

Introduction to GIS

University of Maryland Libraries
GIS and Spatial Data Center

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GIS Services in the Libraries

- Workshops - 10 offerings available
 - Geospatial tools in R coming soon
- 1:1 consulting, collaboration
- Customized guest lectures/lab exercises
- Geospatial Researcher in Residence Program
- GIS lab in 4120 open for use during Library hours
- Access to free online tutorials and software trials
- See www.lib.umd.edu/gis for more information

Add'l Research Services

- Research Commons services:
- General research assistance
 - Proposals, ORAA requirements, presentations, etc.
- Data management
- Statistics consulting
- 3D scanning and printing; video editing
- Funding for open access publishing
- See www.lib.umd.edu/rc for more information

Workshop Outline

1. Introduction – What is GIS?
2. What does GIS do and who uses it?
3. ArcGIS exercises at your own pace.
4. Questions and concerns throughout – feel free to ask questions at any time!

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

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

The screenshot displays the Google Earth desktop application. The main window shows a satellite map of the College Park, MD area, with yellow street overlays and various place labels such as Adelphi, Langley Park, College Park, MD, University Park, Riverdale Park, East Riverdale, Hyattsville, and Brentwood. The interface includes a top menu bar (File, Edit, View, Tools, Add, Help), a toolbar with navigation and tool icons, and three main panels on the left: Search, Places, and Layers. The Search panel shows a search for 'college park, md' with results for 'College Park, MD' and sponsored links. The Places panel shows 'My Places' with a 'Sightseeing Tour' folder. The Layers panel shows various map layers like 'Primary Database', 'Geographic Web', 'Roads', '3D Buildings', 'Street View', 'Borders and Labels', 'Traffic', 'Weather', and 'Gallery'. The bottom status bar shows the current imagery date (Mar 11, 2007), coordinates (39°00'16.28" N, 76°54'02.65" W), elevation (111 ft), and eye altitude (29768 ft). The taskbar at the bottom shows the Start button and several open applications: 'Inbox for lotis@umd.edu...', 'dcgis: DC Atlas - Mozilla ...', 'Microsoft PowerPoint - [...]', and 'Google Earth'.

