

# A GIS Survival Guide for the 21<sup>st</sup> Century ... the road to ROI

Michael Funaro



# Goals

- How to get the most out of the technology you already own
- How to expand the influence of your GIS
- How to keep your GIS current & adapt it to the latest trends
- How to make your GIS an enabling technology
- How to communicate the value of GIS to your organization



# Agenda

Why we need a  
GIS Survival Guide

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Survival Techniques

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A GIS Self-Examination

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# Why we need a Timed Station Response Time GIS Survival Guide Applications Customers





why **GIS** needs a  
super hero

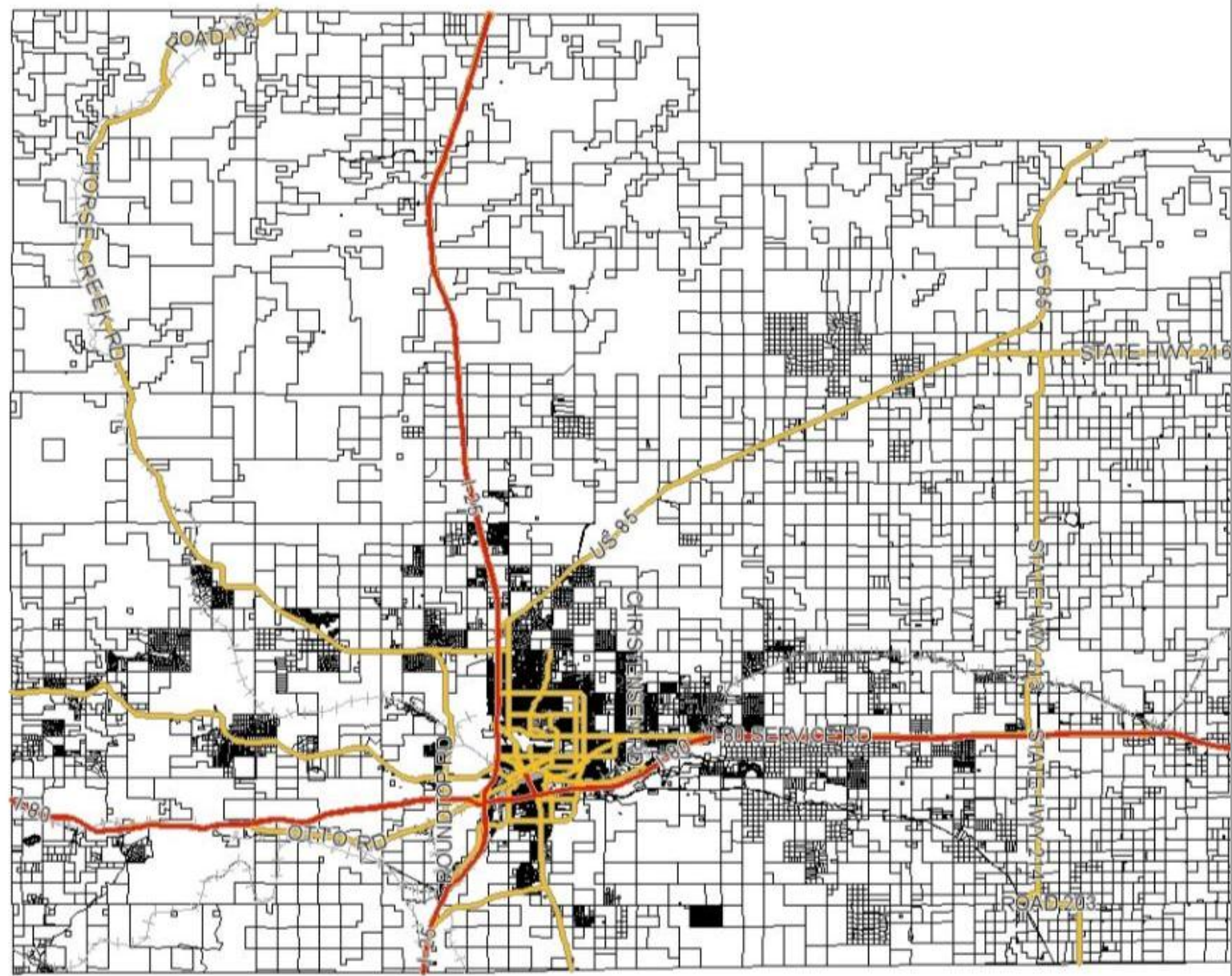


<b>2012</b>	<b><u>Internet Explorer</u></b>	<b><u>Firefox</u></b>	<b><u>Chrome</u></b>	<b><u>Safari</u></b>	<b><u>Opera</u></b>
October	16.1 %	31.8 %	44.9 %	4.3 %	2.0 %
September	16.4 %	32.2 %	44.1 %	4.2 %	2.1 %
August	16.2 %	32.8 %	43.7 %	4.0 %	2.2 %
July	16.3 %	33.7 %	42.9 %	3.9 %	2.1 %
June	16.7 %	34.4 %	41.7 %	4.1 %	2.2 %
May	18.1 %	35.2 %	39.3 %	4.3 %	2.2 %
April	18.3 %	35.8 %	38.3 %	4.5 %	2.3 %
March	18.9 %	36.3 %	37.3 %	4.4 %	2.3 %
February	19.5 %	36.6 %	36.3 %	4.5 %	2.3 %
January	20.1 %	37.1 %	35.3 %	4.3 %	2.4 %

- [http://www.w3schools.com/browsers/browsers\\_stats.asp](http://www.w3schools.com/browsers/browsers_stats.asp)

Leading Browser | Chrome





- Foreground Layers:
- ☐ Az Lot Numbers
  - ☐ Address Points
  - ☒ Roads, Streets, Highways
  - ☒ Ownership
  - ☒ Physical Features
  - ☒ Public Land Survey
  - ☒ Flood Zones
  - ☒ Elevation Contours
  - ☐ River, Creeks, Lakes
  - ☐ Subdivisions
  - ☒ Well Heads
  - ☒ Storm Sewer
- Public Health Layers:
- Administrative Layers:
- ☐ Historic Districts
  - ☐ Cities
  - ☒ Tax Districts
  - ☒ Zoning
  - ☐ Water & Sewer Dist
  - ☒ Fire Districts
- Background Layer:
- ☐ 2010 Developed Areas Higher Resolution Imagery
  - ☐ 2010 County Wide Lower Resolution Imagery
  - ☐ USGS Topos
  - ☐ Hill Shading



