# The Science of Where

Chris Nickola

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# THE SCIENCE OF WHERE

A Framework and Process

## Geographic Knowledge

## Measuring



# Web GIS Is the Modern GIS Architecture

Helping Everyone Do Their Work Better

Distributed . and Interconnected

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# ArcGIS Simplifies Working With All Types of Data

Using Web Services and Maps, Scenes, and Layers



## ArcGIS Brings the Power of Location to Everyone Extending the Reach of GIS



# ArcGIS Government Solutions Industry Focused Apps and Capabilities

#### Local & State Government



Open Source, Supported and No Cost

Simplifying and Accelerating Deployment

**Emergency Management** 

Monitor Performance

Tackle Opioid Epidemic

Reduce Homelessness

Assess Resiliency

Flections  Public Health  Free Service  Public Houlth  Free Service  Manage Mode Road Nations							
Enry Voting:      Reduce Homelessness Nationane Daployment Reports?      Develop Pre-Indicet Plans      Promote Plant (Parking)      Manage Monunity Versite Respond to Enrogendes      Stabilize Versite Plant (Willing)      Stabilize Versite Plant (Willing)      Promote Villic Parking      Manage Monunity Versite Plant (Willing)      Stabilize Versite Plant (Willing)      Stabilize Versite Plant (Willing)      Promote Villic Parking)      Manage Monunity Versite Plant (Willing)      Stabilize Versite Plant (Willing)      Stabilize Versite Plant (Willing)      Promote Villic Plant (Parking)      Manage Monunity Versite Plant (Willing)      Promote Villic Plant (Parking)      Manage Monunity Versite Plant (Willing)      Promote Villic Plant (Parking)      Manage Monunity Versite Plant (Parking)      (Parking)      Manage Monunity Versi	Elections	Public Health	Fire Service	Public	Works	Planning and	Development
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Poling Variations      Drug Activity Reporter      Intersace Fire Prevention      Respond to Energencies      Status reporter      Manage ROW Activities      Prevention Respond to Energencies      Status report of Calculator      Prevention Respond to Energencies      Status report of Calculator      Prevention Respond to Energencies      Status report of Calculator      Prevention Respond to Energencies      Prevention Respond to Energencis      Prevention Respond to Energencies <th>Early Voting</th> <th>Reduce Homelessness</th> <th>Develop Pre-Incident Plans</th> <th>Promote Public Parking</th> <th>Manage Mosquito Populations</th> <th>Promote Vibrant Communities</th> <th>Stabilize Neighborhoods</th>	Early Voting	Reduce Homelessness	Develop Pre-Incident Plans	Promote Public Parking	Manage Mosquito Populations	Promote Vibrant Communities	Stabilize Neighborhoods
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Public Crime Map External Agency Projects ROW Permit Locator		Public Crime Map		External Agency Projects	ROW Permit Locator		
Neighborhood Crime Reports  Pavement Moratoriums  ROW Permit Public Comment		Neighborhood Crime Reports		Pavement Moratoriums	ROW Permit Public Comment		
Participatory Budgeting				Participatory Budgeting			

