

Resource Management

- Most popular GIS applications
 - supported by many vendors through 1980s
 - major gov't investment in these applications
- Most successful applications
 - forestry, agriculture, land use, wildlife
- Less Successful Applications
 - tend to be 3-dimensional by nature
 - subsurface, oceans, groundwater

Resource Management

- Applications typically based on logical data layers
 - included mix of raster & vector data models
 - use of vector polygons to represent ‘likeness’
- Quality of Data
 - relies heavily on interpretation of data (i.e., likeness)
 - quality of interpretation varies
- Scale
 - varied but 1:10,000 common

Resource Management

- **Functionality**
 - simple map analysis
 - overlay, buffers, etc...
 - modeling
 - external watershed models
- **Adoption**
 - forest management by mid-80s
 - broad resource management by late-80s
- **Organizations**
 - public sector
 - private timber firms

Created by JDG 2000

Resource Management

Big Darby Creek Example from NCGIA Core Curriculum

- Integration of GIS technologies with an accepted non-point source pollution model
 - specially designed for agricultural use (USDA's AGNPS)
 - primary concerns include sediment production & fertilizer
 - both the GIS & AGNPS are based on cells (or rasters)
- Purpose is to understand significance of specific management strategies within the watershed (or basin)
 - land use planning

- Multiple Agency Project

Created by JDG 2000

Class slides are based on readings, primarily the NCGIA Core Curriculum for GIS(systems) and GIS(cience), Kump & Goodfriend (1999), the NCGIA Core Curriculum Project at UBC, and Foote & Heubner's *The Geographer's Craft*

Big Darby

- State Scenic River
- Basin includes 370k+ acres
- Over 100 protected or recognized species of plants and animals
- Land use within the basin
 - 71% cropland, 9% forest, 9% pasture, 9% fallow, 1% urban

Big Darby

- **Management Strategies Tested**
 - conservation easements of various widths on both sides of river
 - use of no-till or conservation tillage practices on critical areas
 - conversion of critical areas to forest
 - combinations of the above

Urban Planning & Management

- Urban planning computer-applications can be dated back to 1960s
- Ranged from simple record keeping to small area analysis of socio-economic indicators or events, such as crime
- DIME files expand potential applications
 - census created centerlines, EDs, address ranges

Urban Planning & Management

- Mapping
- Limited Inventory Uses
 - identifying impacted areas
- Scale
 - 1:24,000, 1:50,000, 1:100,000
 - sufficient to show street center lines--not parcels
 - scale can be integrated with subsequent parcel data

Urban Planning & Management

- Major Organizations
 - Urban and Regional Information Systems Association (URISA)
 - organized to coordinate information sharing between governments and local actors in the late-60s
 - Spatially Oriented Referencing Systems Association (SORSA)

Sample Application

Hazardous Materials from NCGIA

- Modeling vulnerability to hazardous materials within the context of increased manufacture, storage, transportation, & disposal of hazardous materials
- Purpose of GIS is to develop strategies to minimize accidents and mitigate incidents
 - an anticipatory GIS

HazMat

- Identifies total distribution of HazMats
- Identifies potentially impacted populations/areas
 - day & night
- identifies communication & transportation infrastructures
- Implications of airborne versus spills (water or soil)

HazMat

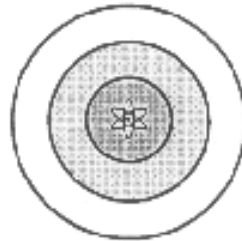
- After identifying location of HazMats & affected populations--HazMat geometries need to be created
 - polygons based on perceived/actual risk
 - potential for overlapping polygons based on multiple locations
 - producing a complex set of ‘contours’

HazMat

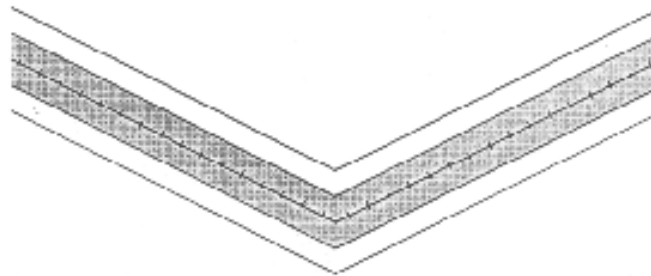
- Based on 3 sample geometries several hazards zones can be created
 - 500m of HazMat Site (polygon)
 - 250M of Freeway (line)
 - 300m of underground tanks (point)

GEO 448 GIS APPLICATIONS

Areas Production Hazard
- e.g. nuclear power plant accident



Lines Transportation Hazard
- e.g. toxic chemical transport



Points Consumption Hazard
- e.g. consumption of toxic chemical in food



Hazard Zone Geometries

HazMat

- Building a database
 - hazardous materials locations and descriptions
 - demographic data
 - infrastructure
 - institutions, roads, sewers, etc
 - physical geography

HazMat

- Since this is a planning tool, other issues should be concerned
 - what is the maximum traffic allowable on a roadway?
 - what public transportation resources are potentially available?
 - where are special populations concentrated?
 - Elderly
 - Schools
 - ESL populations