Layer List

Assessor Parcels

General Plan

Historic General Plan

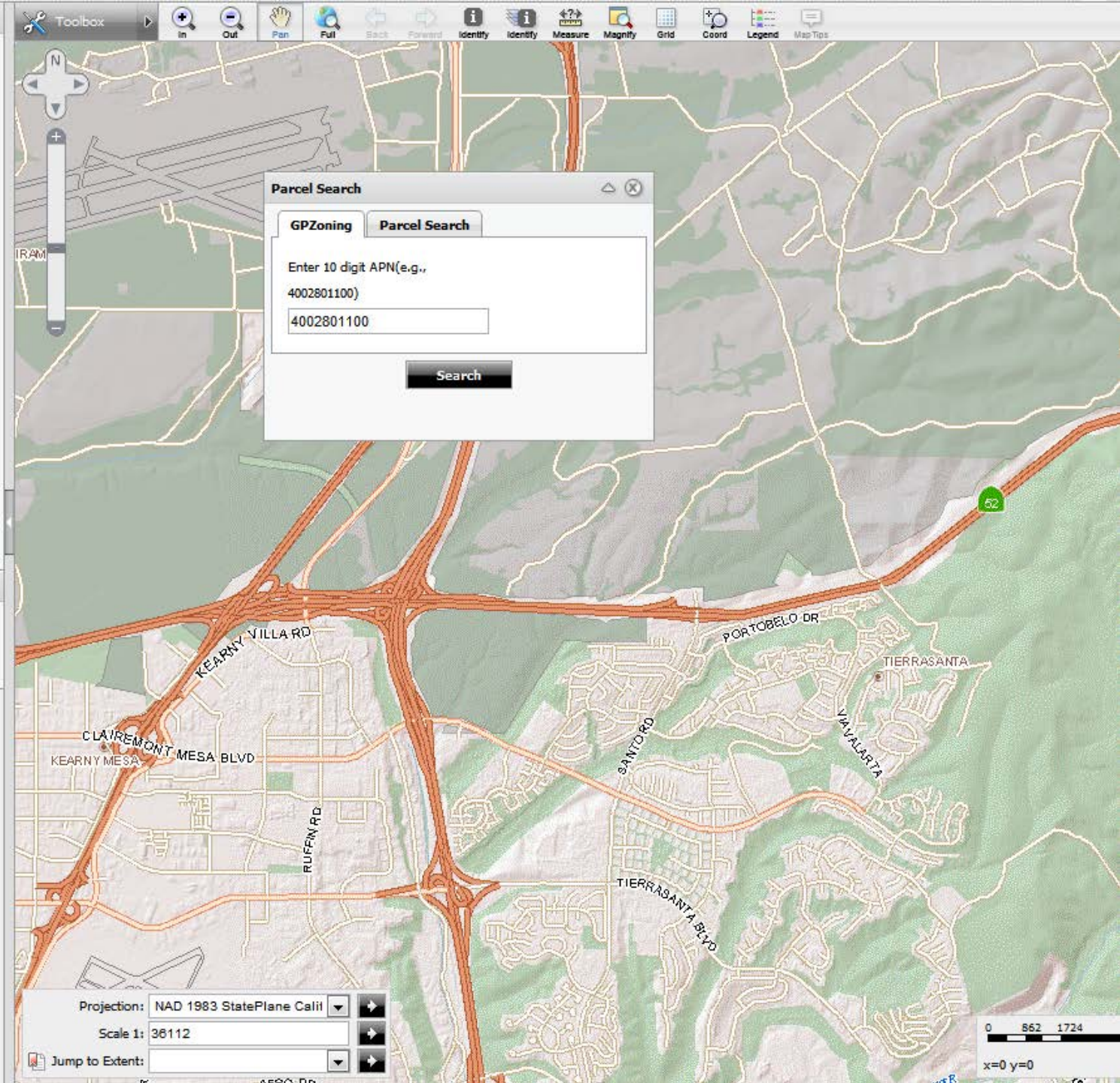
Zoning

Historic Zoning

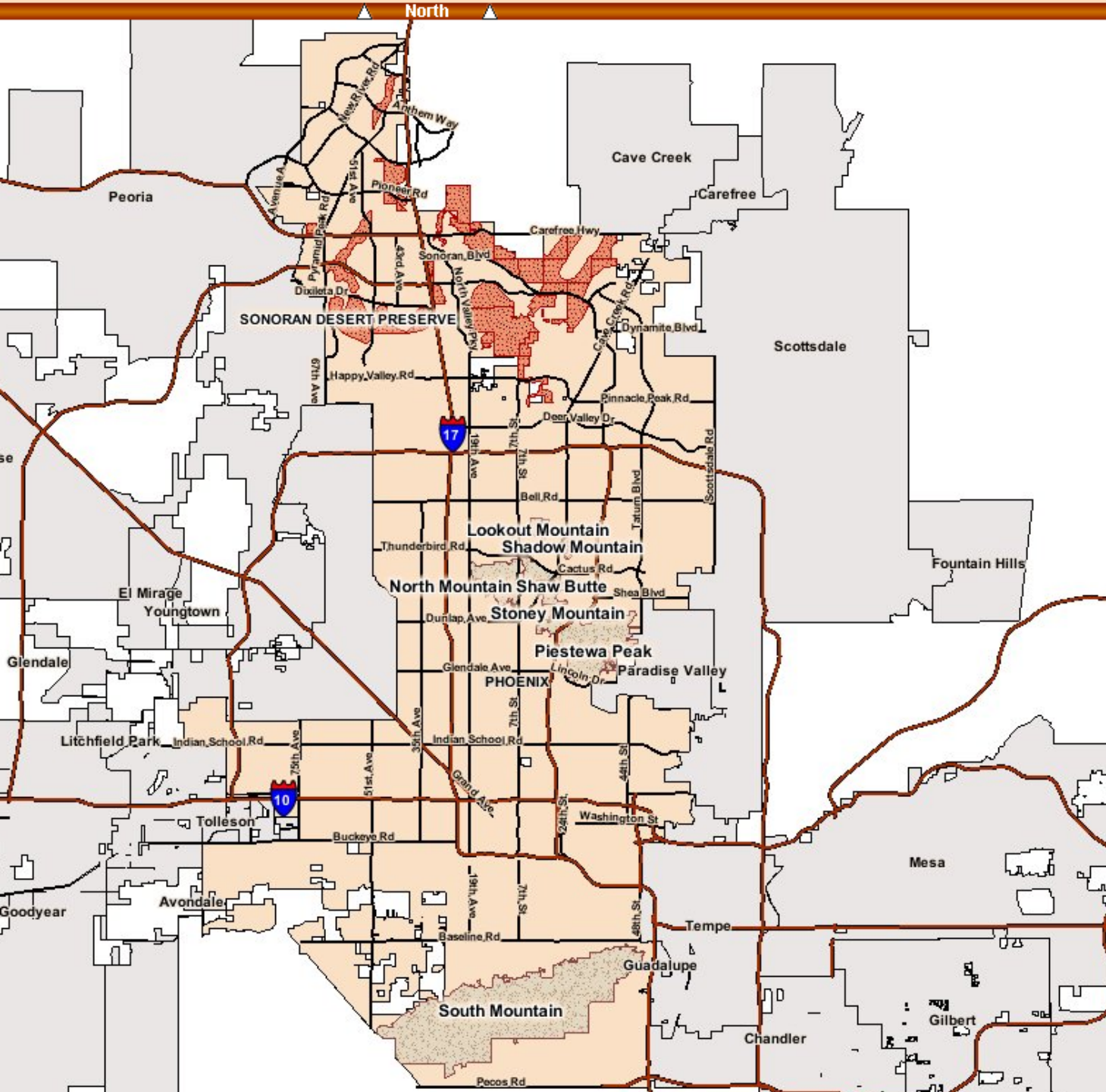
Show Legend

Selection

No features are currently selected. You can select features from one or more layers using the selection tools.







Tools

↑

←

⊞

→

↓

Zoom In

Zoom Out

Center

Identify

Print

+

RESIDENTS

STREETS

REGIONAL

CITY LIMITS

-

Legend

Features

Categories

**Property Search** << [Hide](#)

Search for this street

Search

e.g., "1277 Main St" or "main st"

System (GIS). This tool is intended to help make local government more accessible and efficient.

Please use our [alternate GIS Server](#) if you are having trouble viewing the map at right

☐ [Hide Disclaimer](#)

**Disclaimer**  
GIS information is provided on these Web Pages as a public resource for general information purposes only. It is used to locate, identify and  
information is believed to be accurate but accuracy is not guaranteed.