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) Location Search: Go

DC Atlas

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

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

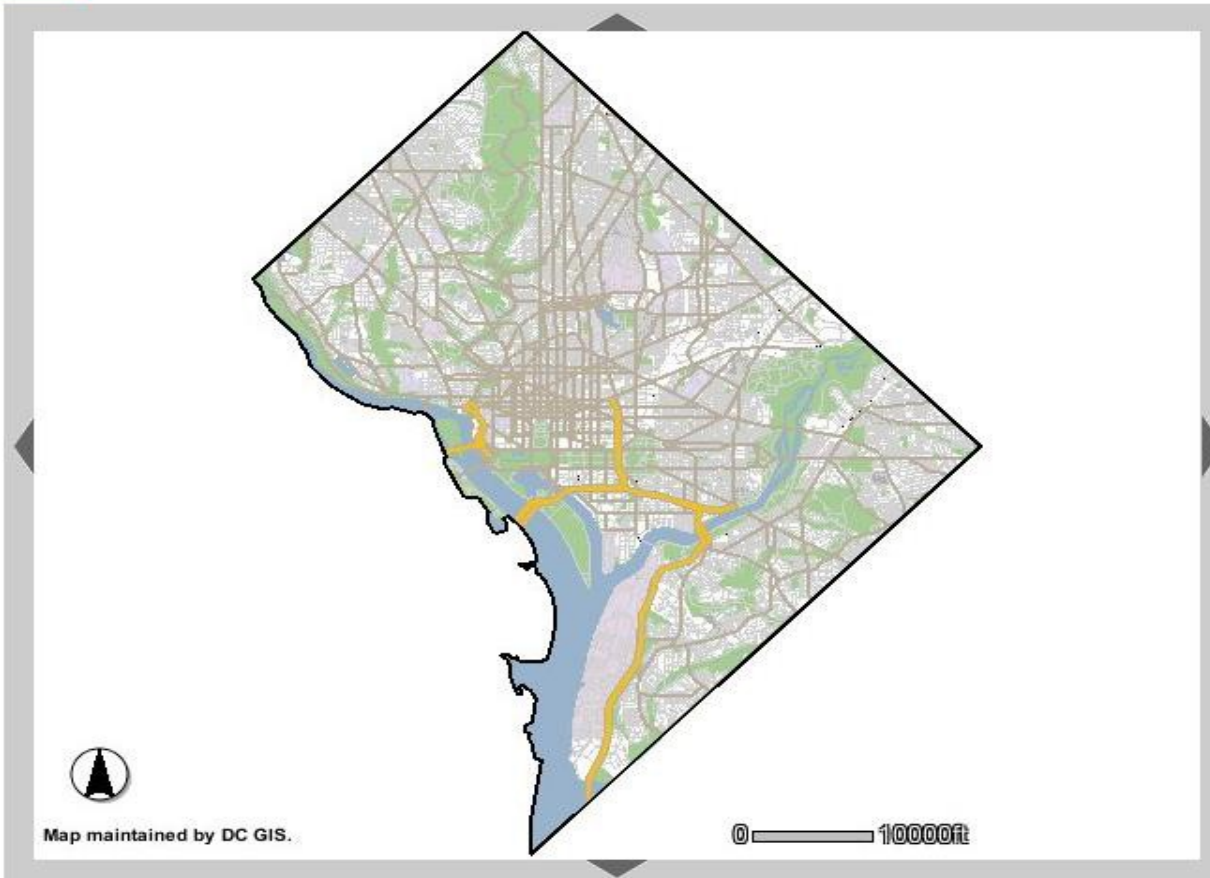
NOTIFY

Create list

UTILITIES

Help

Reset map



Map maintained by DC GIS.

10000ft

