

Introduction to GIS

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University of Maryland, College Park

2012

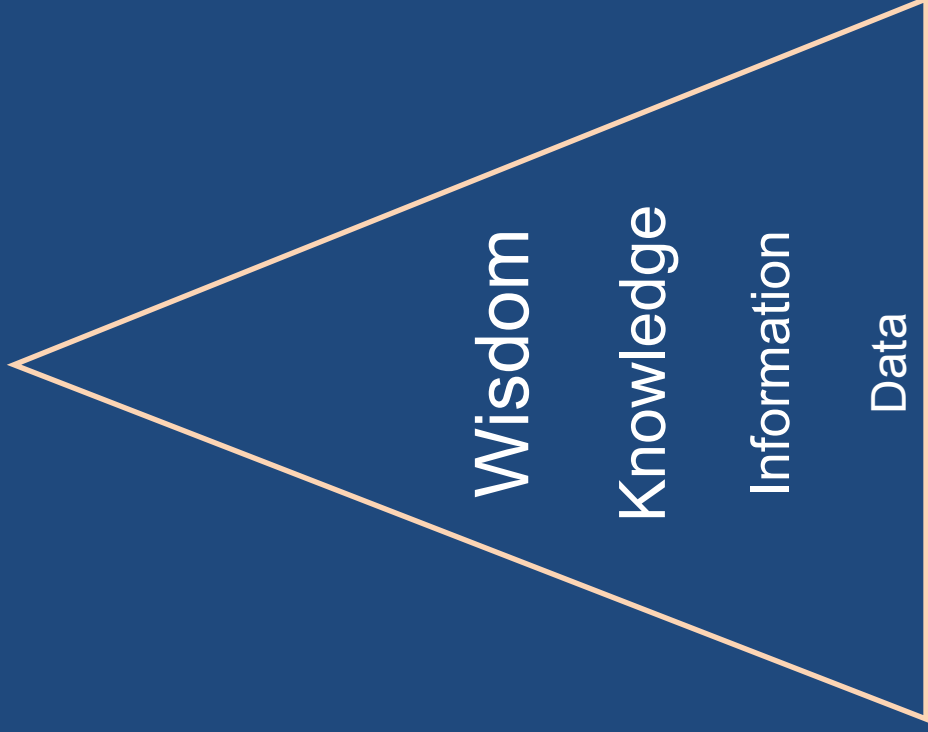
Workshop Outline

1. Introduction – What is GIS?
2. What does GIS do and who uses it?
3. ArcGIS software discussion and demonstration.
4. You use ArcGIS and make a map.
5. Questions and concerns.

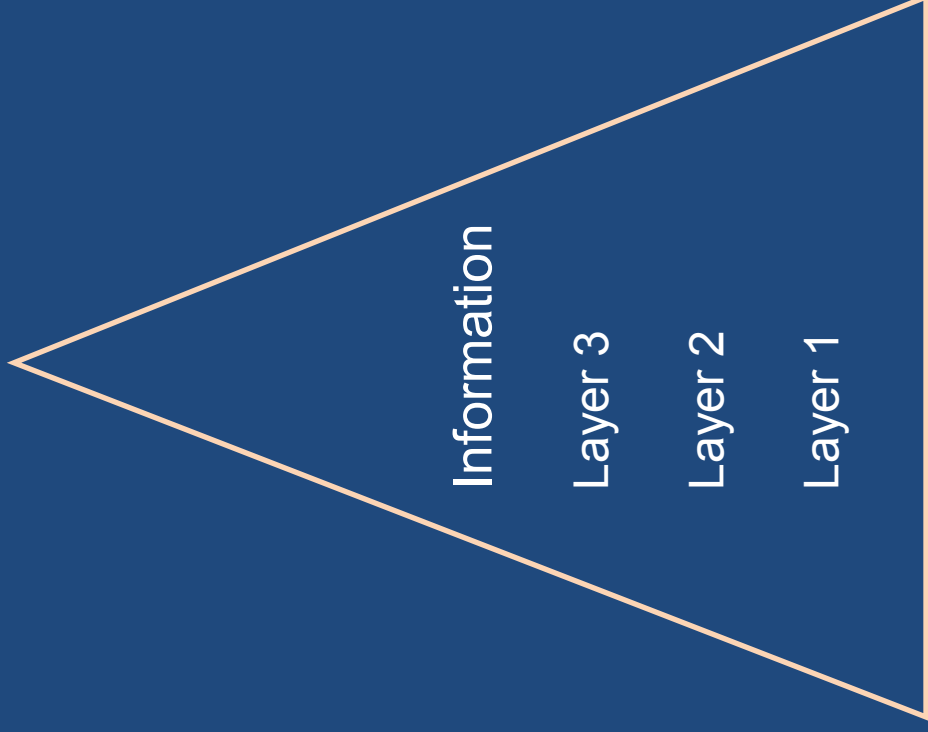
What is GIS?

- Geographic Information System
- “a system for the management, analysis, and display of geographic information”
(*What is ArcGIS*, ESRI Press, 2004)
- Mapmaking software
- A way to visualize information

Wisdom Pyramid



GIS Pyramid



Google Earth - Sort of a GIS (Can add data; projection is imprecise)

The screenshot displays the Google Earth desktop application. At the top, the menu bar includes 'File', 'Edit', 'View', 'Tools', 'Add', and 'Help'. The main window features a search bar with the text 'college park, md' and a search icon. Below the search bar, there are several search results, including 'college park, md' and 'College Park, MD'. A 'Sponsored Links' section is also visible, featuring 'Homes at College Park' from 'Stanford-Square.com'. The 'Layers' panel on the right shows various map layers such as 'Primary Database', 'Geographic Web', 'Roads', '3D Buildings', 'Street View', 'Borders and Labels', 'Traffic', 'Weather', and 'Gallery'. The 'Places' panel on the left shows 'My Places' and 'Add Content'. The main map area shows a satellite view of College Park, MD, with various streets and landmarks labeled, including 'College Park, MD', 'University Park', 'Hyattsville', and 'Edmonston'. The map is overlaid with a yellow grid. The bottom status bar shows the system tray with icons for 'Microsoft PowerPoint', 'Mozilla', and 'Google Earth', along with the system clock showing '12:18 PM'.