MapAerialWetlandsZoning

↑

←\*→

↓

+

-

**Legend**

Selected Feature

wetlands

web parcels

street\_centerlines

roads

buildings

Res A

Res A-1

Res B

Res C

Res C-1

Res C-2

Com A

Com P

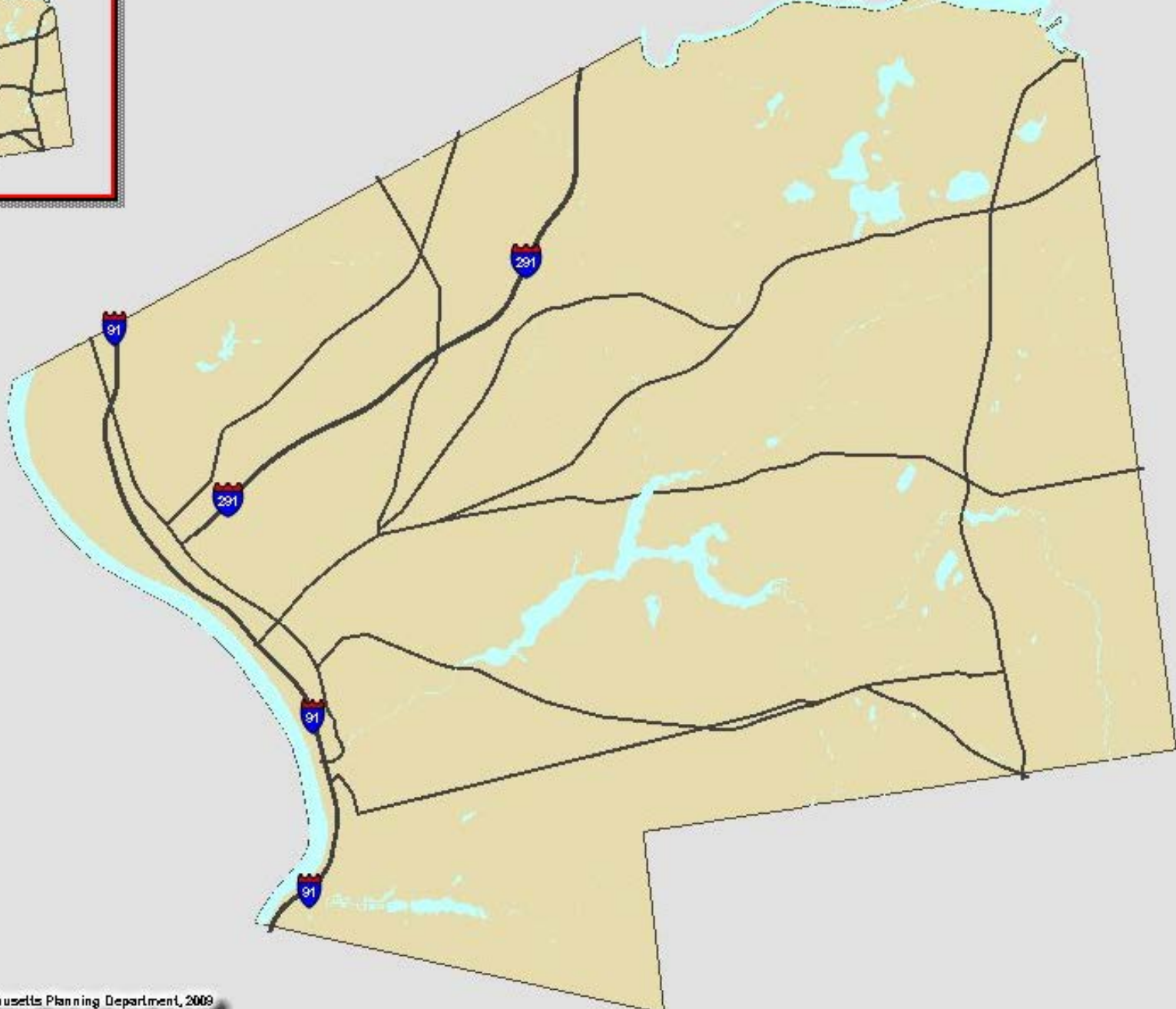
Bus A

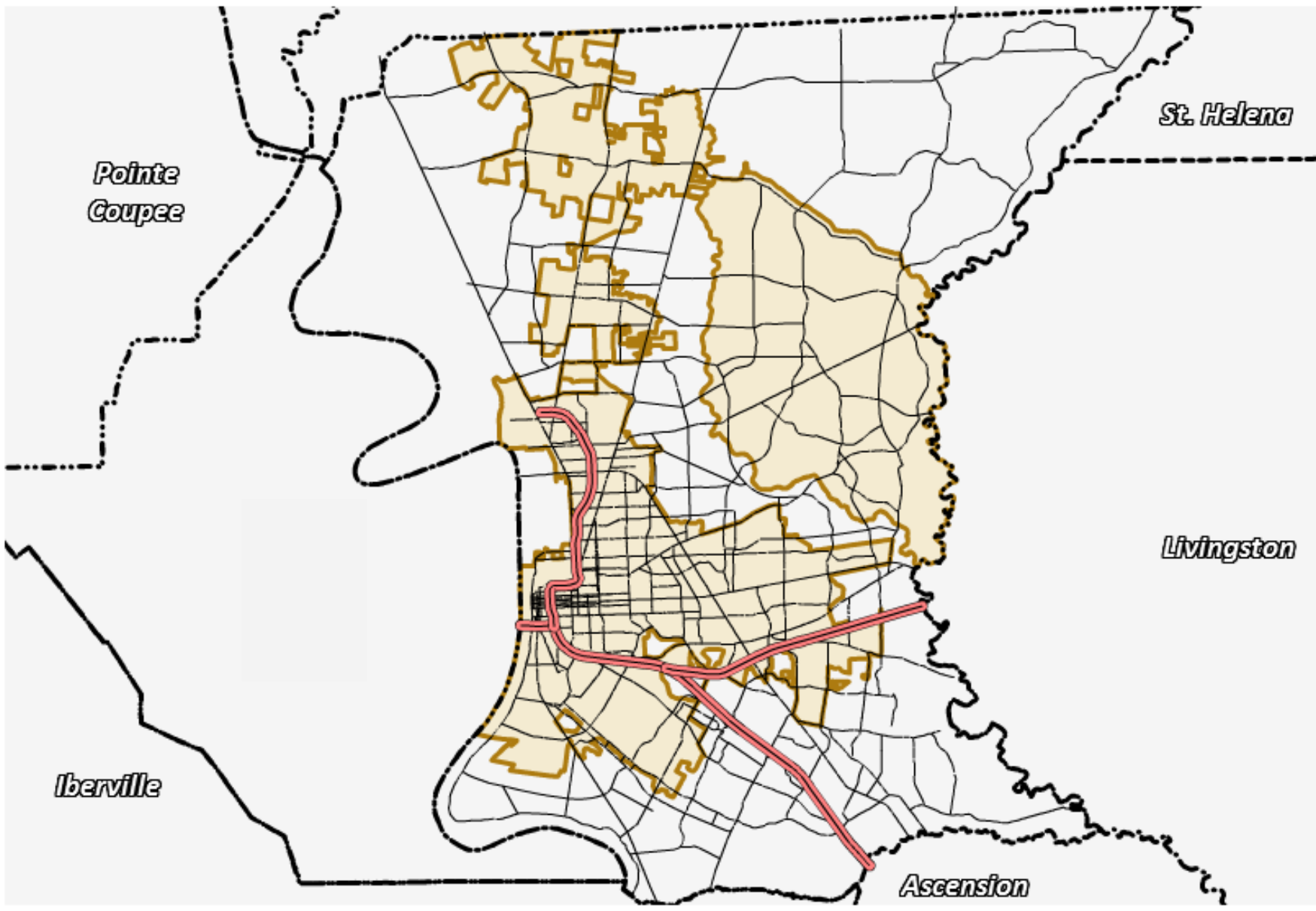
Bus B

Bus C

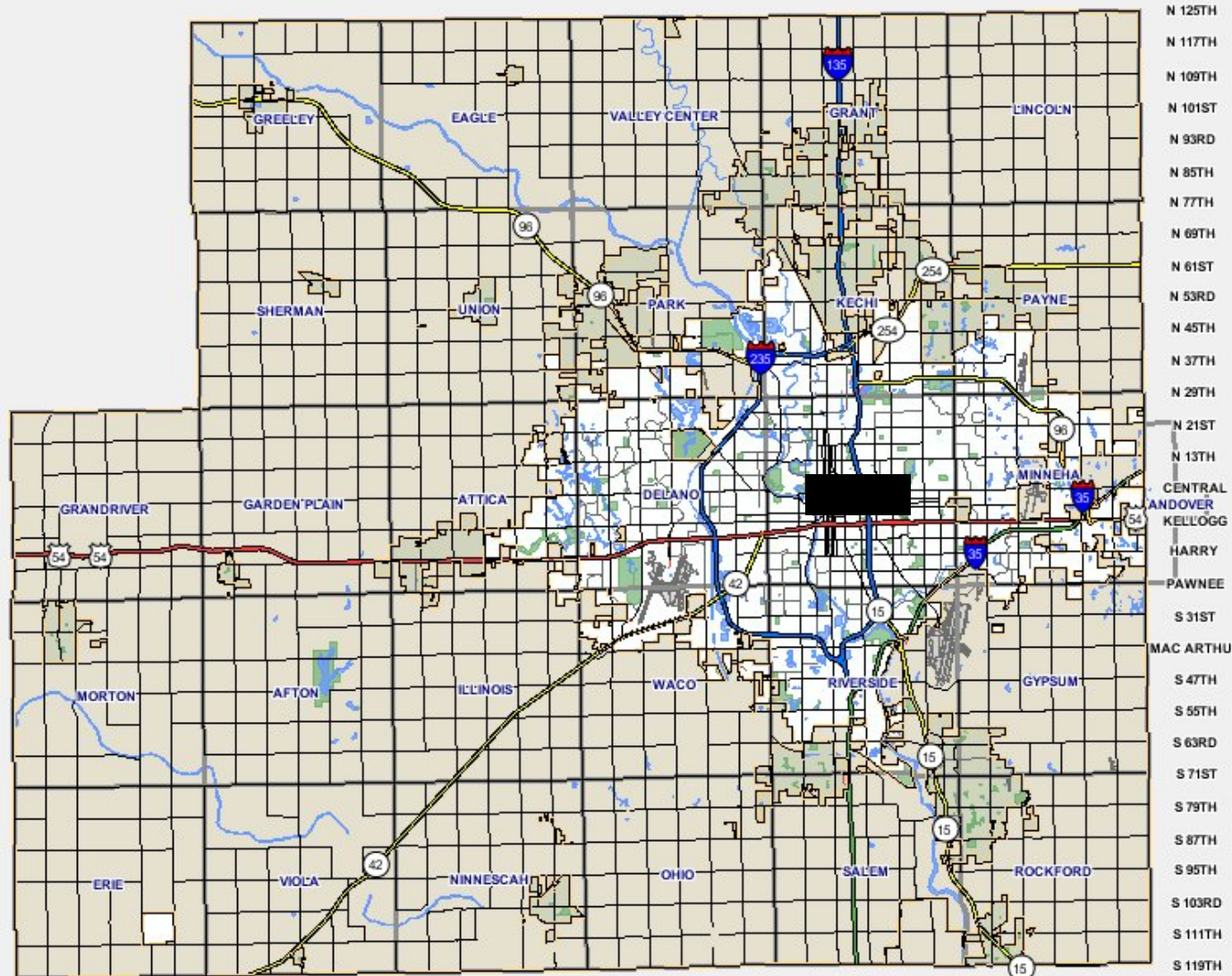
Riverfront











N 125TH  
N 117TH  
N 109TH  
N 101ST  
N 93RD  
N 85TH  
N 77TH  
N 69TH  
N 61ST  
N 53RD  
N 45TH  
N 37TH  
N 29TH  
N 21ST  
N 13TH  
CENTRAL  
ANDOVER  
KELLOGG  
HARRY  
PAWNEE  
S 31ST  
MAC ARTHUR  
S 47TH  
S 55TH  
S 63RD  
S 71ST  
S 79TH  
S 87TH  
S 95TH  
S 103RD  
S 111TH  
S 119TH

E 159TH  
E 143RD  
E 127TH  
GREENWICH  
WEBB  
ROCK  
WOODLAWN  
OLIVER  
HILLSIDE  
HYDRAULIC  
BROADWAY  
SENECA  
MERIDIAN  
WEST  
HOOVER  
RIDGE  
TYLER  
MAIZE  
W 119TH  
W 135TH  
W 151ST  
W 167TH  
W 183RD  
W 199TH  
W 215TH  
W 231ST  
W 247TH  
W 263RD  
W 279TH  
W 295TH  
W 311TH  
W 327TH  
W 343RD  
W 359TH  
W 375TH  
W 391ST

Background Layers

- ☒ None 
- ☐ 2003 Aerial Photography 
- ☐ 2005 Aerial Photography 
- ☐ 2008 Aerial Photography 
- ☐ Annexations 
- ☐ City Council Districts 
- ☐ Floodplain  
- ☐ Neighborhood Associations 
- ☐ Pickup - Leaf 
- ☐ Pickup - Trash & Recycling 
- ☐ Sewer Connection Fee Areas  
- ☐ Sewer Service Areas 
- ☐ Water Connection Fee Areas  
- ☐ Water Service Areas 
- ☐ Zoning 

Feature Layers

- ☐ 2000 Census Tract & Block 
- ☐ Combined Sewer Outfalls 
- ☐ FEMA Letter of Map Amend. 
- ☐ Grid - Quarter Section 
- ☐ Grid - Section 
- ☐ Grid - Township 
- ☐ Historic Districts 
- ☐ Parks 
- ☐ Rivergreenway Overlay Dist. 
- ☐ Rivergreenway Trails 
- ☐ Sewer Mains 
- ☐ Sewer Structures 
- ☐ Snow Routes 
- ☐ Topographic Lines 
- ☐ Water Hydrants 
- ☐ Water Mains 
- ☐ Zip Codes 

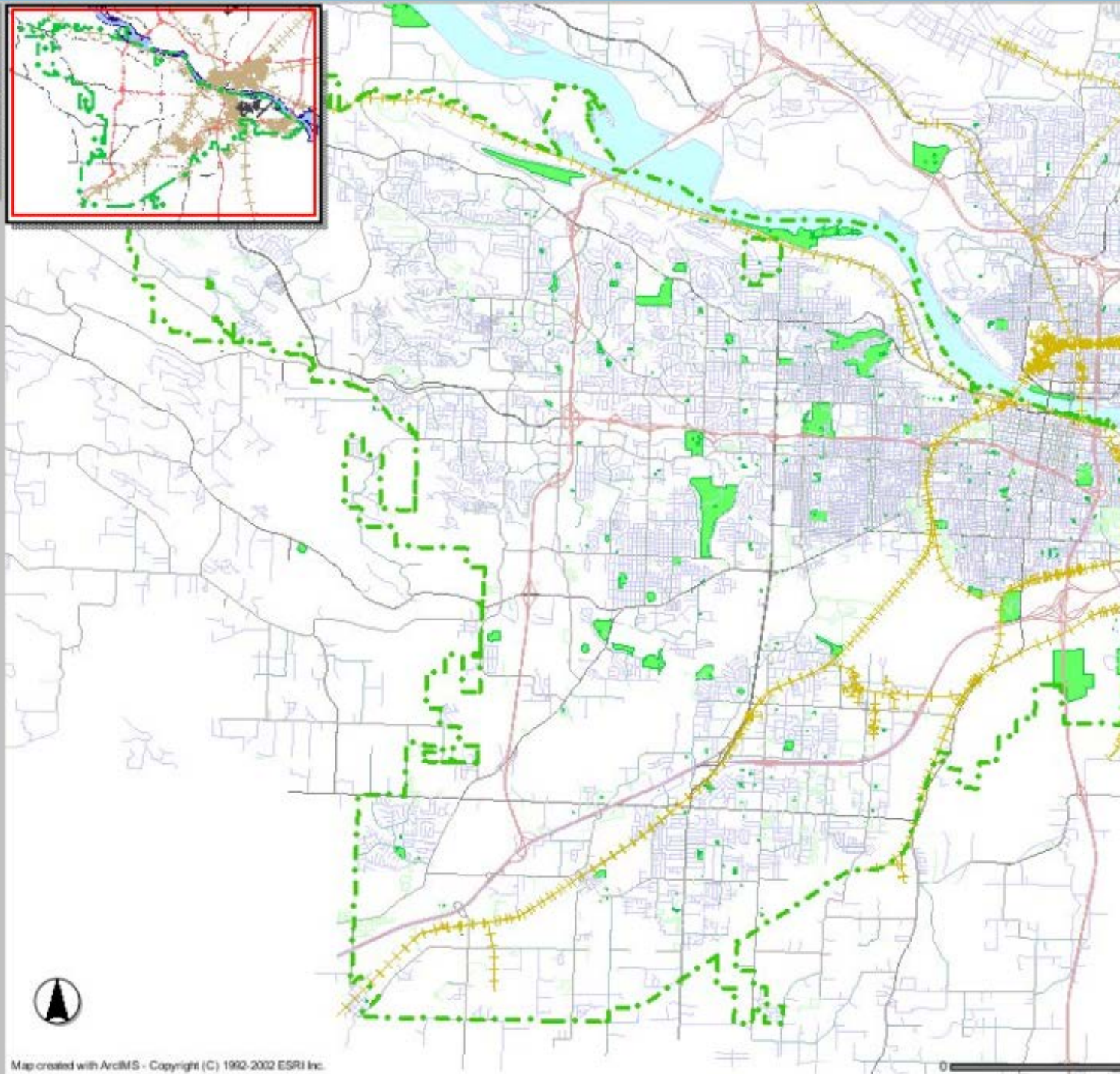
Submit Layers

Clear Layers

# Please Wait... Creating Map.....







## Layers

Visible Active

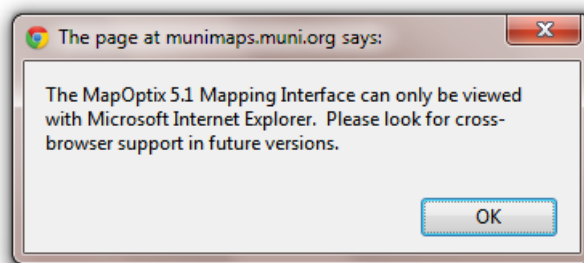
- |                                     |                       |                    |
|-------------------------------------|-----------------------|--------------------|
| <input checked="" type="checkbox"/> | <input type="radio"/> | City Limits Line   |
| <input checked="" type="checkbox"/> | <input type="radio"/> | Railroads          |
| <input checked="" type="checkbox"/> | <input type="radio"/> | Street Centerlines |
| <input checked="" type="checkbox"/> | <input type="radio"/> | Airports           |
| <input checked="" type="checkbox"/> | <input type="radio"/> | City Parks         |
| <input checked="" type="checkbox"/> | <input type="radio"/> | Lake Maumelle      |
| <input checked="" type="checkbox"/> | <input type="radio"/> | Arkansas River     |