## State Government

Transportation	Public Health	Agriculture	Natural Resources	Fish and Wildlife	Economic Development	Secretary of State
Reduce Traffic Fatalities	Analyze Birth Outcomes	Monitor & Report Invasive Pests	Engage Citizen Scientists	Engage the Public	Attract Businesses	Share Election Results
Inventory ROW Assets	Conduct Restaurant Inspections	Protect Water Quality	Monitor Permit Status	Wildlife Photo Survey	Manage Community Events	Early Voting
Manage Snow Operations	Birth Outcome Briefing	Invasive Pest Status	Analyze Environmental Impact	Wildlife Management	Incentive Zones	Election Polling Places
	My Health Services	Invasive Pest Surveys	IVIONITOR PERMIT STATUS	Area Locator	Property Lister	Election Results
Inform Public	Conduct Restaurant Inspections	Invasive Pest Viewer	Monitor Water Quality	Hunting License Locator	Property Listing Reviewer	Historical Election Results Gallery
	Restaurant Inspections	Protect Water Quality	Engage the Public	Park and Recreation Locator	Manage Community Events	My Elected Representative
	Restaurant Inspection Results	BMP Dashboard	Analyze Environmental Impact	State Trail Locator	Events Calendar	
		BMP Reports	Environmental Analysis		Events Permit	Entire Organization
	Law Enforcement	BMP Surveys	Environmental Impact Briefing		Events Permit Review	Organize Foundational Data
	Organize Foundational Data		Environmental Impact		Events Site Map	Community Addresses
Manage Snow Operations	Perform Crime Analysis		Public Comment		Events Coordination	Community Parcels
SnowCOP	and an address of the second		Environmental Screening	[] ( ] 분위님 [C ] [ ( ) [	Events Map Gallery	Public Land Survey Editing
Inform the Public	Develop Tactical Plans		Monitor Water Quality			Carlos Angel Constant and State
Transportation 511	Inform the Public		Water Quality Inspections			
Road Closures	Near Repeat Analysis		Water Quality Status			
	Develop Tactical Plans		Engage the Public			
	Tactical Operation Planner		Water Access Locator			
	Tactical Operation Dashboard		Rest Martine 2015 Billion (1999) Barrier			
	Tactical Operation Surveillance					
	Inform the Public					
	Public Crime Map					

Neighborhood Crime Report

Resilience						
Preparedness	Response	Recovery	Mitigation	Resilience		
Organize Foundational Data	Maintain Situational Awareness	Conduct Damage Assessments	Assess Vulnerabilities	Become More Resilient		
Prepare for Incidents Community Addresses	Assess Incident Impact	Collect Health & Safety Reports	Hazard Assessment & Analysis Hazard Vulnerability Assessment	Community Resilience Community Resilience Surveys		
Engage the Public	Inform the Public	Manage Storm Damage	Community Mitigation	Community Impact		
Manage Community Events	Produce Emergency Maps	Citizen Reports	Mitigation Feedback	Resilience Dashboard		
Prepare for Incidents	Incident Status Dashboard	Public Safety Reports		Resilience Outreach		
Flood Planning	Incident Briefing Road Closures	Health & Safety Reports Health & Safety Dashboard		Community Impact Dashboard		
Engage the Public	Assess Incident Impact	Manage Storm Debris				
Emergency Assistance	CAMEO Tools	Debris Reporting				
Floodplain Inquiry	Inform the Public					
My Hazard Information	Impact Summary Map					
Manage Community Events	Shelter Locator					
Events Calendar	Evacuation Zones					
Events Permit	Public Information					
Events Permit Review	Produce Emergency Maps					
Events Site Map	Emergency Management Maps					
Events Coordination						
Events Map Gallery						



Environmental Screening State of Nebraska State of Idaho Country of South Africa Florida Fish and Wildlife Adirondack Park Organization



**Transportation 511** 

Council of Canterbury - NZ

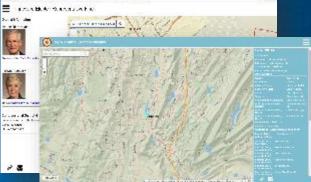
State of Illinois State of Indiana State of Iowa

State of Kentucky

Florida DEM

State of Maryland Washington, DC

> Elected Officials Alabama Tennessee

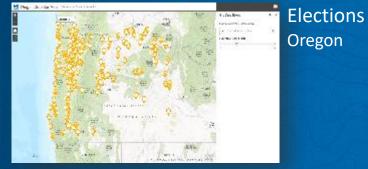




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Photo Survey State of Louisiana

# Implementations





Community Aggregation Wisconsin, New Mexico, Kansas, Michigan ...

# Orchestrate Field Operations with No-Code

Use the ArcGIS Apps to plan, optimize and coordinate your mobile workforce



Deploy complete field mobility solutions

# Deploy Modern Low-Code Apps

Minimize customization and expense while maximizing impact

## Web App Templates



# Image: state stat

Web AppBuilder

## AppStudio



## **Native Apps**

# Leverage the ArcGIS APIs and SDKs

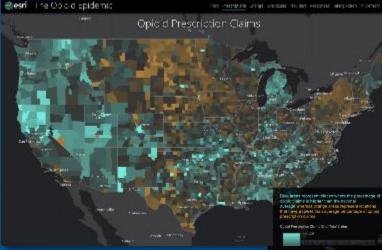
When you need fine grained control over your apps and integrations