Active Tool: Zoom in Zoom

Display Options

Layer List Legend

Display Label Active

Bases

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

Auto Refresh

Help:

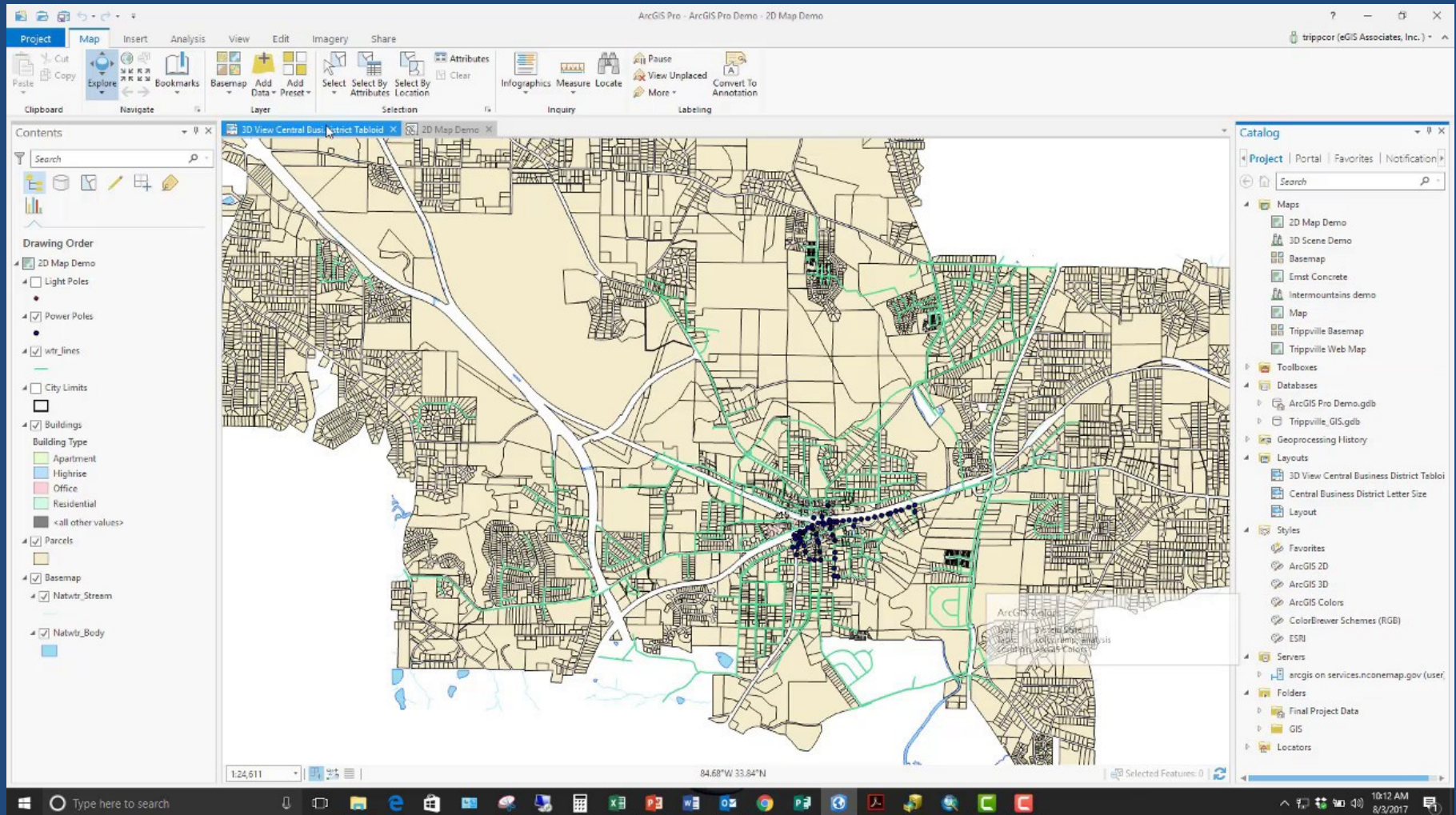
- A closed group, click to open.
- An open group, click to close.
- A hidden group/layer, click to make visible.