Refresh Map



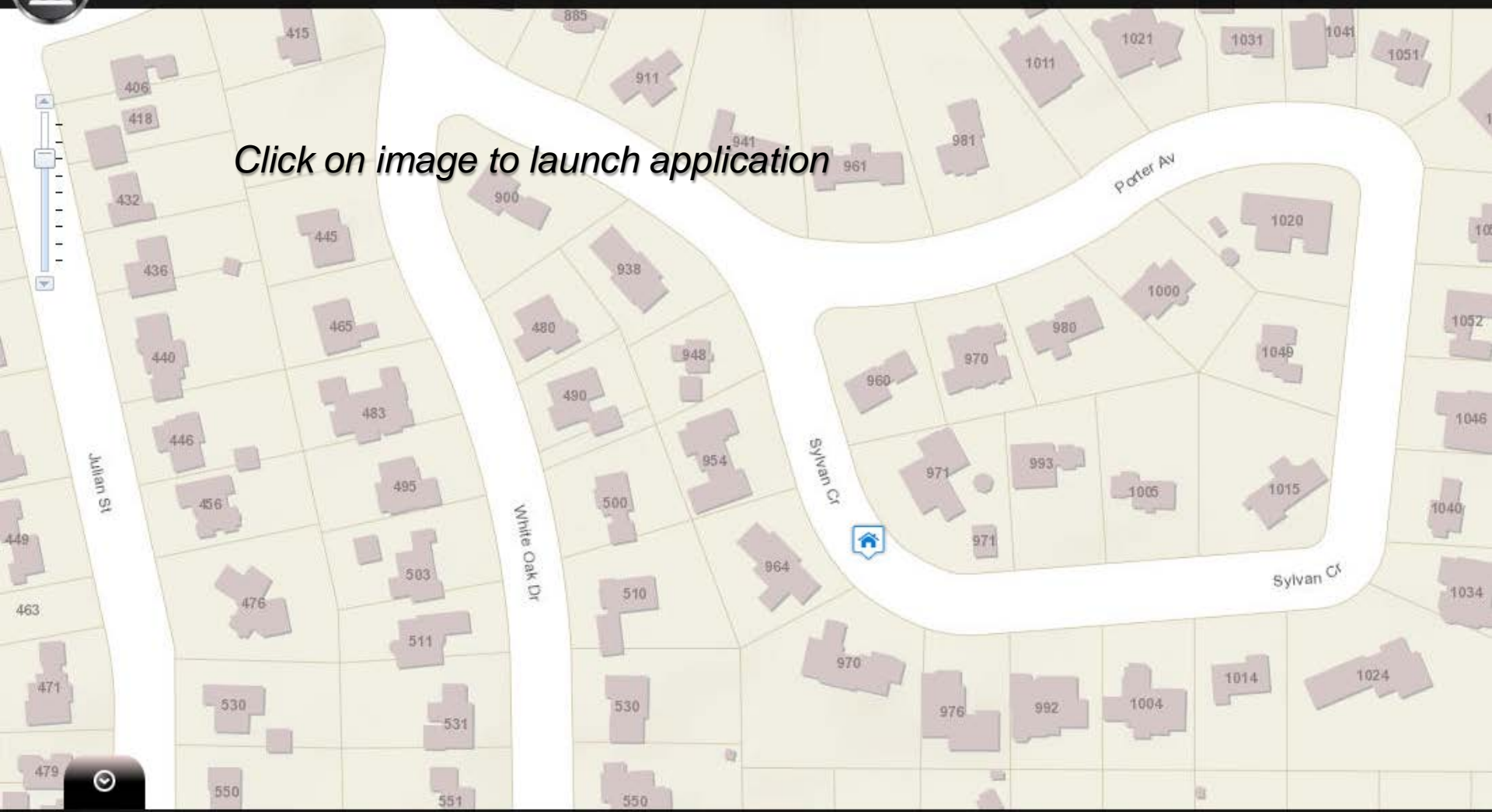








*Click on image to launch application*



## Trash Pickup

Mon Tue Wed Thu Fri Sat Sun

Agency: Allied Waste Services  
Contact: John Smith  
Phone: 630-723-2800  
[Website](#) | [Email](#)

## Recycling Pickup

Mon Tue Wed Thu Fri Sat Sun

Agency: Resource Management Company  
Contact: Greg Maxwell  
Phone: 708-425-8565  
[Website](#) | [Email](#)

## Yard Waste Pickup

Mon Tue Wed Thu Fri Sa

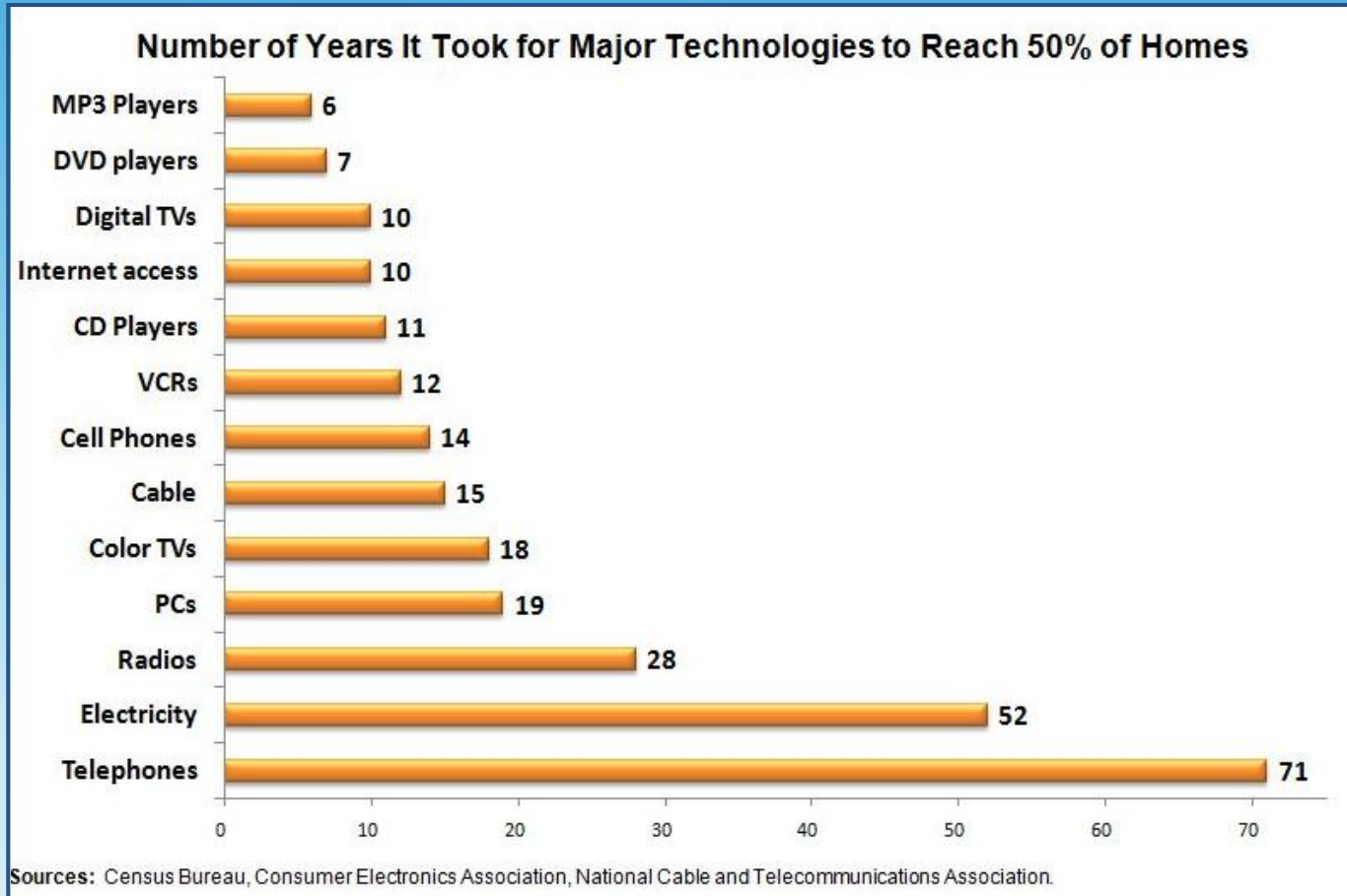
Agency: Resource Management C  
Contact: Greg Maxwell  
Phone: 708-425-8565  
[Website](#) | [Email](#)



# “Nothing endures but **change**.”

– Heraclitus of Ephesus  
Greek Philosopher (c.535 BC - 475 BC)





Pace of Technology Adoption | Steadily Increasing



Chairman & CEO of GE  
1981-2001

GE Market Value from  
\$12 billion to \$280 billion  
(+2,333%)

Named “Manager of the  
Century” by Fortune in 1999



**Importance of Change**

Jack Welch

“When the rate of change outside exceeds the rate of change inside, the end is in sight.”



**Importance of Change**

Jack Welch,  
CEO of General Electric



“Change before you  
have to.”