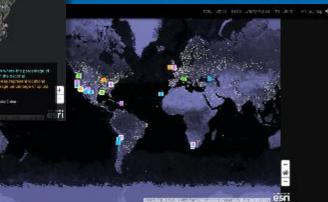
developers.arcgis.com

# Use Maps to Tell Compelling Stories

Aligned with your mission objectives and initiatives



storymaps.arcgis.com





#### A Gallery of DCNR Story Maps

Story Maps serve as virtual visits to the wide variety of Pennsylvania natural wonders, recreational amenities, and conservation focused points of interest. By combining intelligent web maps that incorporate text, photos, and interactive map-related function story maps will take you to places you may never get to see, or inspire you to visit in the near future. Take a journey around Pennsylvania with the story maps listed below.

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#### Exploring Pennsylvania's Top Ten Trail Gaps

The intent of the top ten trail gaps is to establish the top priority trail projects for Pennsylvania and to raise public awareness of the need for funding and interagency. cooperation to complete these gaps. These were selected as the top ten trail gaps out of 38 nominations submitted by trail partners throughout the commonwealth. Mew Map>



#### 25 Must-See Pennsylvania State Parks

Pennsyhania actually has 121 must-see state parks, but the 25 listed here are some of the best examples of the commonwealth's significant natural and historic resources. Mew Map>



#### A Tour of Old Growth Forests

located primarily in north-central Pennsylvania, the 20 sites on the auto tour of old growth. forests represent many different ecosystems, not only deep classic "big tree" forests. Mew Mag>



#### Explore the Pennsylvania Wilds Region

Visit these key destinations and DONR sites that highlight the outstanding natural assets and recreational resources the region has to offer. <u>Mew Map≻</u>



#### Explore Pennsylvania DCNR's LEED Certified Buildings

LEED, or Leadership in Energy & Environmental Design, is a green building certification program that recognizes best-in-class building strategies and practices. To receive LEED certification, building projects satisfy prerequisites and earn points to achieve different levels of certification. Currently, the Pennsylvania Department of Conservation and Natural Resources has 13 LEED certified buildings, 4 more are currently going through the certification process while 4 are in the planning stage. Mew Map>

www.dom.pe.gov

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#### Seminole Tribe of Florida Attractions

Tourism Points of Interest

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Story Maps

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#### MAKING PROGRESS FOR HAWAI'I



### Governor Ige's 2017 Accomplishments

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# **Resilient City Recovery Maps**

Interactive Maps Overview to Aid in the City's Recovery from the October 2017 Wildfires.



Seminole Tribe of Florida

The Servinde Tribe of Florkis ourrently employs more than 2,000 non-indians and purchases more than 324 million dollars in goods and services from more than 850 Fordia workins a year. In addition, the Tribe pays 33.5 million in fodoral payroll saves. The Servinde Tribe of Florida has more non-compassion resensations than any mbe in North America. Take a walk through our six reservations by circling the points on the map or the mages below.