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 Pro- 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

Open Source/Free

- GRASS
- Quantum GIS (QGIS)
- DIVA-GIS

GIS (ESRI) on UMD Campus

- In McKeldin Library
 - On all public computers
 - Contact Dr. Kelley O'Neal in the GIS and Spatial Data Services Center at kelleyo@umd.edu
- Other campus computer labs or terminals (access may be limited due to licensing)

GIS Courses at UMD

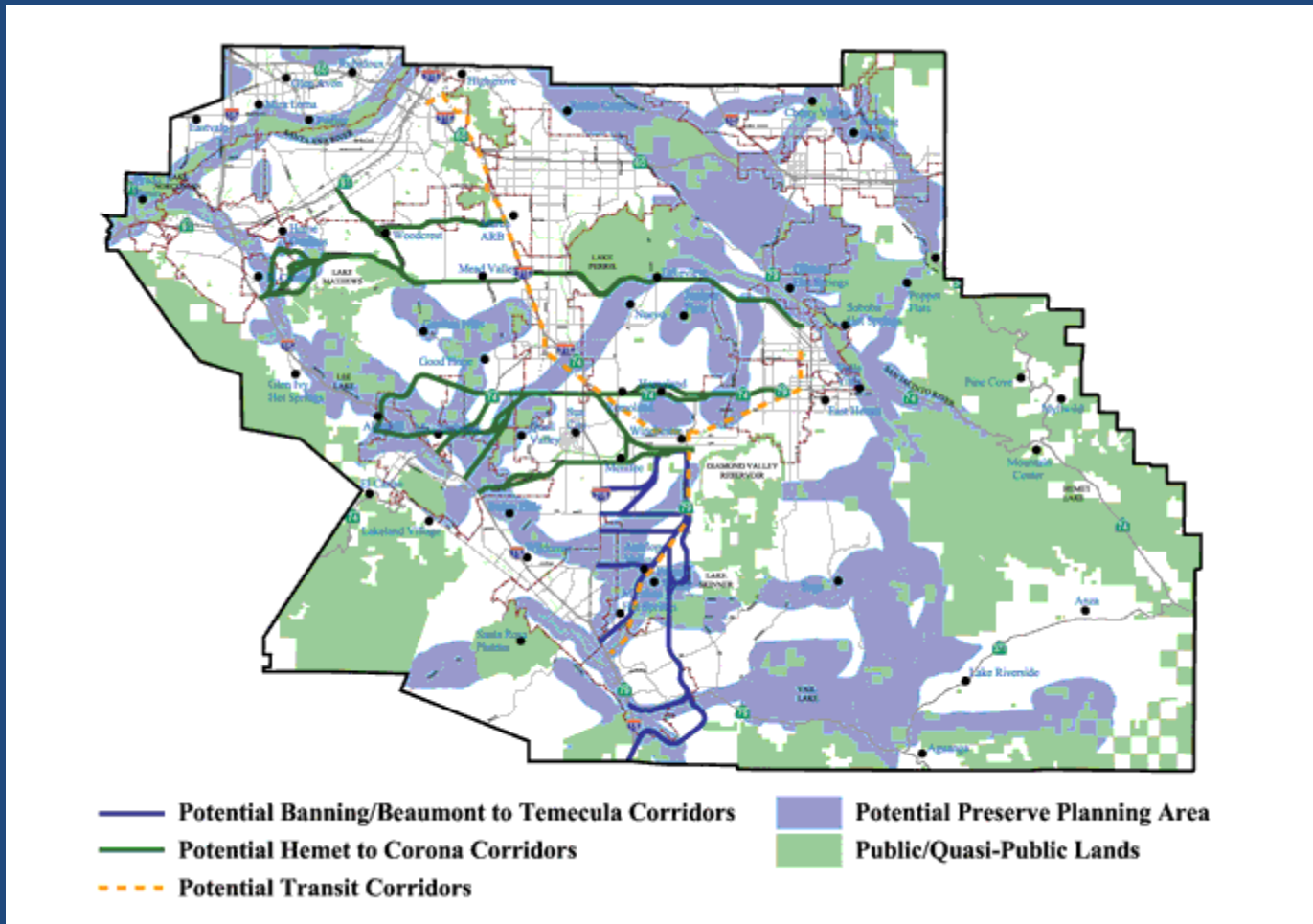
- Geography Department
 - GEOG 170, **306**, 372, **373**, 376, 472, **473**, 475, 476
- Urban Studies
 - URSP 612
- Government & Politics (may be cross-listed)
 - GVPT 729
- Computer Science
 - CMSC 725
- Civil & Environmental Engineering
 - ENCE 200
- Criminology / Criminal Justice
 - CCJS 699
- Landscape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

