



# GIS

*The Geographic Approach for the Nation*



## ESRI Federal User Conference

Washington, D.C. • February 17-19, 2010

# **What is GIS and Why Do I Need to Know About It?**

**Christopher Thomas  
Global Marketing Manager  
Government**

**William Davenhall  
Global Marketing Manager  
Health and Human Services**

**Welcome  
and  
...thanks for coming!**



# Session Agenda

- What is GIS?
- How does it work?
- What are the benefits of using GIS?
- Why GIS is unique?
- How do I learn more about GIS?



# Today's Presenters

- **Chris Thomas**

- Marketing Manager for the Government segments since 1997
- B.A. in Business Administration – Cal State
- Employed by city and county governments in California
- Serves on numerous GIS Task Forces and Advisory Boards
- 23+ years in professional management of GIS services
- Prolific author and speaker about GIS in government

# Formal definition of a GIS

- An organized collection of computer hardware, software, geographic data, and personnel designed to effectively capture, store, manipulate, analyze, and display all forms of geographically referenced information...

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- An organized collection of computer hardware, software, geographic data, and personnel designed to effectively capture, store, manipulate, analyze, and display all forms of geographically referenced information...
- What does GIS mean for you?

# GIS organizes geographic knowledge

- The geographic tag is substituted for more traditional tags such as Social Security Number, account number, driver's license number, etc.
- You are already part of a GIS.



# Using GIS to generate revenue

- City needed to conduct a business license audit to find unlicensed businesses
- Compared licensed business addresses with land use (zoning) data from the planning department

# Using GIS to generate revenue

- City needed to conduct a business license audit to find unlicensed businesses
- Compared licensed business addresses with land use (zoning) data from the planning department
- Created a mailing list of commercial properties with no corresponding business license
- Result: 16 man hours recovered \$156,000 in lost revenue



## **GIS goes one step further...**

- **The mailing list was compared against billing information in the water department.**
- **This identified lots or parcels with active billing files.**

# GIS goes one step further...

- The mailing list was compared against billing information in the water department.
- This identified lots or parcels with active billing files.
- The final result:
  - 32 man hours recovered \$256,000 in lost revenue.
  - New properties were identified for economic development.
  - Records in all three databases were updated and corrected.
- Creating a map was not part of this successful GIS application.

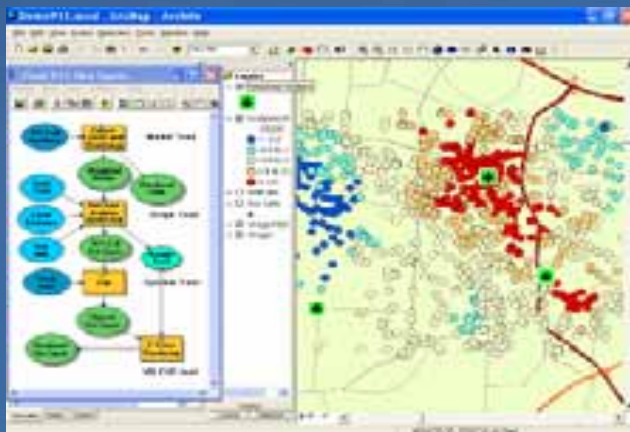
# Redefine your view of GIS

- GIS organizes geographic knowledge into reusable business logic.

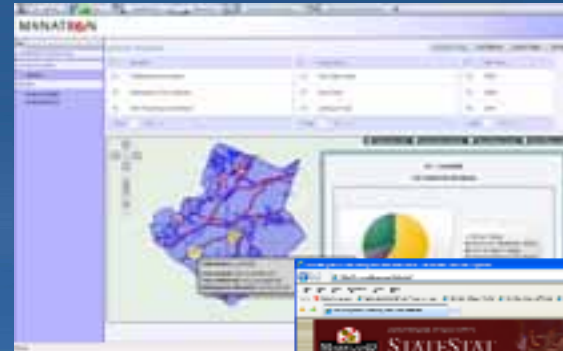


Maps & visualization

Geographic data



Workflow and decision models



Executive Dashboards

# What a manager should know

- GIS is defined by its application.



Enhance workflows & productivity

Build an information base



Increase efficiency



Support decision making



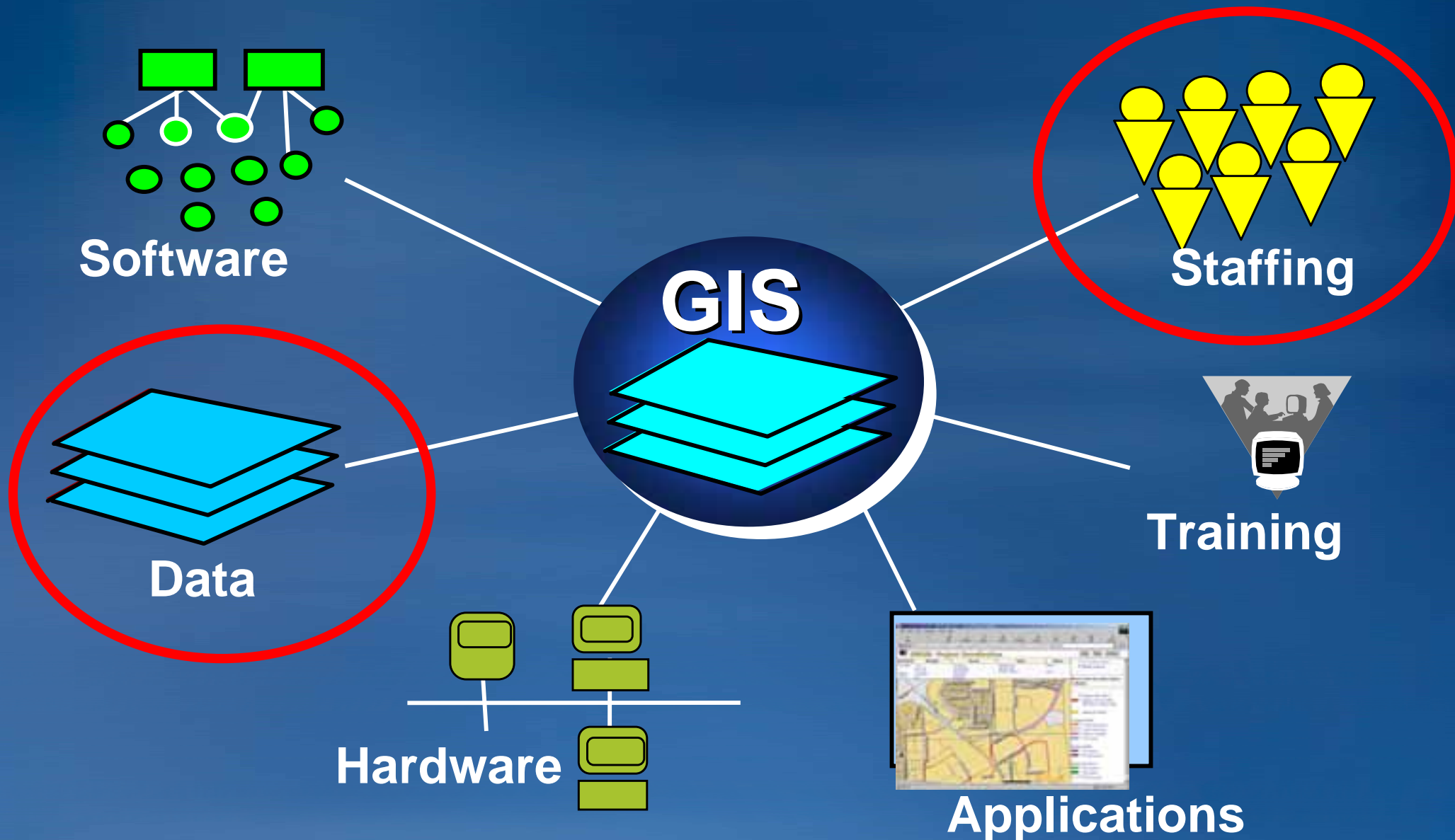
Aid in Performance Measurement and Accountability



Generate revenue



# GIS is Composed of . . . . .



# Build A Solid Foundation

Environment \_\_\_\_\_

Hazards \_\_\_\_\_

Land Use \_\_\_\_\_

Zoning \_\_\_\_\_

Census \_\_\_\_\_

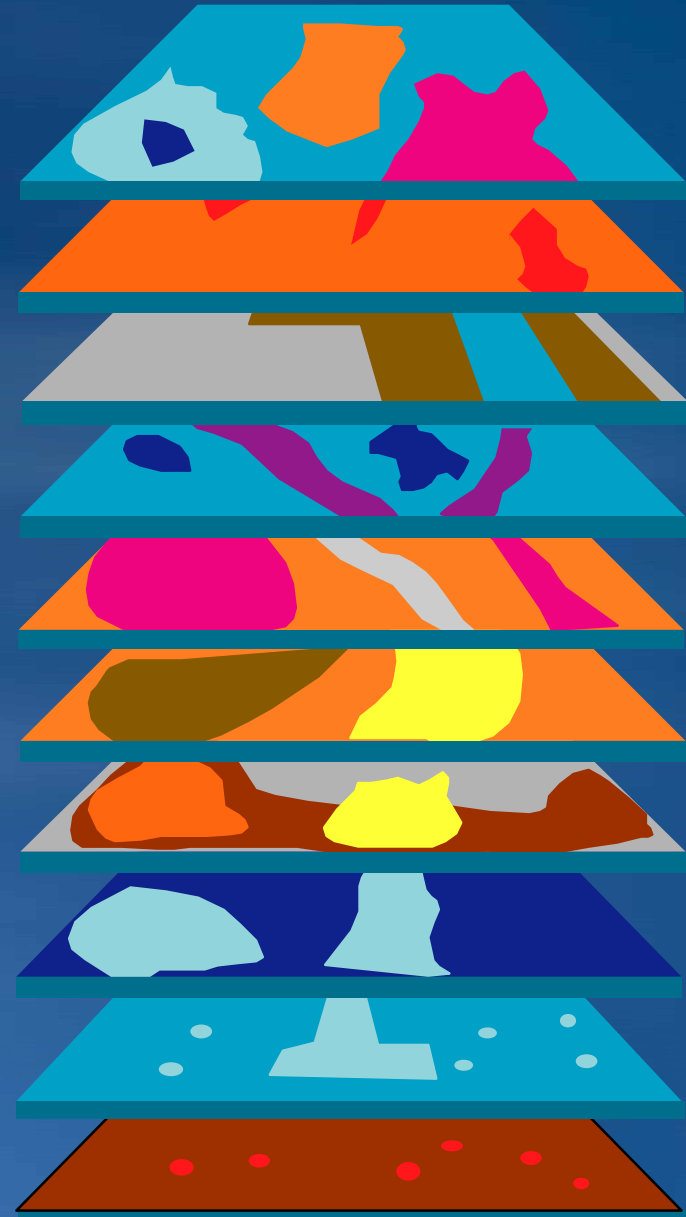
Lakes/Rivers \_\_\_\_\_

Special Districts \_\_\_\_\_

Street Centerlines \_\_\_\_\_

Street Right-of-ways \_\_\_\_\_

Parcels \_\_\_\_\_





# Digital Map Linked to a Database



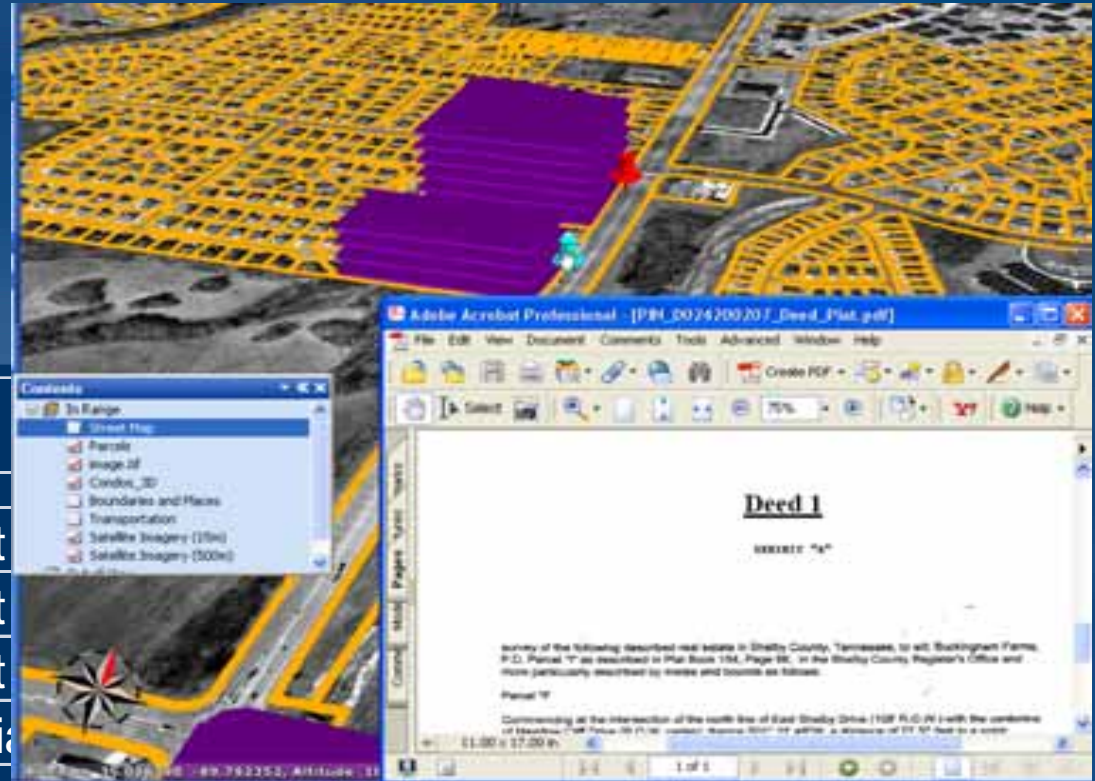
Parcel No.	LU	Address
101	R	123 Main St
102	R	125 Main St
103	C	127 Main St
104	I	400 Industrial Way
105	P	90 Park Lane
106	R	129 Main St

# Digital map linked to a database

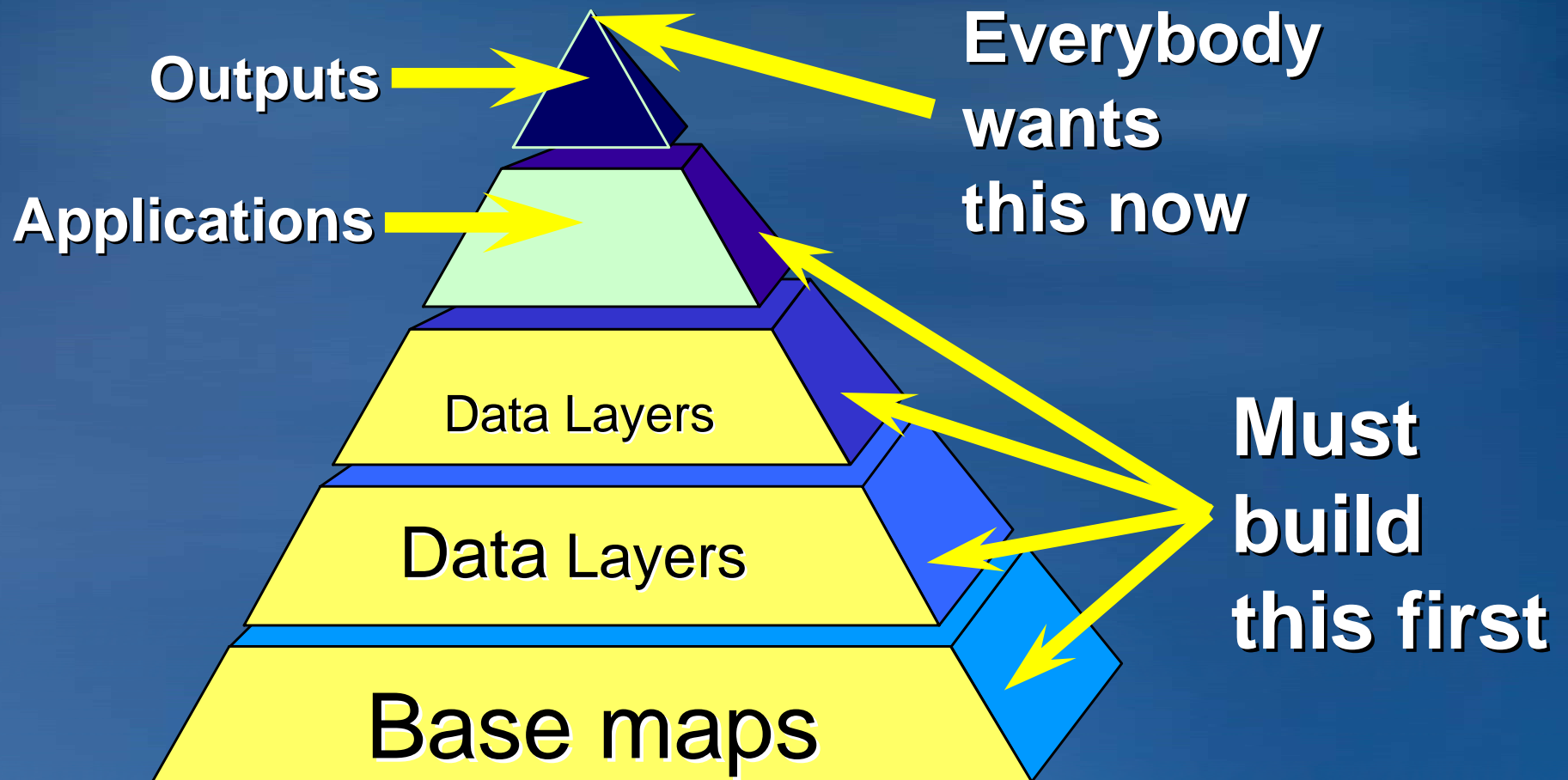


## Address

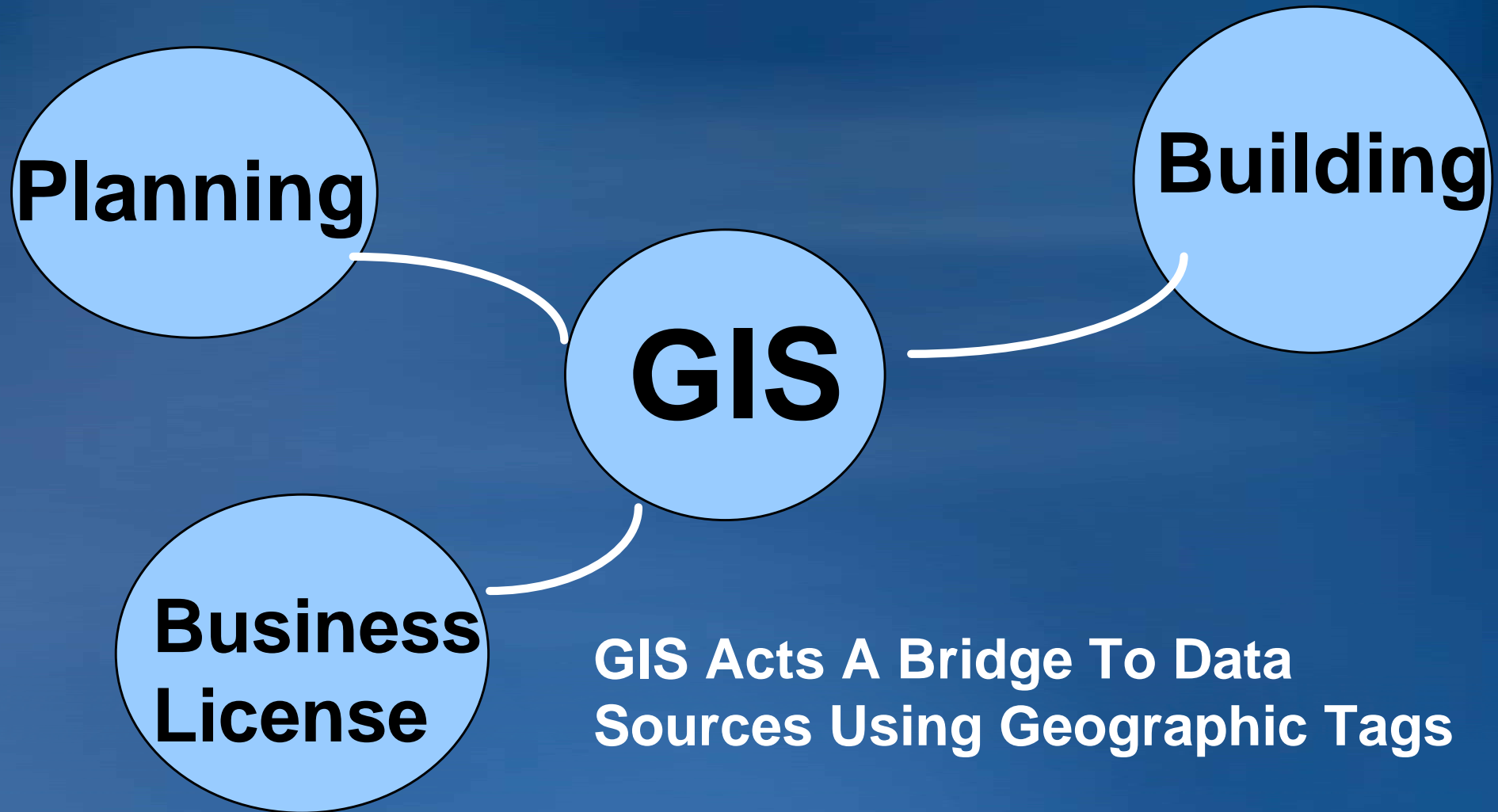
10		123 Main St
45		125 Main St
356554	Res	127 Main St
885469	Ind	400 Industrial
854721	Sch	90 Park Lane
762145	Res	129 Main St