DC Atlas - Almost a GIS. (Query, look at layers--but can't add)

DC Atlas - Mozilla Firefox

http://dcatlas.dcgis.dc.gov/dcgis_allservices/viewer.htm?Title=DC Atlas

DC GIS Home Print Data Center Help Feedback

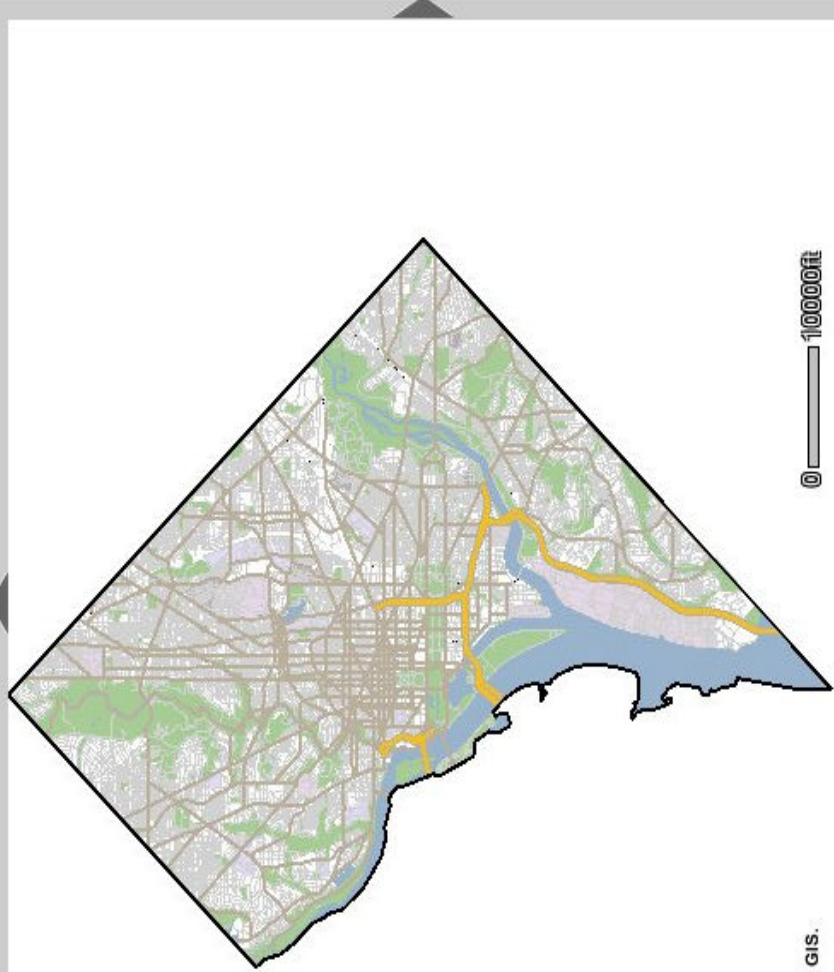
SSL Search: (Example: 2766 N 0001) Go

DC Atlas

All in one

- NAVIGATION**
 - Go to
 - Zoom in
 - Zoom out
 - Back
 - Full map
 - Move map
 - Locator on/off
- IDENTIFY DATA**
 - Ask by point
 - Ask by box
 - Clear select
 - Report by point
 - Report by area
 - Query
 - Ask by shape
- MEASURE**
 - Set units
 - Get coordinates
 - Distance
- REAL PROPERTY TOOLS**
 - Assessment data
 - Sales data
- NOTIFY**
 - Create list
- UTILITIES**
 - Help
 - Reset map

You need to turn off pop-up blocker before using this site!



Map maintained by DC GIS.

Active Tool: Zoom in

Zoom 0 10000ft

Display Options

Layer List Legend Refresh Map

Base Map Air Photo Property

Overlays

- Administrative, Political
- Business and Economic I
- Cultural and Society
- Demographic
- Education
- Elevation
- Environment
- Facility and Structure
- Health
- Historic
- Location
- Planning, Land Use, and
- Property and Land
- Public Safety
- Public Services
- Recreation
- Transportation
- Utility and Communicati
- Aerial Photography and

Refresh Map Auto Refresh

Help:

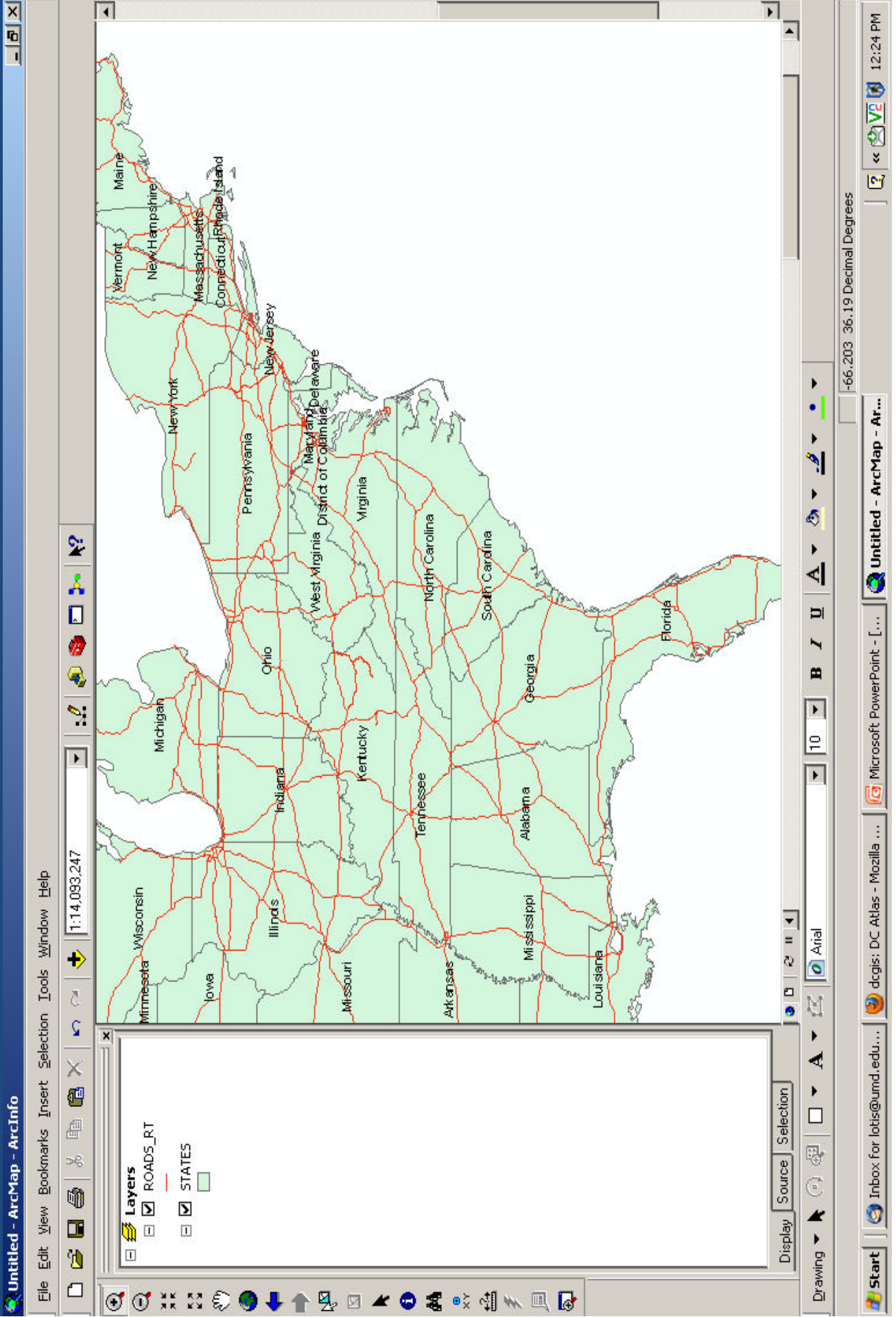
- A closed group, click to open.
- An open group, click to close.
- A hidden group/layer, click to make visible.

Transferring data from dcatlas.dcgis.dc.gov...

Start Inbox for lotis@umd.edu... dcgis: DC Atlas - Mozilla ... DC Atlas - Mozilla Fire... Microsoft PowerPoint - [...]

11:53 AM

ESRI's ArcGIS - the most popular GIS software. (Expensive)



What makes a GIS?

- Add and edit data
- Make queries
- Use various map projections for accuracy
- Work with vector and raster data
- Make map layouts
- Read specific file types (shp, gdb, kml, etc.)
- Store data

Proprietary vs. Open Source

Proprietary

- ESRI ArcGIS
- Cartographica (for Mac)

Open Source/Free

- GRASS
- Quantum GIS
- DIVA-GIS
- GeoDa
- ArcExplorer

GIS (ESRI) on UM Campus

- In McKeldin Library
 - 2 workstations on the 4th floor in computer lab
 - On the computers in instruction labs on 2nd and 6th floors
 - gis@umd.edu
- Other campus computer labs or terminals (access may be limited due to licensing)

GIS Courses at UM

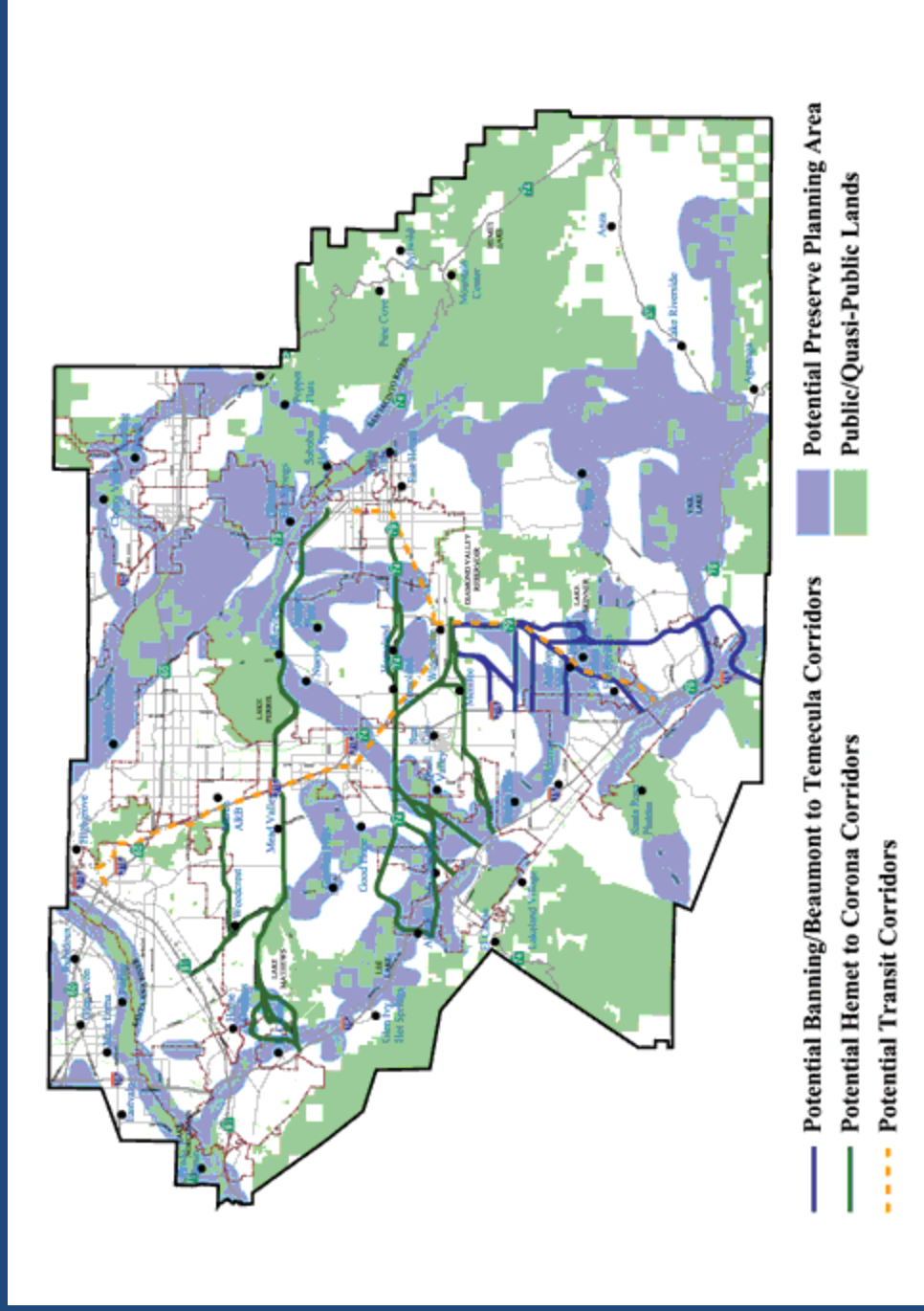
- Geography Department
 - GEOG 170, 306, 372, 373, 376, 472, 473, 475, 476
- Urban Studies
 - URSP 612
- Government & Politics (may be cross-listed)
 - GVPT 729
- Computer Science
 - CMSC 725
- Civil & Environmental Engineering
 - ENCE 200
- Criminology / Criminal Justice
 - CCJS 699
- Landscape Architecture
 - LARC 221, 341

