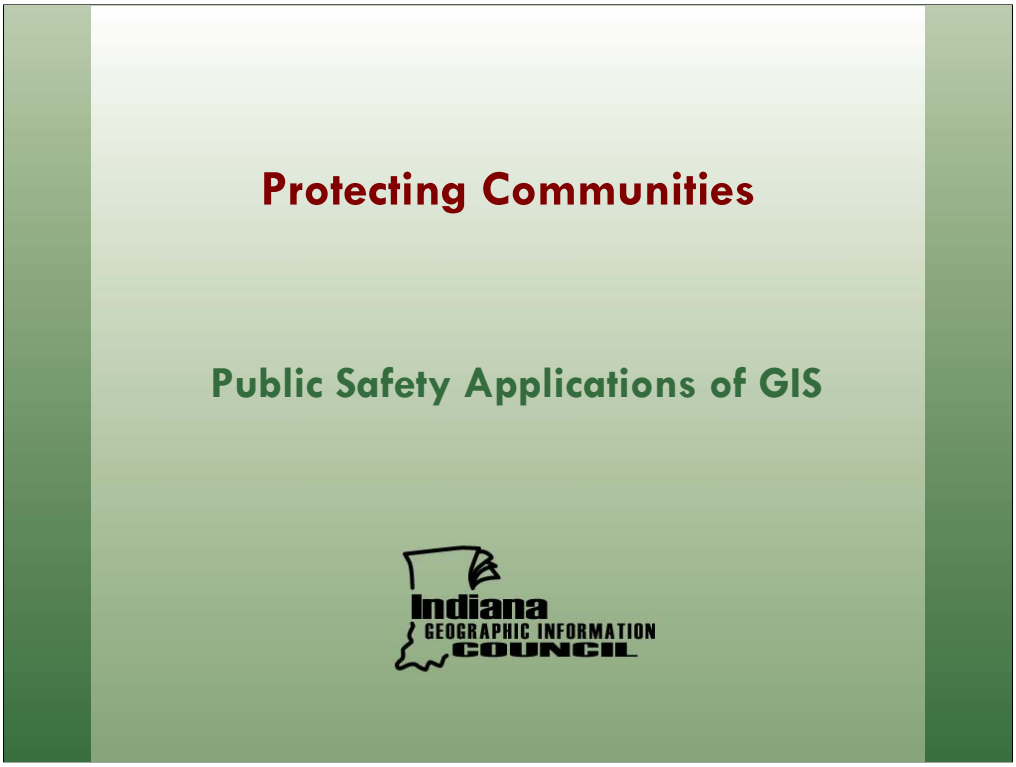
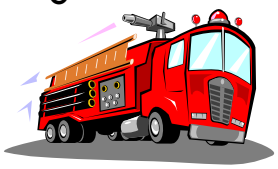


This presentation is intended to be delivered to audiences interested in learning about how GIS can support the needs of public safety workers and agencies. It should require approximately 1 hour to deliver, but could easily be reduce in length to 30 minutes by spending less time than suggested on some of the slides or increased in length to 1.5 or even 2 hours by adding demonstrations of software, website, and other resources as appropriate.

What is Public Safety?

- Public safety is the protection of the population from all forms of injury, damage, or harm.
- It involves all organizations and individuals that support this goal.



Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

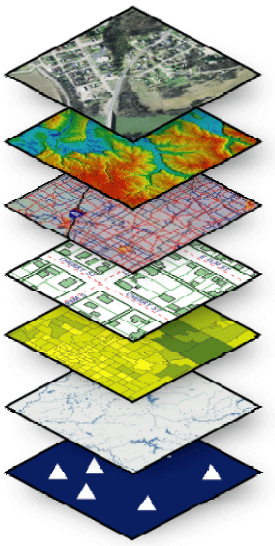
This slide sets the context for the remainder of the presentation. Help your audience understand that public safety involves addressing any issues that threaten injury, damage, or harm to the general population More importantly – for the purposes of this presentation – it requires the involvement of a multitude of sectors who have a role in addressing public safety issues. This includes police, fire, emergency medical services, emergency management, homeland security, health agencies, and all of those organizations that support these organization.

GIS Brings Information Together

This presentation focuses on how GIS brings together information that supports the goals of public safety organizations.

It will focus on three key areas of public safety.

- Crime
- Public Health
- Emergency Management



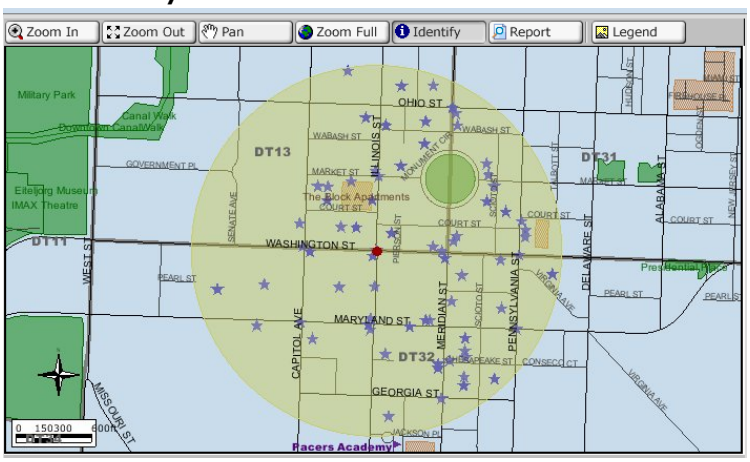
Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

The element that brings together the multitude of organizations that address public safety issues is information – often referred to as 'data' in a GIS context. In many cases, that information is spatial in nature. This slide provides examples of some of the many types of spatial information that public safety agencies require – photography; locations of facilities, events such as crimes, and more; demographic data; infrastructure such as roads and utilities; streets used for evacuation and response planning and other purposes; and even more advanced types of data such as satellite imagery.