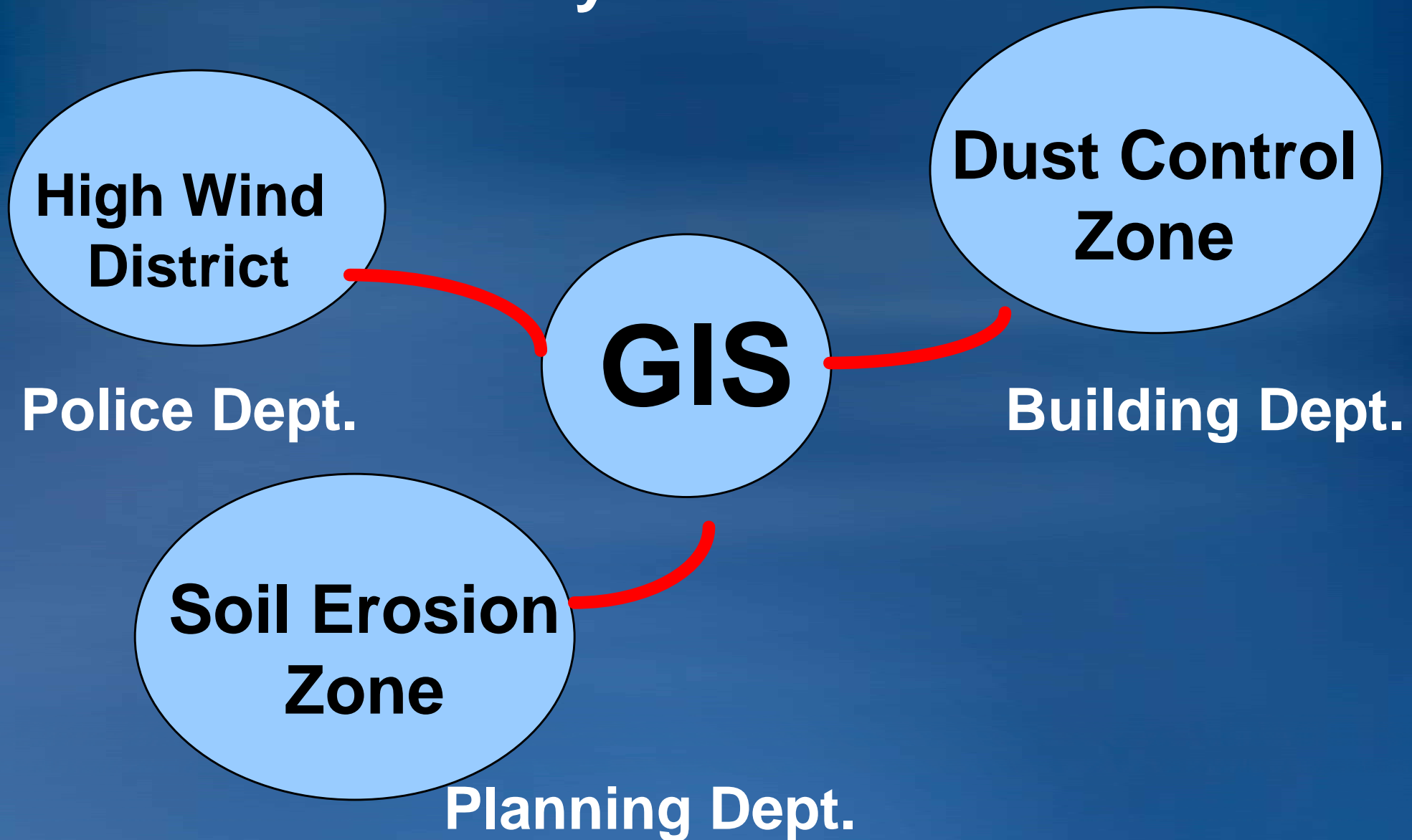
# Building a GIS is Like Building a Pyramid



# Understanding Data

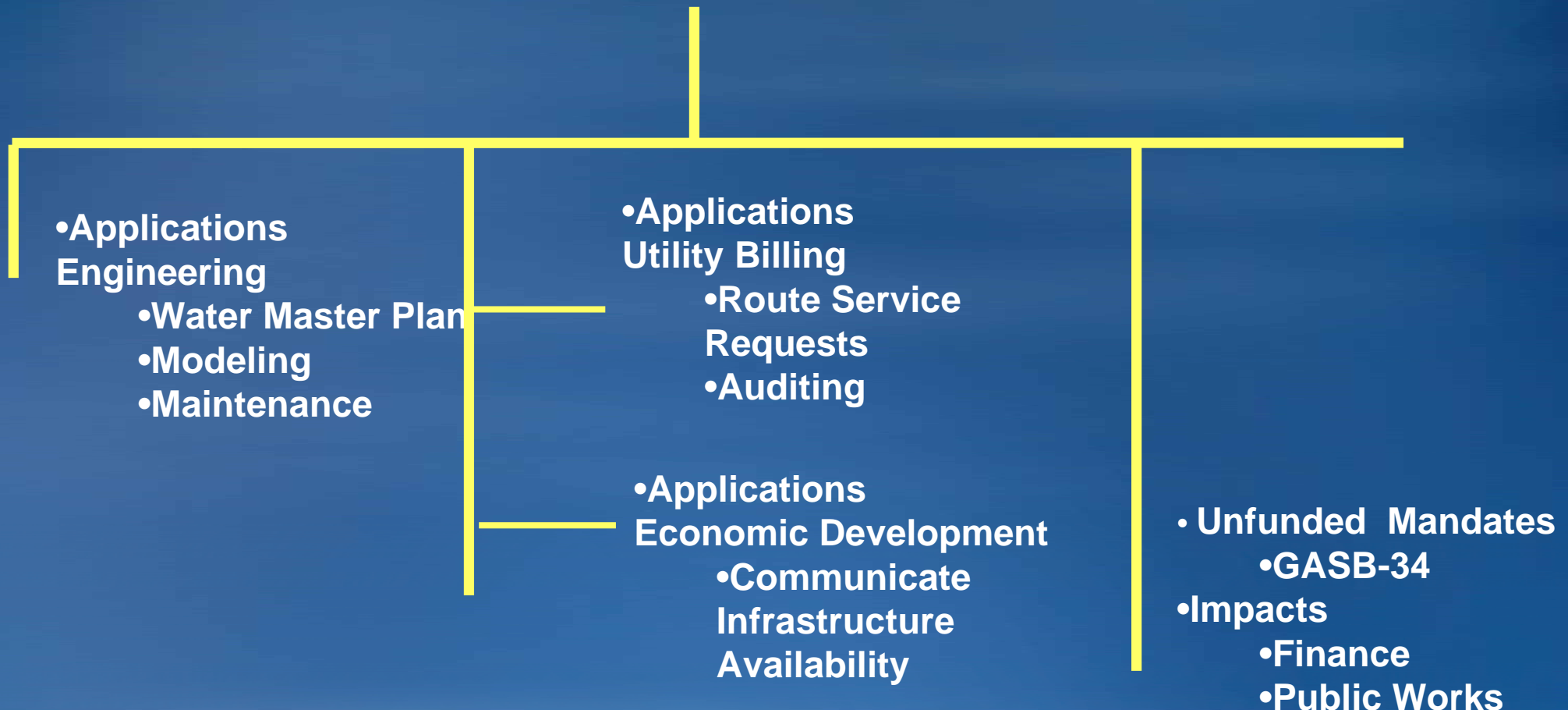


Same data .... many users  
Same data .... many uses





# Reuse of Data





# Share data

- Data created in one department can be used by multiple departments for a wide variety of applications.



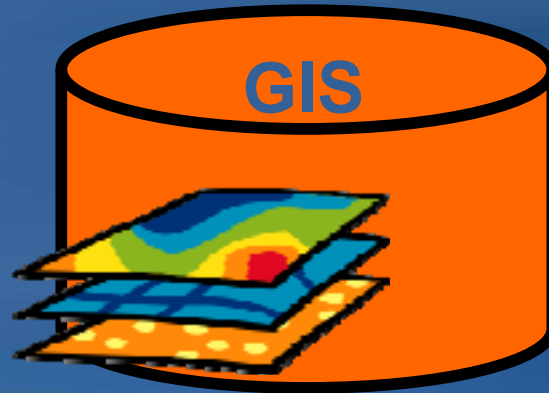
Business services



Manufacturing



Advertising



Strategic  
planning



Distribution

# Leverage Your GIS Investment

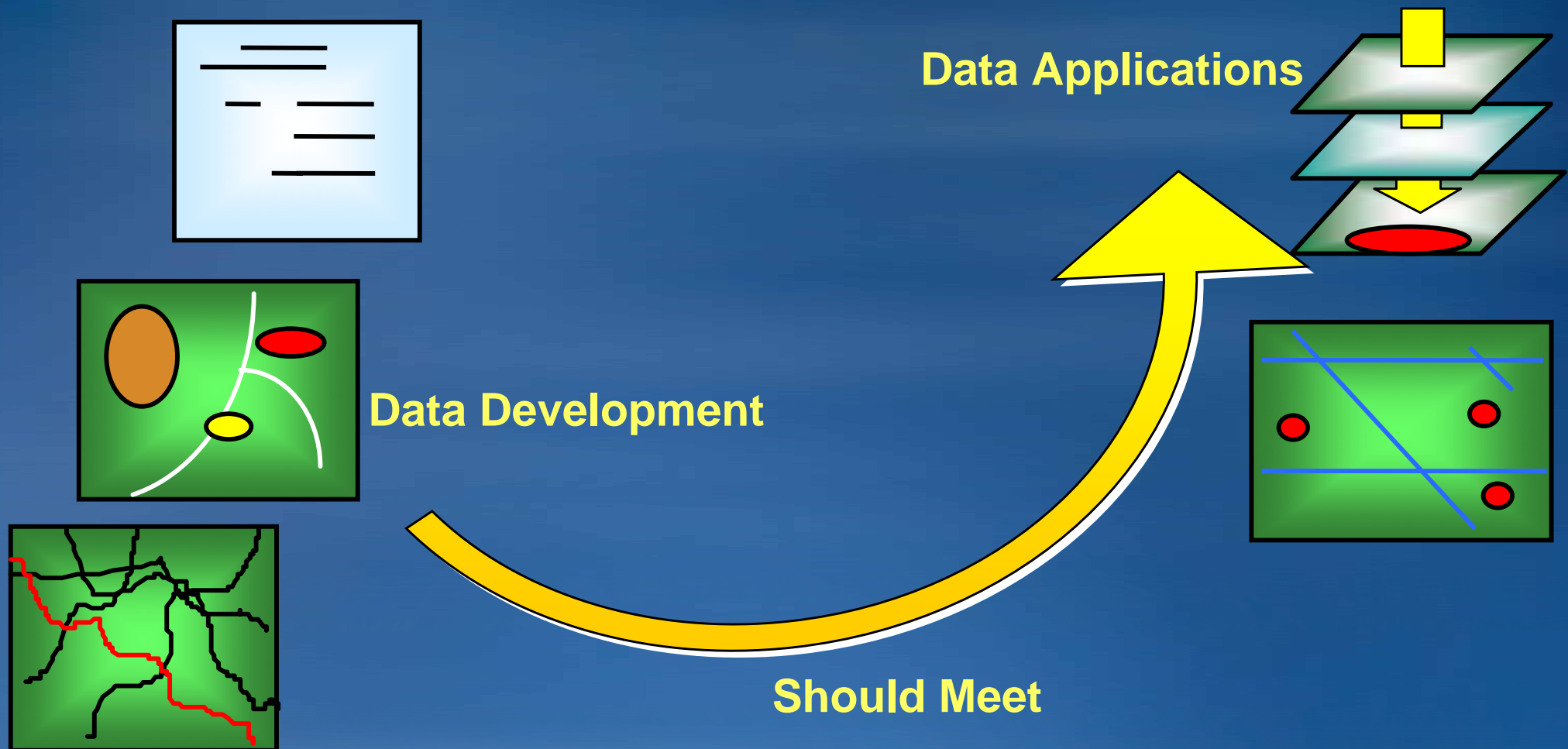
## Developing an Organization-wide GIS Program



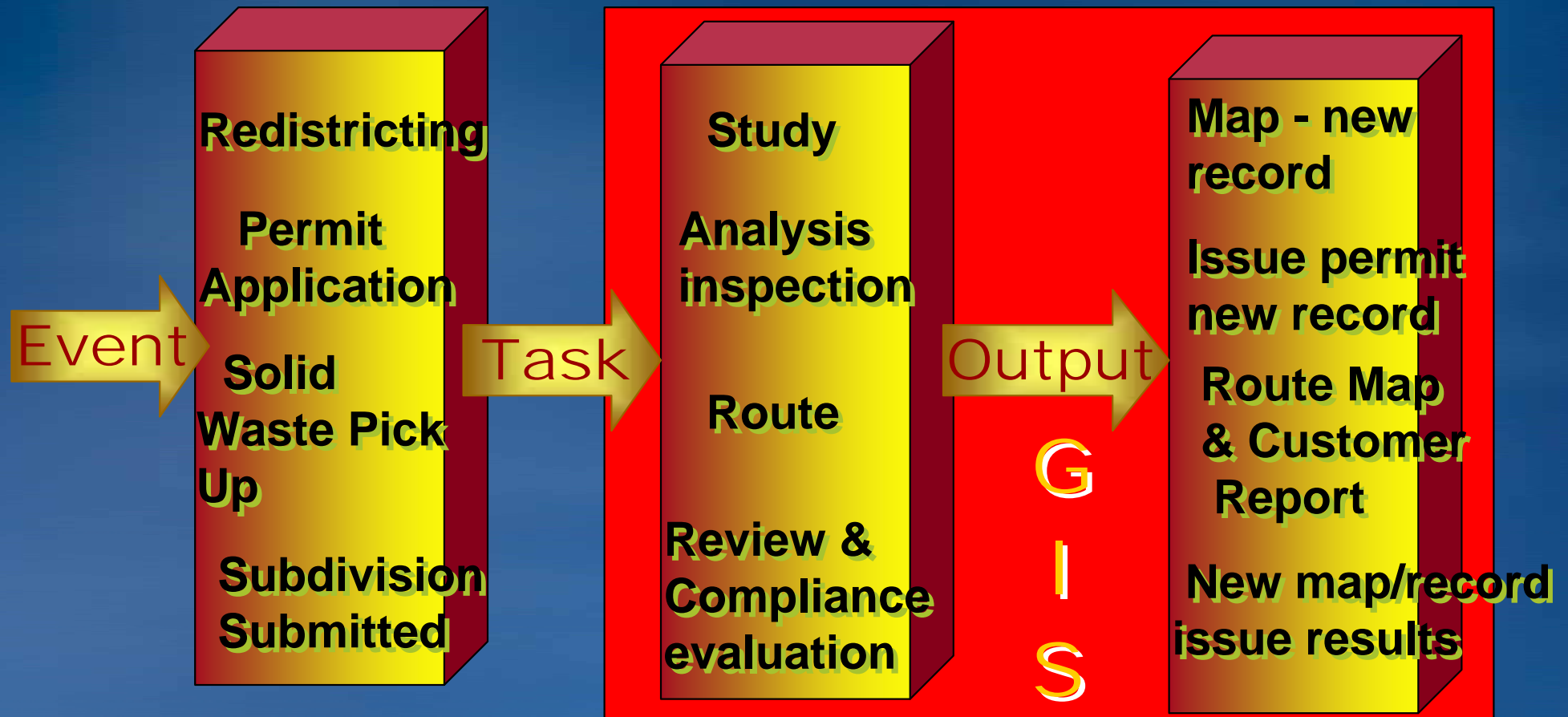
# Rate of Return



# Understand why you would build a GIS



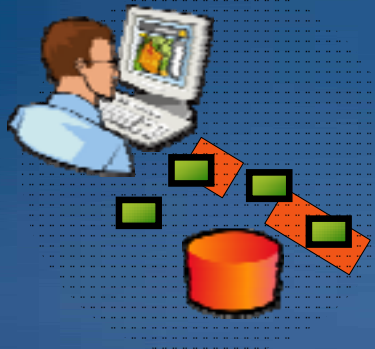
# Work Flow Process



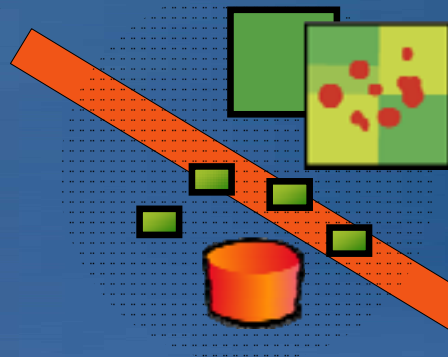
Where does GIS fit?

# Complete Enterprise Resource Management: Work Order Management with Logistics

## Service Requests



## Create Work Orders



## Generate Schedules



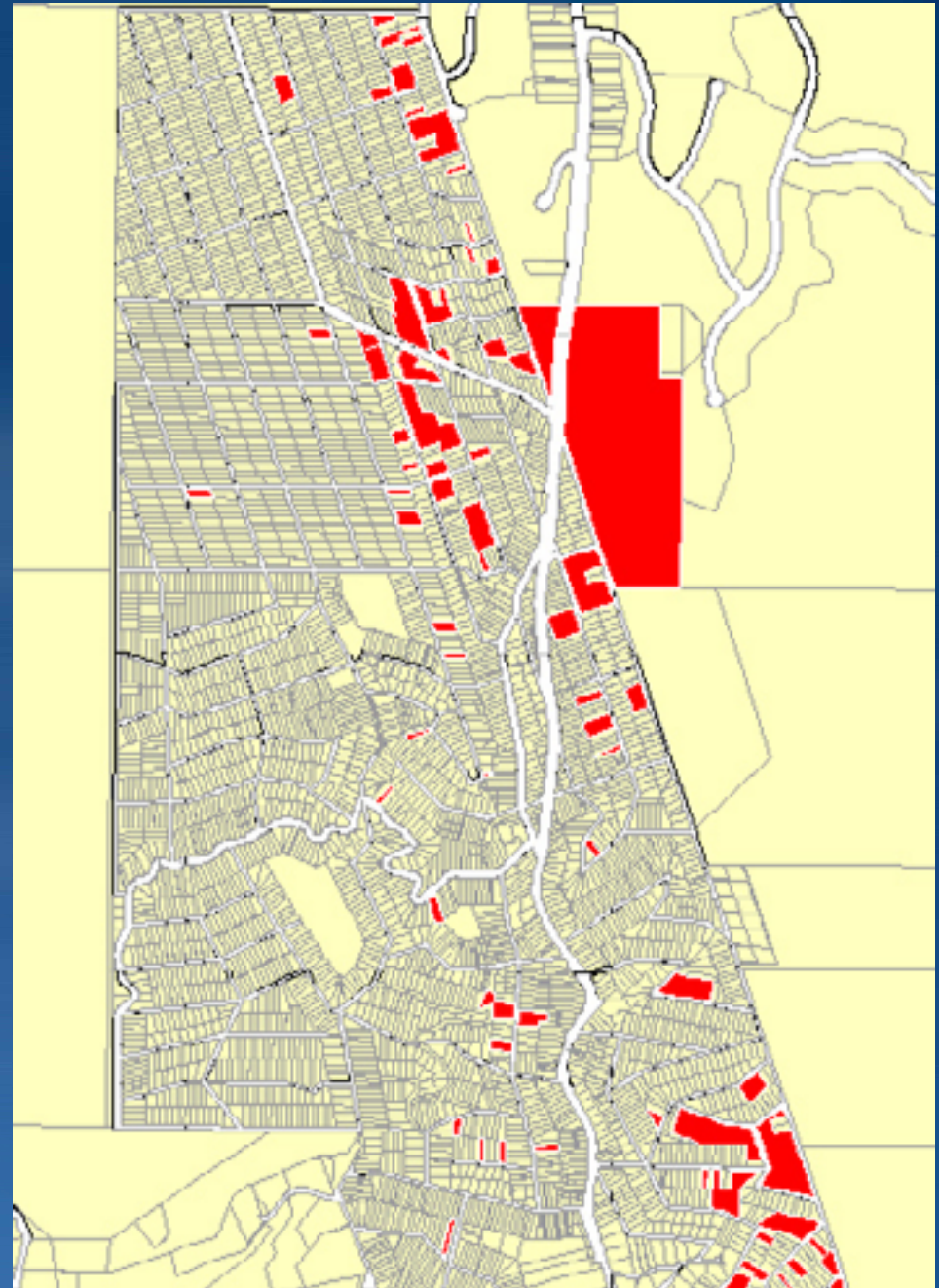
## Optimize Routes





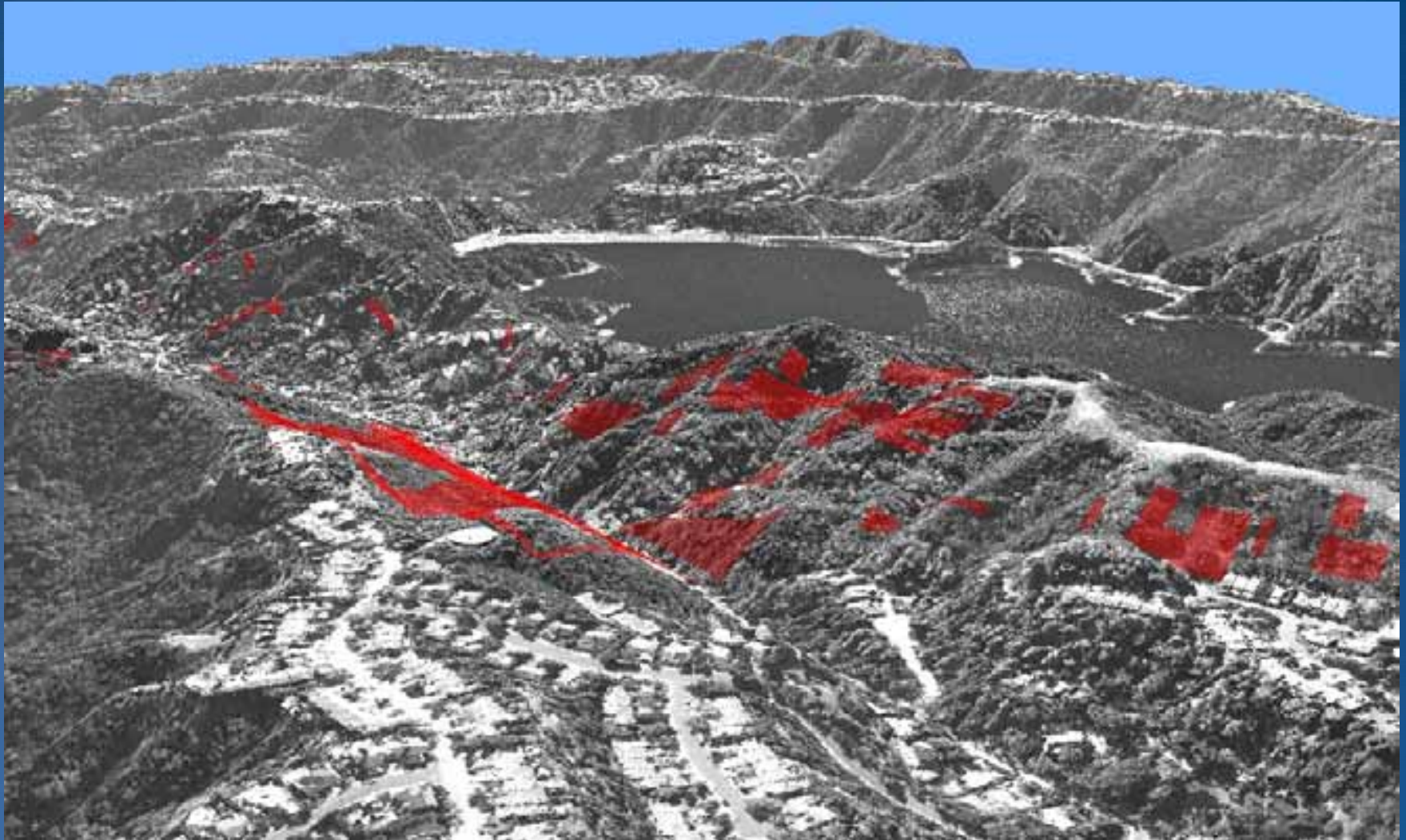
# Deceiving Data

- Simple subdivision
- City owned in Red
- High value properties that are sellable
- Locate Public Facilities



