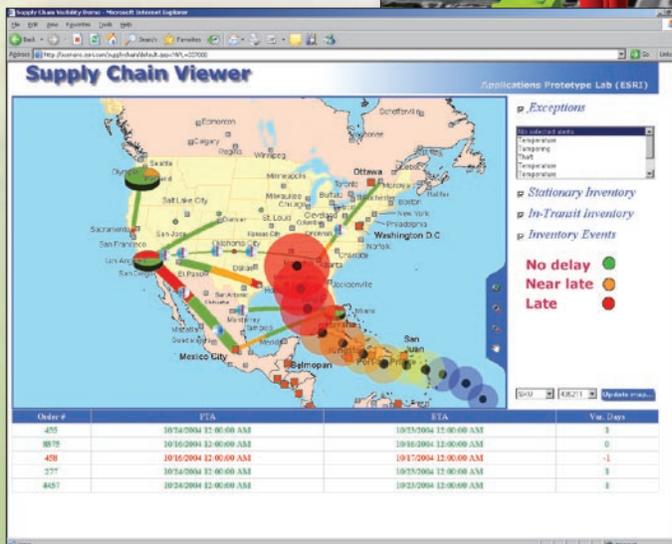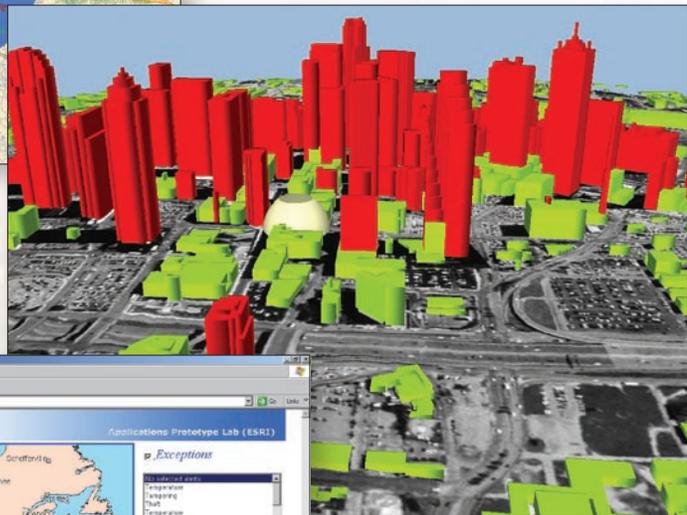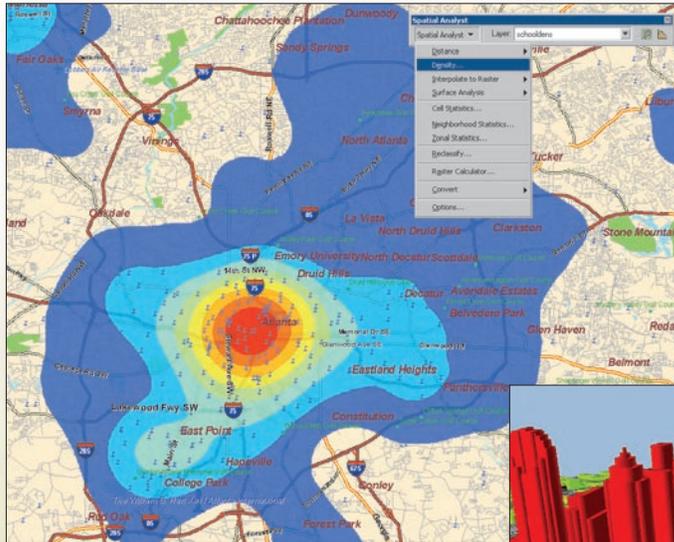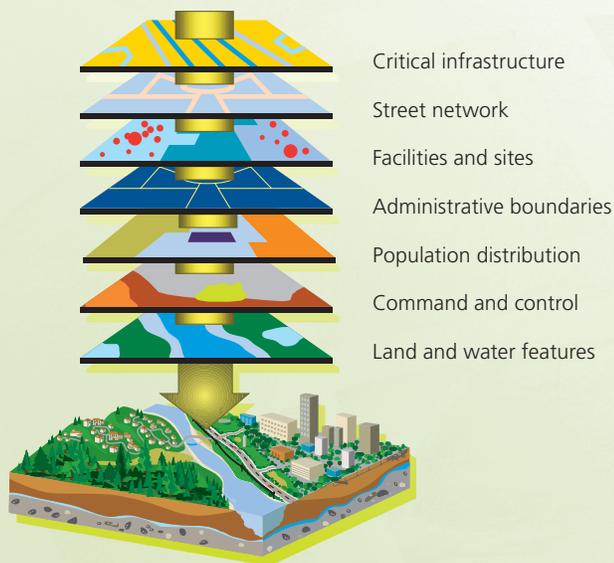# GIS Solutions for Business Continuity Planning

