xls*.

Goals: The goal of this exercise is to gain a basic understanding of data types commonly used in GIS and work within ArcCatalog and Windows Explorer to view these files.

Skills: After completing this exercise, you will have some familiarity with common data formats used in GIS. You will explore, move, and organize spatial and non-spatial data effectively and safely using ArcCatalog.

Exploring Spatial Data in Windows Explorer

1. Open Windows Explorer by going to the **Start** menu and choosing **My Computer**.
2. Browse to the *Considering_Spatial_Data_Exercise_Data* folder.
3. You should see lots of files, some with the same name but different extensions.

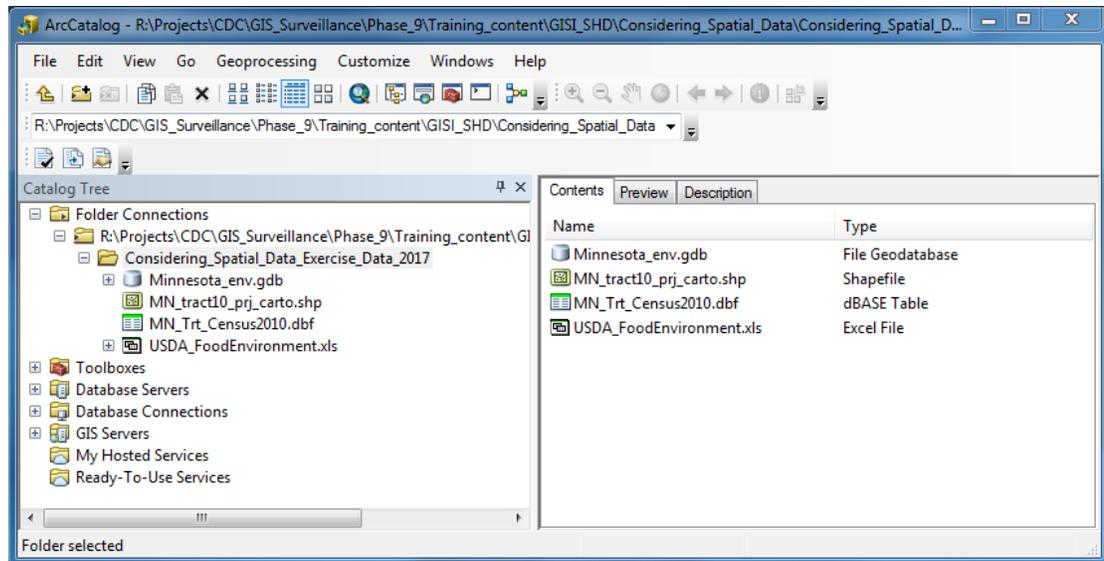
Name	Date modified	Type	Size
 Minnesota_Data	12/13/2016 10:33 ...	File folder	
 Minnesota_env.gdb	12/13/2016 10:59 ...	File folder	
 cb_2013_us_county_5m.kmz	2/19/2015 2:18 PM	KMZ File	2,095 KB
 MN_hospitals	12/11/2016 12:34 ...	Compressed (zipp...	39 KB
 MN_tract10_prj_carto.CPG	12/12/2016 10:22 ...	CPG File	1 KB
 MN_tract10_prj_carto.dbf	12/12/2016 10:22 ...	DBF File	141 KB
 MN_tract10_prj_carto.prj	12/12/2016 10:22 ...	PRJ File	1 KB
 MN_tract10_prj_carto.sbn	12/12/2016 10:22 ...	SBN File	14 KB
 MN_tract10_prj_carto.sbx	12/12/2016 10:22 ...	SBX File	1 KB
 MN_tract10_prj_carto.shp	12/12/2016 10:22 ...	SHP File	11,126 KB
 MN_tract10_prj_carto.shp	12/13/2016 10:28 ...	XML Document	29 KB
 MN_tract10_prj_carto.shx	12/12/2016 10:22 ...	SHX File	11 KB
 MN_Trct_Census2010.CPG	12/9/2016 4:37 PM	CPG File	1 KB
 MN_Trct_Census2010.dbf	12/9/2016 4:37 PM	DBF File	1,447 KB
 MN_Trct_Census2010.dbf	12/13/2016 5:06 PM	XML Document	1 KB
 USDA_FoodEnvironment	4/8/2014 9:35 AM	Microsoft Excel 97...	598 KB

4. This folder contains: a shapefile, a Geodatabase file, a database table, a Microsoft Excel table, a Google KMZ file, and a ZIP file. You are probably used to managing/moving/copying some of these file types in Windows Explorer, but spatial data are different - if you forget just one of the associated files when moving them, it will make the data unusable. Let's look at the same data using ArcCatalog.