Who Uses GIS?

- Municipalities and urban planners
- Public health professionals
- Federal government
- First responders
- Video game designers
- Cartographers
- Military
- Etc., etc.

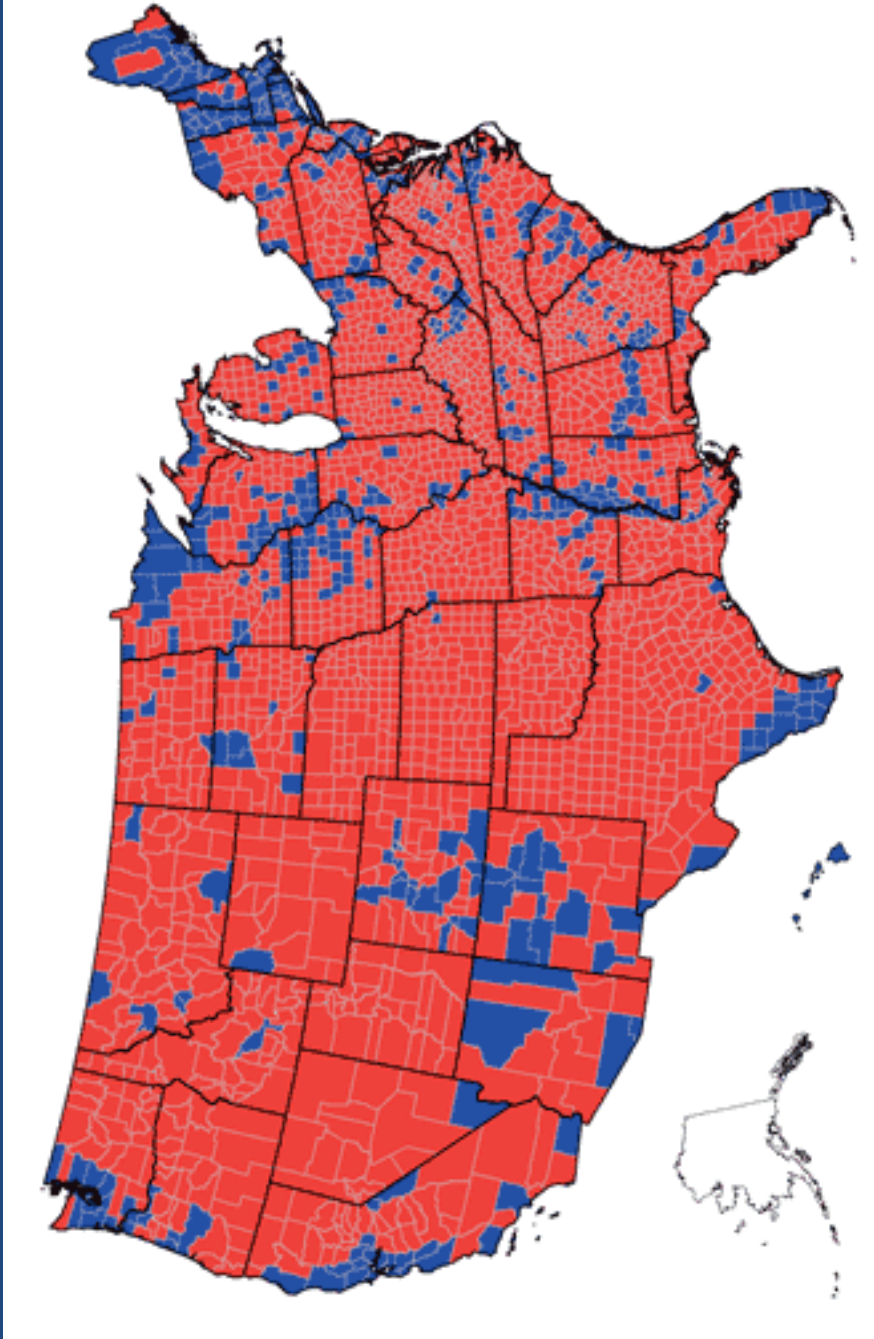
GIS for Urban Planning

Riverside County, CA (from <http://www.fhwa.dot.gov/tcsp/case7.html>)