ESRI GIS

One in five businesses experiences a major business disruption each year. For those that do experience a disruption, many do not resume operations or will fail within 24 months. Disruption can be caused by power outages, internal flooding, fire, terrorism, crime, transportation issues, or severe weather events. While a portion of businesses have deployed measures for ensuring business continuance, few have implemented a BCP that encompasses front- and back-office systems, employee safety, and supplier and client management.

Why Use GIS to Plan for Contingencies?

GIS technology allows businesses to quickly display, analyze, and determine vulnerabilities, exposures, and weaknesses. Developing mitigation strategies, modeling against potential events, and analyzing consequences can be done quickly and efficiently. GIS enables a business to mitigate risks that disruptions pose in areas such as health and safety liability, loss of productivity from downtime, loss of work to competitors, failures within the supply chain, penalties from regulators, and higher insurance rates.

Regardless of industry or size, all companies have responsibilities from a compliance standpoint.

Critical infrastructure

Street network

Facilities and sites

Administrative boundaries

Population distribution

Command and control

Land and water features

What Is GIS?

Geographic information system (GIS) technology combines mapping software with database management tools to collect, analyze, organize, report, and share many types of information. Different data sources and data types are linked using the location at which the data is collected or its association to a place or address. A GIS can link to and access information that is shared from the field or read from a departmental database anywhere on the network. In addition, time-critical information collected by real-time sensors and broadcast from notification systems can be combined to improve situational awareness.

GIS provides an intuitive medium through which a consolidated and coordinated common operational picture (COP) can be developed. This visual snapshot can be enriched and extended by spatial analysis and modeling of events as they occur, thereby improving decision making and response execution. Historical results can be modeled for possible impact analysis.
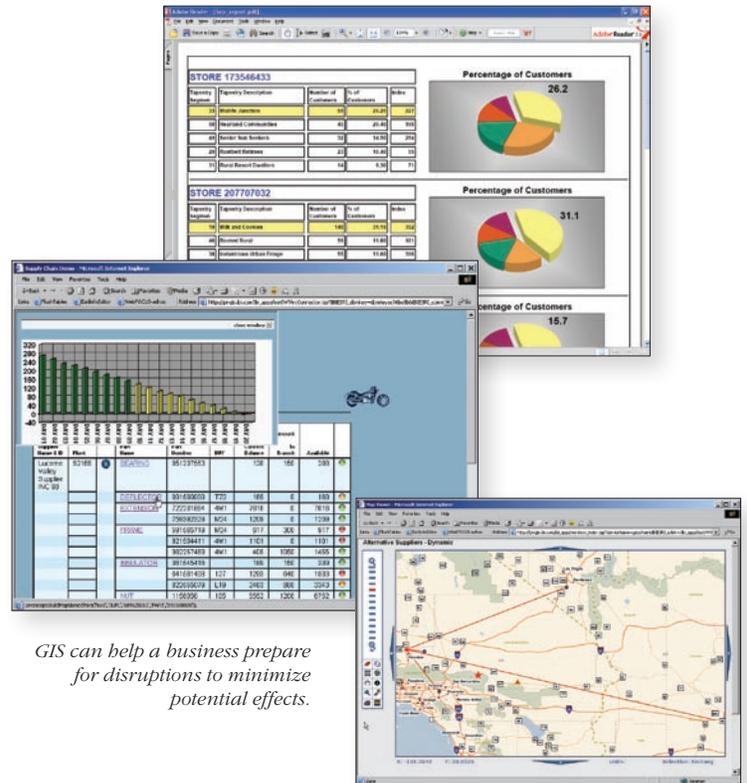
GIS data is normally organized into collections of map layers that contain the important datasets that are relevant to the scenario or event. Business continuity systems often contain street-level data; aerial or satellite imagery; administrative boundaries; and dynamic or real-time layers such as weather, GPS locations, plume tracks, and live video feeds.