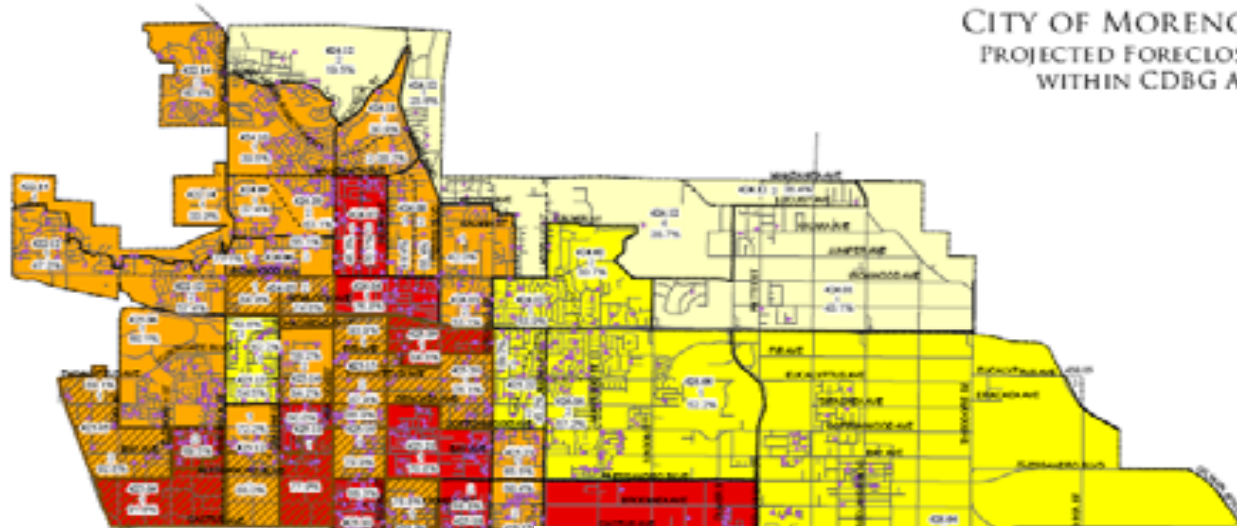
# GIS Analysis

## Use of Overlay and 3D





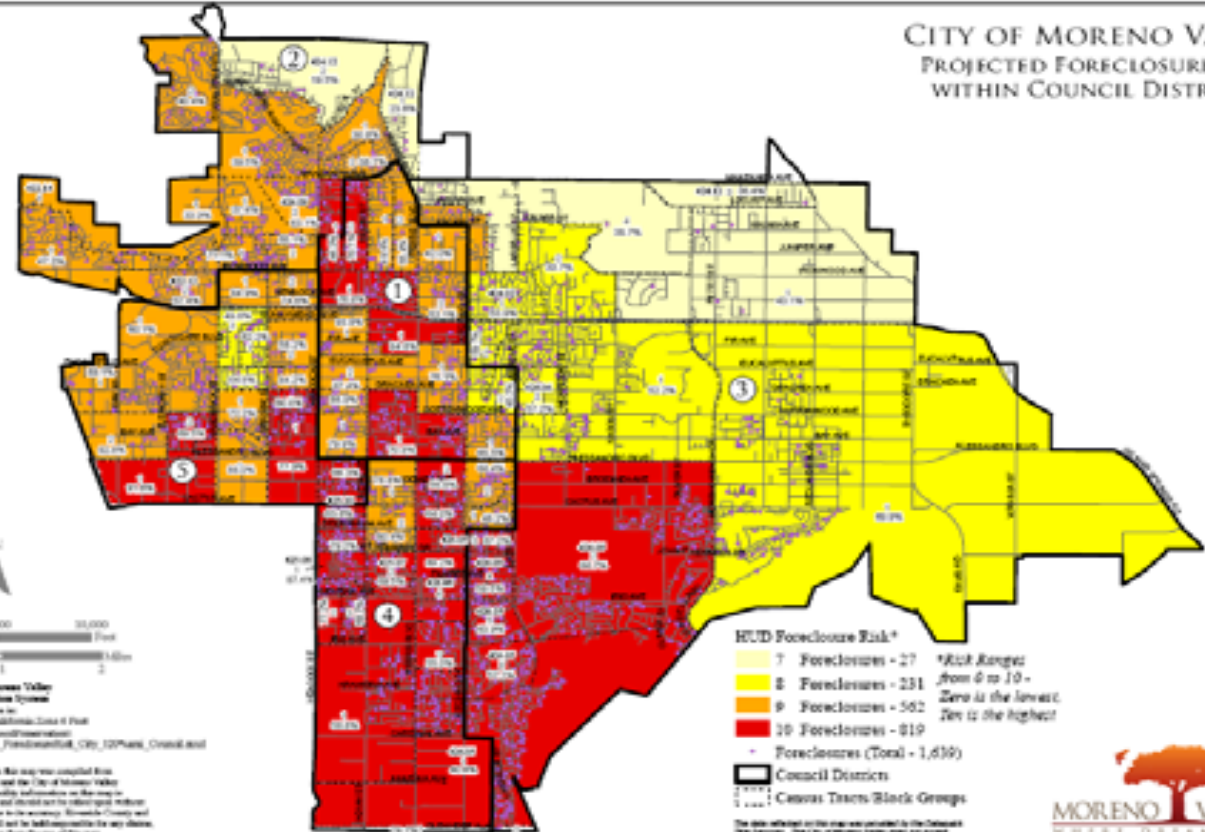
# CITY OF MORENO VALLEY PROJECTED FORECLOSURE RISK WITHIN CDBG AREAS



Map Produced by Moreno Valley  
Geographic Information System  
Geographic Information System  
Source: Public Data, U.S. Census Bureau, Census 2000  
© 2000 MapInfo Corporation  
City of Moreno Valley, California, City, 10/10/00, CDBG and  
November 14, 2000

The information shown on this map was compiled from  
the Riverside County GIS and the City of Moreno Valley  
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will not be held responsible for any damage,  
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# CITY OF MORENO VALLEY PROJECTED FORECLOSURE RISK WITHIN COUNCIL DISTRICTS



Map Produced by Moreno Valley  
Geographic Information System  
Geographic Information System  
Source: Public Data, U.S. Census Bureau, Census 2000  
© 2000 MapInfo Corporation  
City of Moreno Valley, California, City, 10/10/00, CDBG and  
November 14, 2000

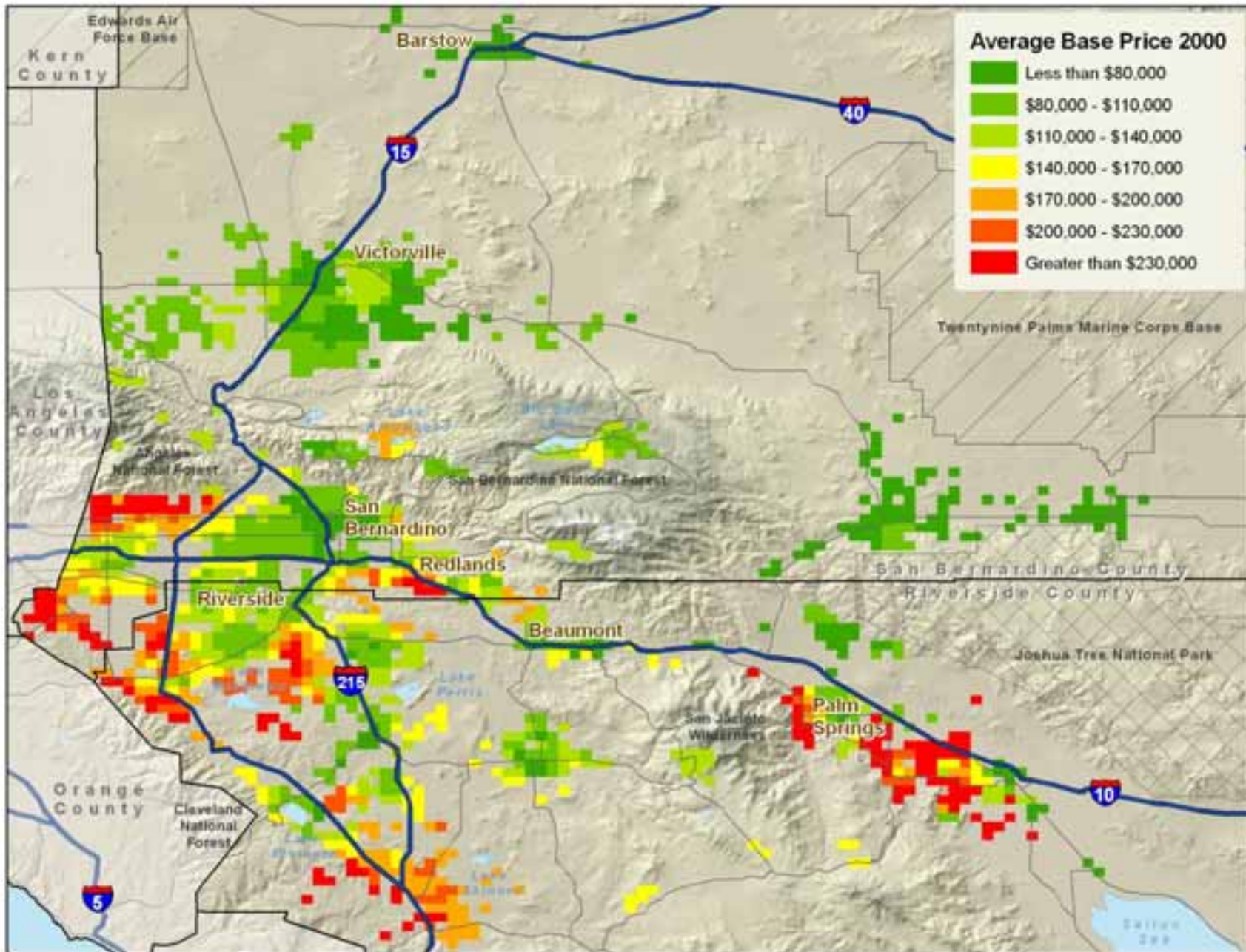
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loss or delay resulting from the use of this map.

HUD Foreclosure Risk\*  
7 Foreclosures - 27  
8 Foreclosures - 231  
9 Foreclosures - 562  
10 Foreclosures - 819  
Foreclosures (Total) - 1,639  
Council Districts  
Census Tracts/Block Groups

\*Risk Ranges  
from 0 to 10 -  
Zero is the lowest.  
Ten is the highest



# Home Prices before the Bubble



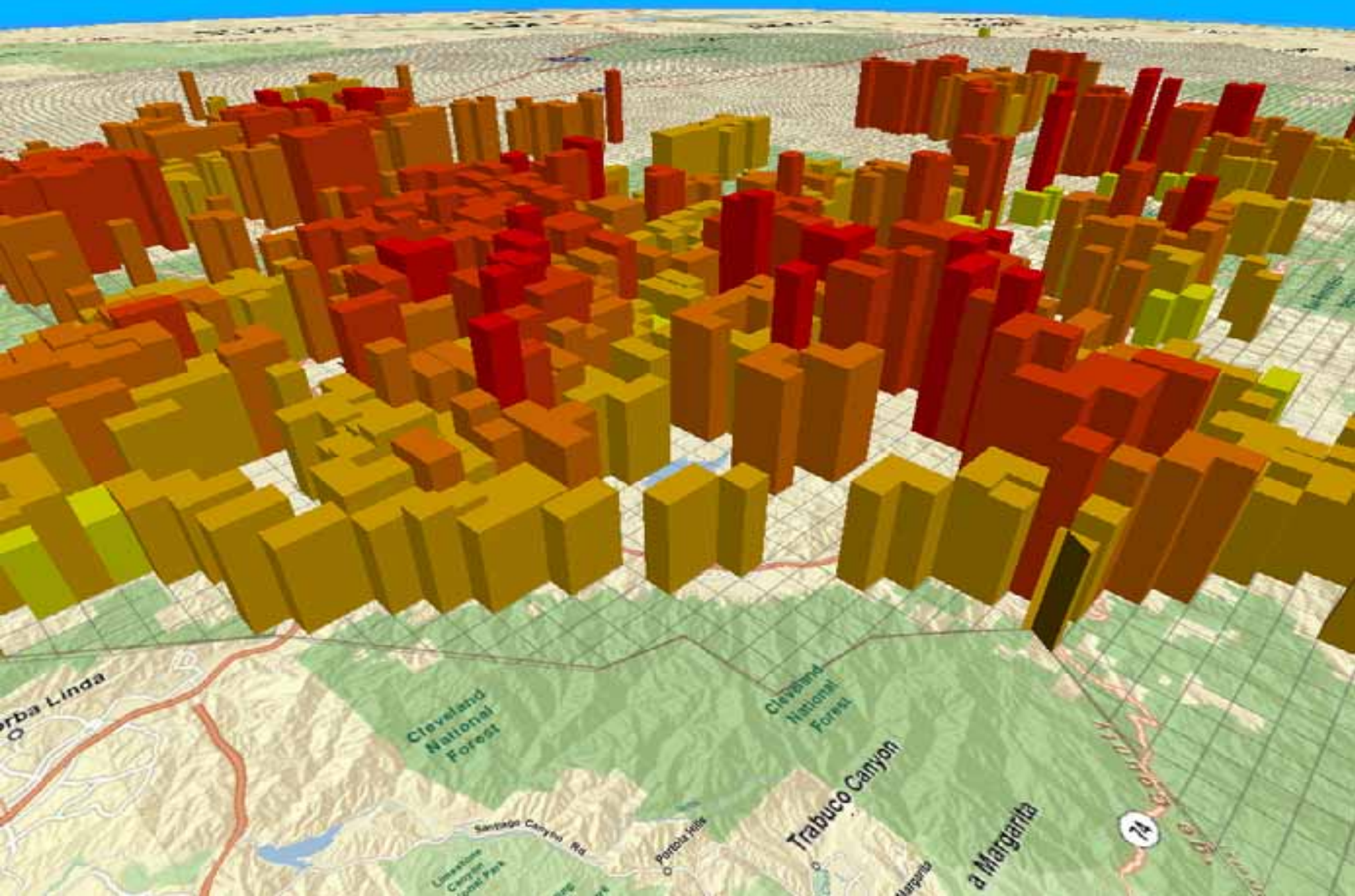


## 2003 Q3





2006 Q3





2008 Q3

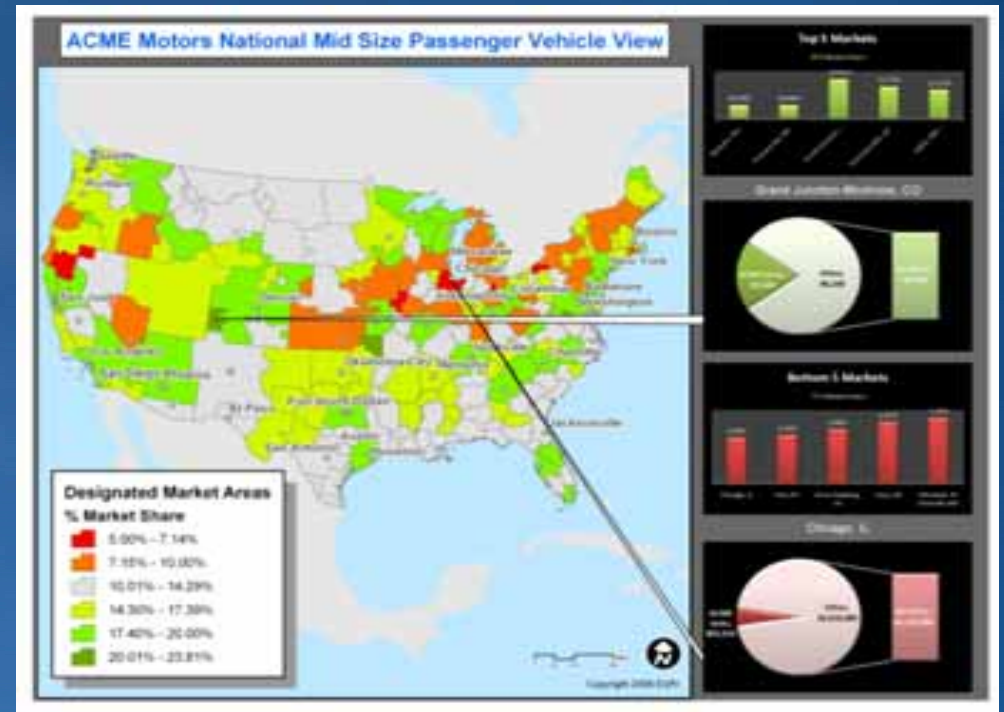
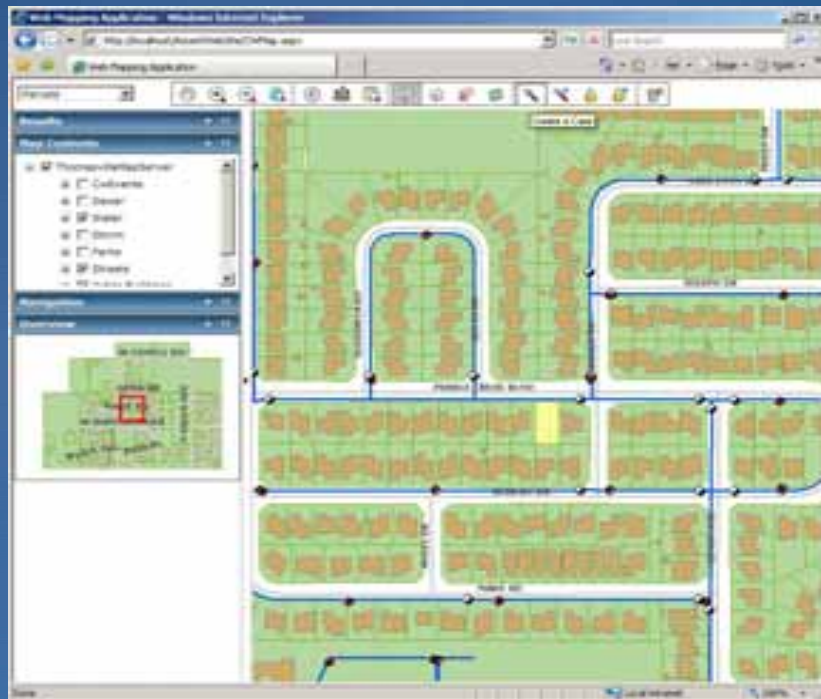


# GIS in everyday life



# Complimentary systems to a GIS

- Customer relationship management (CRM)
- Business intelligence (BI)
- Work order management
- Permitting
- Executive dashboards



# Customer Services

AAA Maps & Directions - Microsoft Internet Explorer

**Maps & Directions** [Join AAA](#) [Legend](#) [Save](#) [Fly To](#) [Preferences](#) [Help](#)

AAA Maps, Directions & TourBook Information [Plan Trip](#) [New Map](#) [Directions](#) [Travel Info](#) [Print](#)

**Trip Itinerary**

1. San Diego, California
2. Redlands, California

**Estimated Time:** 1 hr, 36mins.  
**Total Distance:** 110.2 miles (177.3km)  
**Detailed Maps:** 2

**Driving Directions** [Map: Origin](#)

**Segment:** San Diego, California to Redlands, California  
**Distance:** 110.2 miles (177.3 km)

1. Start out heading **EAST** on **BROADWAY** towards **100 AVENUE**. Drive for 0.4 miles.

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http://www.childlocate.co.uk

**Child Locate** [Home](#) [Tell us](#) [Contact us](#)

Peace of mind for parents, safety for children

100,000 children under the age of 16 go missing every year in the UK!

**Why ChildLocate?**

ChildLocate addresses the worry the parents need to know where their children and other family members are. As well as all existing mobile phones on Vodafone, 3, Mobile and all (available on Orange only).

No new Hardware to Purchase, No Upgrade required.

ChildLocate operates securely for the whole family.