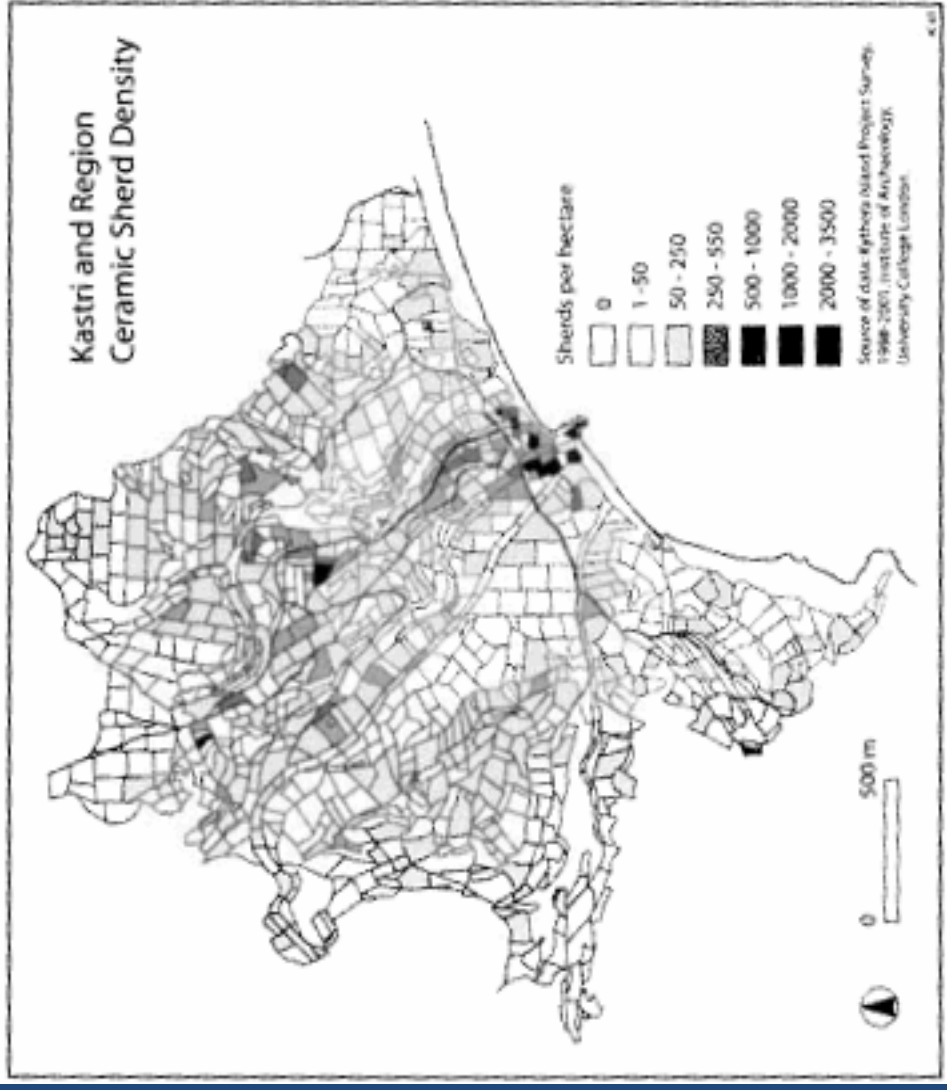
GIS for Politics

2004 election results by county, from USA Today



GIS for archaeology

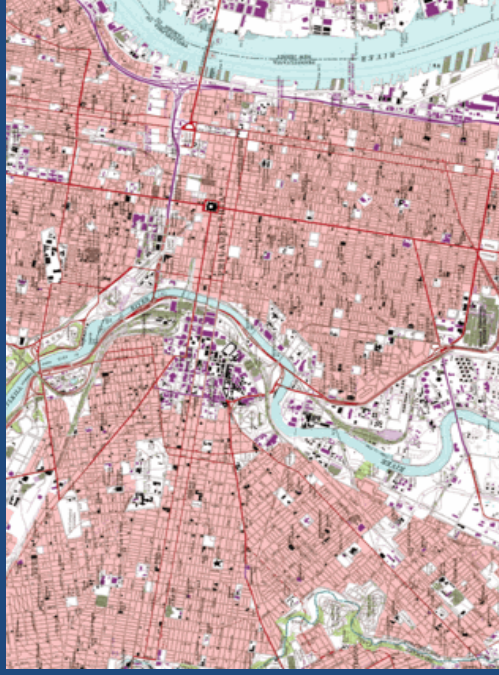
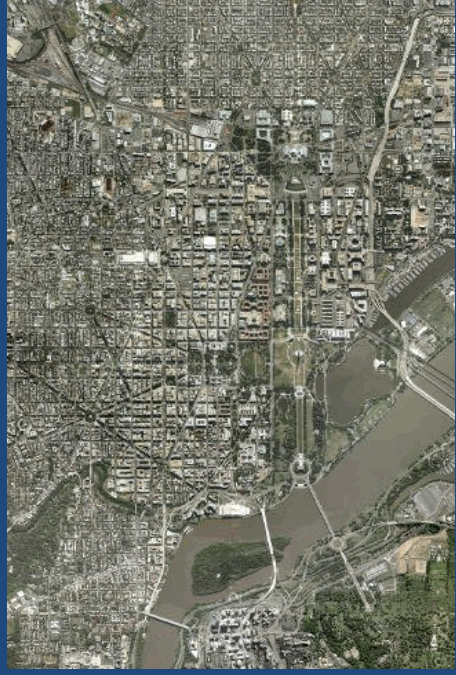
(Image from *Geographical Information Systems in Archaeology* / Conolly and Lake)



Why is GIS so great?

- Fast, powerful, interactive!
 - You can ask it questions – can't do that with paper maps.
 - Analysis and comparisons.
 - Easy layering.
 - Easy projection and changes of projection.
 - Land, water, space, time – works for all of them.

GIS Maps are Versatile...