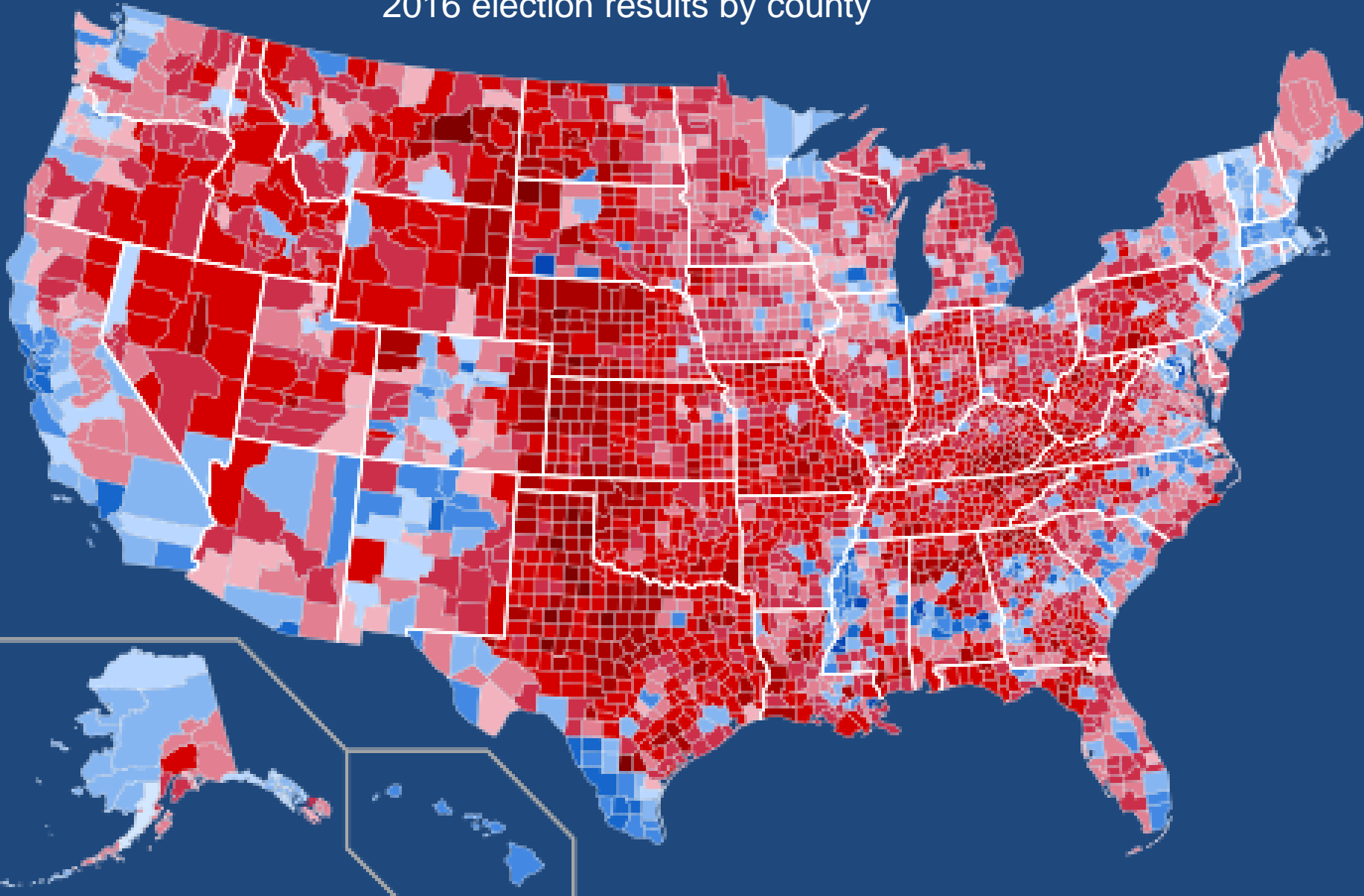
GIS for Urban Planning

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



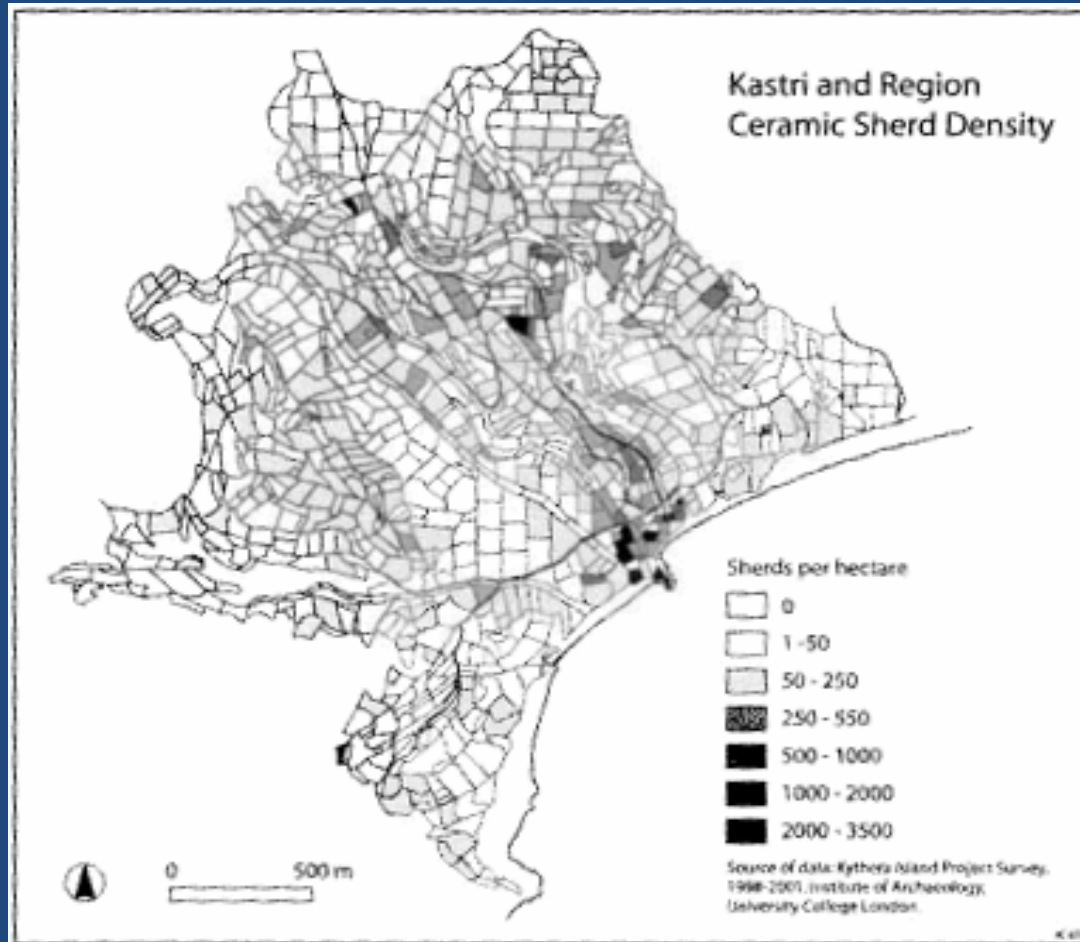
GIS for Politics

2016 election results by county