**Service Description:**

- 24/7 24/7 subscription
- Register up to 8 mobile phones per family group
- 10 inclusive (per min) minutes
- 10 inclusive Text (per min)

**Your Payment**

100% guaranteed by the bank

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**Select For Display** [What's this?](#)

- ☒ Lodgings
- ☐ Restaurants
- ☐ Attractions
- ☐ Campgrounds
- ☐ Events
- ☐ Show Your Card & Save Partners
- ☐ AAA/CAA Offices
- ☐ Approved Auto Repair
- ☐ Area Description
- ☐ Hertz Rental Centers

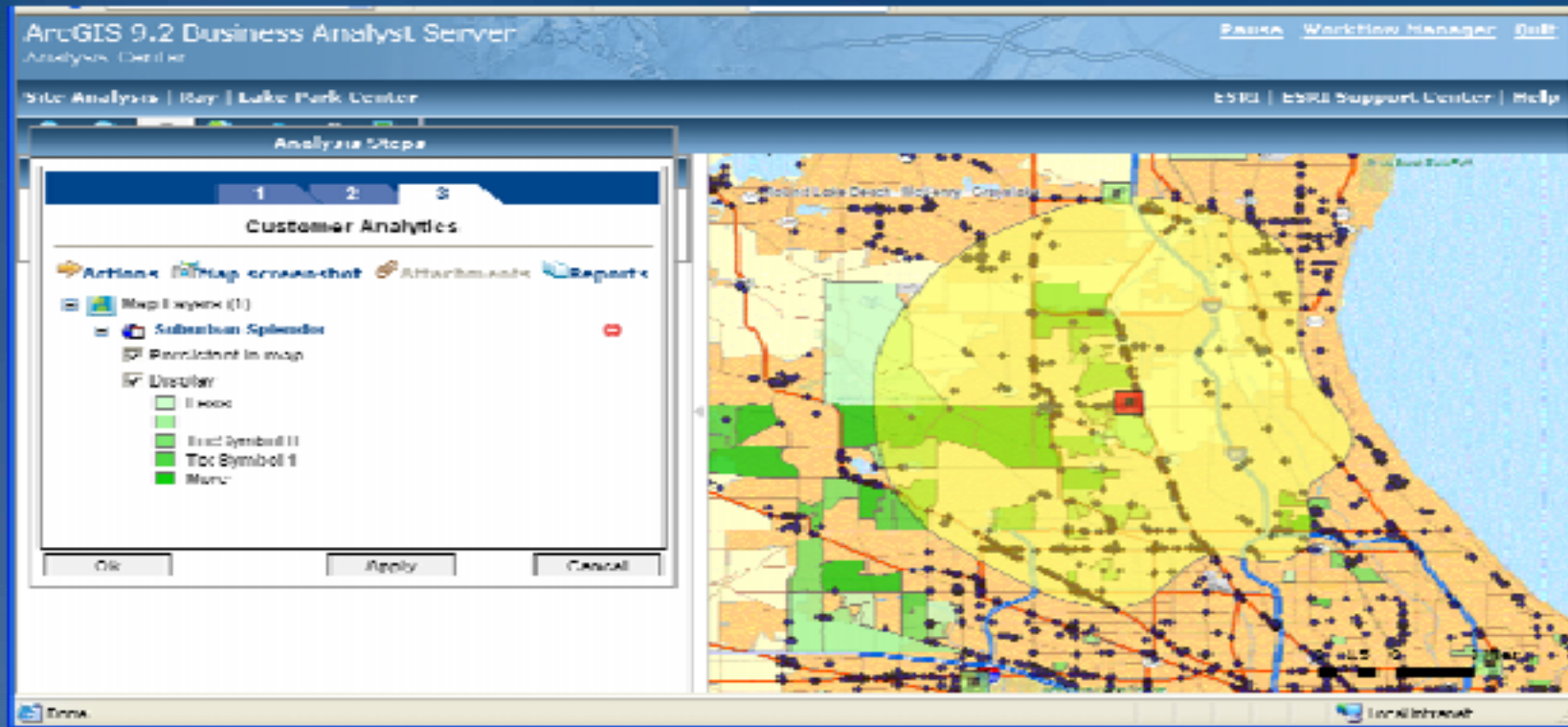
**AAA Approved Lodgings**

Name	Rating	Add to Trip
Best Western Bayside Inn	☆☆☆	Add
Best Western Cabrillo Garden Inn	☆☆☆	Add
Comfort Inn-Downtown	☆☆☆	Add
Comfort Inn-Gaslamp	☆☆☆	Add
Days Inn Harbor View	☆☆☆	Add
Days Inn-Rock/Downtown/Convention Ctr	☆☆☆	Add
Embassy Suites Hotel San Diego	☆☆☆	Add
Hampton Inn-San Diego	☆☆☆	Add
Hilton San Diego Gaslamp Quarter	☆☆☆	Add
Holiday Inn Harbor View	☆☆☆	Add
Horton Grand Hotel	☆☆☆	Add
Manchester Grand Hyatt San Diego	☆☆☆	Add

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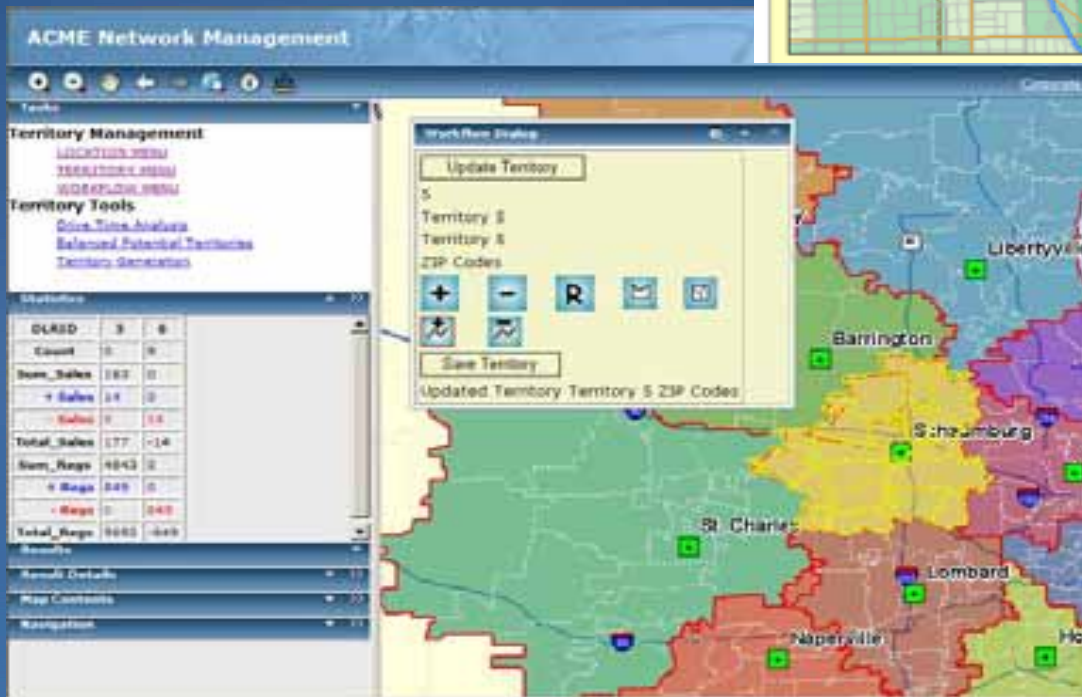
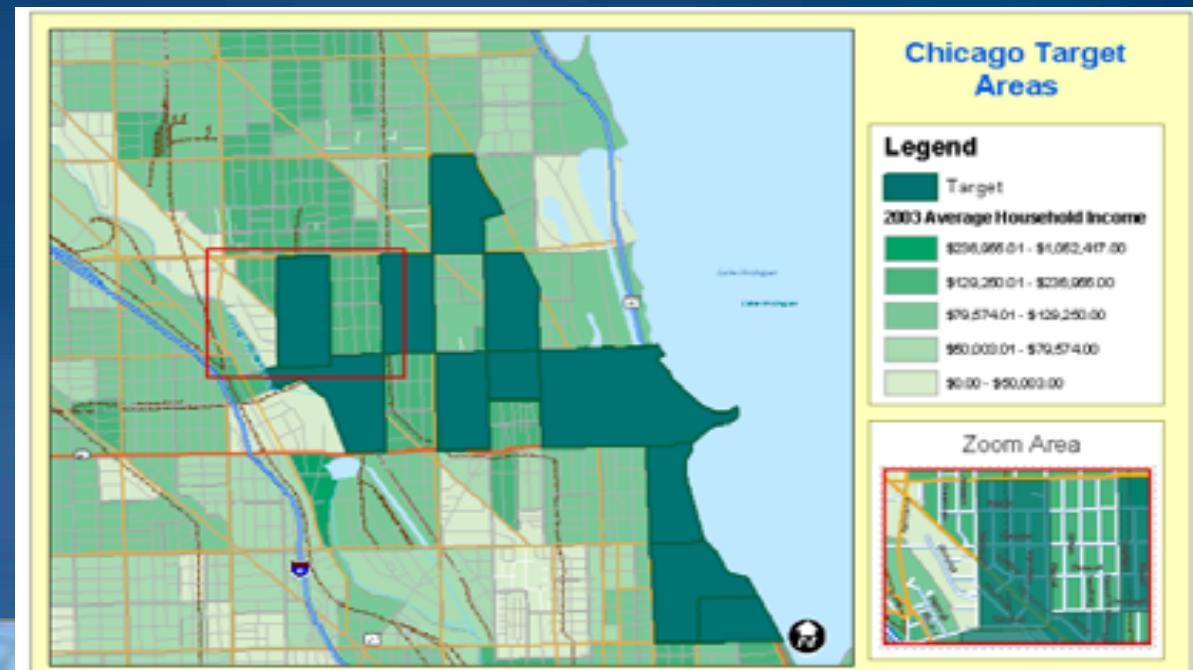
# Business



Customer analytics

# Business

## Advertising



## Sales territories management



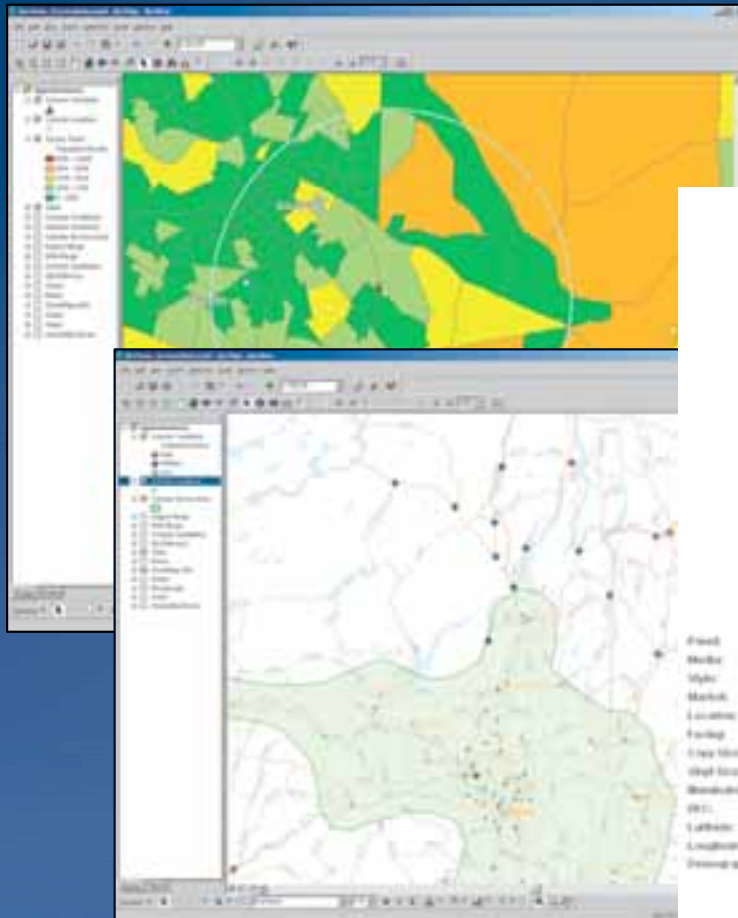
# Media



Television: News and entertainment



# Marketing and Sales



Coinstar

**LAMAR**  
Baton Rouge, LA Midco

Address: 17034  
Media: Print, Bulletin  
Style: Regional  
Market: BATON ROUGE, LA  
Location: I-10 @ MISSISSIPPI RIVER BRIDGE  
Facing: East  
Size: 10' x 10'  
Height: 10' x 10'  
Structure: 100  
SKU: 07000  
Latitude: 30.4299  
Longitude: -91.13027

Westbound motorists view this right hand header on an elevated stretch of I-10 spanning the Mississippi River Bridge. Downtown attractions include the Fairgrounds, U.S. Post and Texas Museum, Louisiana Arts & Science Center, and an new State Capitol Building, and Baton Rouge's new Racing complex, Louisiana State University is also located nearby. The only of Facilities to view the bridge I-10 is the main corridor along Baton Rouge and I-10/US 90/US 190.

Lamar Advertising, Baton Rouge, LA  
Physical Address: 1800-100 Parkside Rd.  
Baton Rouge, LA 70801  
Mailing Address: P O Box 11129  
Baton Rouge, LA 70801

Lamar





# Media



## Newspapers

## Web-based news



# GIS in Government

*Endless Opportunities*





# Traditional Role of GIS in Government

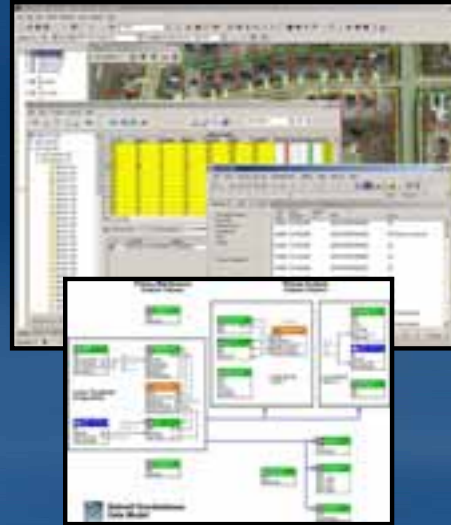
## Scenario Planning



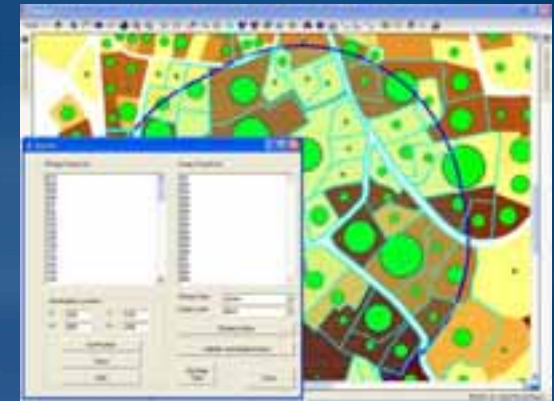
## Urban Design *Massachusetts*



## Integrated Assessment



## Property Valuation *Illinois*

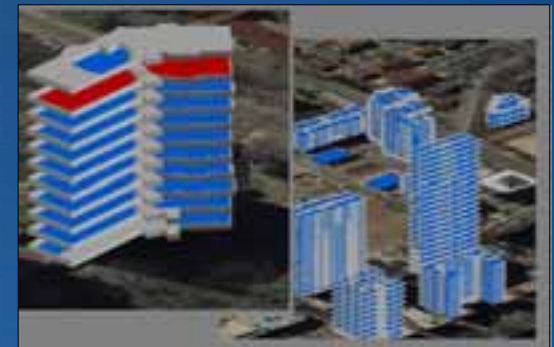


## Land Use Planning *Maryland*



## Circulation Modeling

## Vertical Tax Appraisal



## Sustaining Infrastructure *Public Works/Engineering*

# The GIS to E-Government Connection



***Open Government***



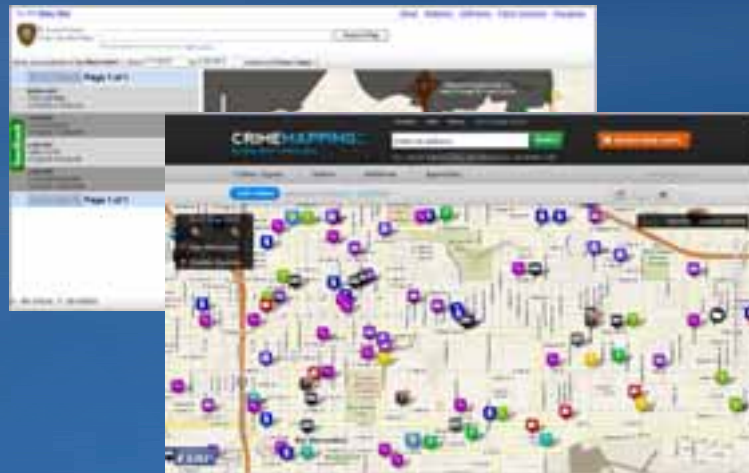
***Online Services***



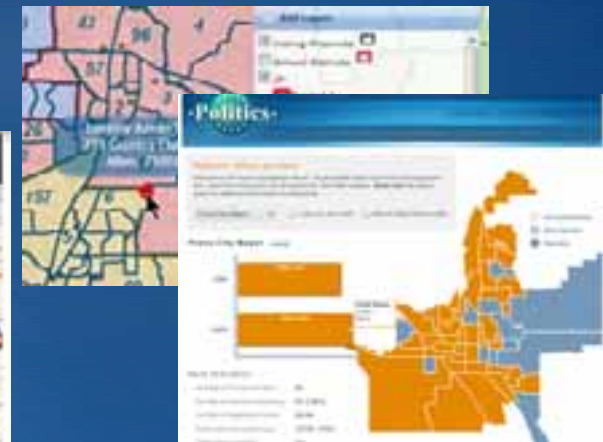
***Infrastructure***



***Economic  
Development***



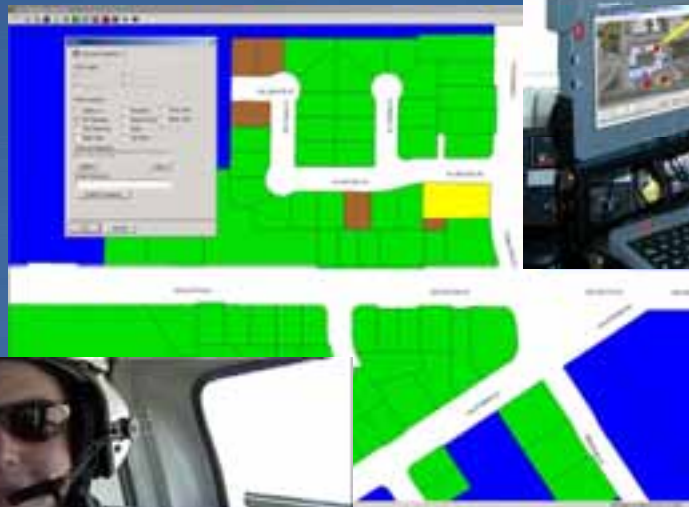
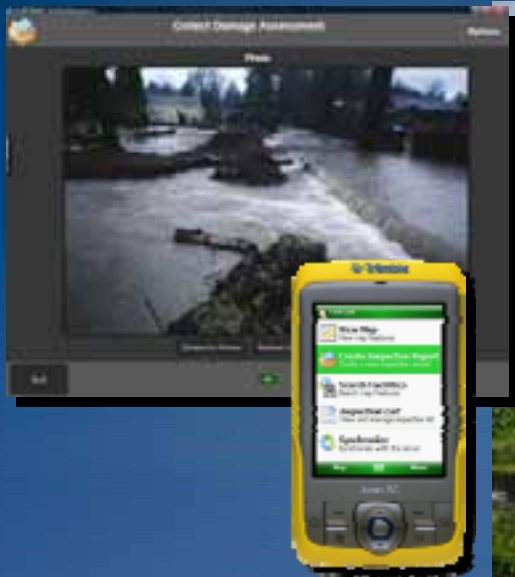
***Law Enforcement***



***Elections***



# Mobile GIS



# Law Enforcement

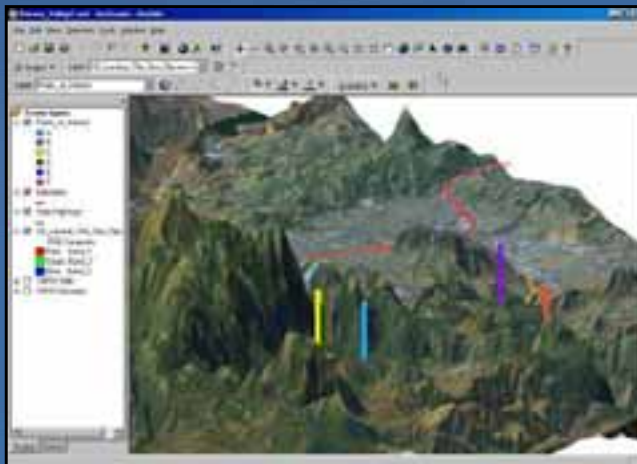
## Identify Hot Spots



Crime Analysis



Crime Tracking



U.S. Customs and Border Patrol

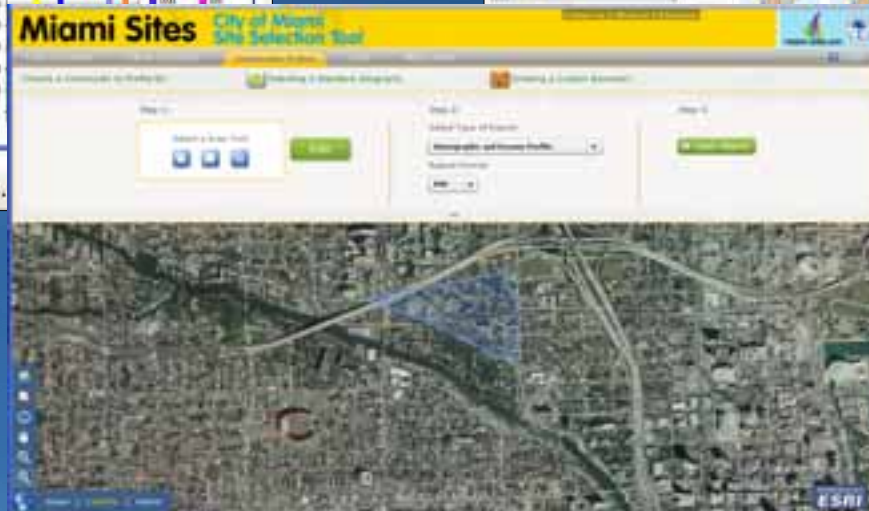
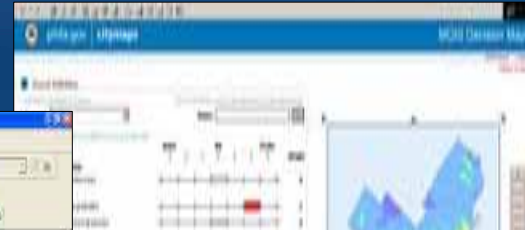
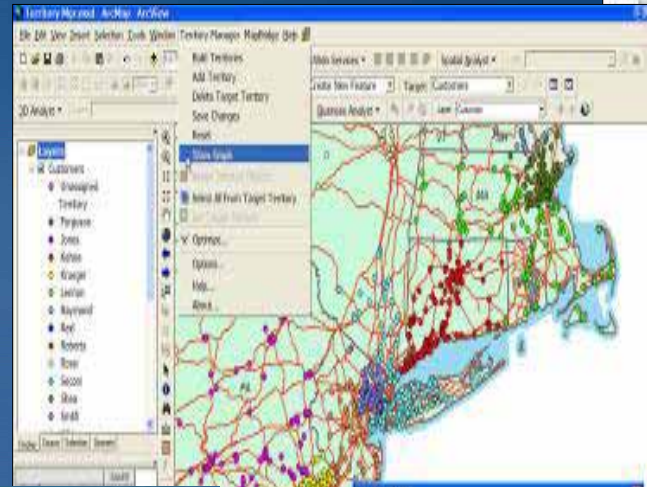
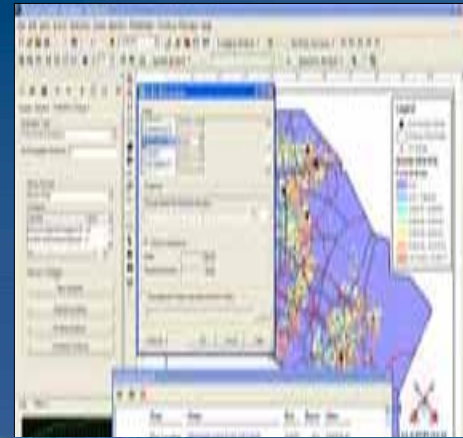


