

**Considering Spatial Data**

GIS I: Organizing Principles



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 **Overview**

- What is spatial data?
- Spatial data formats
- Organizing spatial data
- Sources of spatial data

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 **Learning Objectives**

- Types of data you might encounter
- Difference between raster and vector data
- Safely and effectively moving data
- Where to look for appropriate and accurate data

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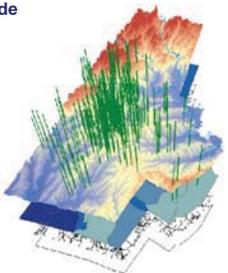
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**CEI** What is Spatial Data?

- Any piece of data with a geographic component
  - Latitude/longitude
  - Street address
  - Zip code
  - County




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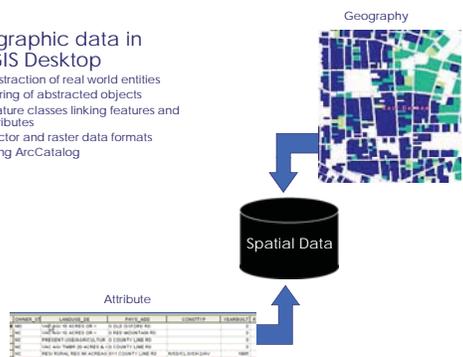
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**CEI** Spatial Data

- Geographic data in ArcGIS Desktop
  - Abstraction of real world entities
  - Storing of abstracted objects
  - Feature classes linking features and attributes
  - Vector and raster data formats
  - Using ArcCatalog



ADDRESS	CITY	COUNTY	STATE	ZIP
1000 N. UNIVERSITY BLVD.	ANN ARBOR	WASHTENAW	MI	48106
1000 N. UNIVERSITY BLVD.	ANN ARBOR	WASHTENAW	MI	48106
1000 N. UNIVERSITY BLVD.	ANN ARBOR	WASHTENAW	MI	48106
1000 N. UNIVERSITY BLVD.	ANN ARBOR	WASHTENAW	MI	48106
1000 N. UNIVERSITY BLVD.	ANN ARBOR	WASHTENAW	MI	48106
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1000 N. UNIVERSITY BLVD.	ANN ARBOR	WASHTENAW	MI	48106

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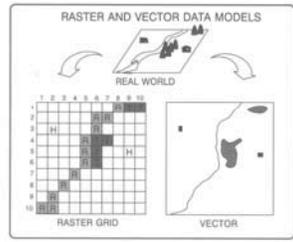
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**CEI** Storing Abstracted Objects

- Two primary methods for digital storage
  - Vector formats discretely identify shape coordinates
  - Raster formats assign square cells to real world entities




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**CEI** **Vector Data Formats**

- Shapefile
- Coverage
- GeoDatabase
- CAD files

Feature class or feature dataset

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**CEI** **Abstraction of Real World Entities**

In vector based spatial data, real world entities are abstracted into three basic shapes

- Points:
  - facility locations
  - patient homes
  - fast food restaurants
- Lines:
  - roads
  - rivers/streams
  - movements
- Polygons:
  - census geographies
  - State/county/city extents
  - lakes/ponds

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**CEI** **Raster Data Formats**

- Image
- Grid

Raster dataset

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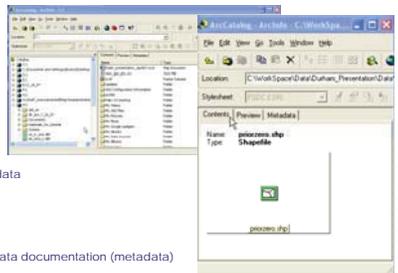
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**Using ArcCatalog**



- Window into your data
- Browse your data
  - Graphical
  - Textual
- Manage your data
- Create and view data documentation (metadata)

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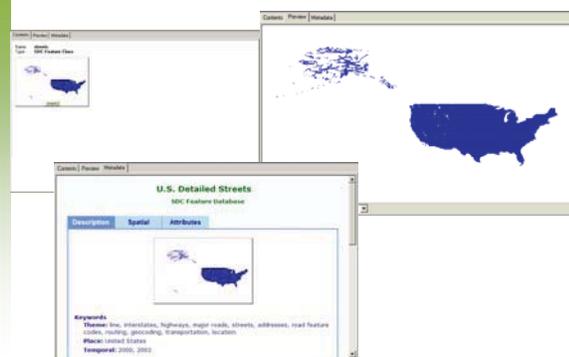
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**Viewing Data: Three Ways**




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**Spatial Data Sources**

- Established spatial datasets
- Established tabular datasets
  - BRFSS - [www.cdc.gov/BRFSS](http://www.cdc.gov/BRFSS)
  - Census - [www.census.gov](http://www.census.gov)
- State/County/city GIS
  - Arkansas – <http://www.gis.state.ar.us/>
  - Massachusetts – <http://www.mass.gov/mgis/>
  - Minnesota - <http://deli.dnr.state.mn.us/>
  - Montana - <http://nris.mt.gov/gis/>
  - North Carolina - <http://www.cgia.state.nc.us/>
  - Utah - <http://agrc.its.state.ut.us/>
- GIS clearinghouses
  - <http://data.geocomm.com/>
  - <http://www.geodata.gov>
  - <http://www-atlas.usgs.gov/>

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## Organizing Principles: An Introduction to GIS

### Exercise 2: Considering Spatial Data

\*\*\* Files needed for exercise: selected\_shed\_co\_esri.shp, salt\_ned10

**Goals:** After completing this exercise, you will be able to move and organize spatial data effectively and safely. You will also be able to use ArcCatalog to explore your data.

