

What Is GIS?

UW Colleges WISLINE
Web
June 1, 2006



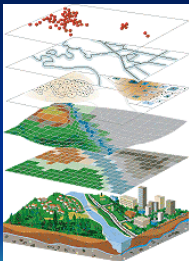
Jim Brey, Ph.D.
University of Wisconsin
Fox Valley

GIS = Geographic Information System

- GIS is a computer technology that uses a geographic information system as an analytic framework for managing and integrating data; solving a problem; or understanding a past, present, or future situation.



Modeling Our World



What Is GIS?

- A Spatially Relational Database
- A Spatial Analysis Tool
- An Automated Mapper
- A Remote Sensing Tool

The Process of GIS

- Think about a place or topic...
- Ask a question about it...
- Make a map...
- Explore the patterns that appear...
- Enhance the data or...
- Modify the analysis...
- Ask a new question
- Repeat...

GIS is a Generic Computer Tool

- Its power can be used by anyone for anything just like a traditional database, spreadsheet or word processor.
- Of course you need to know something about it to use it.
- Some training in geography or another spatial science is important for advanced users.

How does a GIS work?
Relating information from different sources

- U.S. Geological Survey (USGS) digital line graph (DLG) data of roads.



- USGS DLG of rivers.



- USGS DLG of contour lines (hypsography).



- USGS digital elevation (DEM).



- USGS scanned, rectified topographic map called a digital raster graphic (DRG).



- USGS digital orthophoto quadrangle (DOQ).



- USGS geologic map.



- Landsat 7 satellite image from which land cover information can be derived.



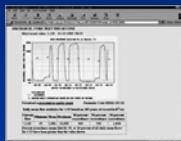
- Satellite image data in the figure have been analyzed to indicate classes of land uses and cover.



- Part of a census data file containing address information.



- Part of a hydrologic data report indicating the discharge and amount of river flow recorded by a particular streamgage that has a known location.



What is GIS used for?

- Keeping track of things.
- Finding new things.
- Discovering how things occur together.
- Learning better ways to move things around.
- Increasing the POWER of remote sensing and GPS.
- Answering all kinds of spatial questions.



Applications

- Inventory
- Facilities Management
- Marketing
- Urban Planning
- Routing and Transportation
- Resource Exploration and Management.
- Monitoring Environmental Change.

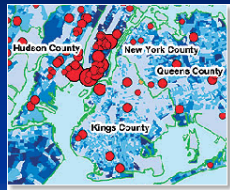


And...

- Law Enforcement
- Census and Demographic Studies
- Political Redistricting
- Emergency Response
- Weather Forecasts and Models
- Property Management
- Tax Rolls and Survey Data
- Soils and Agriculture

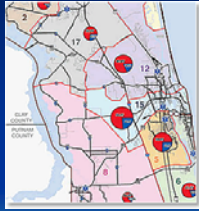
Discovering Relationships

- Here's an example of how Bank of America used GIS to show the geographic distribution of the bank's network in relation to deposit potential in the New York City market area. From this analysis, Bank of America can determine where their coverage is strong and where it is weak. Red dots symbolize strong coverage; no dots means coverage is nonexistent.



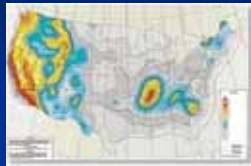
EMS

- In this example, emergency medical service (EMS) call information, including call type, elapsed travel time, and which rescue unit was dispatched to the call's location, has been linked to addresses. With this GIS-linked database, questions such as "What percent of dispatched calls did each EMS unit respond to within its assigned zone?" can be answered.



Map Where Things Are

- Maps of the locations of earthquake shaking hazards are essential to creating and updating building codes used in the United States. Online, interactive earthquake maps, as well as seismicity and fault data, are available at earthquake.usgs.gov.



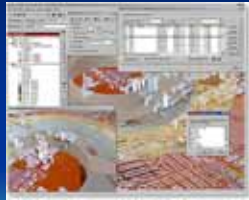
Map Quantities

- This map shows the number of children under 18 per clinically active pediatrician for a particular study area. It was created by the Center for the Evaluative Clinical Sciences at Dartmouth Medical School as part of an effort to develop a national U.S. database of primary care resources and health services.



Find What's Inside An Area

- This map shows an urban setting with building footprints rendered in ArcScene. These tools allow advanced visualization and flythroughs of urban or rural settings similar to Google Earth but with your data.



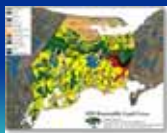
Find What's Nearby

- Find out what's occurring within a set distance of a feature by mapping what's nearby.
- The Pacific Disaster Center has developed and applied a Vulnerability-Exposure-Sensitivity-Resilience model to map people and facilities (what's nearby) exposed to flood risk in the Lower Mekong River Basin (the feature).

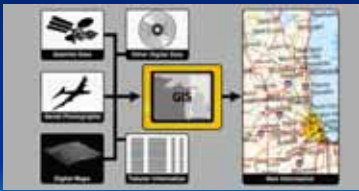


Map Change

- These images are from a poster titled "Losing Cape Cod," which is distributed by the Woods Hole Research Center in Woods Hole, Massachusetts. The poster shows the severe change in land use on Cape Cod since 1951. The image on the left shows the town of Barnstable in 1951 and the image on the right shows Barnstable in 1999.



Data integration is the linking of information in different forms through a GIS.



Why GIS Now?

- GIS has been around since the 1960's.
- Movement has been away from mainframes where it started.
- PC Based GIS is now the rule.
- GIS software is easier to use.
- Digital Data is easier and cheaper to get.
- Costs of everything are going down.
- More People are trained to use it.

Are There Jobs?

- GIS is one of the fastest growing employment areas.
- Geospatial is ranked 3rd in the President's Workforce Development priority list for ramping up training.
- Good jobs, great pay!
- But you need to have some specific area of expertise like soils, geology, business.
- But we still need to continue to look at it as a generic computer tool.

Software Available

- ArcGIS 9.1
 - ArcInfo
 - ArcEditor
 - ArcView

- For further information...

james.brey@uwc.edu