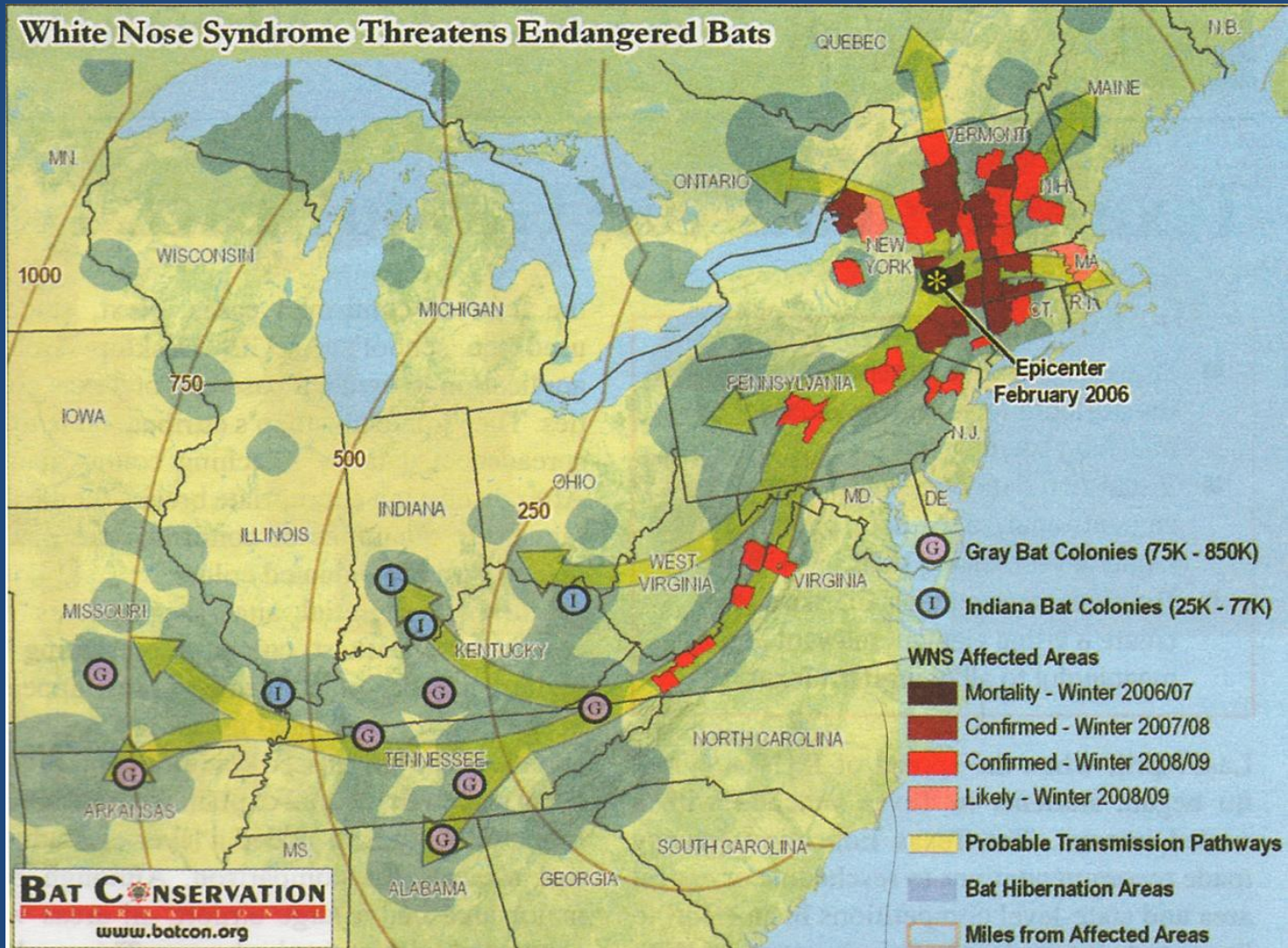


GIS for archaeology

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



GIS for environmental / natural resources / health



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.