**Importance of Change**

Jack Welch,  
CEO of General Electric

# Consumerization Impacts Expectations







**pc-centric** | our digital lives revolved around the personal computer





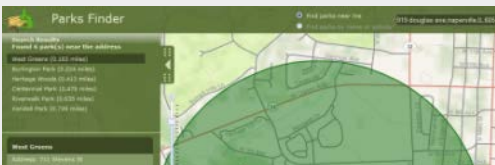
**human-centric** | user is at the center of their own digital universe

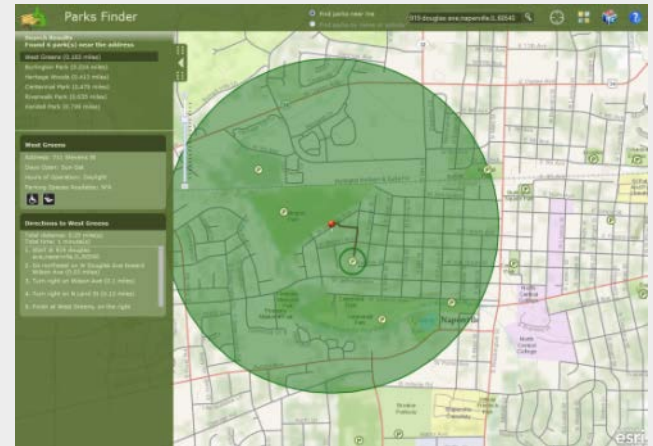
# New Rules for Enterprise Applications

1. Make it appealing.
2. Make it transparent.
3. Update it often.



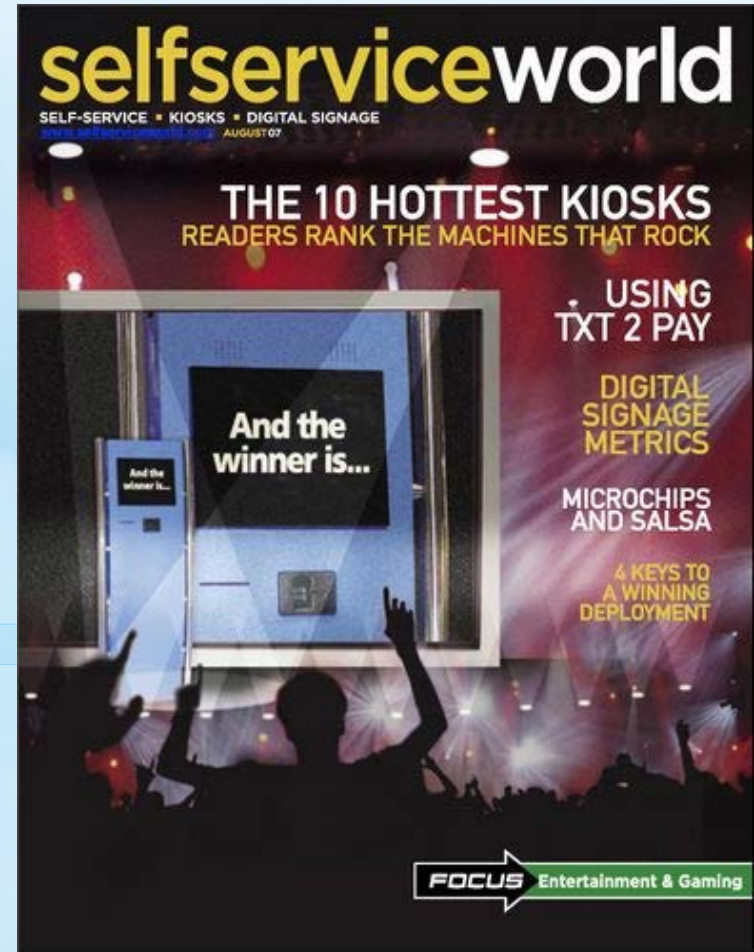
# How the Public Actually Uses Web Maps

- Single-topic maps get 3x more traffic.
  - 60% of map traffic comes from search engines.
  - Map usage is spiky.
  - Users look up info then leave.
  - Users interact with pop-ups.
  - Users rarely change defaults.
- 
- A screenshot of the 'Parks Finder' web application. The interface features a green-themed header with the title 'Parks Finder' and a search bar. Below the header, there is a sidebar on the left with a 'Find Parks' button and a list of parks. The main area displays a map with a green circular overlay indicating a search radius. The map shows various parks and their locations.





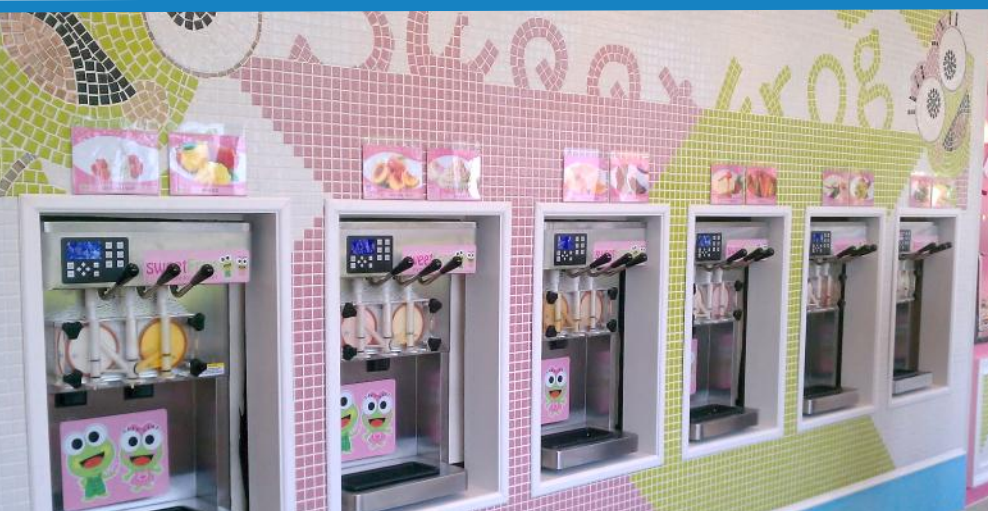
# It is a Self-Service World



# It is a **Self-Service** World



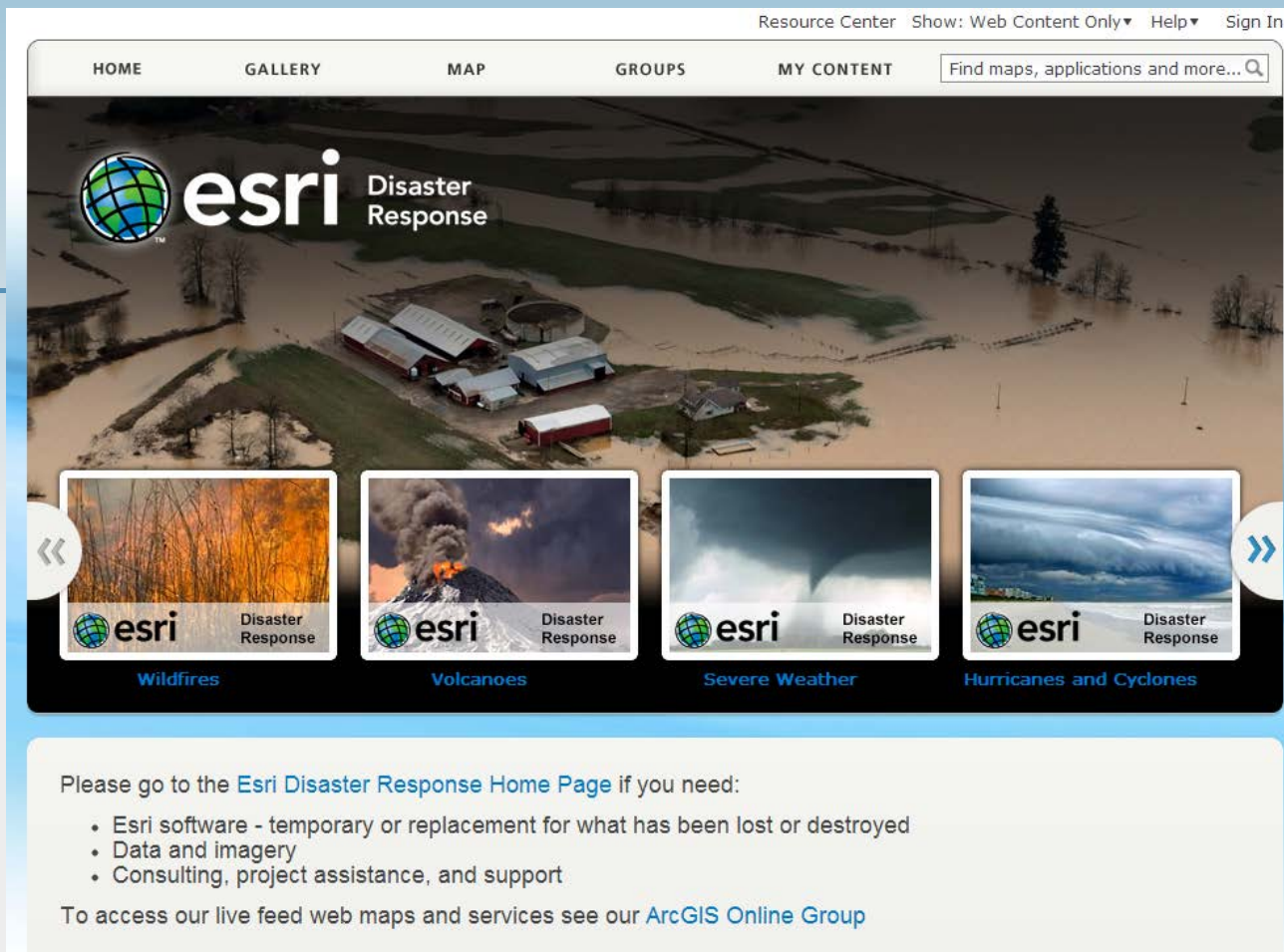
# It is a **Self-Service** **World**





# It is a **Self-Service** **World**





## Self-service mapping

# SalemMaps Online

City of Salem, Oregon Maps and Applications



## Welcome to City of Salem, Oregon Maps and Apps

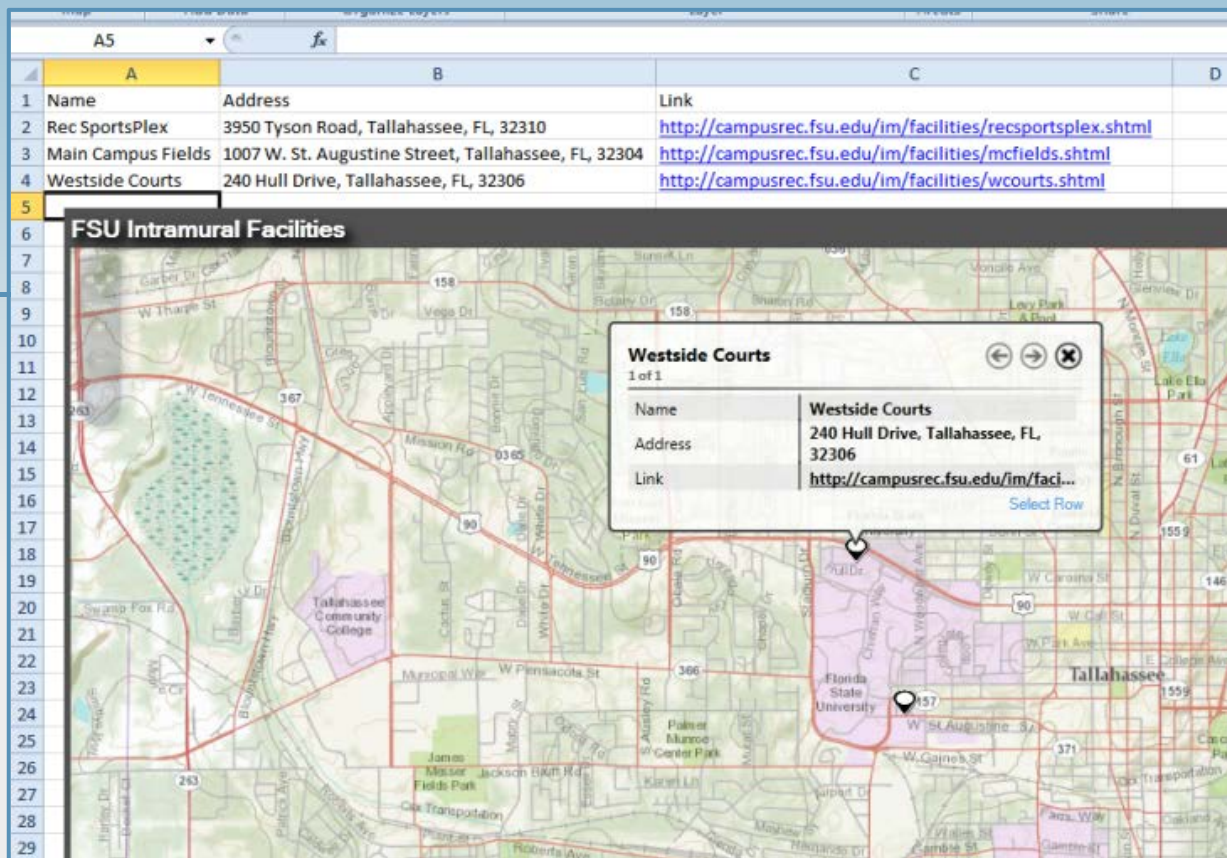
"As the GIS Technical Lead for the City, I am pleased to offer this online resource to our staff, businesses, and citizens. This online product is your gateway to city business information, focused and intelligent maps, and applications that "geocommunicate" across our organization."