This presentation will provide a framework that defines some of the many ways that public safety interests can be served by GIS. It focuses on three types of public safety applications – those involving crime, public health, and emergency management. Stress to your audience that these are not the only areas in which GIS supports public safety, but they are among the most visible and relevant. Also let your audience know that this presentation is not intended to provide an exhaustive study of how GIS supports these areas. Rather, it is intended to help them envision the potential of GIS for supporting public safety goals and to encourage them to pursue additional information about what it presented.

Crime Mapping

- The ability to map the location of crimes is a vital ability of GIS.



Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

The example on this slide shows a screen capture of the Law Enforcement Map Viewer application available from the Indianapolis Marion County GIS department at http://imaps.indygov.org/cvc. The viewer shows Property Offenses that occurred during the period from 3/11/07 to 6/8/07 within a ¼ mile radius of 100 W Washington Street.

Depending on the time that you have to deliver your presentation you might want to do a live demonstration of this viewer – or perhaps another one depending on where you are delivering the presentation and on the availability of relevant websites in that area. The URL for the Indianapolis crime viewer was http://www.indygov.org/eGov/County/ISA/Services/GIS/home.htm at the time that this presentation was developed.

Be sure to point out that GIS is not a tool that always requires lengthy training to use. This website is highly intuitive and available to anyone that has a network connection. Many communities have developed web-based GIS capabilities in addition to – or sometimes as an alternative to – more traditional desktop GIS applications. One of the themes that you should focus on during this presentation is that GIS is intended for a wide range of audiences. Becoming a GIS user can require a very short term commitment or it can be a time consuming process sometimes requiring years of education. Also make sure that the audience understands that GIS is a highly dynamic technology. The ‘state’ of GIS even five years ago was vastly different than what it is today as a result of both technological advances and a response by software developers to the needs of GIS users as they have become better defined.

Public Warning

- GIS can be used in combination with public communication systems to alert communities to dangerous situations.
- Examples
  - AMBER Alert
  - Suspect in the area
  - Terrorist attack
  - Natural disaster

Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

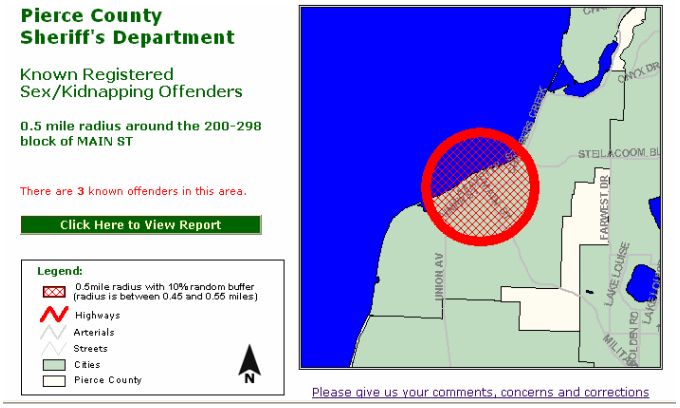
GIS can serve an important role as a component of public warning systems. This is evident thru, among other things, the frequent use of GIS on network and cable news programs to generate maps and analysis that provide context for television audiences. As a result of this use by the media, audiences are provided with knowledge about the locations of terrorist attacks and other crimes in a near real time fashion.

About AMBER alert.

The AMBER Alert System began in 1996 when Dallas-Fort Worth broadcasters teamed with local police to develop an early warning system to help find abducted children. AMBER stands for America's Missing: Broadcast Emergency Response and was created as a legacy to 9-year-old Amber Hagerman, who was kidnapped while riding her bicycle in Arlington, Texas, and then brutally murdered. Other states and communities soon set up their own AMBER plans as the idea was adopted across the nation. Once law enforcement has determined that a child has been abducted and the abduction meets AMBER Alert criteria, law enforcement notifies broadcasters and state transportation officials. AMBER Alerts interrupt regular programming and are broadcast on radio and television and on highway signs. AMBER Alerts can also be issued on lottery tickets, to wireless devices such as mobile phones, and over the Internet. Through the coordination of local, state and regional plans, the Department of Justice (DOJ) is working towards the creation of a seamless national network. AMBER Alert has been very effective. AMBER Alert programs have helped save the lives of over **200** children nationwide. GIS can support the goals of the AMBER alert system by generating maps showing the area where a child has been abducted. It can also be used by law enforcement agencies to track the location of tips that might help solve the crime.

Sex Offender Registries

- Some communities are using GIS to notify communities of known sex offenders.



Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

Megan's Law – requires sex offenders to register their addresses with local law enforcement. Two different types of maps have surfaced in recent years for tracking sex offenders. This map shows a website maintained by Pierce County, Washington model for tracking sex offenders. The county has – as of the date this slide as generated – over 2,000 registered sex offenders and kidnappers.

GIS can support management of sex offenders by creating Web applications for citizens to find sex offenders in their communities. GIS can also provide tools to create in-house maps for police to track and verify location of sex offenders

Sex Offender Registries

- GIS associates map information with a database such as details as the history of a criminal.

Report

There are 3 known registered sex/kidnapping offenders in a 0.5 mile radius (plus or minus 10% random buffer)
Level 3 offenders: 0
Level 2 offenders: 0
Level 1 offenders: 3

Level 1 Offenders

Name	Level	Sex	Race	Age	Crime
[redacted]	1	F	W	33	Sexual Misconduct 2
[redacted]	1	M	W	51	CHILD RAPE 3
[redacted]	1	M	W	17	Child Rape 1 (two counts)

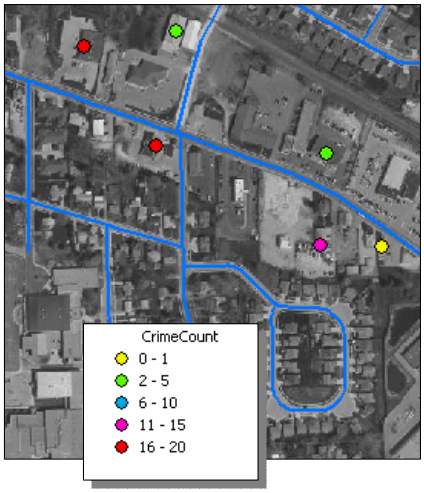
Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

This slide shows an example of how GIS can provide the means for managing information about the sex offenders in addition to the ability to map the offender locations.