**Skills:** After completing this exercise, you will have a basic understanding of how spatial data works in ArcCatalog and Windows Explorer. You will also be able to work with shapefiles.

#### Exploring Spatial Data in Windows Explorer

1. Open Windows Explorer by going to the Start menu and choosing My Computer
2. Browse to your folder
3. You should see two zip files

Name	Size	Type
salt_ned10.zip	72,225 KB	WinZip File
selected_shd_co_esri.zip	8,451 KB	WinZip File

4. Zip files can be extracted by right clicking on them, choosing Winzip and then Extract to here. Unzip the selected\_shd\_co\_esri.zip file first.
5. You should see lots of files with the same name but different extensions

selected_shd_co_esri.dbf	5,603 KB	DBF File
selected_shd_co_esri.prj	1 KB	PRJ File
selected_shd_co_esri.sbn	4 KB	SBN File
selected_shd_co_esri.sbx	1 KB	SBX File
selected_shd_co_esri.shp	10,991 KB	SHP File
selected_shd_co_esri.shp.xml	1,636 KB	XML Document
selected_shd_co_esri.shx	3 KB	SHX File

6. This is one shapefile. We can manage and move this data in Windows Explorer but if we forget just one of these files, it will make the data unusable.
7. Now unzip the salt\_ned10.zip file. This folder contains a raster elevation dataset for Salt Lake County, Utah

info		File Folder
salt_ned10		File Folder
SALT_NED10.aux	5 KB	AUX File
salt_ned10.rrd	15,946 KB	RRD File

8. Again, all of these files and folders make up one raster dataset. Now let's look at the same data using ArcCatalog

## Organizing Principles: An Introduction to GIS

### Exercise 2: Considering Spatial Data

#### Exploring Spatial Data in ArcCatalog

1. Open ArcCatalog
2. Use the menu on the left side of ArcCatalog to browse to your folder
3. Notice that the original zip files are not visible in ArcCatalog. However, the same data now appears as just one file.

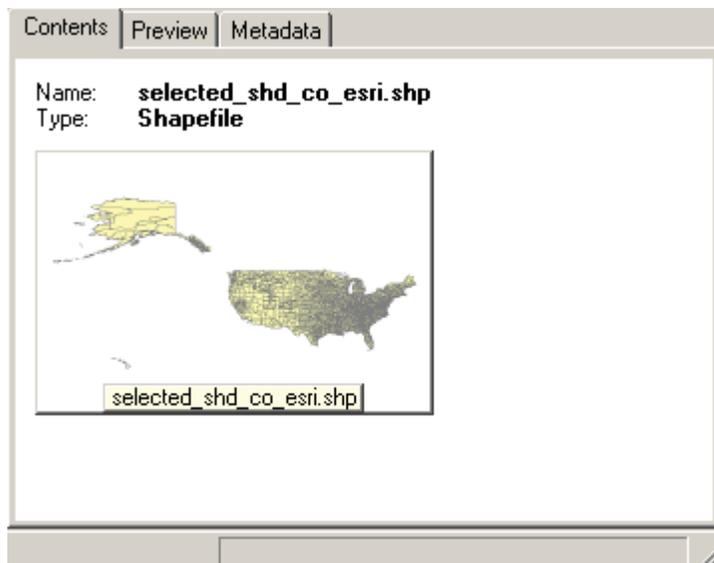
 selected\_shd\_co\_esri.shp

 salt\_ned10

4. This one file is much easier to manage. It can be moved by dragging and dropping or copy and paste. Performing these actions in ArcCatalog will move ALL of the associated files in Windows Explorer
5. You can also make the zip files visible in ArcCatalog. Go to Tools, and then Options. Click on the File Types tabs. Click on New Type and then enter .zip. When you return to ArcCatalog, the zip files are now visible. This is an example of how ArcCatalog is great for exploring spatial data, but not typical computer files types.

#### Viewing data attributes

1. In the table of contents on the left side of ArcCatalog, click once on selected\_shd\_co\_esri.shp
2. On the right side of ArcCatalog, the Contents window should appear. In the Contents window you can view the name of the file, the type of file, and a thumbnail preview of the file.