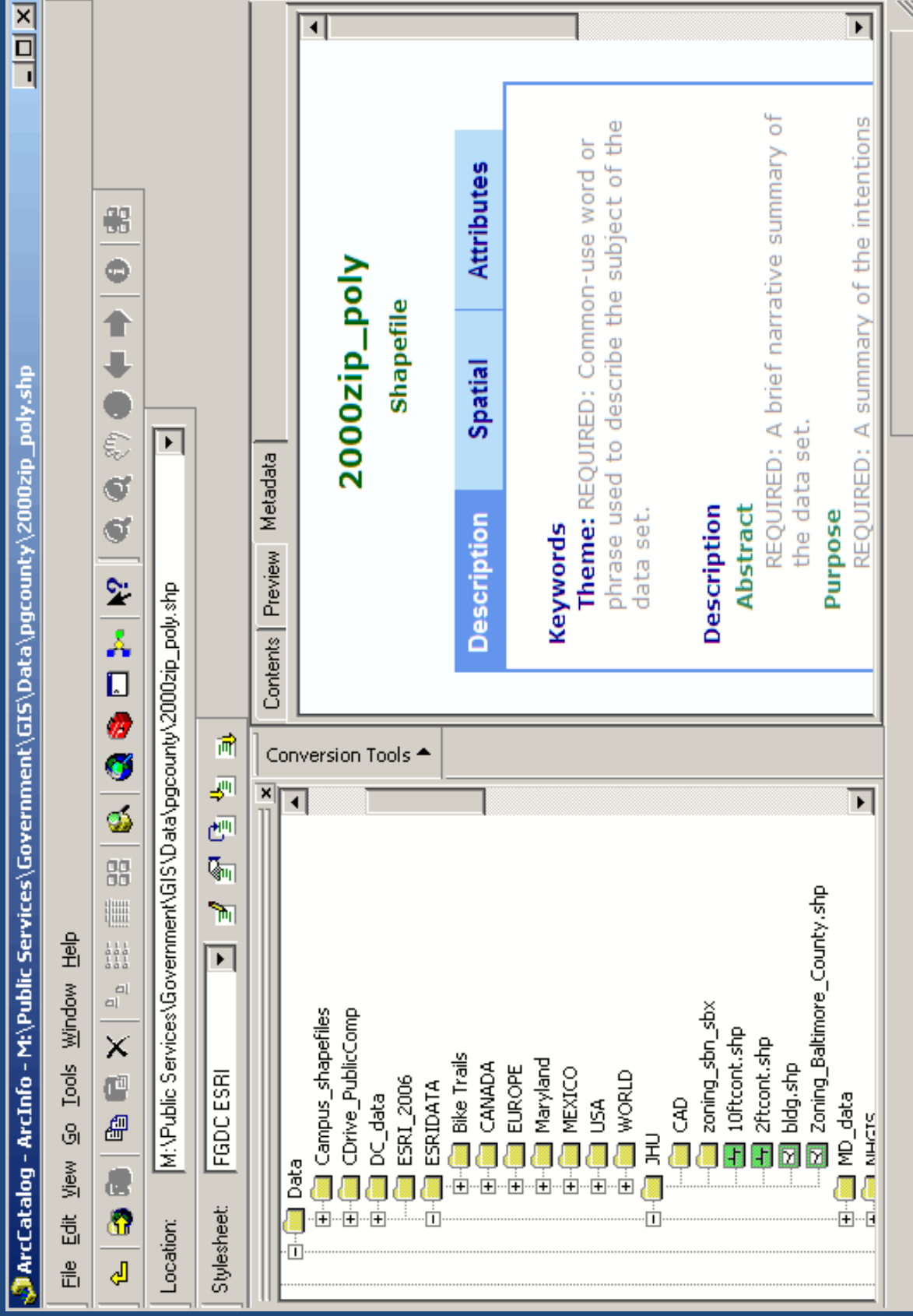
GIS Hazards

- Ugly or misleading maps
- Bad data
 - No metadata
 - No projection information
 - Incomplete fields
- Difficulty finding data

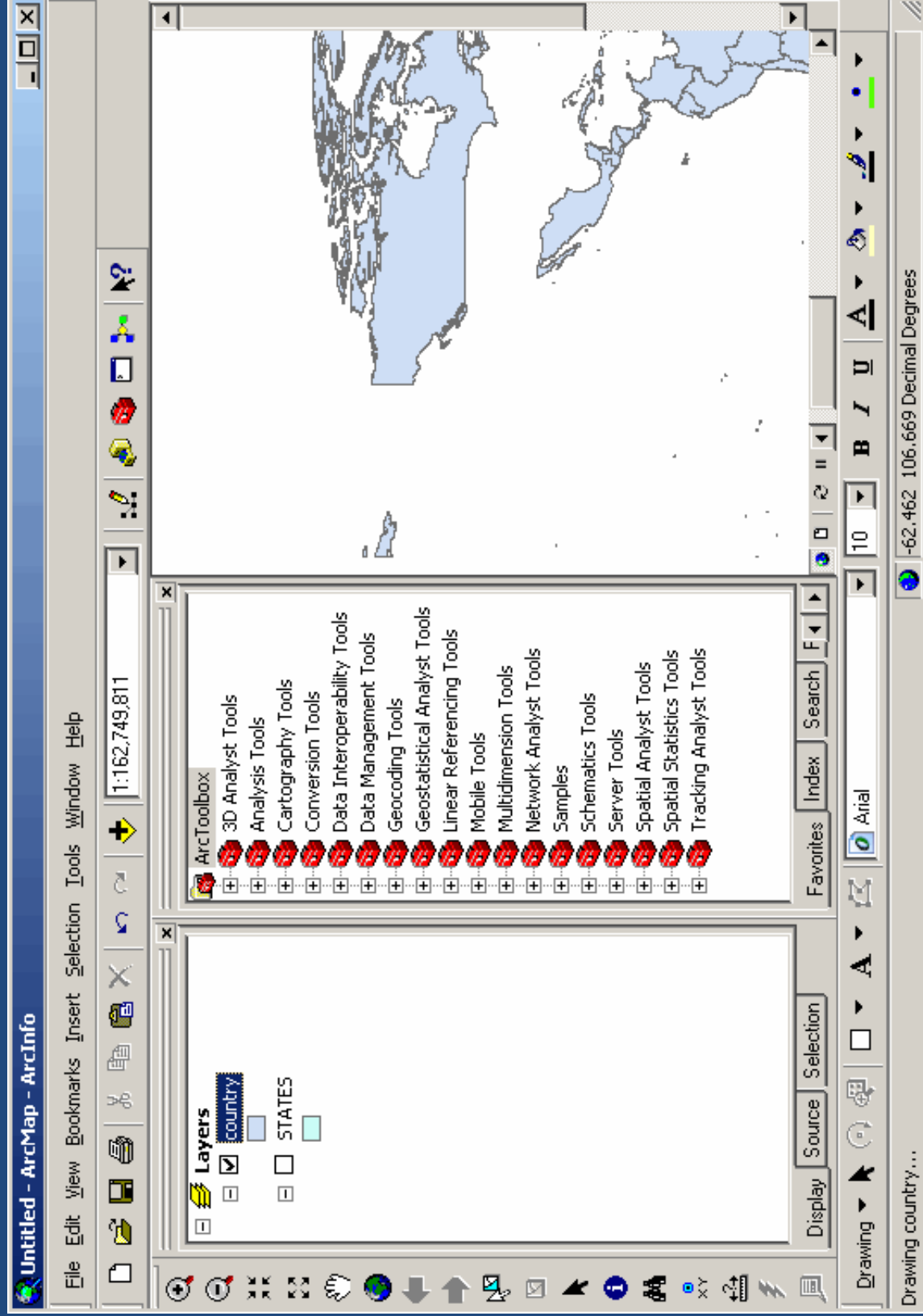
Working with a GIS

- Finding your data.
- Cleaning up and assessing your data.
- Querying and analyzing your data.
- Making your data into useful maps.