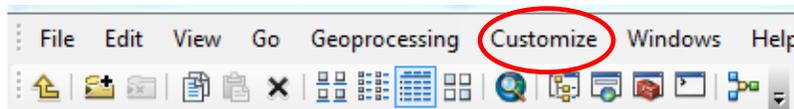
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Exploring Spatial Data in ArcCatalog

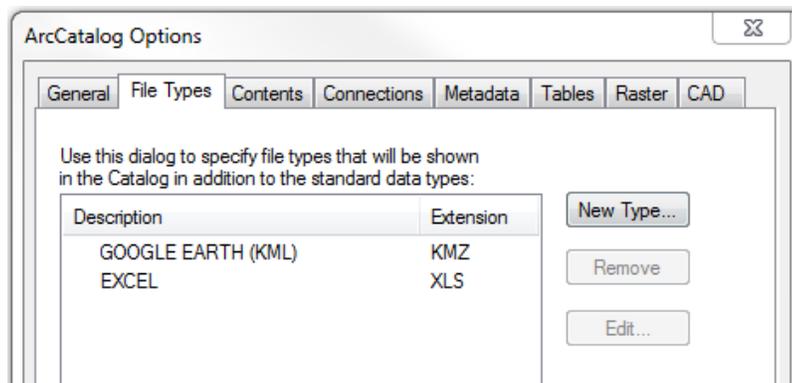
1. Go to the **Start** menu and open **ArcCatalog**.
2. Use the menu on the left side of ArcCatalog to browse to the **Considering_Spatial_Data_Exercise_Data** folder which contains your data. The same data you saw in Windows Explorer now appears as fewer files.



3. Do you see all of these files? You can control the types of files seen in ArcCatalog by adjusting ArcCatalog options. To access these options, select the **Customize** tab at the file level menu and select **ArcCatalog Options**.

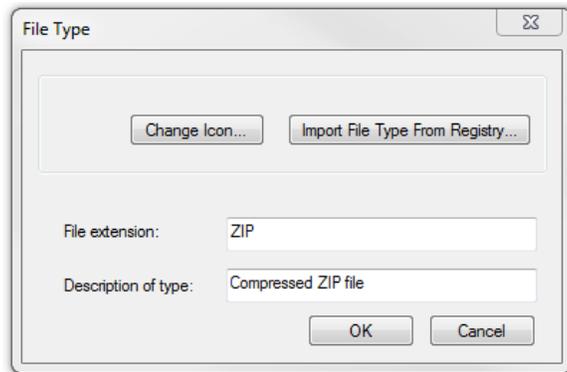


Select the **File Types** tab; here you can add **New Types** of files.



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- Depending on how the machine you are using is configured, you may need to add New Types to see all of the file types in this exercise. Click on the **New Type** button to open the dialogue that will allow you to add file types. Complete the information on a file extension you wish to add, including a brief description, and click **OK**.

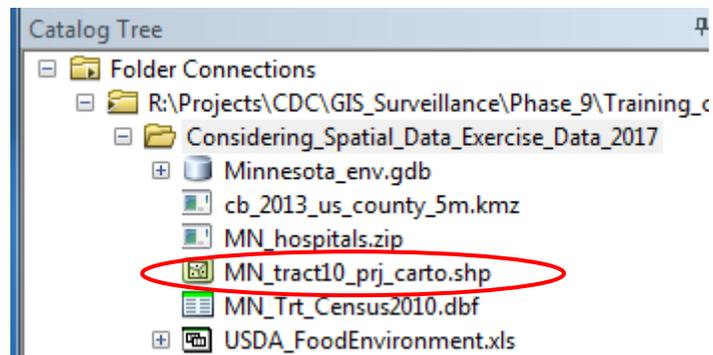


Here we have added the ZIP file extension. If necessary, add New Types for KMLs – Google Map KML and XLS - Microsoft Excel, then check to see that these file types now appear in your folder; you may need to click on the Refresh icon under View for these changes to take effect.