Take a few minutes to talk in a more broad context about the importance of relating maps to a database. This is one of the defining characteristics of GIS. You might want to invite your audience to offer their own ideas about what types of crime related information could be tracked in a database and viewed on a map using the tools in a GIS. Examples might include the time and date that a crime occurred, information about witness reports, the location of crimes, information about the area in which crimes occurred – is it in an abandoned building, an area known for drug related arrests, etc. Remind your audience that thus far you have helped them discover that (a) GIS can make maps and (b) GIS links maps to databases that provide information about what is shown on the maps. Then point out that, while seeing information on a map is important, it does not necessarily help you understand the meaning of what you are seeing. That will then lead you to the next slide which takes GIS from being merely a viewing tool to being an analytical tool.

Crime Analysis

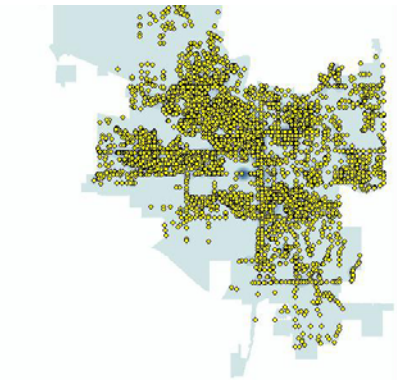
- The real power of GIS lies in its ability to analyze information.
- Spatial analysis can play a key role in reducing crime.



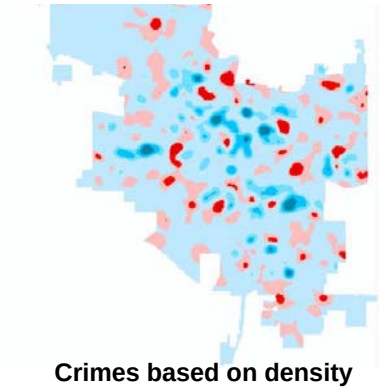
The ability to analyze information is one of the most important things that a GIS can do. This slide shows a simple form of analysis – classifying locations based upon the number of crimes that have occurred. This example reveals how GIS can show areas that have a greater than average number of criminal events or areas where people have a higher than average risk of victimization. This type of analysis is largely visual in nature, but it is relatively easy to perform and can sometimes be useful.

Crime Analysis

- GIS can be used to make sense of complex sets of information.



Crimes as individual points



Crimes based on density as well as growth or decline over time

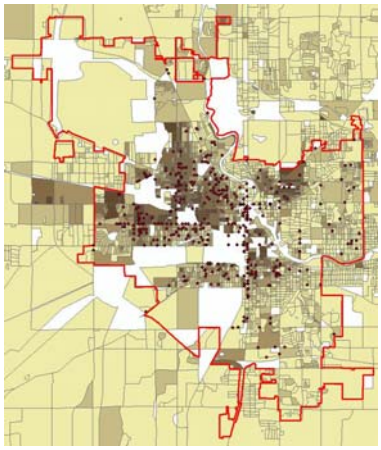
Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

GIS offers a wide range of more advanced analytical options than the one shown on the previous slide. Among those options is the ability to take complex sets of information, such as a database containing thousands of crime reports, and transform that information into something that is meaningful. Point out how difficult it is to interpret the distribution of crimes using the map on the left. It is impossible to determine how many crimes have occurred in many areas of the map since the symbols for crime locations overlap one another. The map on the right clearly shows areas where crime is prevalent (indicated by the darker shades of blue), but also indicates areas where crime has significantly increased (shown in red) vs areas where it has significantly declined (shown in blue).

You might want to tell your audience that these examples were developed as part of an ArcGIS Spatial Analyst training course delivered to the City of South Bend Police Department. That department won an award for their work in applying GIS to crime analysis from the Indiana GIS Council at the 2006 Indiana GIS Conference.

Crime Analysis

- GIS is a powerful tool for identifying relationships between crime and the environment in which it occurs.
- GIS can be combined with statistics and other tools to derive meaningful information that can help communities reduce crime.



Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

The graphic on this slide shows the relationship between the concentration of arrests (brown dots) and a particular ethnic group (darker colors indicate higher numbers of that ethnic group). Crime is a complex phenomena – often occurring as a result of many factors. One of the earlier slides in the presentation showed a series of maps overlapping one another. The goal of that slide was to stress that GIS allows you to dynamically combine geographic information based on your needs. Remind the audience about that slide and then emphasize the point that in a crime analysis context – as is the case in the other areas of public safety that you will discuss in the presentation - this ability is vital. Point out that a GIS user could identify a possible relationship with a map like this and then use tools in GIS, statistical applications, or other tools to conduct even more sophisticated types of analysis to determine whether apparent relationships between crimes - and ,in this example, the demographics of the community in which the crimes occurred - is statistically significant or merely coincidental.