Daniel Brown, GISP



Self-service  
mapping





Self-service  
GIS

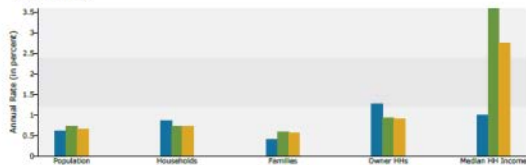


## Demographic and Income Profile

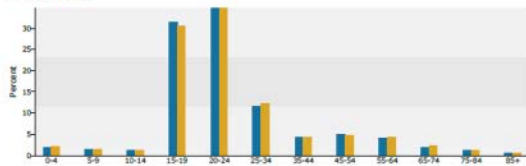
FSU Conference Center  
555 W Pensacola St, Tallahassee, FL, 32301  
Drive Time: 5 minutes

Latitude: 30.4387  
Longitude: -84.2906

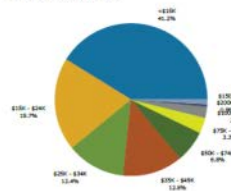
Trends 2011-2016



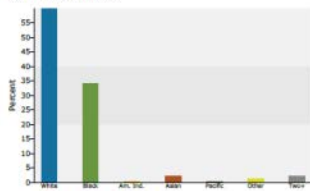
Population by Age



2011 Household Income



2011 Population by Race



2011 Percent Hispanic Origin: 7.6%

Sources: U.S. Census Bureau, Census 2010 Data. Esri forecasts for 2011 and 2016.

November 08, 2012

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## Demographic and Income Profile

FSU Conference Center  
555 W Pensacola St, Tallahassee, FL, 32301  
Drive Time: 5 minutes

Latitude: 30.4387  
Longitude: -84.2906

Summary	2010	2011	2016
Population	27,283	27,273	28,103
Households	9,151	9,154	9,550
Families	1,998	1,989	2,030
Average Household Size	1.84	1.84	1.85
Owner Occupied Housing Units	1,459	1,333	1,422
Renter Occupied Housing Units	7,692	7,819	8,128
Median Age	22.0	22.0	22.1
Trends: 2011 - 2016 Annual Rate	Area	State	National
Population	0.60%	0.73%	0.67%
Households	0.85%	0.71%	0.71%
Families	0.41%	0.59%	0.57%
Owner HHs	1.27%	0.93%	0.91%
Median Household Income	0.99%	3.59%	2.75%

Households by Income	2011		2016	
	Number	Percent	Number	Percent
<\$15,000	3,772	41.2%	3,979	41.7%
\$15,000 - \$24,999	1,801	19.7%	1,491	15.6%
\$25,000 - \$34,999	1,133	12.4%	974	10.2%
\$35,000 - \$49,999	1,173	12.8%	1,261	13.2%
\$50,000 - \$74,999	624	6.8%	943	9.9%
\$75,000 - \$99,999	301	3.3%	451	4.7%
\$100,000 - \$149,999	215	2.3%	286	3.0%
\$150,000 - \$199,999	50	0.5%	64	0.7%
\$200,000+	85	0.9%	99	1.0%

Median Household Income	\$18,379		\$19,509	
Average Household Income	\$30,038		\$34,080	
Per Capita Income	\$22,625		\$24,162	
Population by Age	2010	2011	2016	Percent
0 - 4	Number	Percent	Number	Percent
5 - 9	588	2.2%	569	2.1%
10 - 14	390	1.4%	380	1.4%
15 - 19	367	1.3%	357	1.3%
20 - 24	8,587	31.5%	8,564	31.4%
25 - 34	9,401	34.5%	9,480	34.6%
35 - 44	3,146	11.5%	3,157	11.6%
45 - 54	1,208	4.4%	1,192	4.4%
55 - 64	1,432	5.2%	1,415	5.2%
65 - 74	1,106	4.1%	1,099	4.0%
75 - 84	522	1.9%	525	1.9%
85+	347	1.3%	345	1.3%
	189	0.7%	189	0.8%

Race and Ethnicity	2010		2011		2016	
	Number	Percent	Number	Percent	Number	Percent
White Alone	16,350	59.9%	16,359	60.0%	16,598	59.1%
Black Alone	9,308	34.1%	9,284	34.0%	9,343	34.3%
American Indian Alone	61	0.2%	61	0.2%	60	0.2%
Asian Alone	633	2.3%	632	2.3%	713	2.5%
Pacific Islander Alone	26	0.1%	26	0.1%	26	0.1%
Some Other Race Alone	337	1.2%	343	1.3%	421	1.5%
Two or More Races	568	2.1%	569	2.1%	652	2.3%
Hispanic Origin (Any Race)	2,023	7.4%	2,072	7.6%	2,548	9.1%

Data Note: Income is expressed in current dollars.  
Source: U.S. Census Bureau, Census 2010 Data. Esri forecasts for 2011 and 2016.

November 08, 2012

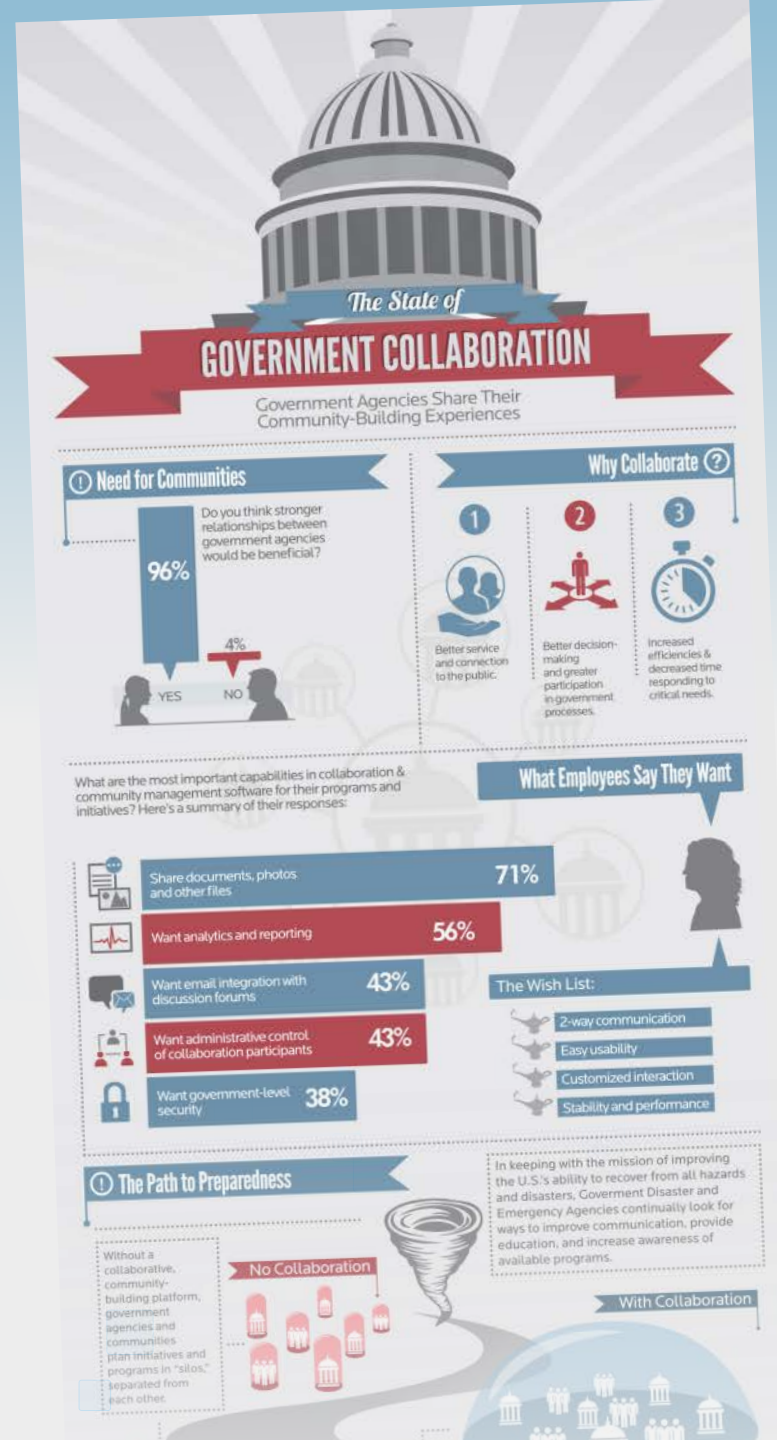
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Self-service  
GIS

# Employees Want Better Collaboration

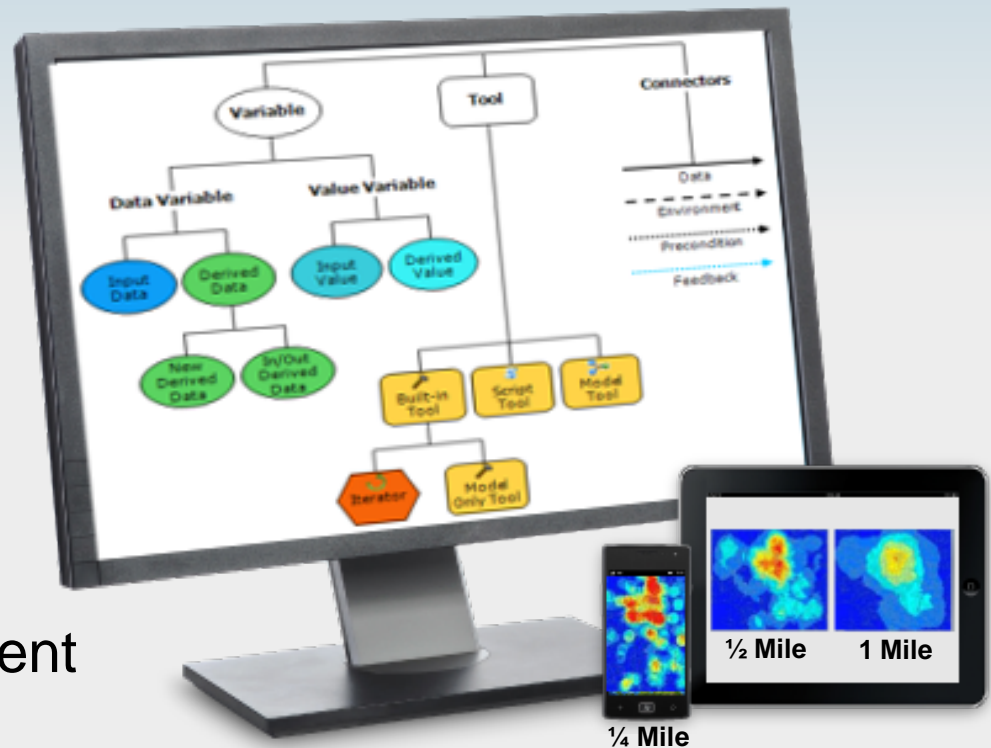
*Click on image for more info*





# Understand the New Paradigm

- Geography has emerged as a Platform
- Anyone can get a map
- Most can make a map
- Embrace your role:
  - Authoritative Data
  - Spatial Analysis
  - Models
  - Web Services
  - Application Deployment
  - System Integration