GIS Solutions for Business Continuity Planning

Keep It Simple

GIS has been recognized as a powerful tool for developing effective BCPs due to the geographic nature of the data and models. GIS helps businesses develop an effective plan by addressing the following:

- Damage assessment and repair during emergencies
- Employee (and family) notification
- Evacuation
- Facilities management
- Mitigation strategy development
- Office relocation
- Supply chain assessment
- Threat assessment
- Vulnerability analysis
- Weather mapping

Business continuity plan (n.)—holistic management process that identifies potential impacts that threaten an organization and provides a framework for building resilience with the capacity for an effective response that safeguards the interests of key stakeholders, reputation, brand, and value-creating activities

—The Business Continuity Institute

GIS can help a business prepare for disruptions to minimize potential effects.
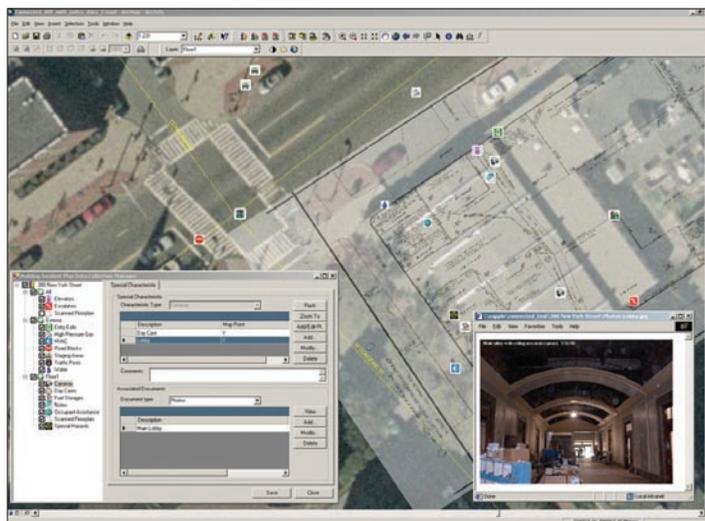
ESRI® ArcGIS® Server integrates with multiple back-end systems such as human resources, customer relationship management, real-time information, and inventory databases.

Stay Connected

GIS integrates many seemingly unconnected data sources. Because a fundamental part of creating a BCP is determining the location of a company's assets, even the most basic GIS application (determining where things are) adds value to a standard BCP.

Using GIS to show locations of assets lets BCP analysts evaluate them in relation to potential disruptions in ways that are not possible with text or tabular representations of the same data. GIS enables businesses to visualize and maintain overall situational awareness during emergencies and normal operations.