- In ArcCatalog, spatial data such as shapefiles are much easier to manage. You can also move and copy aspatial data such as tables and folders. All of the files in this example can be moved by dragging and dropping or copying and pasting. Performing these actions in ArcCatalog will move ALL of the associated files, whereas attempting move files in Windows Explorer is risky.

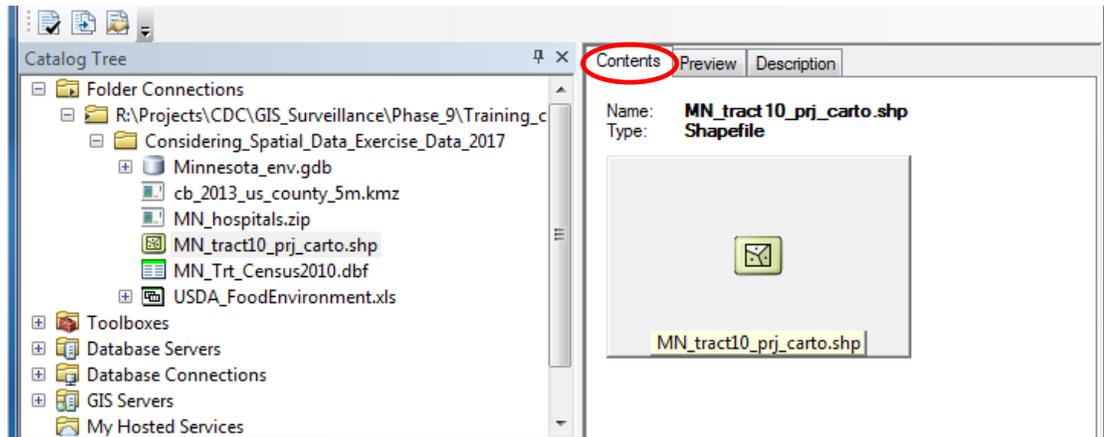
Viewing Data Attributes of a Shapefile

- In the **Catalog Tree** on the left side of ArcCatalog, click once on *MN_tract10_prj_carto.shp*.