Public Health Trends

- 2006 Health Trends
  - For adults over age 50, the annual percentage of persons who received influenza vaccinations was the lowest since 1997.
  - The number of obese adults over age 20 has increased from 19.4% to 26.1% in 2006.
  - This is an increase in diagnosed diabetes among adults over age 18

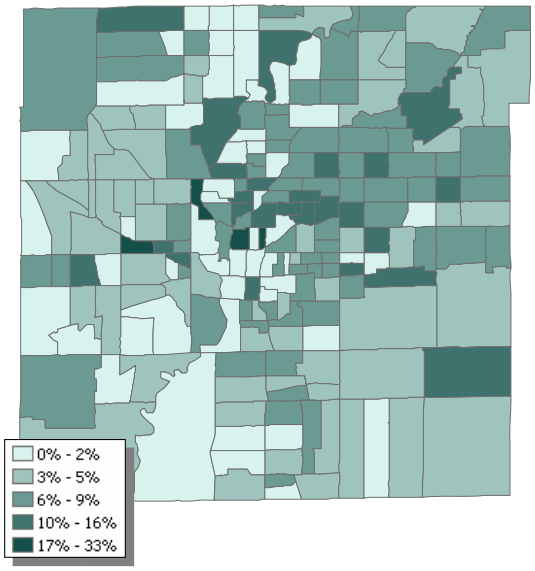
The information on this slide was taken from the 'Early Release of Selected Estimates Based on Data from January-September 2006 National Health Interview Survey' published by the US Department of Health and Human Services and released on 3/20/07. In this release, the National Center for Health Statistics (NCHS) updates estimates for 15 selected health measures based on data from the January–September 2006 National Health Interview Survey (NHIS) and presents estimates from 1997 through 2005 for comparison. The 15 measures included are lack of health insurance coverage and type of coverage, usual place to go for medical care, obtaining needed medical care, receipt of influenza vaccination, receipt of pneumococcal vaccination, obesity, leisure-time physical activity, current smoking, alcohol consumption, human immunodeficiency virus testing, general health status, personal care needs, serious psychological distress, diagnosed diabetes, and asthma episodes and current asthma.

The full report can be viewed at http://www.cdc.gov/nchs/data/nhis/earlyrelease/earlyrelease200703.pdf.

Mapping at Risk Populations

Example

Live births where mother had sexually transmitted disease or aids as percent of all births – Indianapolis 2006



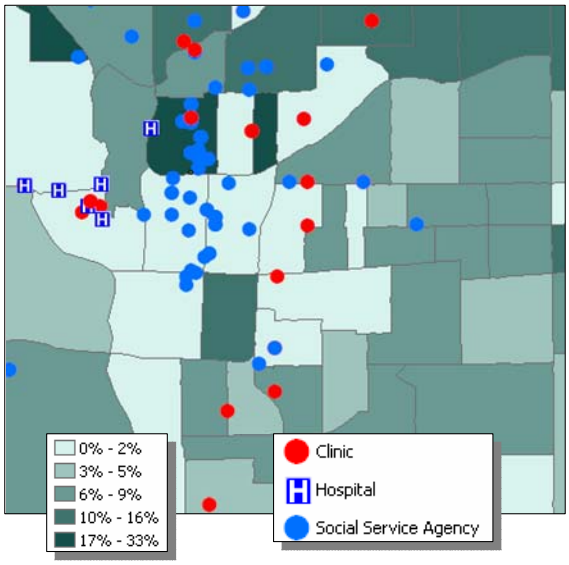
Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

This slide shows information derived from the SAVI website which is accessible at http://www.savi.org. SAVI stands for Social Assets and Vulnerabilities Indicators. It is a community information system that seeks to enhance capacity and improve decision-making in Central Indiana communities and especially in organizations and agencies that serve human needs. SAVI allows you to access, map, and analyze a wealth of information from approximately 30 data providers, including crime, education, welfare, demographics, economy, health, community assets, human service programs and more.

Ask your audience to consider how this map might help them address the prevalence of STDs and AIDS in the areas where it is strongest. Ask what types of additional information might be useful to add to the map – that question leads you to the next slide.

Matching At Risk Populations with Resources

GIS can match local community resources to public health needs



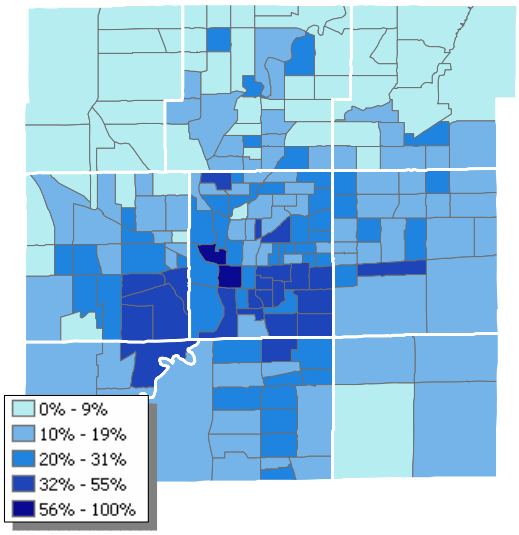
Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

This map shows the central portion of the map on the previous slide. It shows the locations of facilities where mothers afflicted with STDs or AIDS – the highest percentage of which are shown with the darkest colors of green - might seek assistance.