ArcCatalog



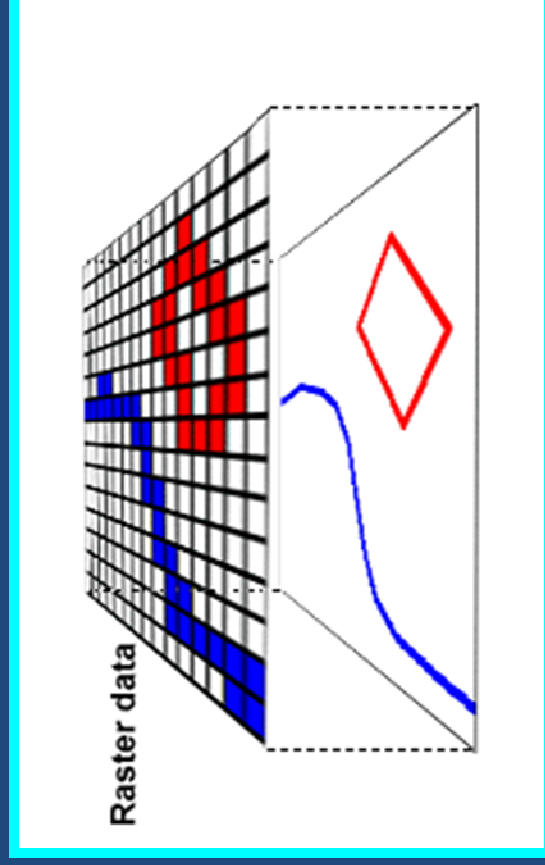
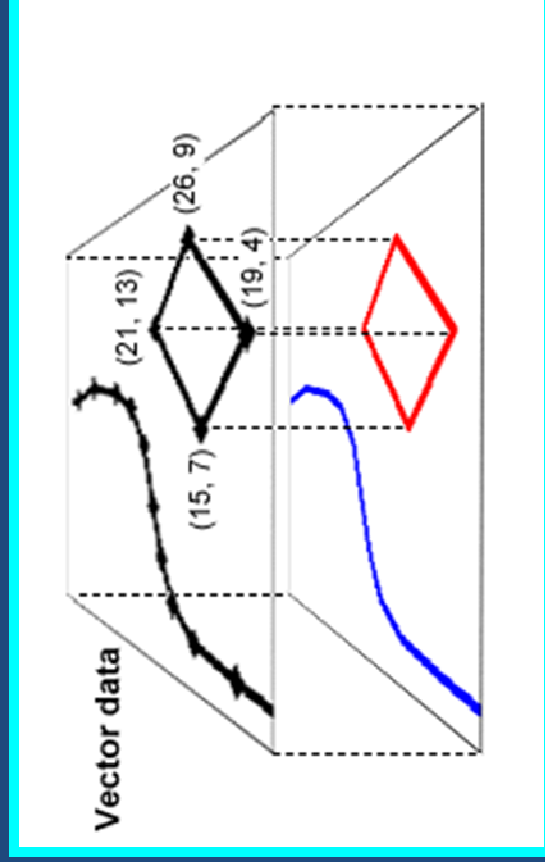
ArcMap and ArcToolbox



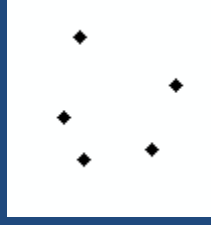
GIS Data

Vector - uses geometric objects (points, lines and polygons) to represent real features on the earth's surface such as light poles, roads and buildings. Ideal for discrete themes with definite boundaries.

Raster - is composed of a continuous grid of cells that represent a portion of the earth's surface. Ideal for continuous themes where there is lots of change.



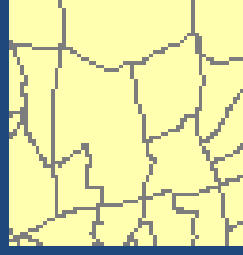
Point



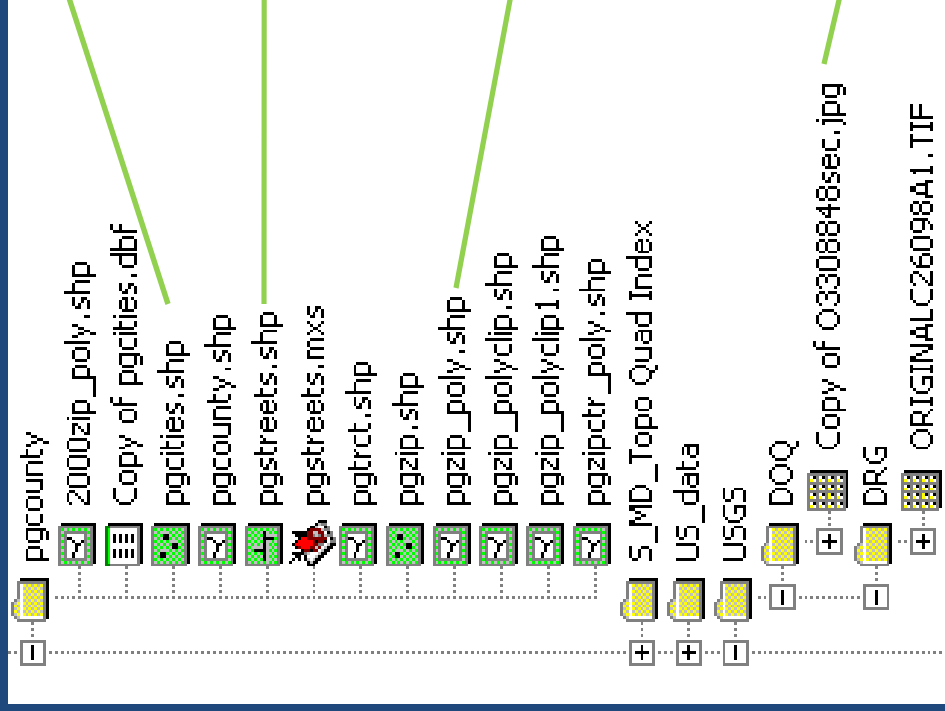
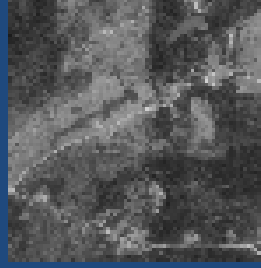
Line