Make Your GIS a  
**Mission-Critical**  
**Enterprise IT System**



# Follow Best Practices

- IT Best Practices
- GIS Best Practices
- Esri Best Practices





# IT Best Practices

- Development/Staging/Production/Publication Environments
- Service Level Agreements
- Business Continuity/Risk Mitigation
- System Architecture Design
- Environment Isolation
- Living Strategic Plan

# GIS Best Practices

- Establish a Geospatial Program
- Develop & Maintain Data as an Asset
- Take an Enterprise Systems Approach
- Share with the Public

March 2011

National Geospatial Advisory Committee (NGAC)

<http://www.fgdc.gov/ngac>

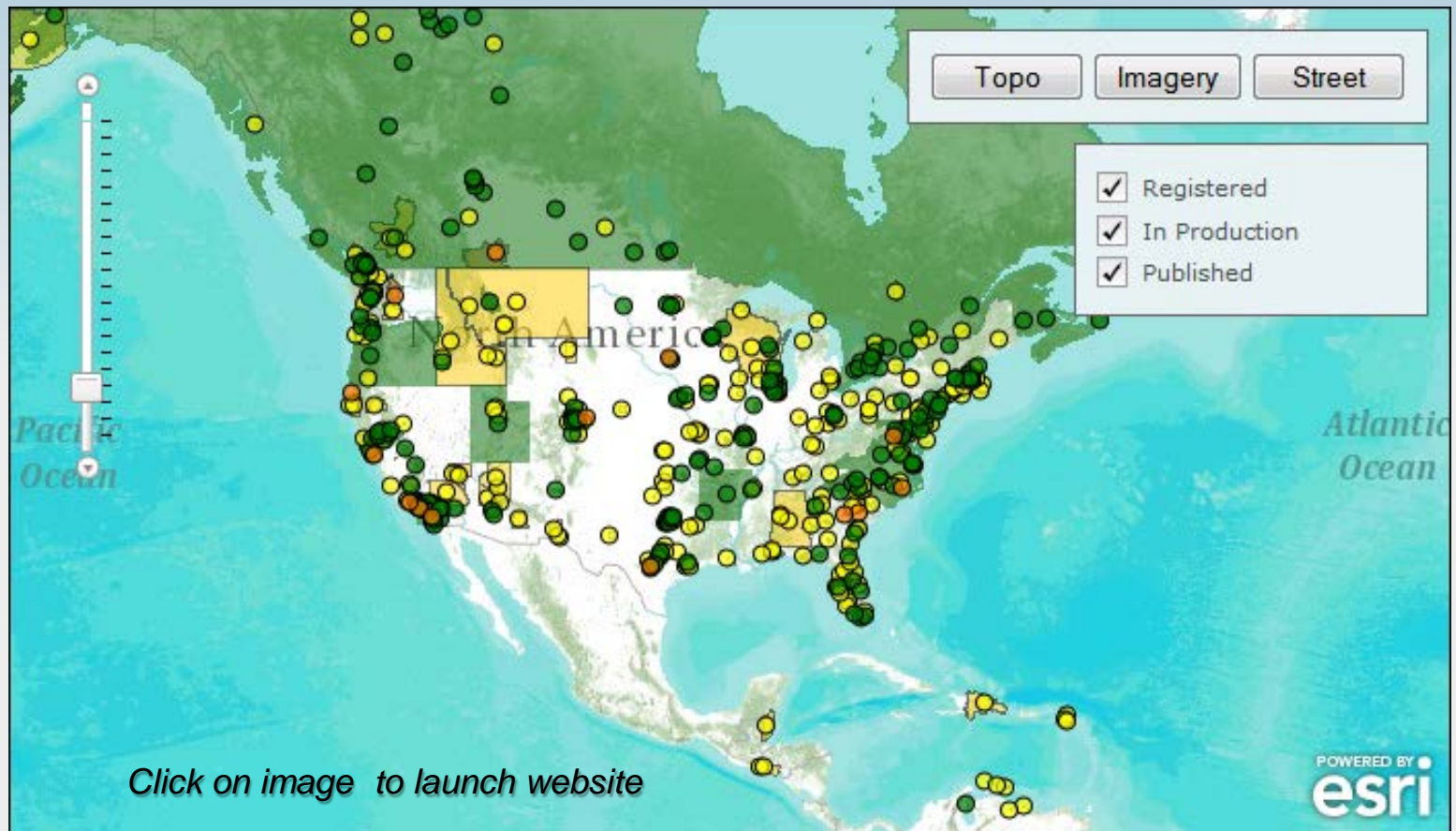
# Esri Best Practices

- Follow Recommendations
- ArcGIS for Local Government
- ArcGIS Online
- Story Maps
- Community Maps Program
- Training
- Technical Support
- Ideas Portal
- Professional Services
- Partners
- Implement Five Pattern Solutions





# Community Map Participants



# Esri Best Practices

- Follow Recommendations
- ArcGIS for Local Government
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- Professional Services
- Partners
- Implement Five Pattern Solutions



# Implement Five Pattern Solutions





# Five Patterns of Business

ArcGIS | A Complete Integrated System



# Five Patterns of Business

ArcGIS | A Complete Integrated System

ROI Increases, Cost per User Decreases





# Five Patterns of Business

ArcGIS | A Complete Integrated System

AGOL, ArcGIS for Local Gov't, Partner Solutions







**Sell GIS to Your Organization**

Successfully serving the  
market & customers



**Jack Dangermond**

Esri President/Founder

# Jack's Messages

- GIS saves money, delivers value – usually 3 to 5 times
- SELL the POWER & the VALUE of GIS to management
- Align solutions to meet their PAIN &/or VISION
- Be effective in communicating to management
- Be passionate
- Deliver on-time & in-budget
- Keep management engaged





# Why Implement GIS?

**Increase Efficiencies**

**Support Better Decisions**

**Improve Customer Service**

**Accountability/Transparency**

**Gov 2.0 | Citizens as Sensors**

# Existing Problem with GIS ROI

## Typical GIS Initiative

- Technology-led
- Technology-driven
- Delivers against project milestones
- Focused on Delivering Applications & Functionality
- Short-lived buy-in
- Sells GIS thru technology demonstration
- Not linked Explicitly to organizational objectives
- Cannot measure success based on value delivered

## An ROI Initiative

- Business-led
- Benefits-driven
- Delivers measurable value to stakeholders
- Focused on delivering business capability
- Long-term stakeholder commitment to success
- Builds consensus by demonstrating value opps
- Linked to organizational objectives
- Can measure success based on the return on investment

# http://roi.esri.com/

Justifying GIS Business Benefits : An ROI Methodology - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites RSS Feeds Print Mail

Address <http://gis.esri.com/roi/> Go Links

ESRI.com | Store | More ESRI Sites...

Proving the Business Benefits of GIS using an ROI Approach

ESRI PA Consulting Group

This website is under construction Beta

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## ROI Methodology

This **Return on Investment (ROI) methodology** was developed to show, in a compelling way, how Geographic Information Systems (GIS) can create business value for an organization. It is an end-to-end process that is comprised of ten distinct steps which, when taken together, provide a recipe for creating a business case covering the relevant business benefits, capital and operational budget, benefits delivery roadmap, GIS organizational structure and ROI financial analysis, for adding value with GIS. Originally developed by PA Consulting Group (PA), the methodology has been adapted in collaboration with Environmental Systems Research Institute, Inc. (ESRI) in order to combine PA's management experience with ESRI's GIS expertise - the result of which is a unique GIS-specific ROI methodology grounded in management science.

Click on the Steps below to follow the ROI methodology:

```
graph TD; 1[1. Prepare for ROI Project] --> 2[2. Identify Business Opportunities]; 2 --> 3[3. Prioritize Business Opportunities]; 3 --> 4[4. Construct GIS Program]; 4 --> 5[5. Define Project Control]; 5 --> 6[6. Specify and Cost GIS Projects]; 5 --> 7[7. Estimate Benefits]; 6 --> 8[8. Create Benefits Roadmap]; 7 --> 8; 8 --> 9[9. Calculate Financial Metrics]; 9 --> 10[10. Build and Present Report]; 10 -.-> 1
```

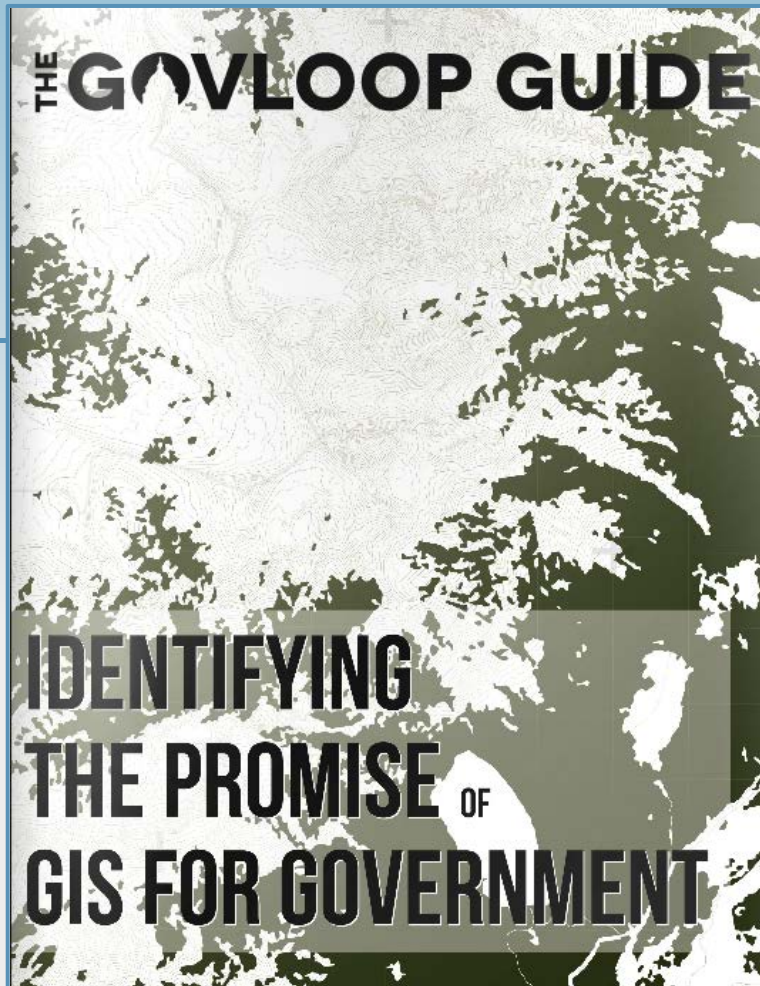
The information on the ROI Website has been derived in whole or in part, under license, from the ROI Methodology of [PA Consulting Group](#), Inc.