# Economic Development

## Web-Based Suitability Modeling for Economic Development

Trade Area

Site Selection



Customer Analysis

# Education

## District planning online

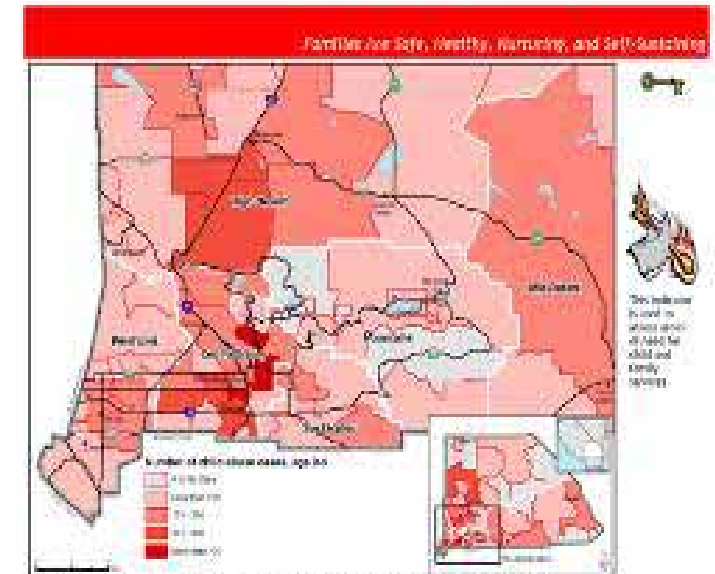
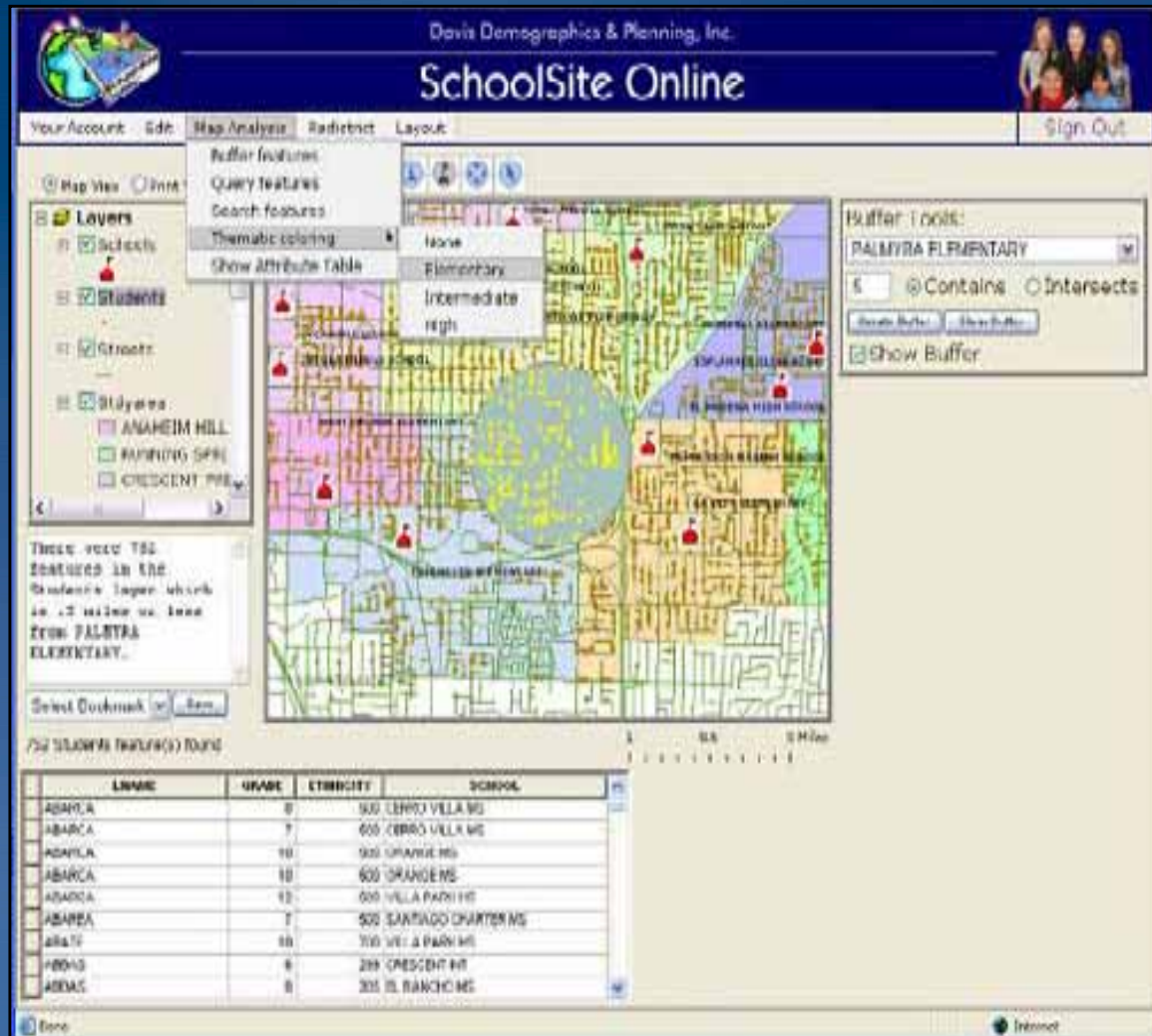


Figure 36: Number of students by age group, by district, 2001-2004

Region	2001-2004
Central Valley	1,100
East Valley	2,000
High Desert	1,500
San Joaquin	1,000
San Joaquin	1,000
San Joaquin	1,000
San Joaquin	1,000
San Joaquin	1,000

Figure 37: Number of students by age group, by region, 2001-2004

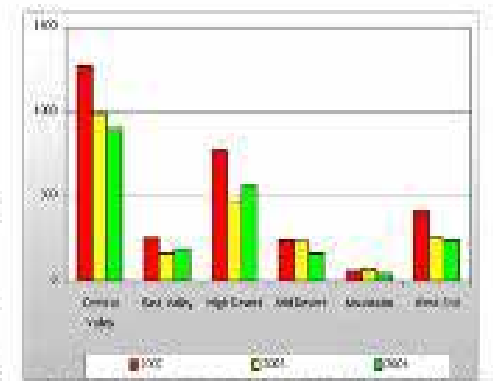


Figure 38: Number of students by age group, by region, 2001-2004

## Demographic assessment



# Mobile GIS

## Diverse application requirements

Map Visualization  
GPS and GIS Editing  
Street Navigation  
Spatial Analysis



# Not-for-profit organizations



Haiti Relief Efforts



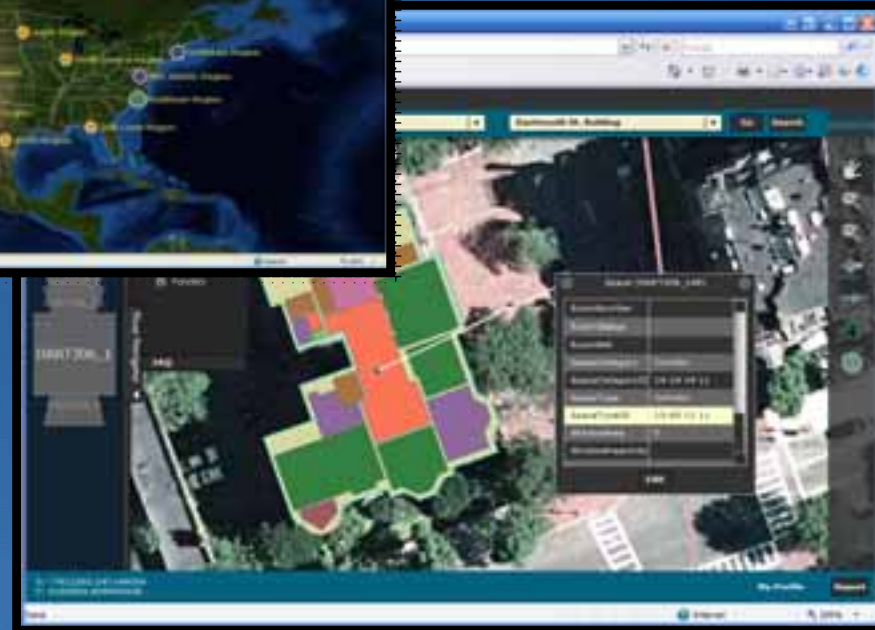
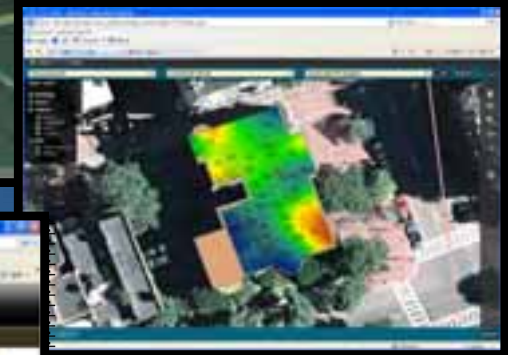
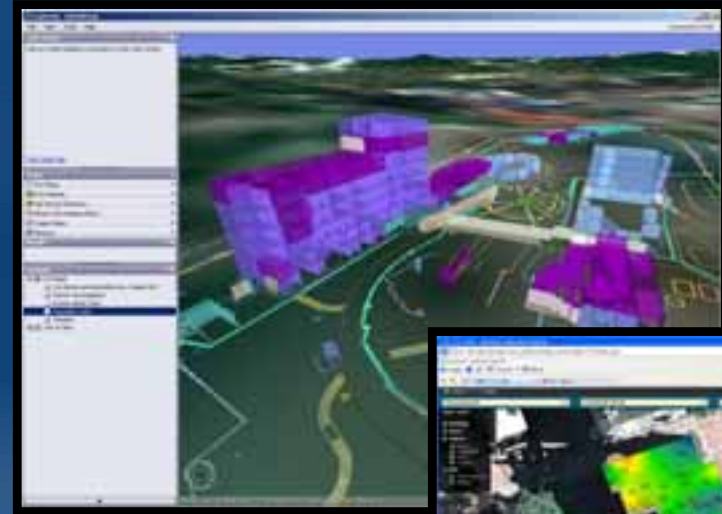
Disaster management



Incident command post

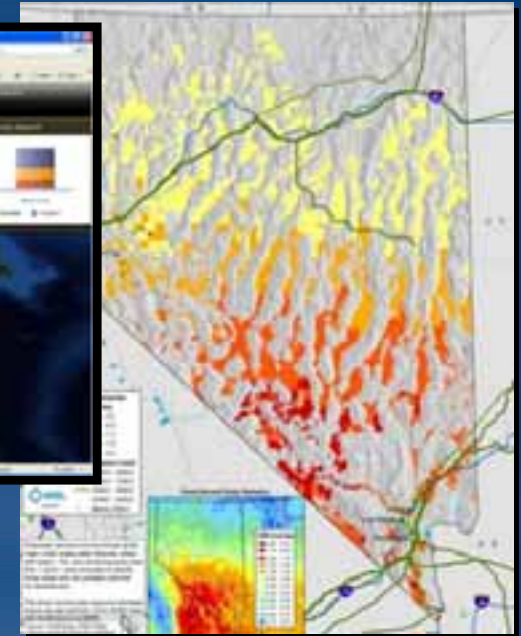


# Facilities Management



# Green Government

Solar Power Potential  
*DOE*



Public Awareness



Generation Potential



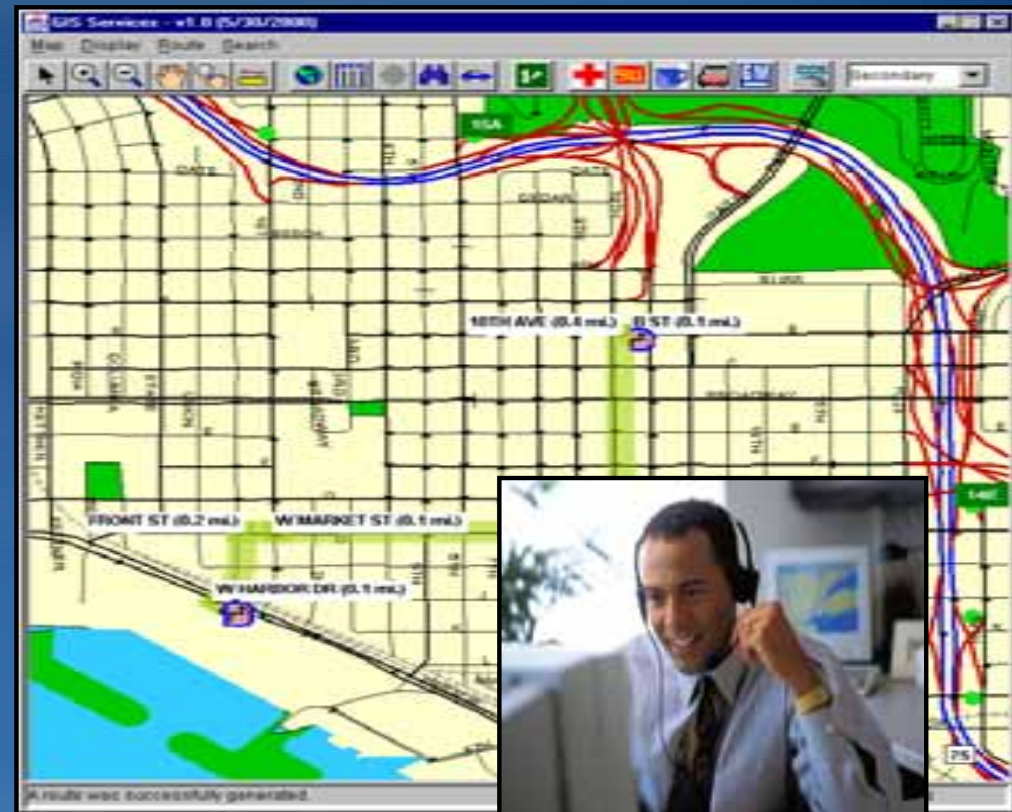
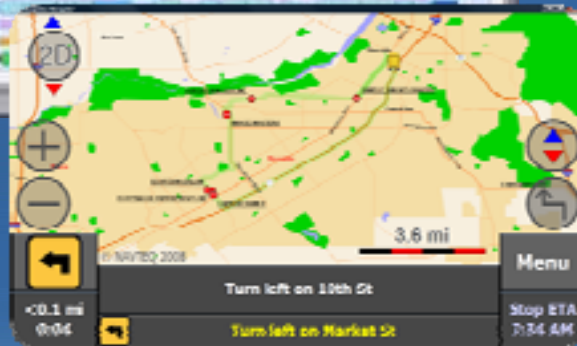
The screenshot shows a web browser window titled "Suzuki Auto Dealers - Microsoft Internet Explorer". The browser's address bar and menu bar are visible. The main content area displays a map of a city area, likely Edmonds, WA, with a sidebar on the left showing a list of addresses and a legend on the right. The map shows a grid of streets, including 1st Ave N, 2nd Ave N, 3rd Ave N, 4th Ave N, 5th Ave N, 6th Ave N, 7th Ave N, 8th Ave N, 9th Ave N, 10th Ave N, 11th Ave N, 12th Ave N, 13th Ave N, 14th Ave N, 15th Ave N, 16th Ave N, 17th Ave N, 18th Ave N, 19th Ave N, 20th Ave N, 21st Ave N, 22nd Ave N, 23rd Ave N, 24th Ave N, 25th Ave N, 26th Ave N, 27th Ave N, 28th Ave N, 29th Ave N, 30th Ave N, 31st Ave N, 32nd Ave N, 33rd Ave N, 34th Ave N, 35th Ave N, 36th Ave N, 37th Ave N, 38th Ave N, 39th Ave N, 40th Ave N, 41st Ave N, 42nd Ave N, 43rd Ave N, 44th Ave N, 45th Ave N, 46th Ave N, 47th Ave N, 48th Ave N, 49th Ave N, 50th Ave N, 51st Ave N, 52nd Ave N, 53rd Ave N, 54th Ave N, 55th Ave N, 56th Ave N, 57th Ave N, 58th Ave N, 59th Ave N, 60th Ave N, 61st Ave N, 62nd Ave N, 63rd Ave N, 64th Ave N, 65th Ave N, 66th Ave N, 67th Ave N, 68th Ave N, 69th Ave N, 70th Ave N, 71st Ave N, 72nd Ave N, 73rd Ave N, 74th Ave N, 75th Ave N, 76th Ave N, 77th Ave N, 78th Ave N, 79th Ave N, 80th Ave N, 81st 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# Consumer Navigation