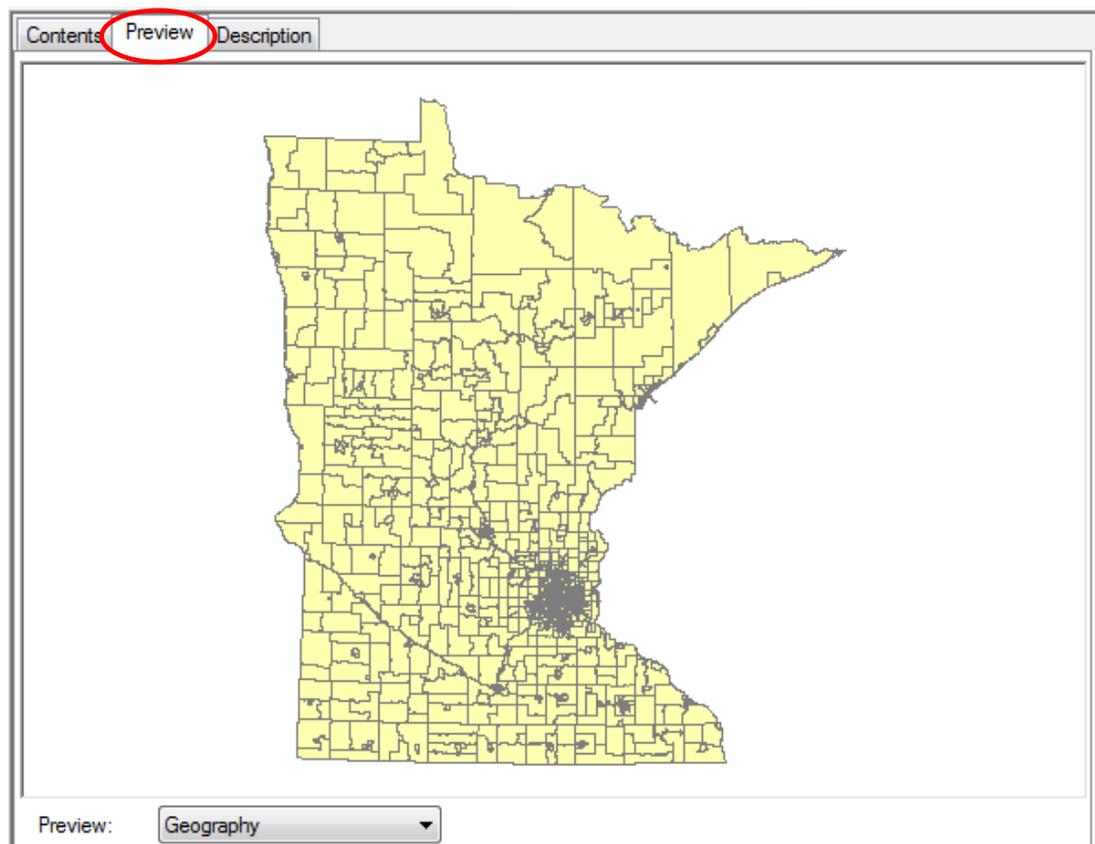


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2. On the right side of ArcCatalog, the **Contents** window should appear. In the Contents window you can view the name of the file and the type of file.



3. Click on the **Preview** tab. Here, you can see what the data will actually look like in ArcMap.



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- You can also view your data attributes by using the preview pull down menu at the bottom of the screen and choosing **Table**.

FID	Shape *	STATEFP10	COUNTYFP10	TRACTCE10	GEOID10	NAME10	NAMESAD10	MTFCC10	FUNCSTAT10	ALAND10	AWATER10	INTPTLAT10
0	Polygon	27	139	080202	27139080202	802.02	Census Tract 802.02	G5020	S	5137595	109563	+44.7552888
1	Polygon	27	139	080204	27139080204	802.04	Census Tract 802.04	G5020	S	4730968	120879	+44.7276090
2	Polygon	27	139	080100	27139080100	801	Census Tract 801	G5020	S	3351673	73045	+44.7791951
3	Polygon	27	139	080302	27139080302	803.02	Census Tract 803.02	G5020	S	30396916	952718	+44.7552922
4	Polygon	27	139	080400	27139080400	804	Census Tract 804	G5020	S	2275838	74005	+44.7959317
5	Polygon	27	139	080500	27139080500	805	Census Tract 805	G5020	S	2830818	115592	+44.7945920
6	Polygon	27	123	042401	27123042401	424.01	Census Tract 424.01	G5020	S	6504664	177815	+45.0271315
7	Polygon	27	123	040302	27123040302	403.02	Census Tract 403.02	G5020	S	3254595	44645	+45.0596609
8	Polygon	27	123	041602	27123041602	416.02	Census Tract 416.02	G5020	S	2625830	335428	+44.9957587
9	Polygon	27	123	030300	27123030300	303	Census Tract 303	G5020	S	2743573	287953	+44.9227640
10	Polygon	27	123	031100	27123031100	311	Census Tract 311	G5020	S	1424680	971	+44.9779708
11	Polygon	27	123	042102	27123042102	421.02	Census Tract 421.02	G5020	S	4947430	1021729	+45.0257743
12	Polygon	27	123	040200	27123040200	402	Census Tract 402	G5020	S	2245636	4741793	+45.0824037
13	Polygon	27	123	041700	27123041700	417	Census Tract 417	G5020	S	3208410	42833	+45.0021786
14	Polygon	27	139	080600	27139080600	806	Census Tract 806	G5020	S	3847484	0	+44.7823157
15	Polygon	27	139	080903	27139080903	809.03	Census Tract 809.03	G5020	S	28332969	4533634	+44.7225340
16	Polygon	27	139	080904	27139080904	809.04	Census Tract 809.04	G5020	S	8991252	573779	+44.7020015
17	Polygon	27	139	080906	27139080906	809.06	Census Tract 809.06	G5020	S	8114300	1372119	+44.7194650
18	Polygon	27	139	080905	27139080905	809.05	Census Tract 809.05	G5020	S	9168818	2725353	+44.7423417
19	Polygon	27	123	041500	27123041500	415	Census Tract 415	G5020	S	4304894	88940	+45.0279816
20	Polygon	27	123	042301	27123042301	423.01	Census Tract 423.01	G5020	S	5243816	554174	+45.0221518
21	Polygon	27	123	041601	27123041601	416.01	Census Tract 416.01	G5020	S	4225398	128936	+45.0225549
22	Polygon	27	123	042302	27123042302	423.02	Census Tract 423.02	G5020	S	4357174	398988	+45.0027981
23	Polygon	27	123	031500	27123031500	315	Census Tract 315	G5020	S	983307	0	+44.9668811
24	Polygon	27	123	032100	27123032100	321	Census Tract 321	G5020	S	983126	0	+44.9636091
25	Polygon	27	123	032200	27123032200	322	Census Tract 322	G5020	S	721717	0	+44.9618615
26	Polygon	27	123	037200	27123037200	372	Census Tract 372	G5020	S	1993688	0	+44.9238964
27	Polygon	27	123	031000	27123031000	310	Census Tract 310	G5020	S	1038316	0	+44.9761631
28	Polygon	27	123	031801	27123031801	318.01	Census Tract 318.01	G5020	S	1424725	0	+44.9894392
29	Polygon	27	123	030900	27123030900	309	Census Tract 309	G5020	S	925888	0	+44.9743609
30	Polygon	27	123	042602	27123042602	426.02	Census Tract 426.02	G5020	S	1677650	306221	+45.0188665