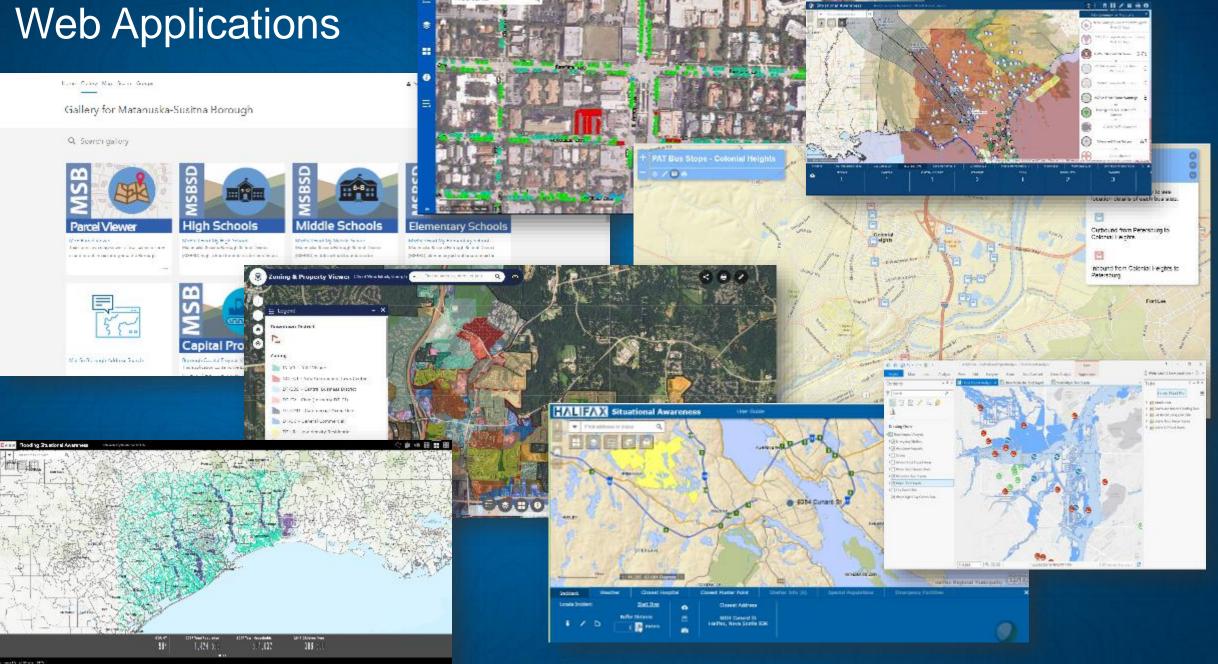
## Growing a Resilient Anchorage from the Ground Up

Cities of Service and Mayor Berkowitz partner to increase food security in our community

The STOP Homepage 🖬 🖬 🖉

Hank cally of April page 4

# Web Applications



Public Parking Incomation - Les Alcohort an ind on edcreas

## ArcGIS Hub Is Transforming Community Engagement and Collaboration

Organizing and Leveraging Stakeholder Interactions



Enabling Civic Participation

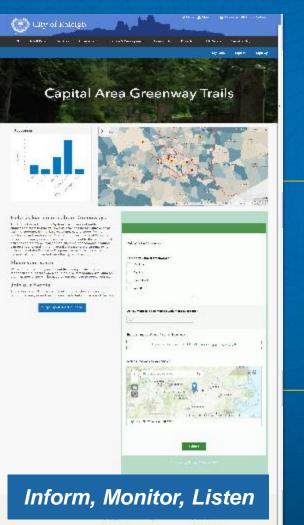
Initiatives

# **Building Bridges from Vision to Execution**

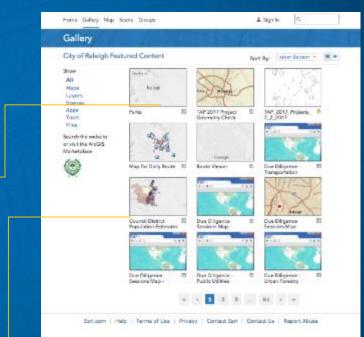
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## Initiatives



## GIS Content & Apps



# Every Community wants to be...



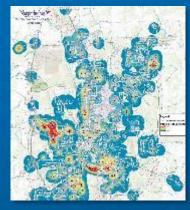
# Nacogdoches, TX

 Smart devices coupled with mobile GIS solutions enable City GIS to get data into the field quickly.

Eliminated paper-based work orders.

 Transitioning from paper to digital workflows saved 11 hours/day (\$230/day) or 2,860 hours/year (\$60,000/year).









# North Augusta, SC

 Modernized work order management process from paper to web-based common view in field and office.

 Faster customer service: City reduced average response time from 33 hours to 8 hours.

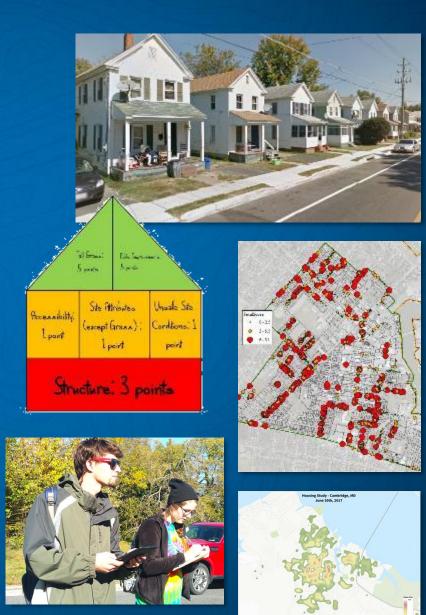
 Savings on fuel and mileage through reduced number of daily trips.