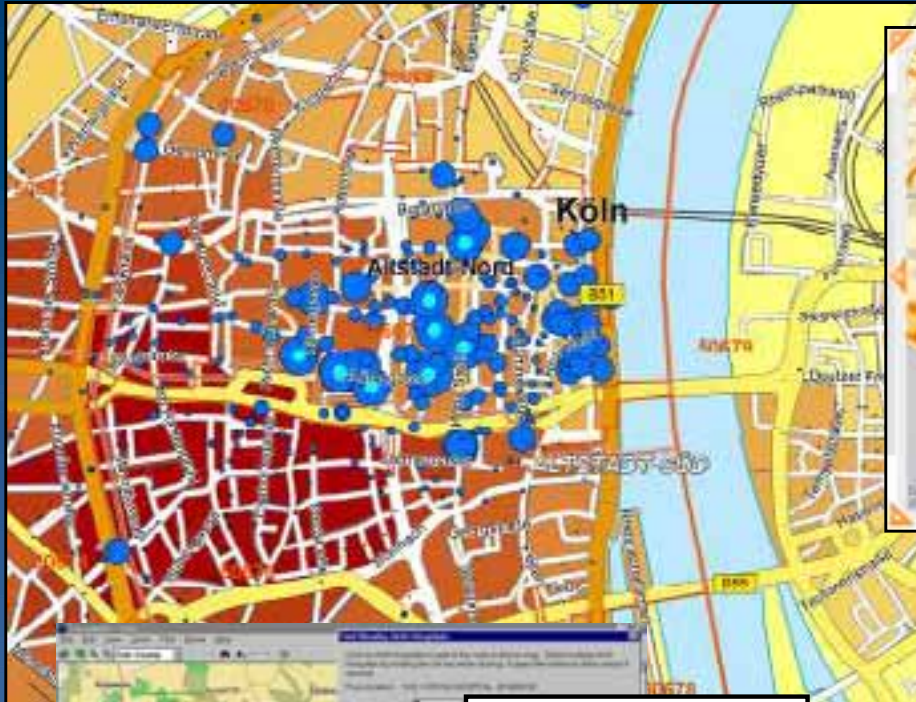
OnStar



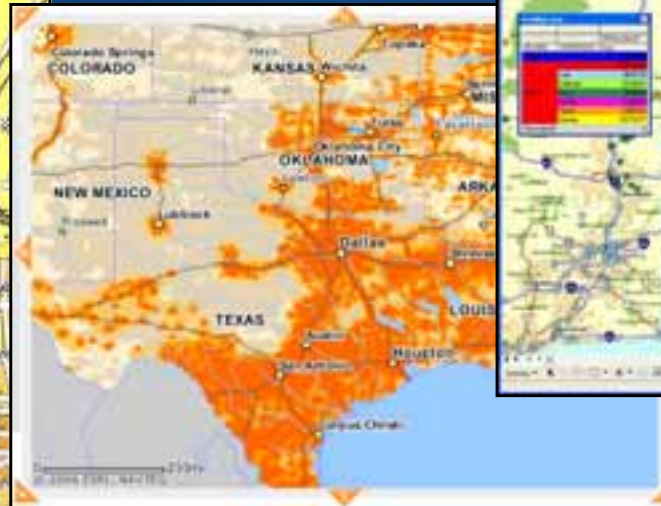


# Business

## Customer/Store Modeling



## Wireless Coverage



## Territory Analysis



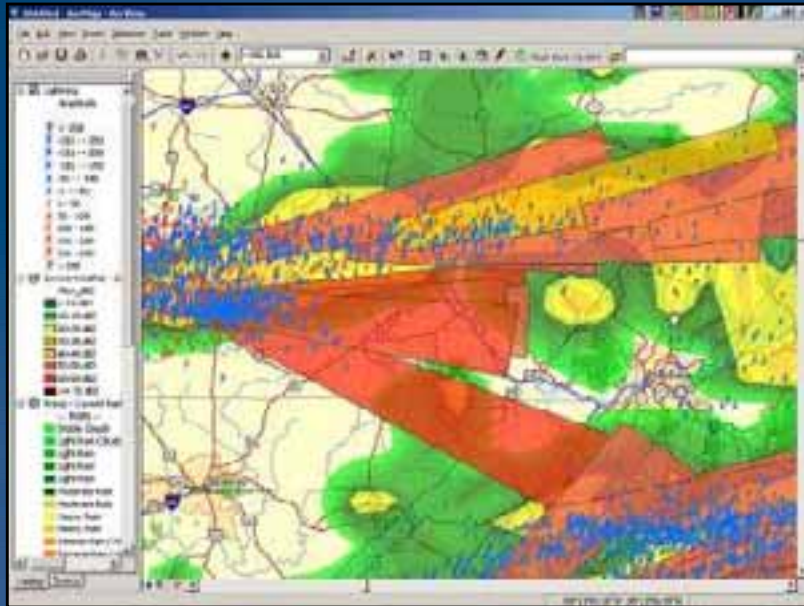
## Site Location



## Real Estate



# Weather Monitoring, Modeling, and Forecasting

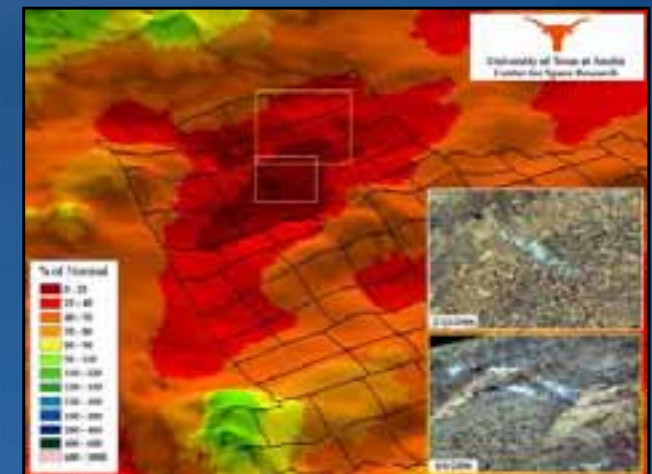


Modeling Wind Energy



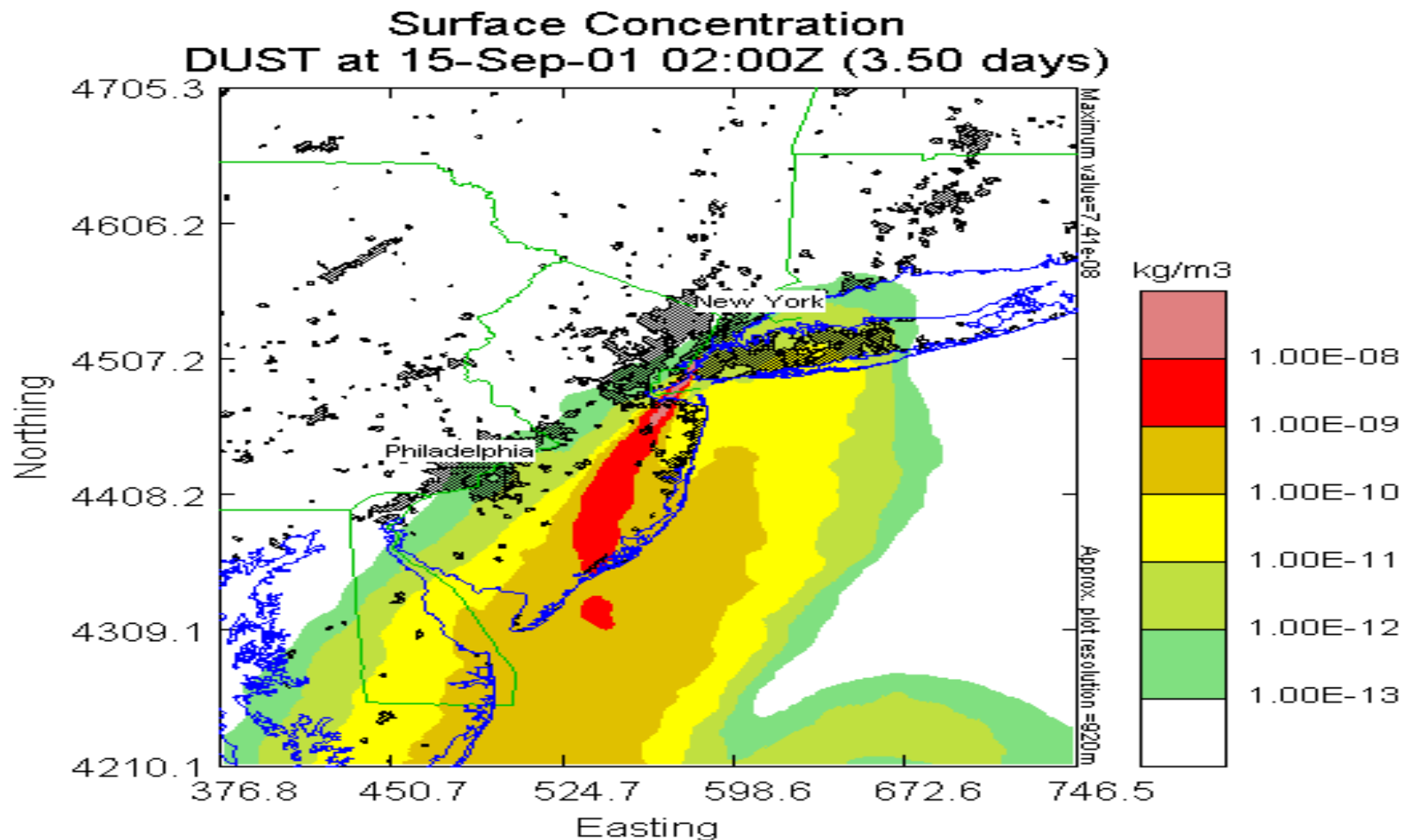
Drought Estimates

Real-time Monitoring



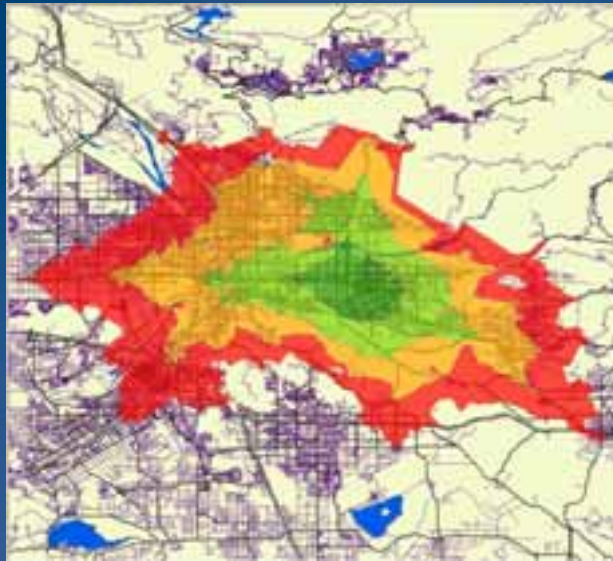
# Modeling the Plume

## Tracking asbestos, pcb's and other material movements

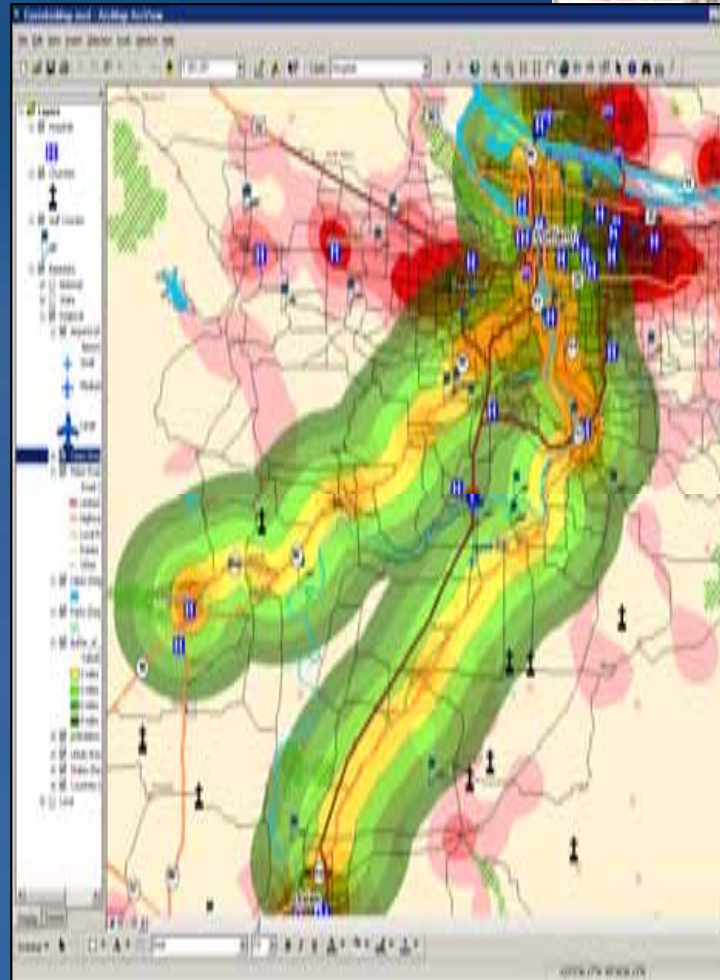




# Defense



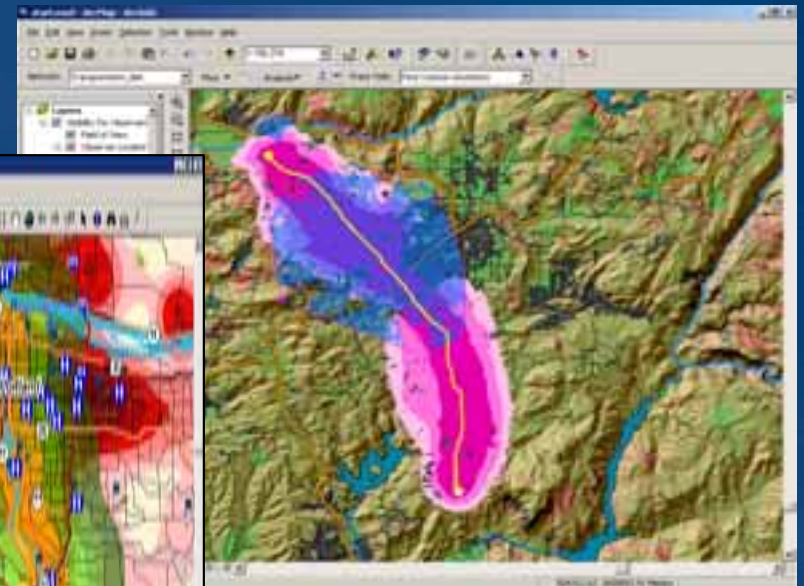
Supply Distribution



Force Protection



Disease Surveillance

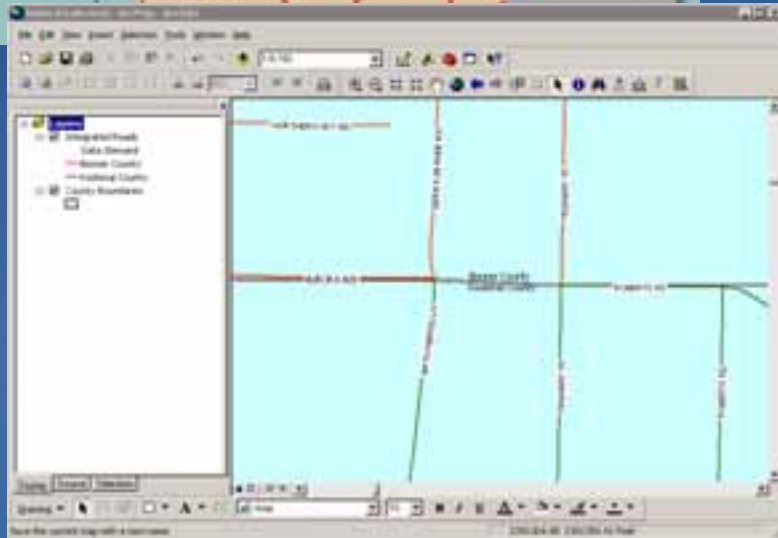


Logistics

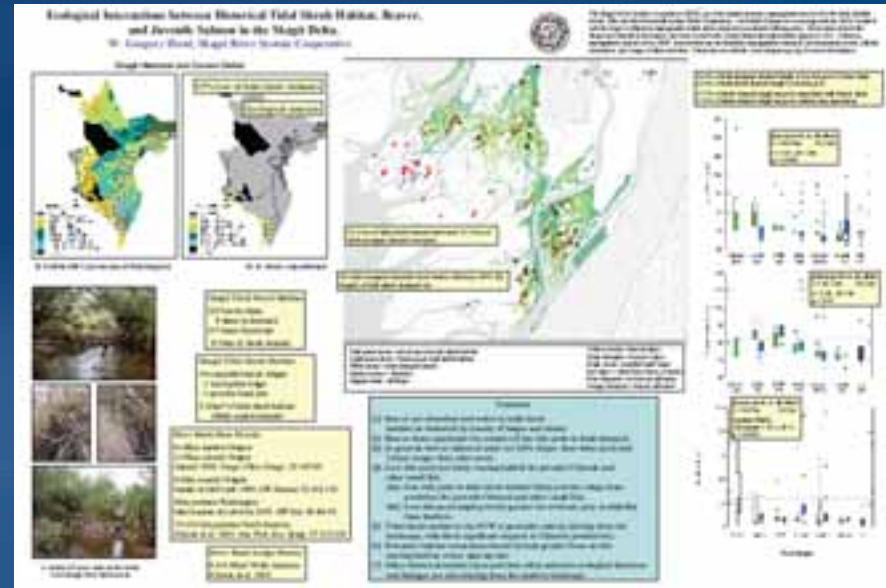


Trash/Recycling  
Container Management

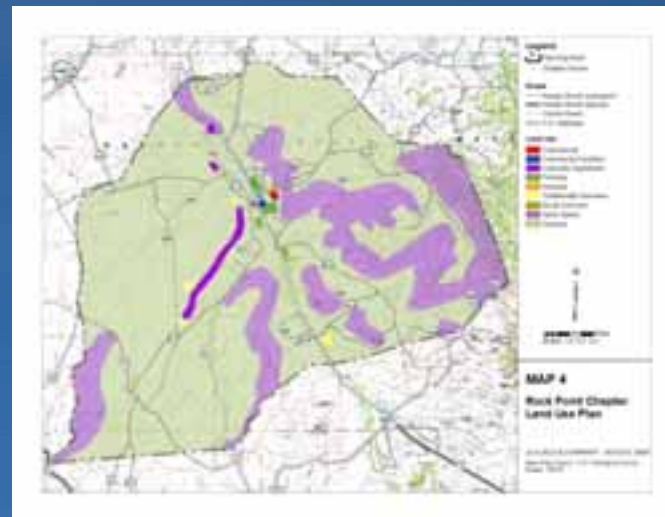
# GIS for Native Americans



Coeur d'Alene Nation



Skagit River Cooperative



Citizen Potawatomi Nation



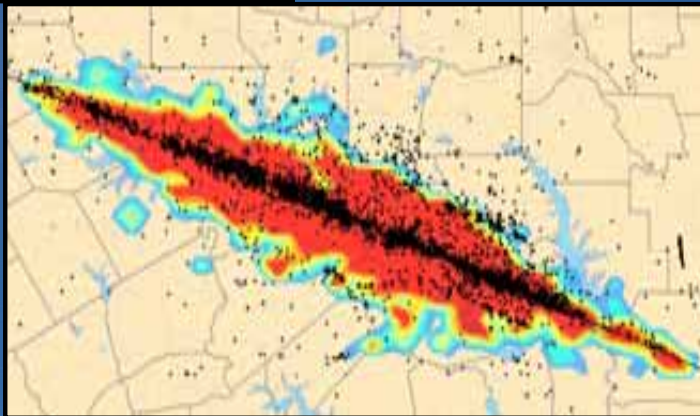
# Emergency Response



Telemedicine



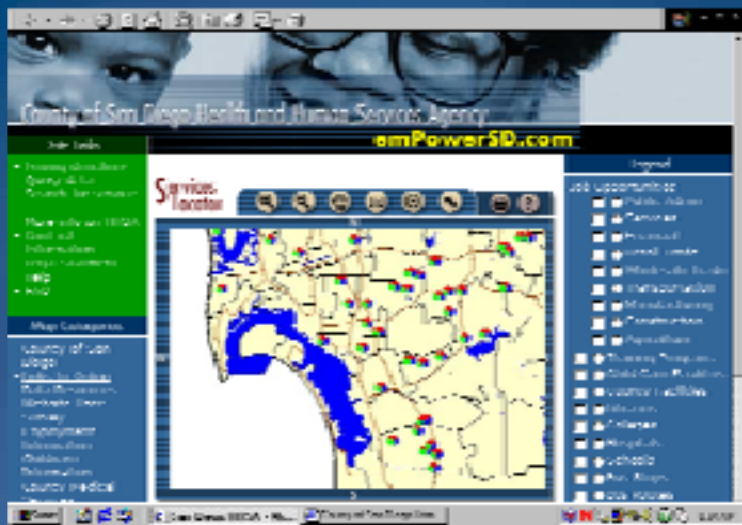
Columbia Space Shuttle  
Debris Recovery