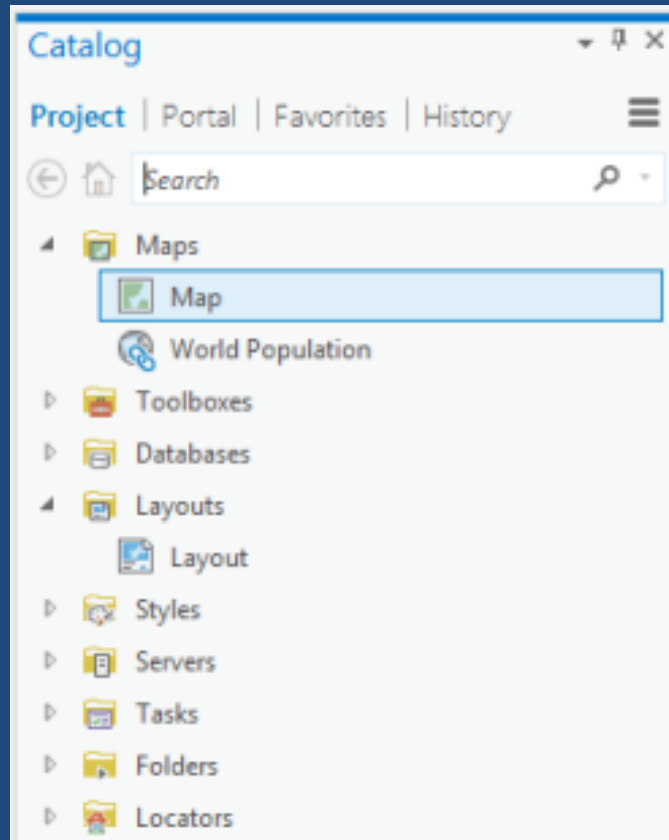
GIS Hazards

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

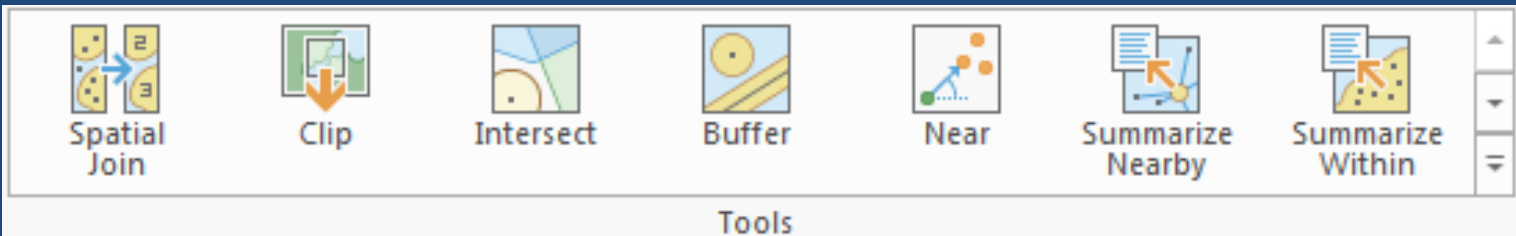
Working with a GIS

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

ArcCatalog



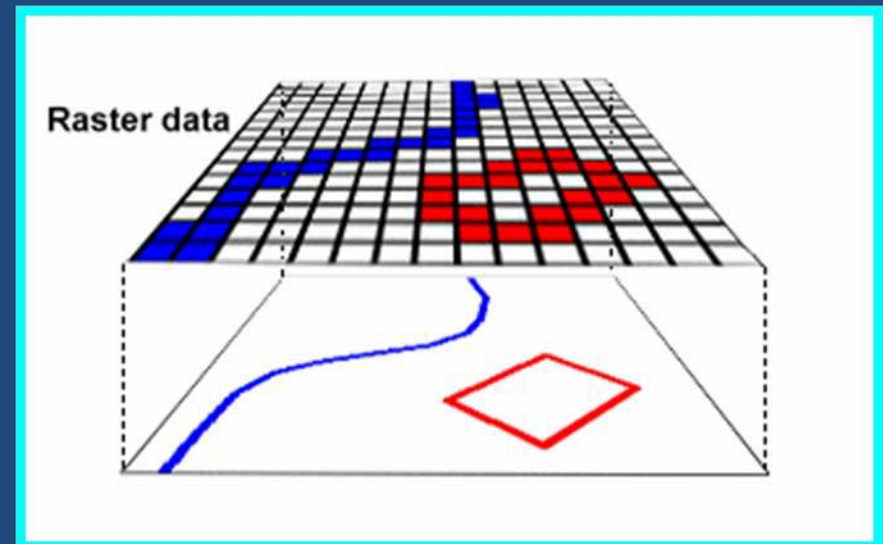
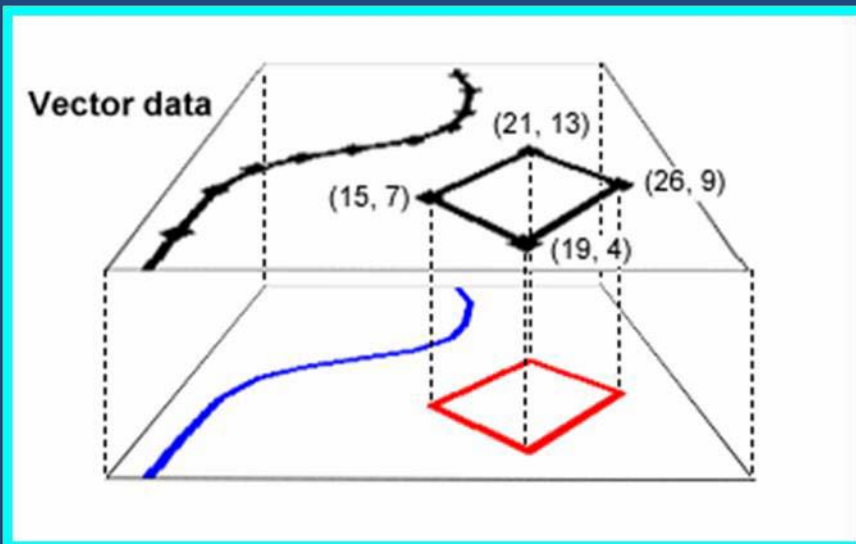
ArcGIS Pro Toolboxes



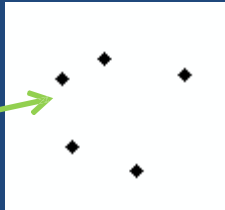
GIS Data

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.

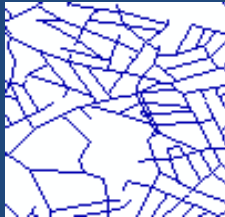
Raster - is composed of a continuous grid of cells that represent a portion of the earth's surface. Ideal for continuous themes where there is lots of change.



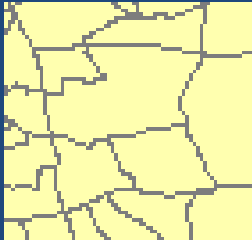
- Mont_Dams
 - ◆
- mdinterst
 -
- mdcounties
 -
- mdzip_06
 -
- Montgomery_County
 -
- Subregions
 -
- TractPly
 -
- Montgomery_race
 -
- Race
 -
- Water
 -
