Internet-based GIS

Larry Theller

October 2007
Geographic Information Systems

• “Mapping” is inventory and presentation of spatial data.

• GIS means “Geographical Information System”
  – its called that because there is information behind the map.
GIS vs CAD

• Difference between mapping software or CAD and GIS: you ask questions in GIS

• Three levels of GIS applications:
  – Inventory (What is there?)
  – Analysis (Answering questions)
  – Modeling (Making predictions)

CAD stands for Computer-Aided Design
GIS is not GPS

GPS or Global Positioning Satellites – are a cloud of satellites that tell tracking devices where they are. These locations are often used in a GIS.

Satellite segment
- 21+ satellites
- 6 orbital planes
- 12 hour return interval for each satellite

Trimble and ESRI
A GIS is a software system that connects map layers with tables of information.
GIS and the internet

• Users quickly adopted the internet for download of large files.

• With satellite-sensors and digital camera the files soon became gigantic

• Not efficient to copy to every PC in Indiana.
Online Models

• Data comes from databases and map layers on the server

• Inputs are simplified for user

• Results may be map-based or downloaded table and reports

• Models flow data into next step
L-THIA OUTPUT

Scenario Name: wcojg40310
Total area: 49917.9 acres
State: Indiana
County: Lake

Average Annual Zinc Losses in lbs

Table: Average Annual Runoff Volume

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Hydrologic Sed Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water/Wetlands</td>
<td>A</td>
</tr>
<tr>
<td>Water/Wetlands</td>
<td>B</td>
</tr>
<tr>
<td>Water/Wetlands</td>
<td>C</td>
</tr>
<tr>
<td>Water/Wetlands</td>
<td>D</td>
</tr>
<tr>
<td>Commercial</td>
<td>A</td>
</tr>
<tr>
<td>Commercial</td>
<td>B</td>
</tr>
<tr>
<td>Commercial</td>
<td>C</td>
</tr>
<tr>
<td>Commercial</td>
<td>D</td>
</tr>
<tr>
<td>Commercial</td>
<td>E</td>
</tr>
<tr>
<td>Agricultural</td>
<td>A</td>
</tr>
<tr>
<td>Agricultural</td>
<td>B</td>
</tr>
<tr>
<td>Agricultural</td>
<td>C</td>
</tr>
<tr>
<td>Agricultural</td>
<td>D</td>
</tr>
<tr>
<td>Agricultural</td>
<td>E</td>
</tr>
<tr>
<td>Low Density Residential</td>
<td>A</td>
</tr>
<tr>
<td>Low Density Residential</td>
<td>B</td>
</tr>
</tbody>
</table>

Average Annual Chromium Losses in lbs

Chart showing detailed chromium losses by land use category.
Possible Engineering Practices

SedSpec can design all the following structures. Which structure would you like to design?

- Channels (Grass Lined, Riprap Lined, Concrete Lined, Open)
- Culvert
- Sediment Basin
- Level Terraces
- Storm Water Detention Basin
- Runoff Diversion
- Low Water Crossing

Continue
Sedimentation Basin Information

Enter the approximate length of pipe for the barrel: [ ] feet

Continue
The map layer shows one building "selected" and the table has one row with information about that item.
A GIS originally was software installed on a computer and using local files as layers with attached tables of information.
Now the software connects map layers with data from the internet.

Named streets and property parcel lines from the Tippecanoe County GIS server
This map is drawing data from two streaming data sources on the web and from files on the hard drive.

These high-resolution aerial photos use 8 terabytes of storage at IU, which is why you do not want to download files anymore.
Internet-based GIS

• Data AND TOOLS on the internet

• Starts with specialized models like LTHIA
  – Use GIS and databases for easy input

• Now, sites like Google offers online GIS tools
INTERACTIVE MAPS

IMPORTANT: These map sites require Microsoft Internet Explorer 5.0 or above.

A GIS Atlas for Indiana

This online atlas allows you to construct custom maps with layers showing information about coal, environment/biology, geology, hydrology, and infrastructure/demographics. New layers or features will be added each month. The information available in two previously built online GIS atlases for specific regions of Indiana (see below) eventually will be incorporated into the statewide atlas.

Petroleum Database Management System

The Petroleum Database Management System is a Web application designed to distribute petroleum-related information from the Indiana Geological Survey. The database contains information on more than 70,000 petroleum-related wells drilled in Indiana. The Map Viewer is an interface that displays interactive maps of petroleum well data.
Zoom in to Brazil, Indiana and answer questions.
Click the identify button, then the map, for data about the “Active Layer.” A floating pop-up appears with the data.
The Google Maps interface is becoming a standard.

www.google.com, click “maps”
The newest tool on Google Maps is the “My Maps” tab; it allows you to create geographic data and share it. Enter http://cobweb.ecn.purdue.edu/~theller/abe325/
Click “View larger map” to see this. Examine (zoom in to) the points and lines I placed on Google Maps. The data is stored on a Google Server. After save I do not need to worry about it again.
My Maps tools allow anyone with a Google account, including gmail, to use these tools.
Tools are rapidly evolving.
For many GIS sites, the next step is to let Google manage the basic framework layers - and let specialist groups manage “value-added” layers.

This map, embedded on the web page, is one example.

http://cobweb.ecn.purdue.edu/~what/WHAT GOOGLE/in_sam.html
Select a crop type, then digitize the field boundary. Click “Toggle Field Boundary” to outline a field (with “hand tool”). Save.
Shape is saved on Purdue server, displayed over Google images.
This is a Beta version site, various processing steps are seen.

New shape file created!!

click here to download shape file