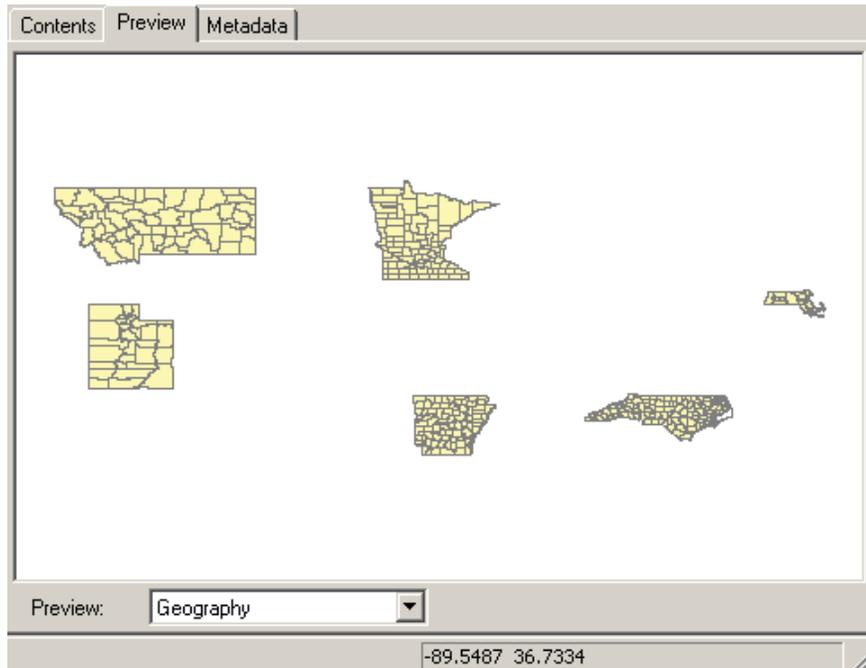


3. Click on the Preview tab. In the Preview tab, you can see what the data will actually look like in ArcMap.

## Organizing Principles: An Introduction to GIS

### Exercise 2: Considering Spatial Data

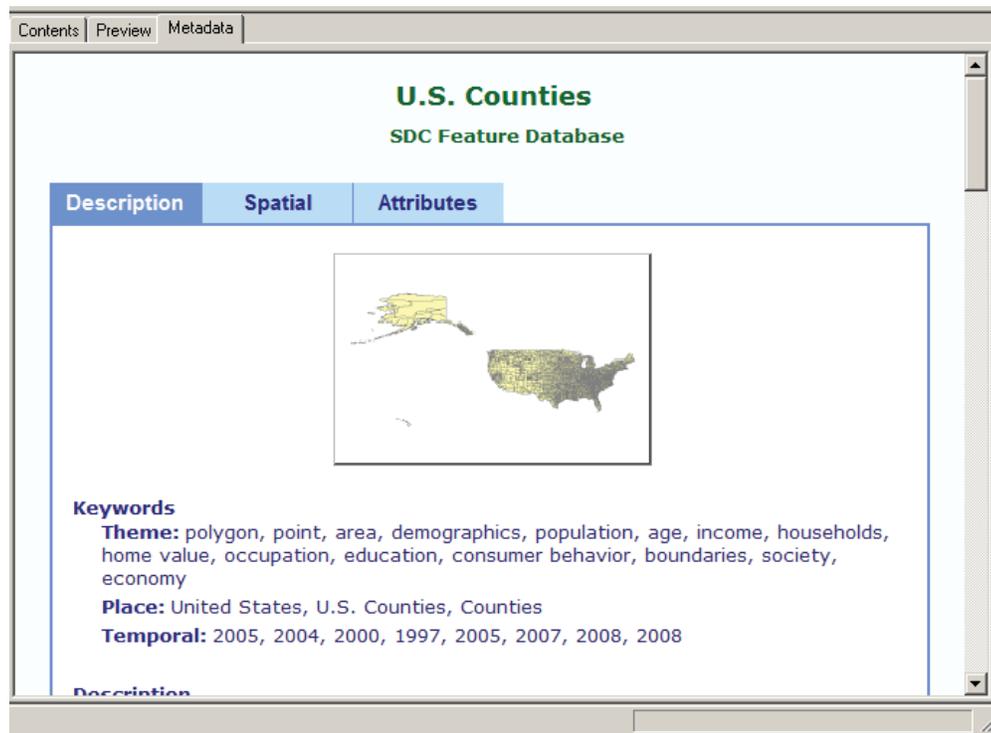
4. You can also view your data attributes by using the preview pull down menu at the bottom of the screen and choosing Table.



5. Finally, you can view the metadata about the file by clicking on the Metadata 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.

## Organizing Principles: An Introduction to GIS

### Exercise 2: Considering Spatial Data



#### If you have time...

Visit one of the various state GIS sites or GIS clearinghouses on the web and download a file that is interesting and relevant to your work. Note what format this file comes in. It may be a zipped shapefile, or it may be in a conversion format that you will need a tool to work with. Open this file in ArcCatalog and view its attributes. Does the file have any metadata? Is it spatially referenced?