Preview: **Table**

- Finally, you can view metadata about the file by clicking on the **Description** tab. Metadata is information about your data. It can help you determine what your data represents, what the spatial reference information is, and what attributes are contained in the dataset.

Contents Preview **Description**

Print Edit Import

MN_tract10_prj_carto

Shapefile

Thumbnail Not Available

Tags
boundaries, State or equivalent entity, Polygon, Census Tract, Tract

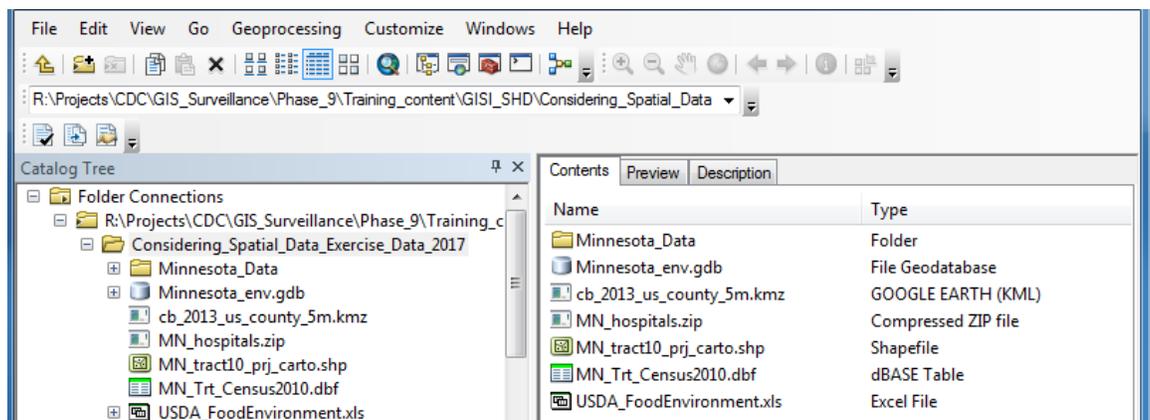
Summary
In order for others to use the information in the Census MAF/TIGER database in a geographic information system (GIS) or for other geographic applications, the Census Bureau releases to the public extracts of the database in the form of TIGER/Line Shapefiles.

Description
The TIGER/Line Files are shapefiles and related database files (.dbf) that are an extract of selected geographic and cartographic information from the U.S. Census Bureau's Master Address File / Topologically Integrated Geographic Encoding and Referencing (MAF/TIGER) Database (MTDB). The MTDB represents a seamless national file with no overlaps or gaps between parts, however, each TIGER/Line File is designed to stand alone as an independent data set, or they can be combined to cover the entire nation. Census tracts are small, relatively permanent statistical subdivisions of a county or equivalent entity, and were defined by local participants as part of the 2010 Census Participant Statistical Areas Program. The Census Bureau delineated the census tracts in situations where no local participant existed or where all the potential participants declined to participate. The primary purpose of census tracts is to provide a stable set of geographic units for the presentation of census data and comparison back to previous decennial censuses. Census tracts generally have a population size between 1,200 and 8,000 people, with an optimum size of 4,000 people. When first delineated, census tracts were designed to be