# Key Goals

ROI Methodology is about how to communicate with executives





*Click on image to launch website*

## Great Resources

Government GIS Guide | Benefits, strategies, citizen engagement, and much more

# Case Studies

Lake County GIS Web Solutions Realizes a  
Staggering Return on Investment

*A Case Study*



<http://bit.ly/Qlixmn>



*Click on image to launch video*



**ELIZABETH ALEX**

**ELIZABETH.ALEX@KSHB.COM**



**5:59 63°**

# Solution Map Example

## Problem

### Problem Statement

Jan. 22, 2008 FHWA  
Mandate – Public  
agencies must  
establish & implement  
a method to maintain  
traffic sign  
retroreflectivity

Nighttime crash rate is  
three times the daytime  
crash rate – improving  
sign visibility helps  
everyone

Failure to adhere to  
federal mandate &  
standards, reduced  
sign visibility, increase  
in crashes, increased  
liability

# Solution Map Example

## Solution

### How We Solve the Problem

Implement a GIS-based Sign Inventory & Management System using Best Practices & all five of the business patterns

Full compliance with FHWA mandate, improve sign visibility, reduce crashes, limit liability, increased efficiencies, support better decisions, etc...

# Sign Management/ Retroreflectivity Solution



*Credit: GISi, City of Appleton, WI*





**Implement  
Consistently and  
Immediately**

# Solve the Solution Puzzle



# What is the Killer GIS App?

One that turns your management into daily GIS users



Home Business Technology Innovation

Aerospace Architecture Cities Design Education Energy Finance Food Government Healthcare

Home / Blogs / Business / The Bulletin

## An app that runs Britain

By Mark Halper | November 8, 2012, 4:41 AM PST

Forget policy advisers and debate. All you need to run a country is an iPad and an app.

That's hyperbole of course, but the point is that British Prime Minister David Cameron has taken his digital dealings to another level. Cameron, already a tweeter, is now trialing an app on his iPad that helps him make executive decisions, according to the BBC.



"I'm tellin' ya, Barack. You GOTTA get this app."

GOVERNOR O'MALLEY'S STATESTAT

HOME REPORTS HISTORY GOVERNOR CAPITAL BUDGET

### Capital Budget

Map Last Updated: 6/5/12

Budget Economic Development Education Environment Health Parks and Recreation Public Safety Other Transportation

an Address: address, zip code GO FULL VIEW Show Individual Projects on Map Help



Map of Maryland showing various counties and cities, with a legend for the Capital Budget.

Legend:

- Total FY13 Capital Budget: \$3,210,089,000
- This number includes all Statewide, Regional and Local Projects.
- Capital Budget Mapped: \$1,624,841,450
- This number represents the total Projects Shown on the Map for FY13.
- (See Pie Chart in FY13 Tab)

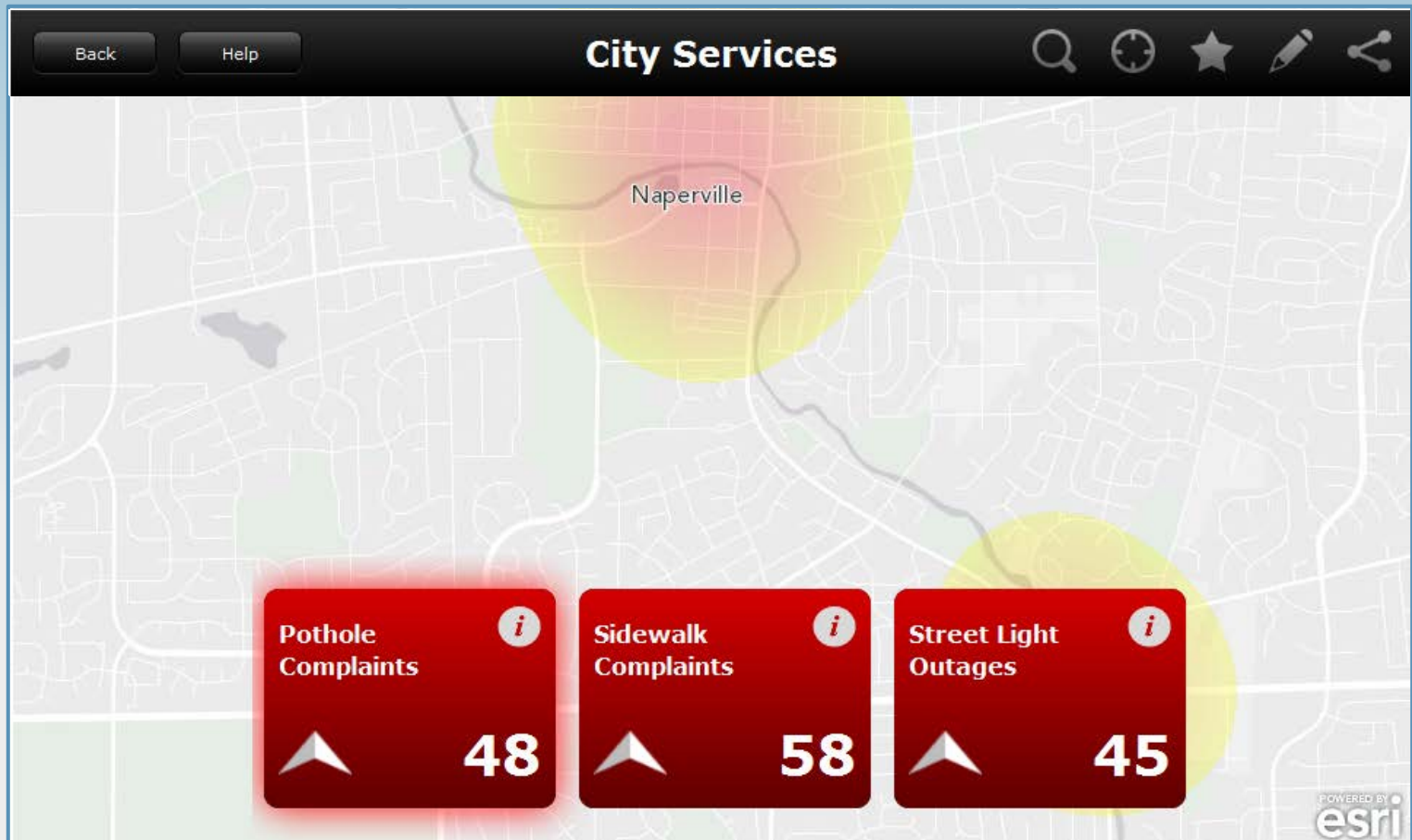
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Executive Dashboard | Partner Solution



A close-up photograph of a green lizard, possibly a tree monitor, perched on a branch surrounded by dense green foliage. The lizard has a bright green body with a white, scale-like collar around its neck and orange eyes. The text "Taking a Closer Look" is overlaid on the right side of the image.

# Taking a **Closer Look**





Is your GIS a **Lamborghini** or **food**?

# Don't just Survive...Thrive!

- The “cure” for your “ills” are:
  - Provide single topic, easy-to-use apps that meet the needs of your customers & work on any device
  - Deploy self-service mapping
  - Make your GIS Mission-Critical
  - Implement Best Practices (IT, GIS, Esri)
  - Sell GIS to Your Organization
  - Implement Five Pattern GIS Solutions for Real Business Problems
  - Make Management GIS Users

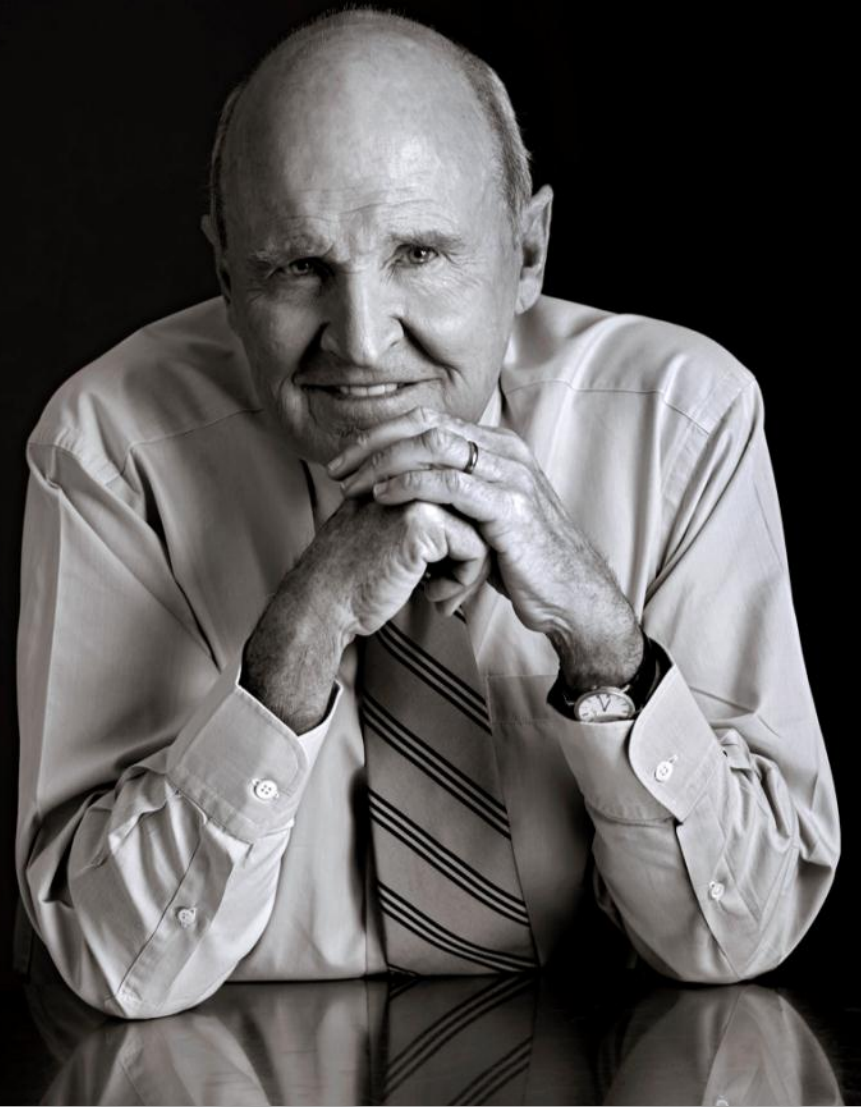


# Don't just Survive...Thrive!

- The “prescription” for the “cure” is:
  - COTS over Custom, Configure rather than Code
  - ArcGIS Online, Story Maps
  - Esri Maps for Microsoft Office
  - Community Analyst
  - ArcGIS for Local Government
  - Community Maps
  - Partner Solutions
  - Executive Dashboards
  - Team with Esri & our Partners



“Good business leaders create a vision, articulate the vision, passionately own the vision, & relentlessly drive it to completion.”



VISION



**Thanks for your time...**

Michael Funaro

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**esri**