Polygon



Raster



GIS Data - Attribute Table

Attributes of COUNTIES

FID	Shape *	I_NAME	STATE_I_NAME	STATE_FIPS	CITY_FIPS	FIPS	AREA	POP1990	POP1999	POP90_SOMI	HOUSEHOLDS	MALES	FEMALES
0	Polygon	Lake of the Woods	Minnesota	27	077	27077	1784.0634	4076	4597	2	1576	2037	2039
1	Polygon	Ferry	Washington	53	019	53019	2280.2319	6295	7150	3	2247	3280	3015
2	Polygon	Stevens	Washington	53	065	53065	2529.9794	30948	39965	12	11241	15454	15494
3	Polygon	Okanogan	Washington	53	047	53047	5306.18	33350	38596	6	12654	16828	16522
4	Polygon	Pend Oreille	Washington	53	051	53051	1445.0286	8915	11788	6	3395	4426	4489
5	Polygon	Boundary	Idaho	16	021	16021	1279.2987	8332	9840	7	2857	4252	4080
6	Polygon	Lincoln	Montana	30	053	30053	3746.0908	17481	18691	5	6668	8777	8704
7	Polygon	Flathead	Montana	30	029	30029	5232.0306	59218	72458	11	22834	29316	29902
8	Polygon	Glacier	Montana	30	035	30035	3124.4572	12121	12524	4	3816	5985	6136
9	Polygon	Toole	Montana	30	101	30101	1943.2598	5046	4653	3	1922	2486	2560
10	Polygon	Liberty	Montana	30	051	30051	1485.9458	2295	2332	2	788	1120	1175
11	Polygon	Hill	Montana	30	041	30041	2917.3611	17654	17299	6	6426	8788	8866
12	Polygon	Sheridan	Montana	30	091	30091	1686.5827	4732	4228	3	1899	2332	2400
13	Polygon	Divide	North Dakota	38	023	38023	1279.9633	2899	2305	2	1193	1447	1452
14	Polygon	Burke	North Dakota	38	013	38013	1121.417	3002	2194	3	1252	1506	1496
15	Polygon	Renville	North Dakota	38	075	38075	883.772	3160	2779	4	1209	1560	1600
16	Polygon	Bottineau	North Dakota	38	009	38009	1710.0681	8011	7113	5	3105	4030	3981
17	Polygon	Rolette	North Dakota	38	079	38079	943.6554	12772	14336	14	4150	6262	6510
18	Polygon	Towner	North Dakota	38	095	38095	1051.6146	3627	2950	3	1433	1817	1810
19	Polygon	Cavalier	North Dakota	38	019	38019	1503.6905	6064	4896	4	2375	3032	3032
20	Polygon	Pembina	North Dakota	38	067	38067	1111.7749	9238	8375	8	3555	4577	4661
21	Polygon	Kittson	Minnesota	27	069	27069	1095.0149	5767	5279	5	2274	2833	2934
22	Polygon	Roseau	Minnesota	27	135	27135	1670.997	15026	16122	9	5415	7695	7331
23	Polygon	Blaine	Montana	30	005	30005	4226.2541	6728	7174	2	2379	3358	3370
24	Polygon	Phillips	Montana	30	071	30071	5197.3383	5163	4744	1	1931	2537	2626
25	Polygon	Valley	Montana	30	105	30105	5055.5539	8239	8136	2	3268	4110	4129
26	Polygon	Daniels	Montana	30	019	30019	1421.8024	2266	1959	2	919	1115	1151
27	Polygon	Whatcom	Washington	53	073	53073	2170.2019	127780	159393	59	48543	62848	64932
28	Polygon	Bonner	Idaho	16	017	16017	1902.6247	26622	35901	14	10269	13231	13391
29	Polygon	Ward	North Dakota	38	101	38101	2043.8348	57921	59560	28	21485	28824	29097
30	Polygon	Koochiching	Minnesota	27	071	27071	3141.0325	16299	15420	5	6025	8440	7859
31	Polygon	Skagit	Washington	53	057	53057	1765.1474	79555	101320	45	30573	39205	40350
32	Polygon	Williams	North Dakota	38	105	38105	2175.6903	21129	20025	10	8041	10386	10743
33	Polygon	McHenry	North Dakota	38	049	38049	1874.8388	6528	6024	3	2551	3309	3219
34	Polygon	St. Louis	Minnesota	27	137	27137	6750.4944	198213	192958	29	78901	96435	101778
35	Polygon	San Juan	Washington	53	055	53055	55.9182	10035	12738	179	4392	4967	5068
36	Polygon	Roosevelt	Montana	30	085	30085	2395.1857	10999	10936	5	3694	5374	5625
37	Polygon	Mountrial	North Dakota	38	061	38061	1944.771	7021	6590	4	2587	3469	3552
38	Polygon	Marshall	Minnesota	27	089	27089	1819.1567	10993	10190	6	4194	5566	5427

Let's Go!

Demonstration of ArcGIS

Course Assessment – Please Complete This!

**Complete the “Intro to GIS Survey/Assessment” at:
<http://www.lib.umd.edu/GOV/geospatial.html>**

Or use the direct link:

<http://www.zoomerang.com/Survey/WEB22E8JKC6T8F>