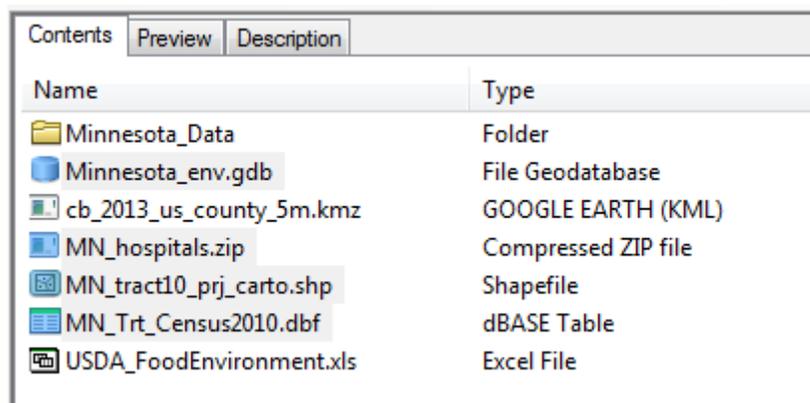
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Creating a New Folder and Moving Data

1. Next, you will add a new folder for Minnesota data and move data into it.
2. Right click on the *Considering_Spatial_Data_Exercise_Data* folder in the Catalog Tree on the left side of ArcCatalog and select **New > Folder**.
3. Name the folder *Minnesota_Data*.
4. The data related to Minnesota are *MN_tract10_prj_carto.shp* (a shapefile), *MN_Trct_Census2010.dbf* (a table), *MN_hospitals.zip* (a ZIP file), and *Minnesota_env.gdb* (a geodatabase).

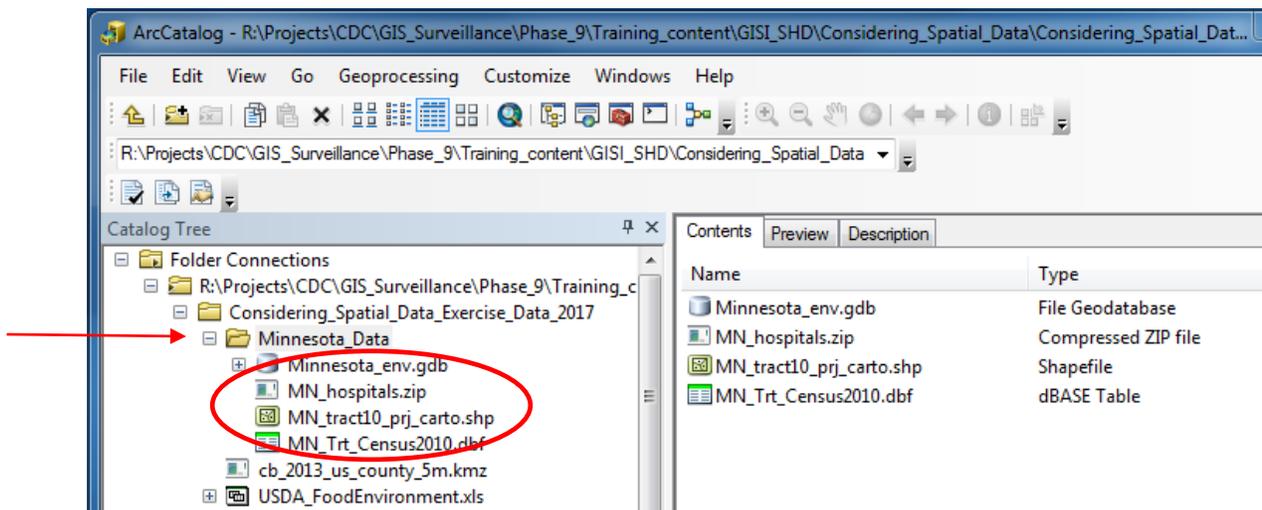


5. In the **Contents** tab, click on *MN_tract10_prj_carto.shp* then hold down the Control key and click on *MN_Trct_Census2010.dbf*, *MN_hospitals.zip*, and *Minnesota_env.gdb* to select all datasets.