- M:\Public Services\Government\GIS\GISWorksho
 - elevation
 - Value
 - High : 143.686
 - Low : -0.859671



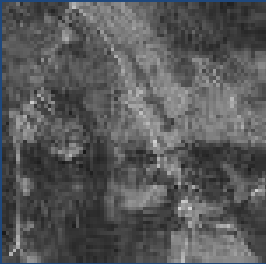
Point



Line




Polygon





Raster

GIS Data - Attribute Table

 Campus Buildings ▼ □ ×

OBJECTID	SHAPE	Name of Building	Size of Building	Operational Hours	Acc
1	Polygon	Gym	1768.992398	8:30am-5:00pm	Emp
2	Polygon	Gym	1043.515552	8:30am-5:00pm	Emp
3	Polygon	J	3834.247963	8:30am-5:00pm	Emp
4	Polygon	OA	14550.305355	8:30am-5:00pm	Emp
5	Polygon	G	11507.921772	8:30am-5:00pm	Emp
6	Polygon	S	2690.197171	8:30am-5:00pm	Emp
7	Polygon	L	11246.731494	8:30am-5:00pm	Emp
8	Polygon	E	10625.150848	8:30am-5:00pm	Emp
9	Polygon	F	4913.179712	8:30am-5:00pm	Emp
10	Polygon	O	25929.942586	8:30am-5:00pm	Emp
11	Polygon	7	2240.686448	8:30am-5:00pm	Emp

Search   0 of 27 selected ◀ ▶

Let's Go!

ArcGIS Exercises

lib.umd.edu/gis/workshops