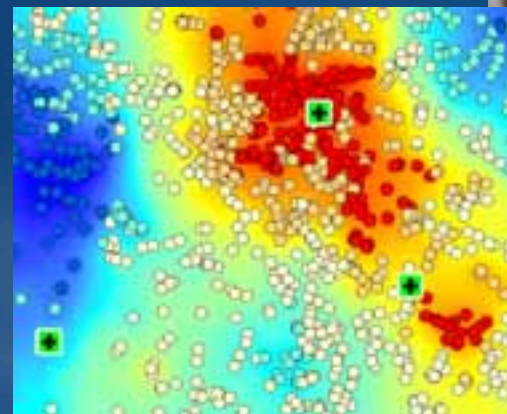


# Health and Human Services

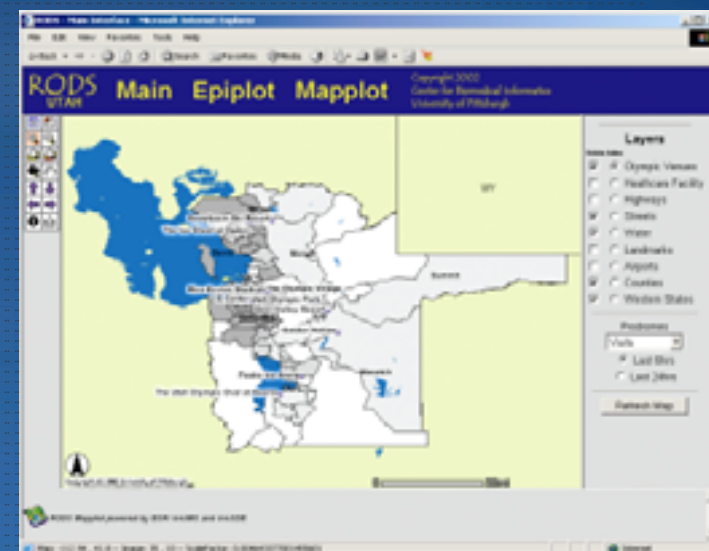
## Public Services Locator



## Health Surveillance and Monitoring



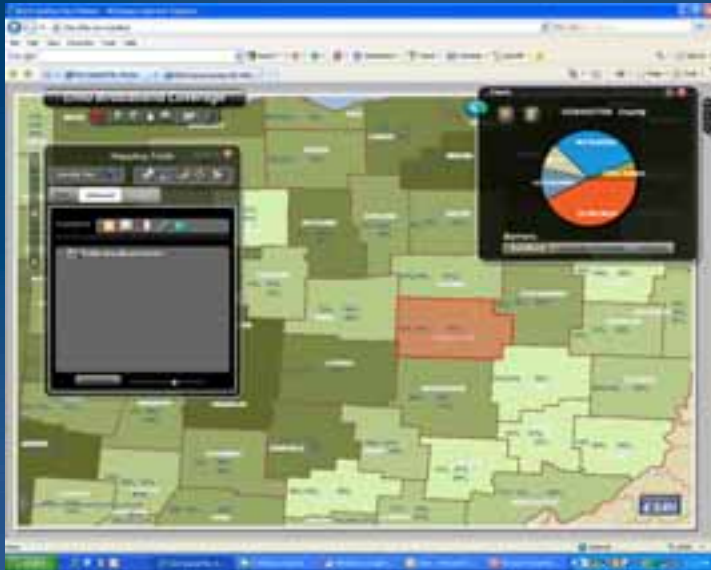
## Mapping Disease Clusters



## Health Monitoring



# Utilities



## Telecommunication

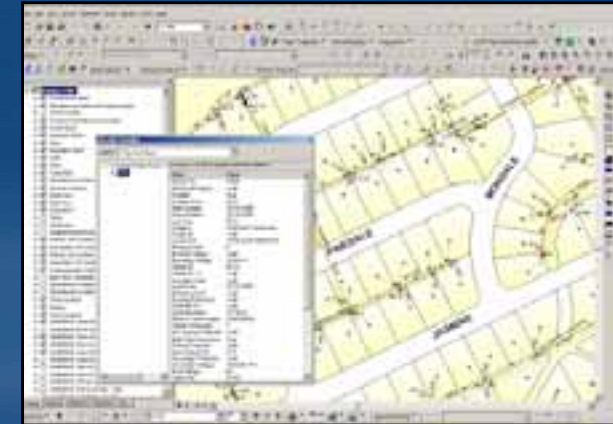
BroadBand Stat: State of Ohio



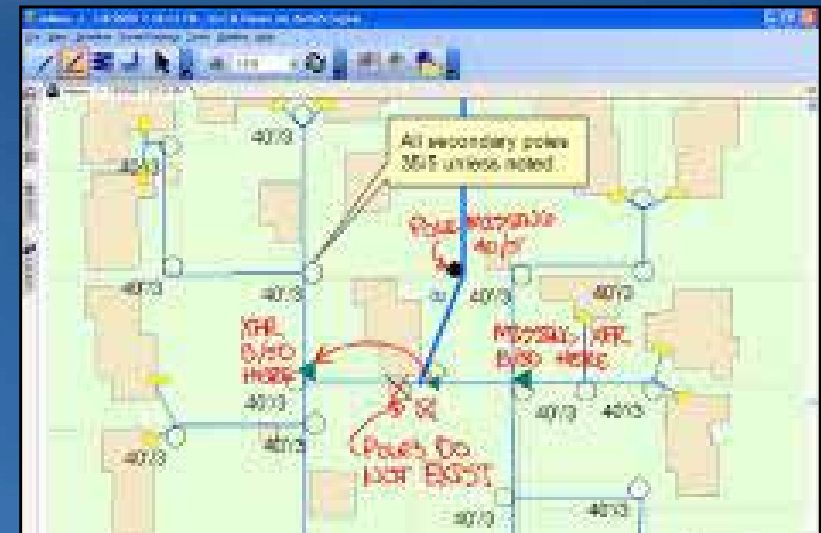
## Water & Sewer Incident reporting

## Electricity

### Asset Management



### Network Tracing



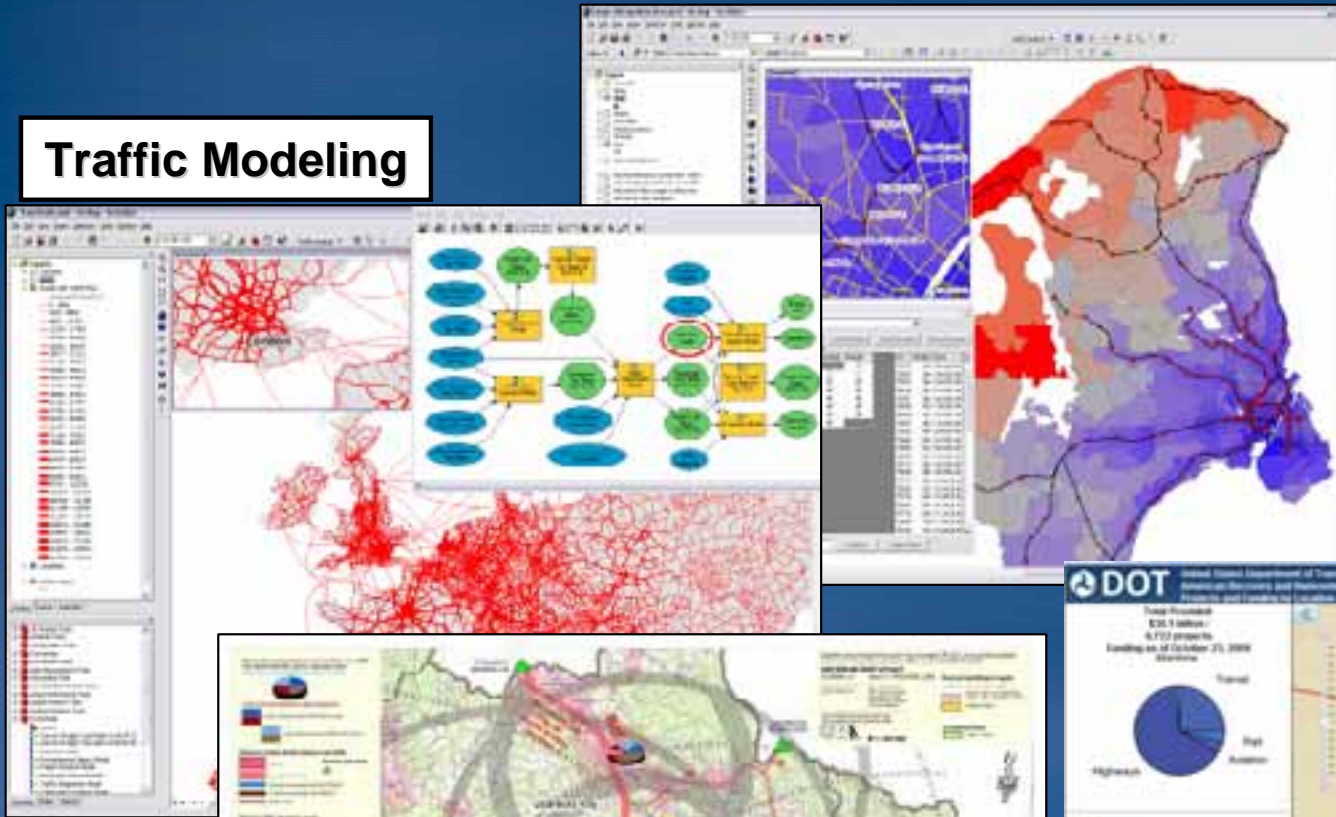
## Pipeline





# Transportation and Transit

**Traffic Modeling**



**Transit Analysis**



**Transportation Planning**

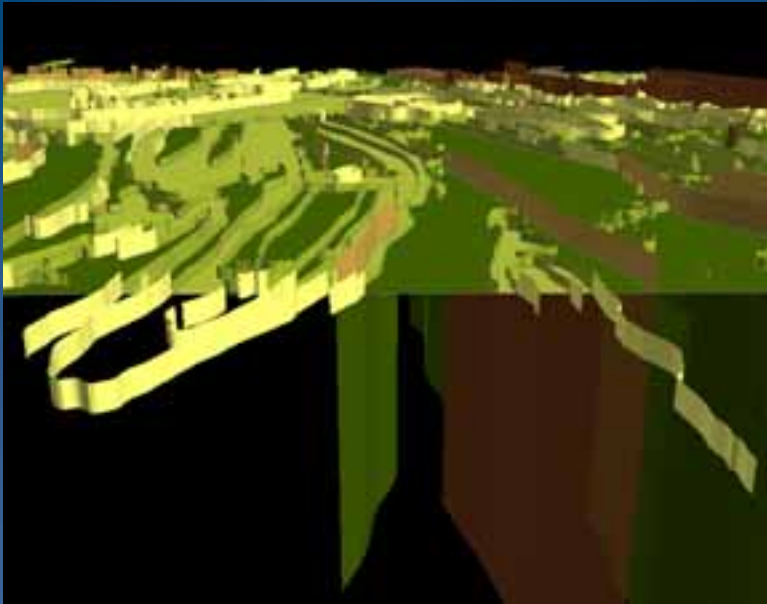


**Traffic Control**



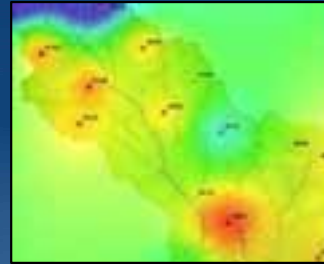
# Earth Science

## Geological Fault Lines



California

## Ground Water Modeling

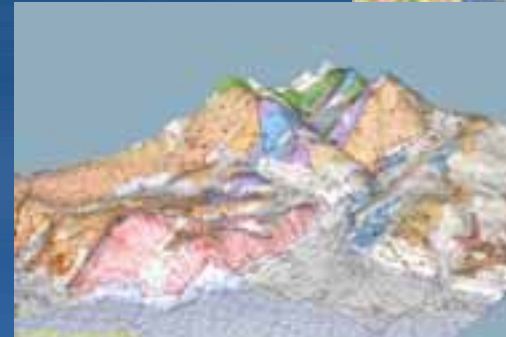


## Volcanism



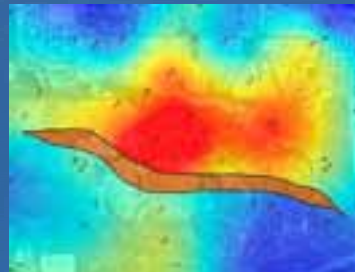
France

## 3D Geology



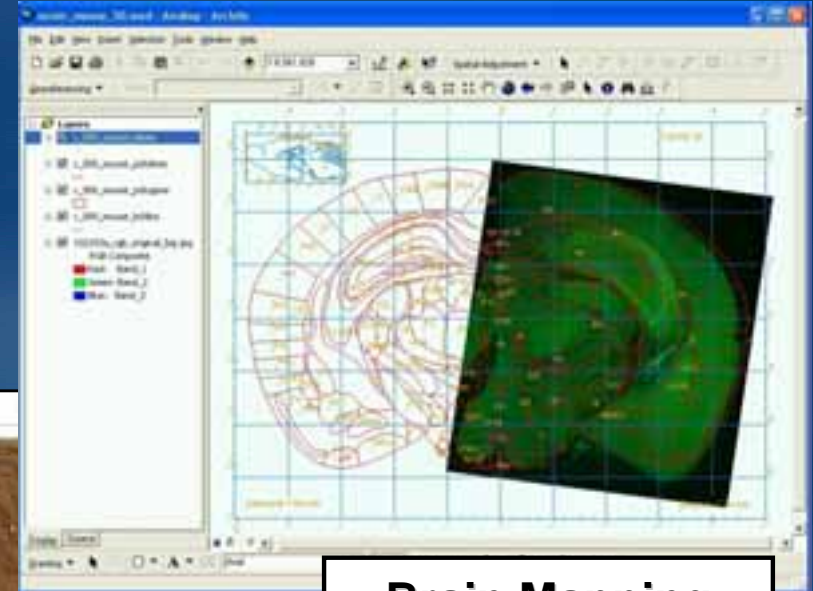
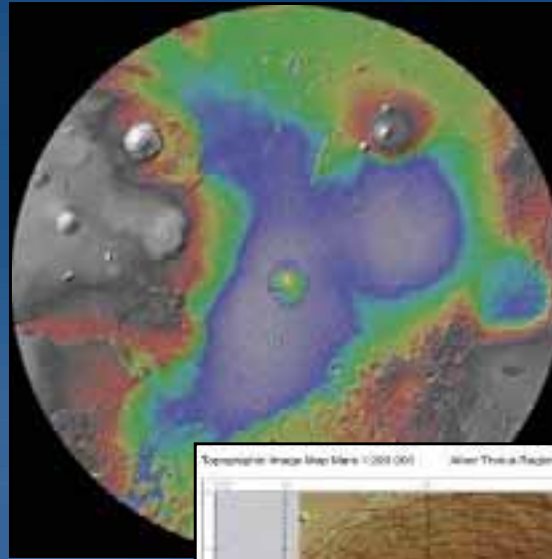
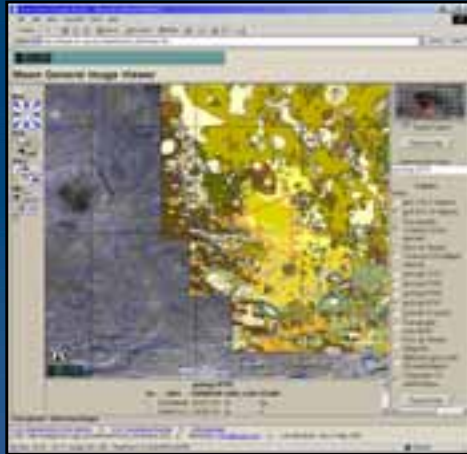
Germany

## Reservoir Modeling



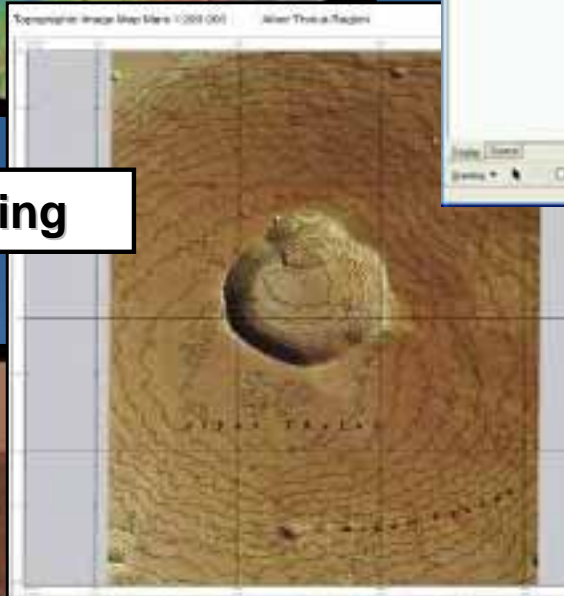
Texas

# Exploration



**Mars Mapping**

**Brain Mapping**



# Today's Presenters

- **Bill Davenhall**

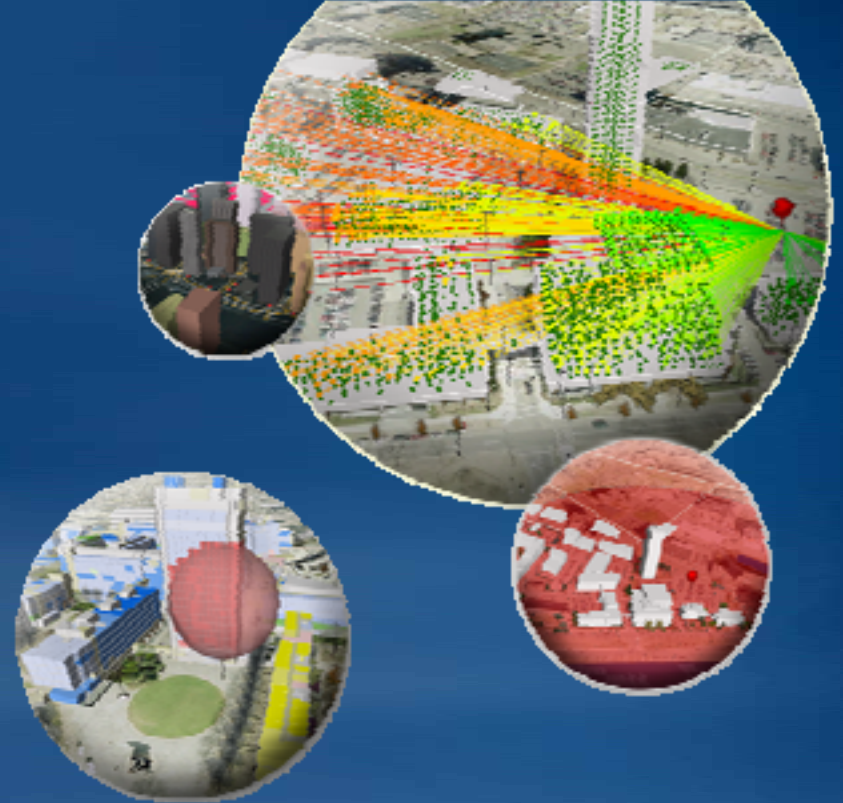
- Marketing Manager for Health and Human Services since 1997
- M.A. Degree - Medical Behavioral Science, U. of Kentucky
- Employed by medical research and healthcare organizations
- 30+ years experience as a GIS user
- Frequent author and speaker about GIS in Health



# When the use of GIS is not that obvious...

- Finding a place on an Internet map
- Getting accurate travel directions
- Identifying epidemics
- Obtaining a business license
- Determining where to build a store
- Buying home owners insurance
- Changing a workflow in an organization

# How Does GIS Work?



**... linking data to place**



# Finding a “digital” address

Street address is linked to a digital street master file

380 New York Street  
Redlands, CA 92373



Converts to this... (geographical data)

34.0575 degrees latitude  
-117.1949 degrees longitude

A street master file is typically maintained by national postal or census agencies



# Capturing a location

A specific place where something or someone is located or an event takes place....

GPS receiver used by a field data worker



Converts to this... (geographical data)

38.5026 degrees latitude

-105.0238 degrees longitude

(GPS is a system that uses geopositioning satellites to calculate place)

# Defining an “irregular” event...

Such as a hurricane, smoke plume, algae bloom in the ocean or a weather front moving across a land mass

Data from satellites is remotely collected (photos or sensors) and converted into digital shapes

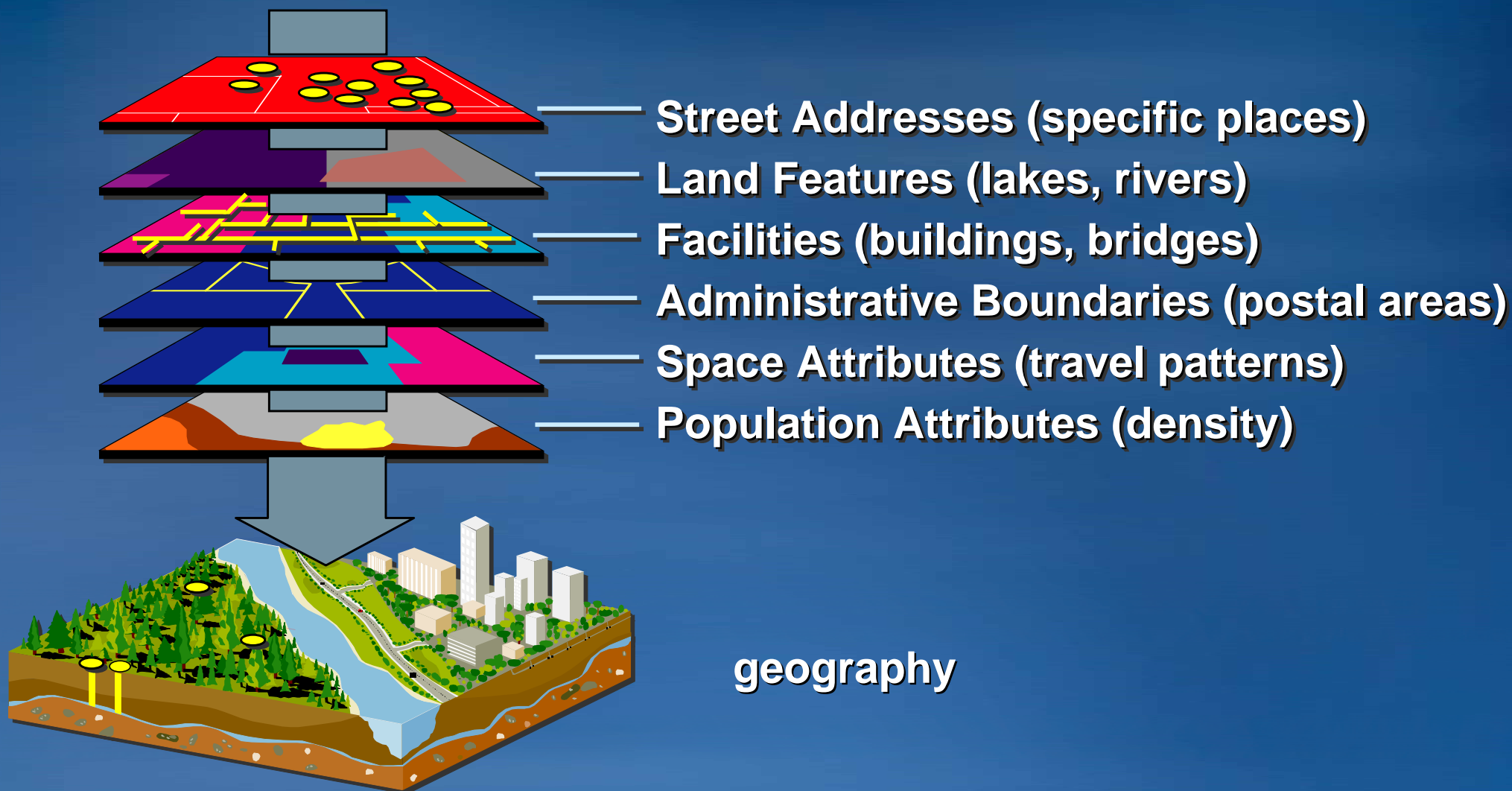


Converted into digital “shapes”

*(Public and private agencies operate satellites that collect earth images and publish geo-referenced data on a continuous basis.)*

# GIS Creates Data Layers

... that links data about our geography





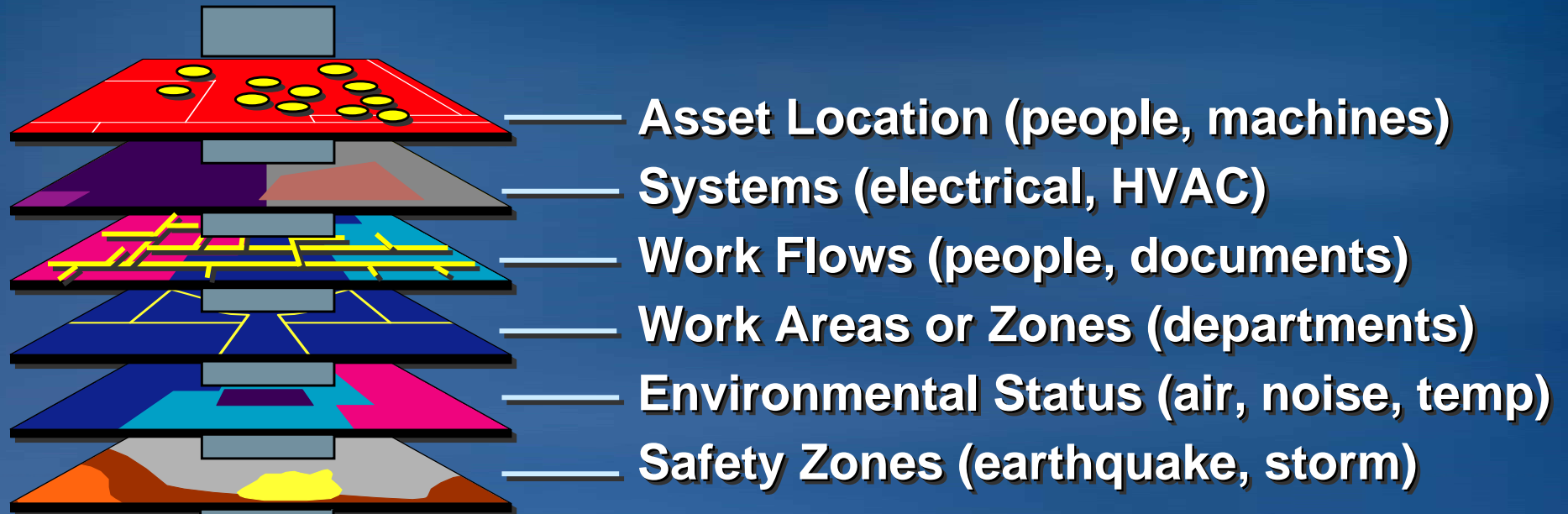
JS1

Bill-Ann already has this slide and the one following in her presentation.