# Cambridge, MD

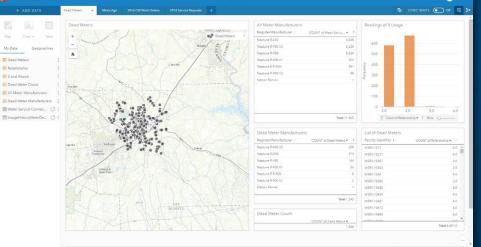
- City of 12,480 wanted to map property conditions of all residential structures to identify deteriorating housing stock and at risk properties.
- Piloted a GIS workflow in one ward of city
- Effort resulted in securing \$1 Million (to date) from U.S., State of Maryland and Habitat for Humanity for housing improvements – in just one ward.
- Initiative is now expanding to remainder of City and other Eastern Shore communities.



# Opelika, AL

- Opelika Utilities serves 14,000 water customers.
- City took a closer look at potential revenue loss and solutions to help increase revenue more efficiently.
- Non-operational (dead) meters are City's primary concern for non-revenue water.
- Discovered problem was bigger than they ever imagined
  (3,000 of 14,000 meters or more than 20%) were dead.
- Losses were \$25,000/month or \$300,000/year
- Using spatial analysis, determined dead meters were result of one manufacturer and model – still under warranty. No cost to City. d





# New Bern, NC

 For each person not counted during the Census, it costs a community \$1,624/person per year. GIS is essential for Census preparation.

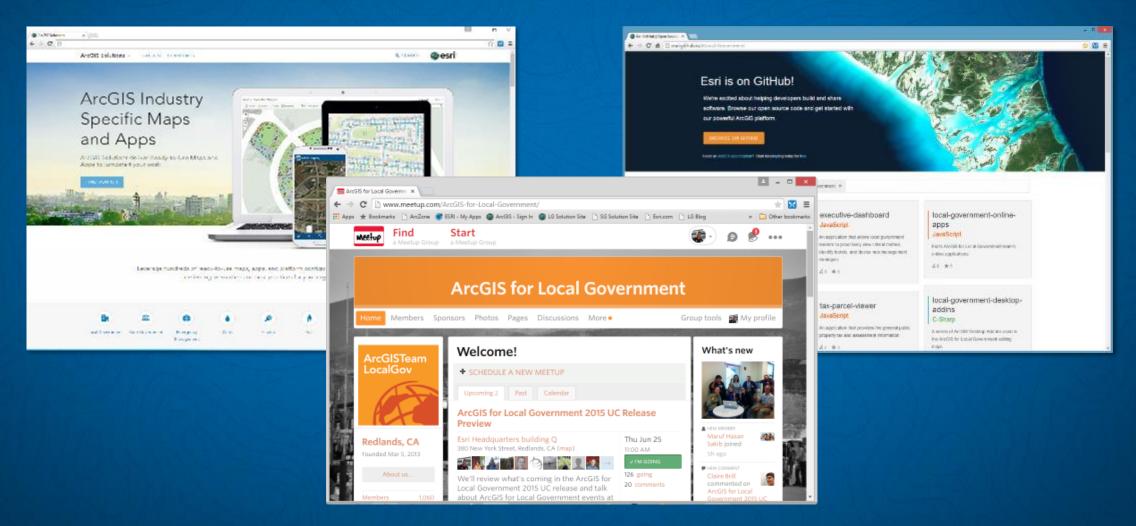
 Estimated savings of \$50,000 following each of the last 2 Census counts by doing redistricting in house vs. hiring an outside consultant.

 City provides utility services to customers outside the city limits. Non-city customers pay a 2x rate but nearly 2,000 customers were not being assessed the accurate rate – recovered \$250,000 annually.



# The Community

#### It's not just about the technology



## Thank you

Chris Nickola <u>cnickola@esri.com</u>