Mapping At Risk Populations

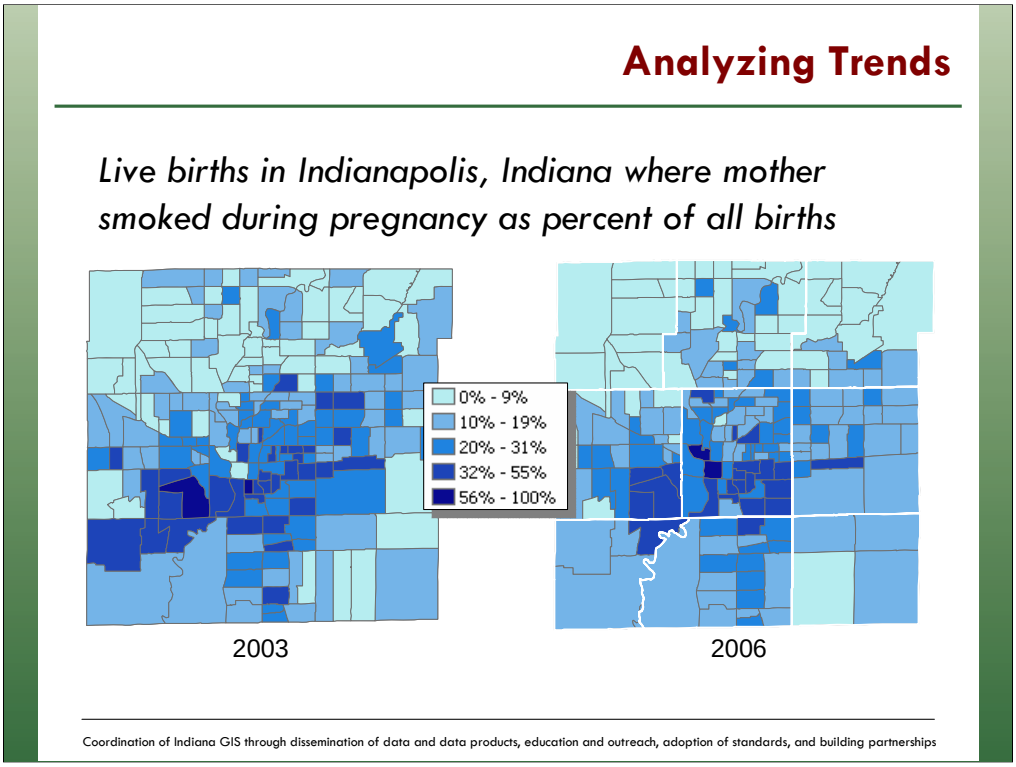
Example

Live births in Indianapolis, Indiana where mother smoked during pregnancy as percent of all births - 2006



Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

This slide also shows information obtained from the SAVI website. The map illustrates where mothers that smoked during pregnancy are spatially concentrated. A GIS user could compare information like this to smoking induced health problems such as cancer and emphysema. They could also examine the incidence of smoking in mothers of different ages, ethnicities, education levels, incomes, and more if the information is available. An important point for you to make with regard to this map is that GIS does not usually provide answers, it does however provide information that can help show cause and effect relationships (such as smoking can sometimes cause cancer) and thus enable you to make better decisions.



This slide also comes from the SAVI website. SAVI is somewhat unusual among Internet GIS sites in that it provides access to multiple years of data – thus allowing for trend analysis.

Spend a few minutes talking with the audience about what these maps might suggest. Point out the areas where the rates of mothers who smoked during pregnancy dropped and the areas where it increased. Ask the audience to think about what types of additional information could be added to these maps to help explain these trends. Examples might include things like changing demographics, availability of programs that encourage mothers not to smoke, and other factors. This slide should provide several minutes of audience interaction regardless of whether the audience is familiar with this geography.

Time permitting – and assuming that you have Internet access – you might want to consider showing your audience additional information on this website.

Public Health and GIS

- Determining geographic distribution of diseases
- Analyzing spatial and temporal trends
- Stratifying risk factors
- Assessing resource allocation
- Planning and targeting interventions
- Monitoring diseases and interventions over time

This slide lists some of the additional ways that GIS can support public health objectives. Spend a few minutes talking with your audience about how GIS can support these needs. If you have any health professionals in the audience you should try to engage them in the conversation by asking them to share their experiences with use GIS or their thoughts on how GIS might be able to help them improve on the ways that that they address public health concerns.

Emergency Management and GIS

- Emergency management has five phases.
  - Planning
  - Mitigation
  - Preparedness
  - Response
  - Recovery
- GIS can play an important role in each of these phases.

Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

Emergency management activities are broken into the five phases listed on this slide. Emergency management is an ongoing process where, done properly, each of these activities produces information and products that leads to improvement in dealing with and ideally preventing disasters. A short explanation of each phase is provided below. Only describe these terms in a general sense since you will be going into more detail about what they mean in upcoming slides.

•Planning – Activities necessary to analyze and document the possibility of a disaster or emergency and the potential impacts on life, property, and the environment.

•Mitigation – Activities that actually eliminate or reduce the probability of a disaster.

•Preparedness – Activities necessary to the extent that mitigation measures have not or cannot prevent disasters.

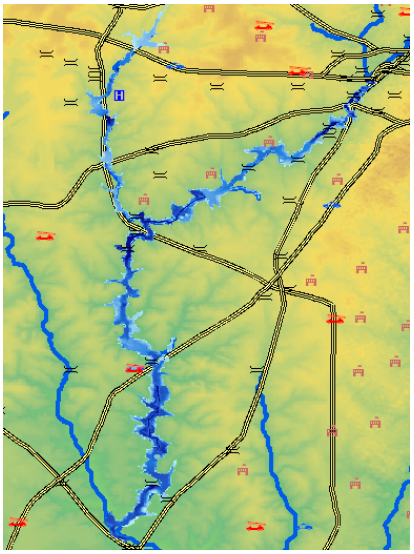
•Response – Activities following an emergency or disaster.

•Recovery – Activities necessary to return all systems to normal or better.

The next few slides describe some of the many ways that GIS can support the emergency management process.

Planning Goals

- Assess the hazards and risks that might impact a community
- Determine possible mitigation approaches as well as preparedness, response and recovery needs.
- Document plans (Disaster Mitigation Act of 2000)



Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

GIS provides an extremely important roll in disaster planning which requires identifying the location of hazards – floods, earthquakes, wind, terrorism threats, and so forth – populations at risk, critical infrastructure, and resources that are available to respond to hazards. Each of these needs has a strong GIS component.

The Disaster Mitigation Act of 2000 (DMA 2000) (P.L. 106-390) provides an opportunity for states, Tribes and local governments to take a new and revitalized approach to mitigation planning. DMA 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the Act) by repealing the previous mitigation planning provisions (Section 409) and replacing them with a new set of mitigation plan requirements (Section 322). This new section emphasizes the need for state, Tribal, and local entities to closely coordinate mitigation planning and implementation efforts. The requirement for a State mitigation plan is continued as a condition of disaster assistance, adding incentives for increased coordination and integration of mitigation activities at the State level through the establishment of requirements for two different levels of state plans: “Standard” and “Enhanced.” States that demonstrate an increased commitment to comprehensive mitigation planning and implementation through the development of an approved Enhanced State Plan can increase the amount of funding available through the Hazard Mitigation Grant Program (HMGP). DMA 2000 also established a new requirement for local mitigation plans and authorized up to 7% of HMGP funds available to a state to be used for development of state, Tribal, and local mitigation plans. More information about DMA 2000 is available at http://www.fema.gov/plan/mitplanning/DMA.shtm.