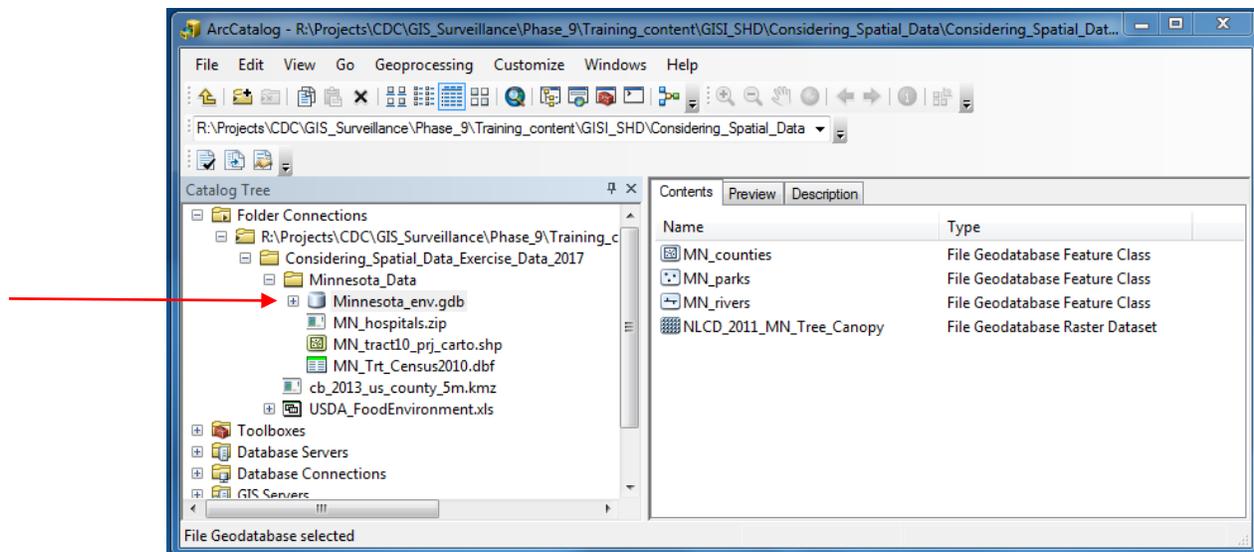
5. Once they are selected you can drag (left mouse click and hold down) them into the folder you created. Or right click on the datasets you want to move and use the copy and paste functions.
6. Your new folder should now contain the Minnesota datasets.

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Exploring a Geodatabase

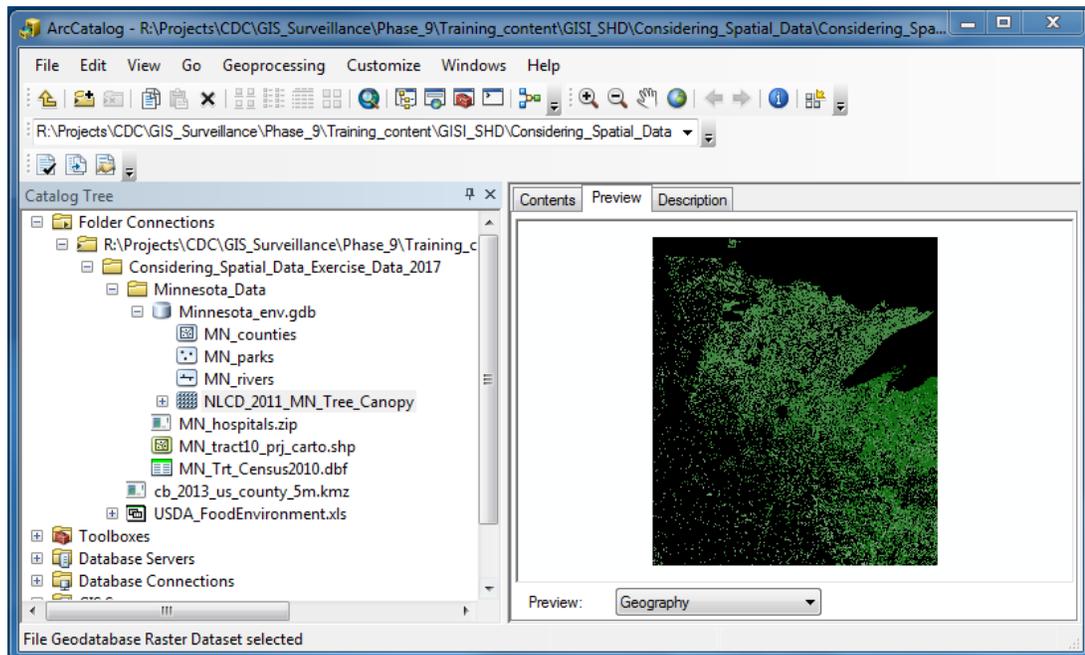
1. View the *Minnesota_env.gdb* file in ArcCatalog by clicking on it in the Catalog Tree. This **File Geodatabase** contains several **feature classes** and a **raster dataset**. Geodatabases are containers that can hold different types of spatial and aspatial data that are related.