Jennifer Schneider, 10/21/2005

# GIS Creates Data Layers

... that links data about our work space

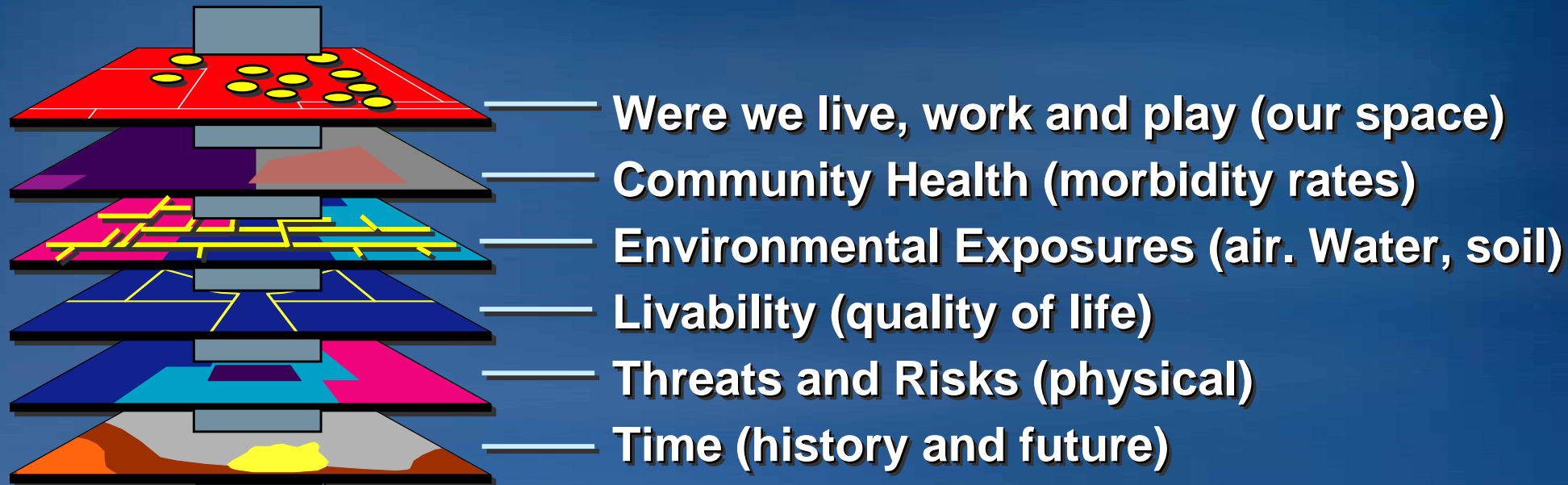


built space



# GIS Creates Data Layers

... that links data about our unique relationship with place



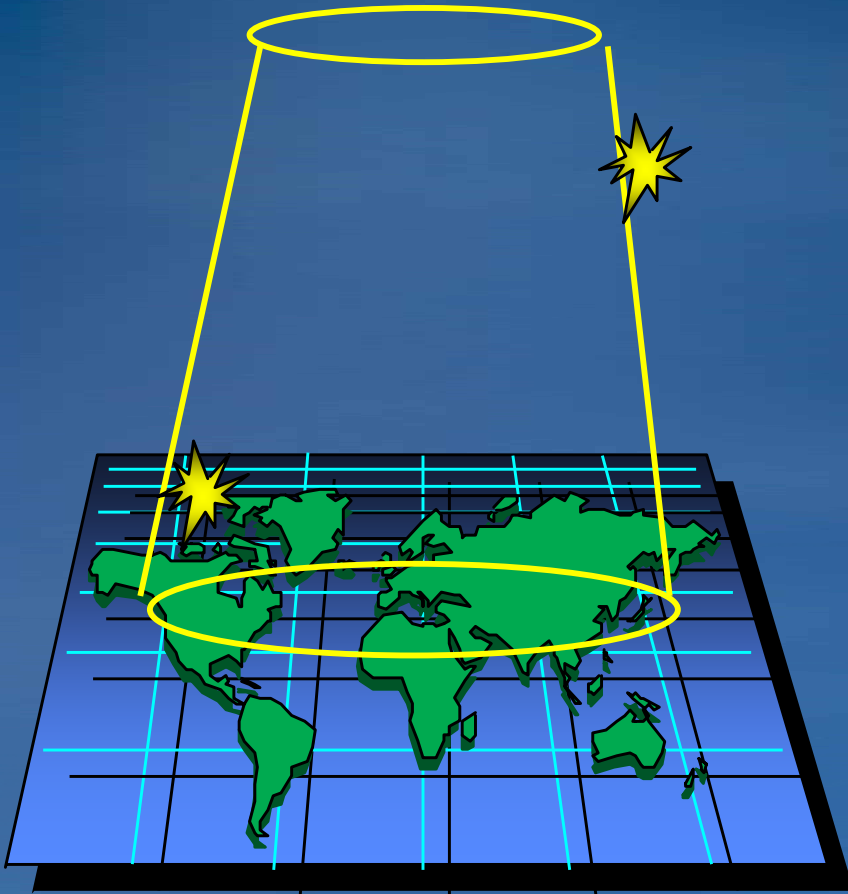
place, person, time





# In the Real World We Need to do Both . . .

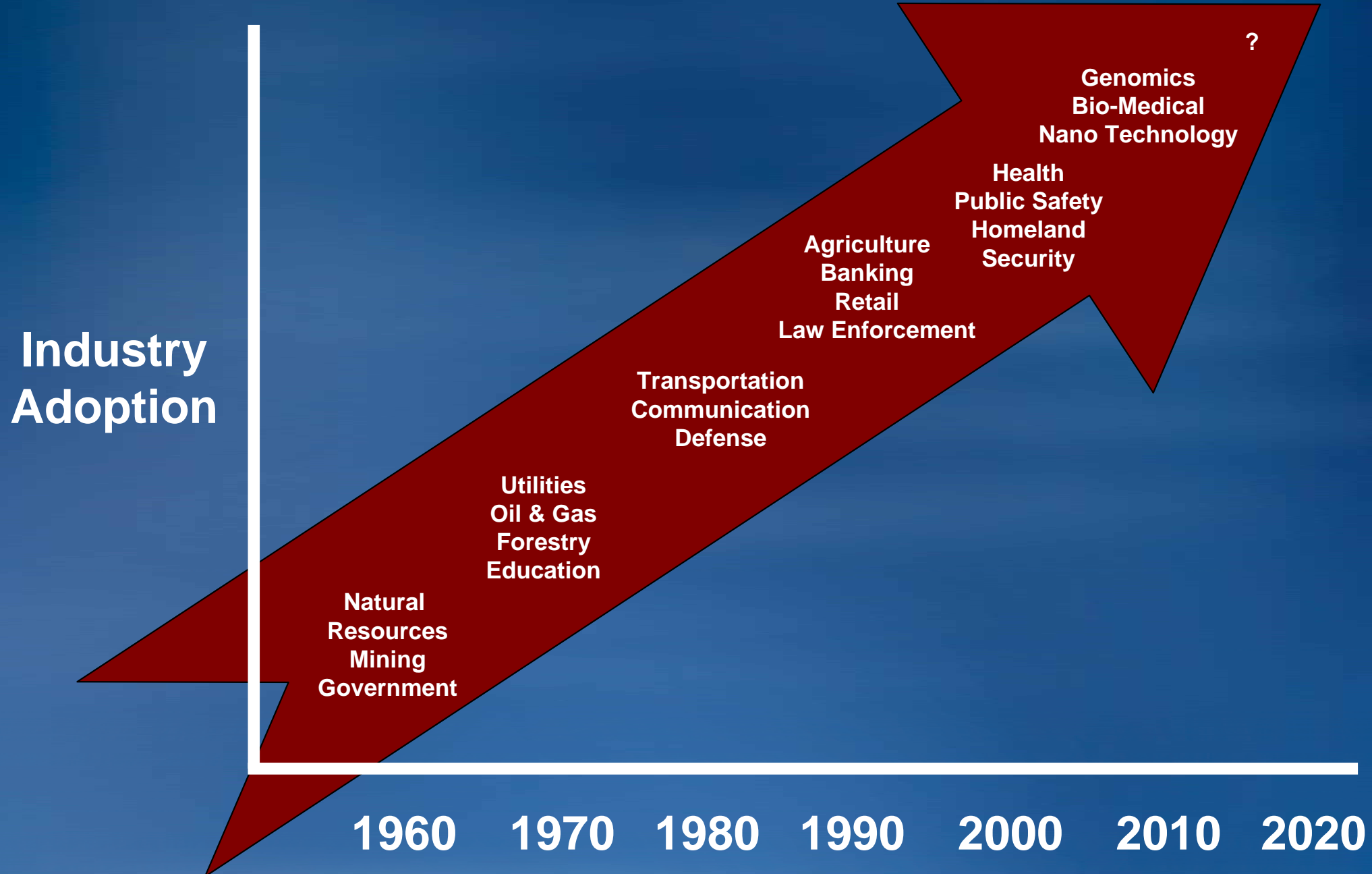
See it all



See it in context



# GIS Technology Adoption Trends



# Many benefits of using GIS...

- Save Time and Money
- Cost Avoidance
- Increase Data Accuracy
- Enhance Communication
- Generate Revenue
- Support Decision Making
- Automate Workflows
- Build Digital Databases
- Manage Assets and Resources
- Assist Consumers Locate Resources
- Improve Access to Information
- Create Compelling Maps
- Streamlining Business Processes



# Why is GIS important?

1. Integrates different types of data
2. Improves accuracy of information
3. Accelerates understanding of situations
4. Increases the intrinsic value of all information
5. Creates actionable intelligence

**[www.esri.com](http://www.esri.com)**

...company - solutions – industries – software – education – distributors – partners ...

## **ESRI Conferences and Events**

- Global
- International - Regional
- Domestic – Regional
- Industry Sector Specific

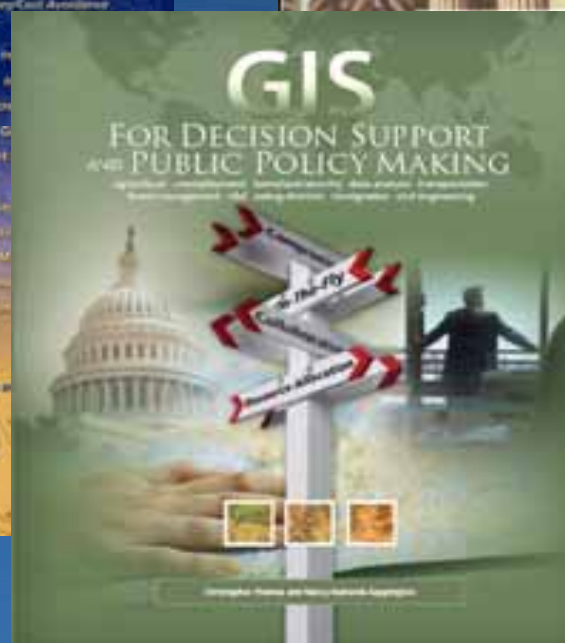
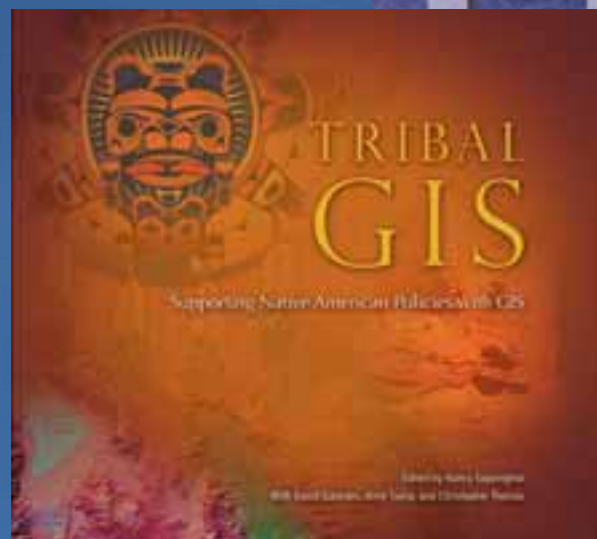
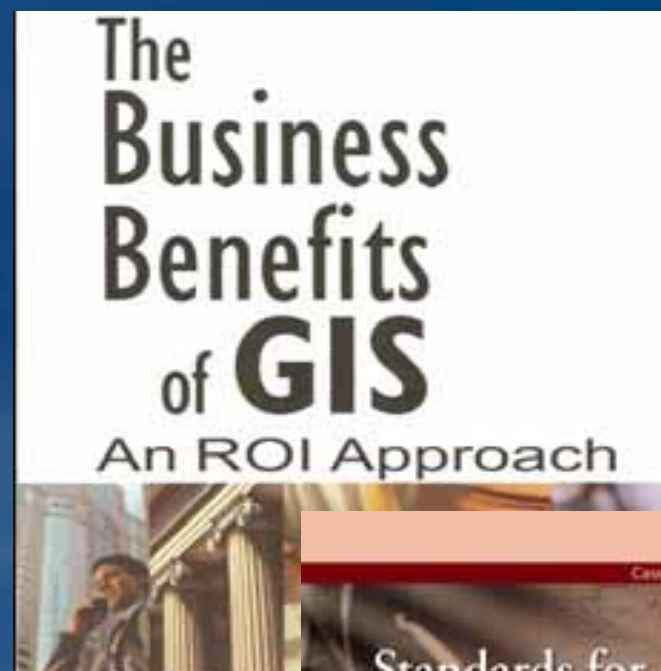
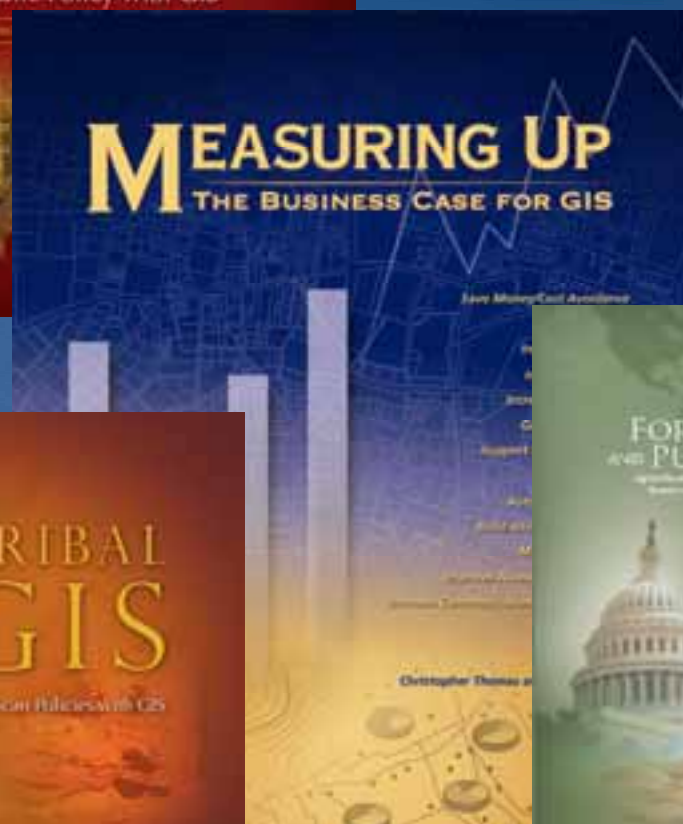
## **ESRI Publications & Information**

- ArcNews
- ArcUser
- Industry Newsletters

## **ESRI Education & Training**

- Virtual Campus
- ESRI Press

# Educational Resources





# For more information

## Web training

*Getting Started with ArcGIS Business Analyst*  
*Introduction to ArcLogistics Route*

## Instructor – led training

*Introduction to ArcGIS Business Analyst*

## Books or tutorials

*Measuring Up: The Business Case for GIS*  
*GIS Tutorial for Marketing*

## Other resources

Return On Investment

<http://www.esri.com/roi>

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...company - solutions – industries – software – education – distributors – partners ...

## **ESRI Conferences and Events**

- Global
- International - Regional
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- Industry Sector Specific

## **ESRI Publications & Information**

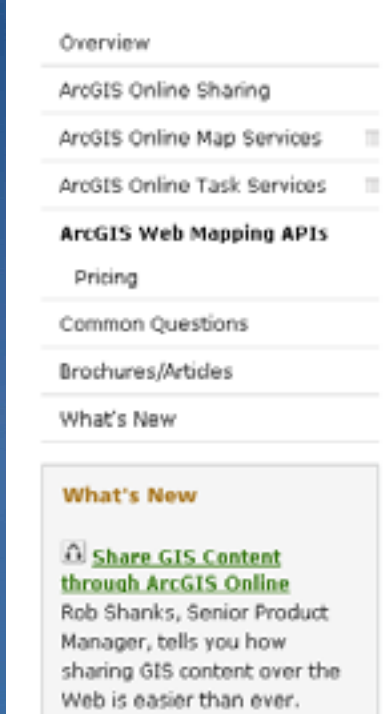
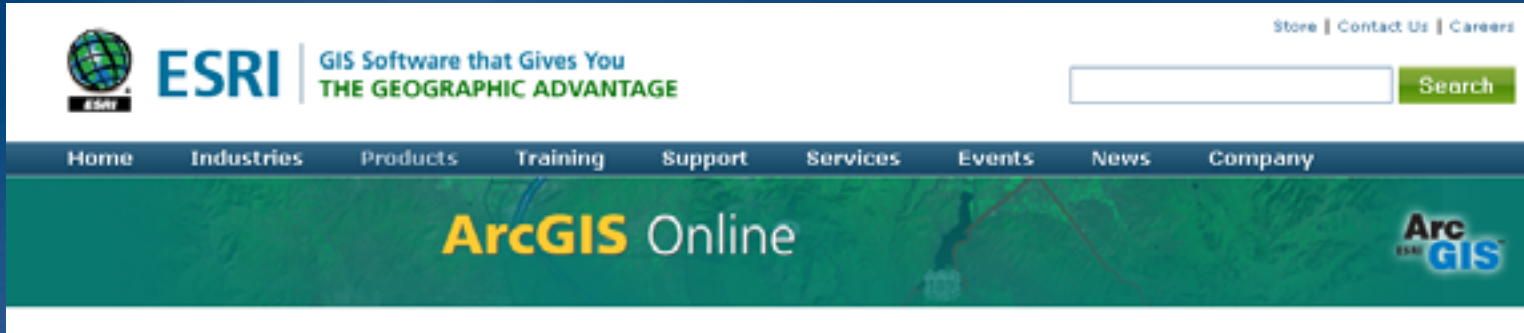
- ArcNews
- ArcUser
- Industry Newsletters

## **ESRI Education & Training**

- Virtual Campus
- ESRI Press

# ArcGIS Resource Centers

<http://resources.esri.com/arcgisonlineservices>



## ArcGIS Web Mapping APIs

**Leverage ArcGIS Web Mapping APIs** to applications and mashups that include GIS. You can access these APIs to build and deploy **internal or non-commercial use at no cost**. For commercial use applications, you must [purchase a subscription](#).

**Get started quickly** with ArcGIS Web Map

- [ArcGIS API for Flex](#)
- [ArcGIS API for JavaScript](#)
- [ArcGIS API for Microsoft Silverlight](#)

You'll have access to ArcGIS Web Mapping Started Web help, API references, code g maps.

With ArcGIS Web Mapping APIs you can al **ArcGIS Online Map and Task Services**, a subscription-based services. [ArcGIS Online](#) imagery, street, topographic and other hi [ArcGIS Online Task Services](#) include geoco demographic data analysis and reporting.





# Mapping For Everyone

[www.esri.com/mapping](http://www.esri.com/mapping)



The screenshot shows the ESRI Mapping for Everyone website. The header features the ESRI logo and the text "Mapping for Everyone". Below the header, there are navigation links: "Mapping Home", "Make a Map", "Web Mapping APIs", and "Virtual Globe". A large teal banner reads "Create and Share Maps for Free".

**Free Web Map Tools**

Anyone can use geographic information systems (GIS) to create maps and use them to make better decisions.

Explore how you can make interactive maps and share them with others:

- [Make a Map](#)—Make interactive demographic maps and share them.
- [Web Mapping APIs](#)—Create interactive maps and embed them in your Web site.
- [Virtual Globe](#)—Use the free ArcGIS Explorer download to view your spatial data and combine it with free map services.

**Mapping for Everyone Community**

See all the free map tools, lessons, and more.

Recent Community Updates:

- [How to use the free map tools](#)—Updated 10/27/10 at 10:07 AM
- [How to use the free map tools](#)—Updated 10/27/10 at 10:07 AM
- [How to use the free map tools](#)—Updated 10/27/10 at 10:07 AM
- [How to use the free map tools](#)—Updated 10/27/10 at 10:07 AM
- [How to use the free map tools](#)—Updated 10/27/10 at 10:07 AM
- [How to use the free map tools](#)—Updated 10/27/10 at 10:07 AM

[View all updates](#)

The main content area features a map of the United States with a legend for "Median Household Income". The legend shows five income ranges with corresponding colors: \$0 to \$17,999 (lightest green), \$18,000 to \$24,999 (light green), \$25,000 to \$34,999 (medium green), \$35,000 to \$49,999 (dark green), and \$50,000 to \$99,999 (darkest green). The map shows that higher income levels are concentrated in the Northeast and West Coast, while lower income levels are more prevalent in the central and southern regions. The map also includes a scale bar and a north arrow.

Try this interactive map and then [publish a map](#) you can share with others.

**...thanks for your attention  
and  
we hope you learned something  
useful about GIS today!**