Mitigation

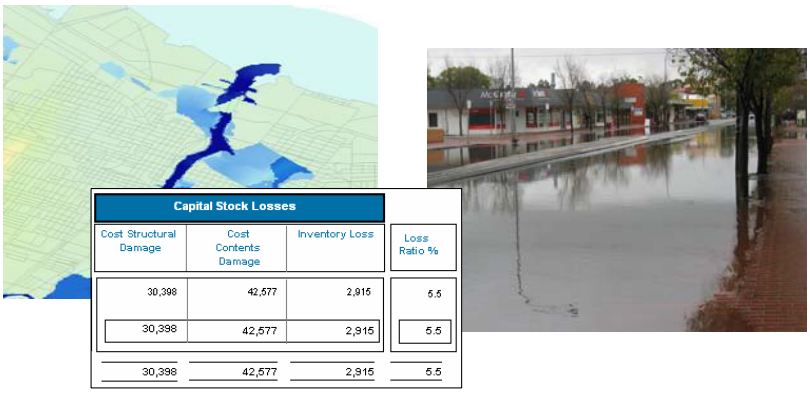
- Eliminate or reduce probability of a disaster.
- Examples
  - Land use management
  - Building regulations in flood zones
  - Building codes in earthquake-prone areas
  - Vegetation clearance in high fire danger areas

Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

GIS is an ideal tool for testing mitigation strategies. It provides the ability to bring together a wide array of data and tools that can help assess the impact of mitigation actions. This slide points to only a few of the many types of mitigation that GIS can support. Feel free to add your own to the discussion.

Mitigation Example

- GIS can help assess the impact of mitigation actions by integrating science and engineering with spatial data.



Capital Stock Losses			
Cost Structural Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %
30,398	42,577	2,915	5.5
30,398	42,577	2,915	5.5
30,398	42,577	2,915	5.5

Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

This slide shows an example of how GIS can (1) assess the risk – in this case a flood (2) generate maps of the risk and compare them to the exposed population and built environment (3) assess the economic and social impact of the hazard and (4) provide the ability to assess the impact of various mitigation options prior to expending resources to implement them.

This analysis was done using HAZUS-MH, a free GIS-based risk assessment tool that is available from the Federal Emergency Management Agency. HAZUS-Multihazards is a free ArcGIS extension developed by the Federal Emergency Management Agency (FEMA) that supports mitigation, response, recovery, planning, and risk management activities for earthquake, hurricane, and flood related events. HAZUS-MH provides tools that help users meet the requirements of programs such as FEMA's Disaster Mitigation Act of 2000 – a program that supports those ongoing needs of communities as they relate to planning for and responding to disasters. HAZUS-MH provides a diverse range of options that allow it to be effectively used by individuals and organizations with fairly limited knowledge of hazard analysis as well as users with extensive expertise in the earth, building, and GIS sciences.

The Flood model allows users to define riverine and coastal floods of varying magnitudes and then estimates short and long term economic and social impacts from those events. It specifically determines potential damages to buildings, essential facilities, transportation and utility lifelines, and agricultural areas. It also addresses debris generation and shelter requirements and can estimate direct losses based on physical damage to structures, contents, and building interiors.

The Earthquake model applies mathematical formulas and information about building stock, local geology and the location and size of potential earthquakes, economic data, and other information to estimate losses from a potential earthquake. Once an earthquake location and size is specified, HAZUS will estimate the violence of the following ground shaking, the number of buildings damaged, the number of casualties, the amount of damage to transportation systems, disruption to electrical and water utilities, the number of people displaced from their homes, and estimated cost of repairing projected damage and other effects.

The Hurricane Wind Preview Model has been developed for communities in Atlantic and Gulf coast regions of the United States and Hawaii. It incorporates a building classification system that depends on the characteristics of the building envelope and building frame. It provides the capability to compute damage based on building classes and the effects of rain and progressive failure. It also models damage to contents and building interiors and provides estimates of tree blow-down and structure debris quantities. Model output includes loss estimates for direct and indirect economic loss, shelter requirements, and casualties.

The HAZUS-MH user community includes local, state, and federal government officials; students and researchers; insurance companies; utility representatives, and many other organizations and individuals who plan for or are interested in the impacts of flood, hurricane, and earthquake hazards. As of 2004, HAZUS-MH had been used by 68% of states and territories for Disaster Mitigation Act of 2000 planning (HAZUS Annual Progress and Utilization Report, 2004). A FEMA marketing study estimates that there will be nearly 20,000 HAZUS-MH users by 2008.

HAZUS-MH provides for three levels of analysis:

A Level 1 analysis yields a rough estimate based on the nationwide database that comes with HAZUS-MH and is a great way to begin the risk assessment process and prioritize high-risk communities. A level 1 analysis can be conducted by individuals or organizations with a minimal amount of training and knowledge.

A Level 2 analysis allows for the input of additional or refined data and hazard maps that will produce more accurate risk and loss estimates. Examples of such data might include tax assessment files, local flood studies, soils maps, and other sources of information. This type of analysis often involves collaborations between local emergency management personnel, city planners, GIS professionals, and others.

A Level 3 analysis yields the most accurate estimates of loss and typically requires the involvement of technical experts such as structural and geotechnical engineers who can modify loss parameters based on to the specific conditions of a community. This level of analysis allows users to supply their own techniques to study special conditions such as dam breaks and tsunamis. Engineering and other expertise is needed at this level.