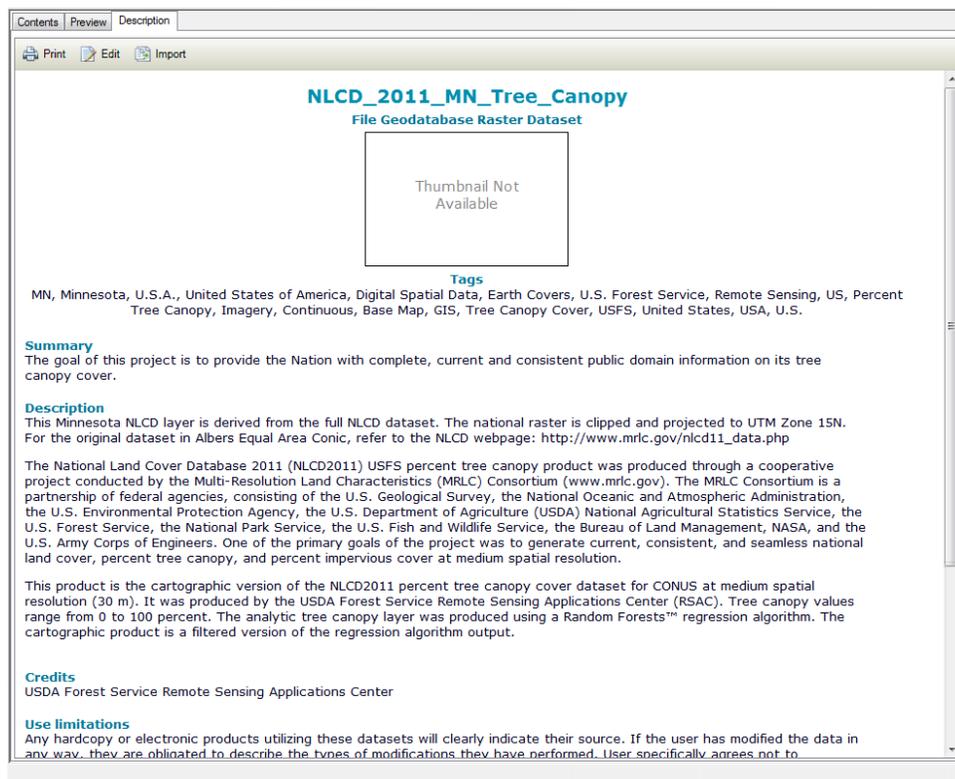
2. The vector data (counties-polygons, parks-points, and rivers-lines) can be viewed just like shapefiles. The geodatabase also contains a raster dataset of tree cover canopy. Preview the *NLCD_2011_MN_Tree_Canopy* file.

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3. View the **Description** tab for this raster file. This file has attached metadata with a good description of the data. Who created this dataset?



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Viewing Aspatial Tables

1. Take a look at the two pieces of aspatial data in the exercise data folder:
MN_TrI_Census2010.dbf and *USDA_FoodEnvironment.xls*.
2. Often these tables are linked to spatial data to display their attributes; you will have practice doing this soon.
3. Both of these table formats are commonly used in ArcGIS and can be previewed in ArcCatalog just like your spatial data.

If you have time... Double click on the *cb2013_us_county_5m.kmz* file in Windows Explorer.

Increasingly, data providers are offering this format (KMZ) as an option. This file was downloaded from the US Census and displays all counties in the USA as polygons in Google Earth.