Preparedness

- Actions necessary to the extent that mitigation measures have not, or cannot, prevent disasters.
- Examples
  - Compiling state resource inventories
  - Training exercises
  - Early warning systems

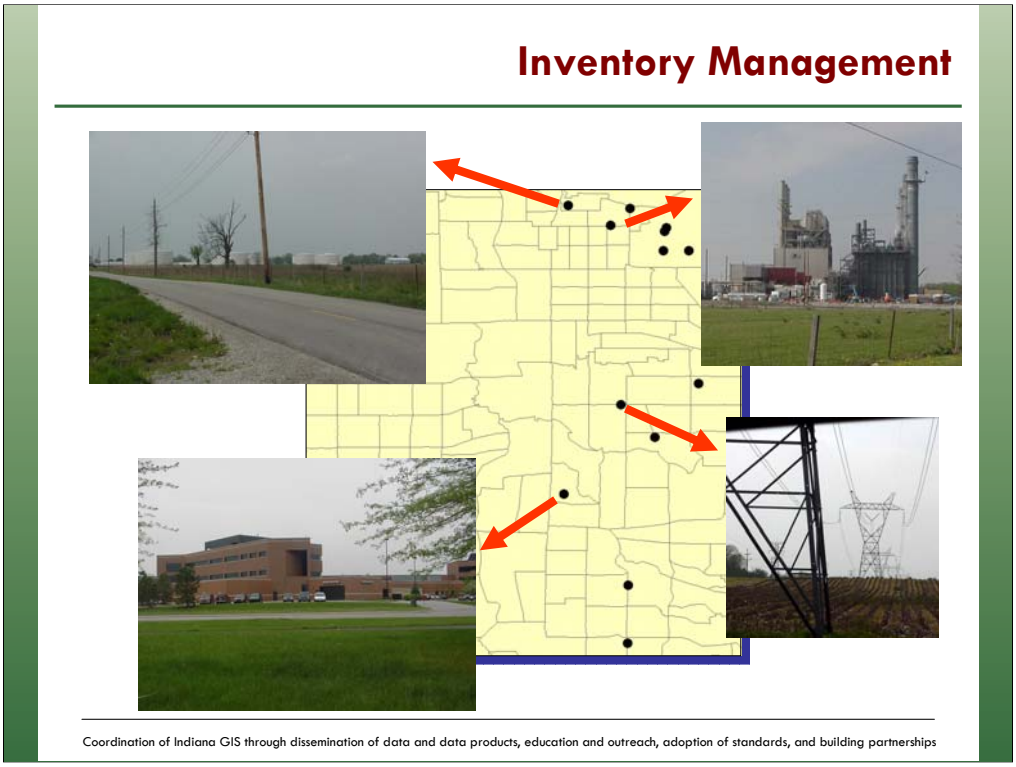
Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

Spend a few minutes talking about how GIS can support the examples listed on this slide. Some ideas you might want share are as follows:

State Resource Inventories - Many states are in the process of inventorying critical infrastructure. The Indiana Department of Homeland Security, for example, is working with each county in the state to collect information about their critical facilities. In addition efforts are underway thru initiatives like the Homeland Security Infrastructure Program (HSIP) to collect this type of information for every state in the nation. More information about the HSIP can be found at http://www.nsgic.org/hottopics/hsip_ci_geospatial_data_sharing_program_121806.pdf.

Training Exercises – A vital component of any training exercise is accessibility to information. By working GIS into the training exercise environment it is possible to help first responders understand how this important tool can support the need for immediate information in the event of an actual disaster. Lessons learned from using GIS in a disaster then need to be integrated into post disaster exercises so that the process of using GIS in disaster planning, mitigation, response, and recovery continues to improve over time.

Early Warning Systems – This was noted on an earlier slide, but remind the class that this is a form of preparedness.



This slide shows examples of the types of inventory that are of interest to the emergency management community.

Response

- Activities that occur during and immediately after disasters.
- Examples
  - Identify impacted areas
  - Search and rescue
  - Emergency shelter and medical care
  - Patrol loot-prone areas

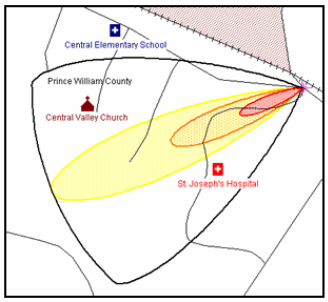
Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

Disasters are typically characterized by confusion and uncertainty – especially in situations where the disaster is sizable as was the case with recent events such as Hurricane Katrina and the September 2001 terrorist attacks. One of the key lessons learned from these types of events is that first responders need information as rapidly and as accurately as possible in order to adequately respond to a disaster. It has been widely recognized that GIS must play a central role in the gathering and dissemination of information during a disaster.

This slide shows some of the many uses of spatial technology tools and data. Invite your audience to share any thoughts that they have about additional uses. The next few slides also provide additional examples.

Evacuation

- Identify an area to evacuate around a chemical spill, fire, or natural disaster.



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First responders often need to conduct evacuations in order to prevent injury from an ongoing situation. If there is a need to evacuate people in a timely fashion, GIS can buffer the area location of the disaster to help identify those people that need to be evacuated. Emergency personnel can either be dispatched to those areas to begin evacuation or the use of an emergency call back system could be employed.

This example on the left shows a buffer of a constant distance around the location being evacuated. Evacuation areas can also be based on boundaries that consider issues such as atmospheric conditions and other factors. Such an example, based on the ALOHA computer program, is shown on the right.

ALOHA (Areal Locations of Hazardous Atmospheres) is a computer program that uses information you provide it, along with physical property data from its extensive chemical library, to predict how a hazardous gas cloud might disperse in the atmosphere after an accidental chemical release. ALOHA can predict rates of chemical release from broken gas pipes, leaking tanks, and evaporating puddles, and can model the dispersion of both neutrally-buoyant and heavier-than-air gases. ALOHA can display a "footprint" plot of the area downwind of a release where concentrations may exceed user-set threshold levels. It also displays plots of source strength (release rate), concentration, and dose over time. ALOHA accepts weather data transmitted from portable monitoring stations, and can plot footprints on electronic maps displayed in a companion mapping application, MARPLOT, as in the example at right. ALOHA originated as an in-house tool used by NOAA's emergency responders. It was originally based on a simple model--a continuous point source with a Gaussian plume distribution (Turner, 1970). It has evolved over the years into a tool used for response, planning, training, and academic purposes.

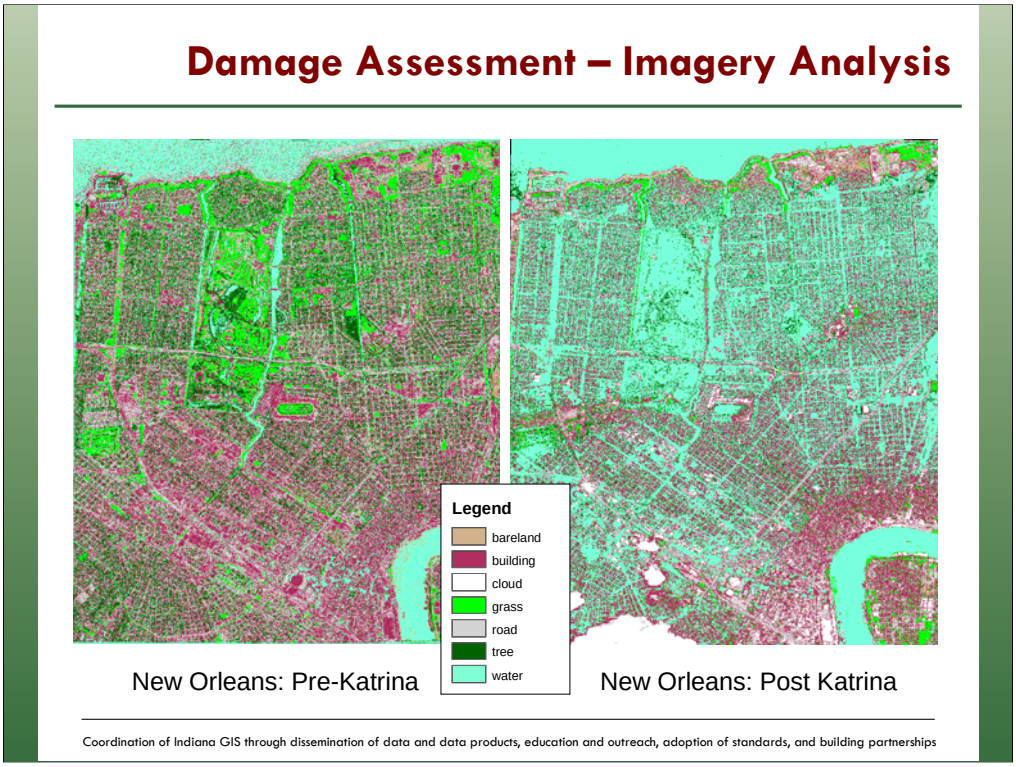
Damage Assessment - Imagery

New Orleans – March '04 New Orleans – Sept 03 '05

Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

The Quickbird images on this slide show the impact of Hurricane Katrina which struck the US Gulf Coast on August 29, 2005. The storm damaged the states of Louisiana, Mississippi, Florida, and Alabama. It generated in excess of $100 billion in losses according to some estimates.

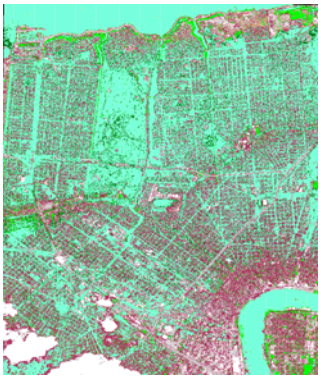
These data illustrate one example of how GIS can play an important role in supporting a response to a disaster. Be sure to point out that this type of information could be overlaid with other GIS data such as critical infrastructure, evacuation routes, essential facilities, and more.



One of the more powerful abilities of GIS is spatial analysis. This slide illustrates the results of 'reclassifying' the imagery shown on the previous slide for the purpose of differentiating different types of land cover.

This slide and the following slide show a portion of the work done as part of a study by Jae Sung Kim and Jie Shane who are affiliated with the Department of Civil Engineering at Purdue University. This information was offered as part of a presentation titled 'Damage Assessment of Hurricane Katrina Using Remote Sensing Technique' at the Indiana GIS Conference on March 13, 2007.

Damage Assessment – Imagery Analysis



		Area change (km^2)	Change Rate (%)
Building		-3.86	-13.94
Road		-11.97	-59.17
Bare land		-3.94	-73.34
Tree		-9.03	-57.33
Grass		-5.22	-56.37
Water		30.06	+195.65

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As a result of classifying the data shown on the previous slide, it was possible to quantifiably determine the reduction or increase of different types of land cover as a result of the flooding of New Orleans following the numerous levee breaches that occurred immediately after Hurricane Katrina. This slide clearly illustrates that a significant amount of land was inundated (nearly 30 km more than the condition prior to the storm). By comparing the types of land cover with other GIS data such as transportation, utilities, and so forth, this information could be used to help quantify the economic and social impacts of this tragic event.

Recovery

- Activities that are necessary to return systems to normal.
- Short term examples
  - Debris cleanup
  - Temporary housing
  - Access to food and water

- Long term examples
  - Community planning
  - Redevelopment loans

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Following the response process, emergency management moves into a response period that can take months or even years to complete depending on the scale of the disaster. Spend a few minutes talking about how GIS can support each of the examples listed on the slide and invite your audience to come up with additional examples of how GIS can support recovery needs.

Conclusion

- Ensuring public safety requires access to up-to-date information made available in a useable and accessible form.
- GIS can play an important role in meeting these goals and therefore should be integrated into public safety programs.

Thanks for your attention!

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