www.esri.com/businesscontinuity

# GIS Solutions for Business Continuity Planning

See Your Company

GIS can provide a visual snapshot that shows where assets and employees are located. Using GIS to model what-if scenarios can capture the infrastructure, business processes, and locations of an organization in a meaningful way. Through GIS-based dashboard-type applications, managers can quickly obtain a high-level overview of a situation and understand what needs to be done to reestablish critical business functions in the event of a disruption.
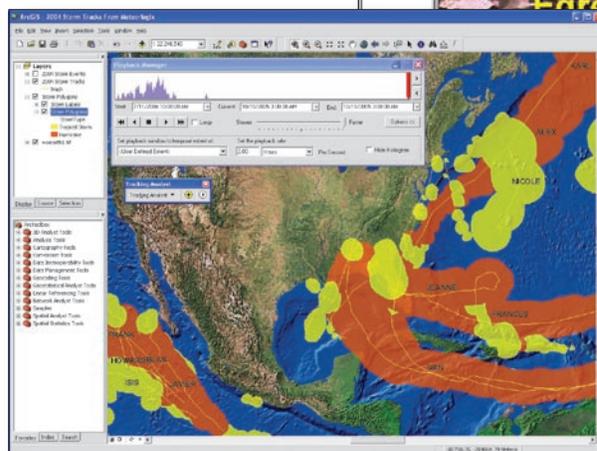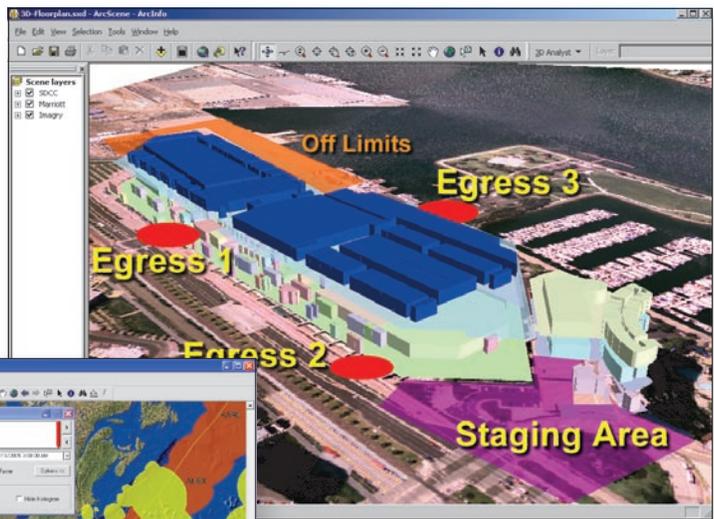
GIS models can be integrated into CAD and 3D analysis to more effectively plan and build scenario response models.


Multimedia- and event-driven data, including historic playback, can be easily combined to more fully model and understand the potential impact on your organization.
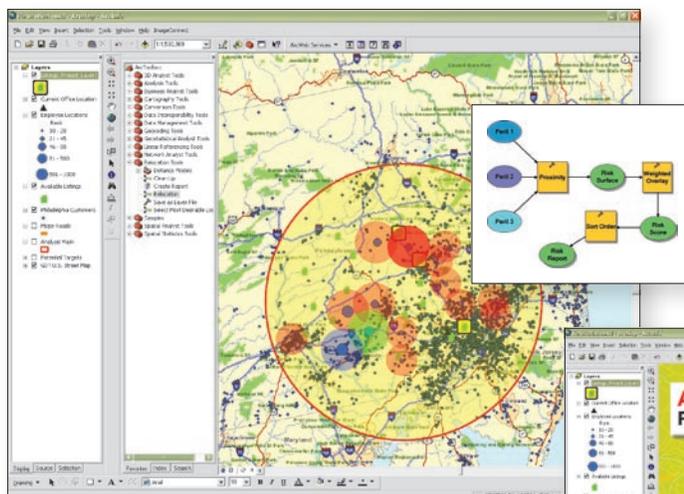
Companies can avoid existing potential threats when relocating their facilities yet remain close to customers and major transportation routes by using relocation models available in ArcGIS.

Relocate Operations

Every BCP must address the relocation of personnel, operations, and assets. In some industries, specific rules govern what must be included. GIS is well suited to relocation analysis, allowing BCP analysts to factor in locations of the company's most critical employees from a day-to-day operations perspective and determine a temporary operations site that is accessible and optimal in relation to these employees.
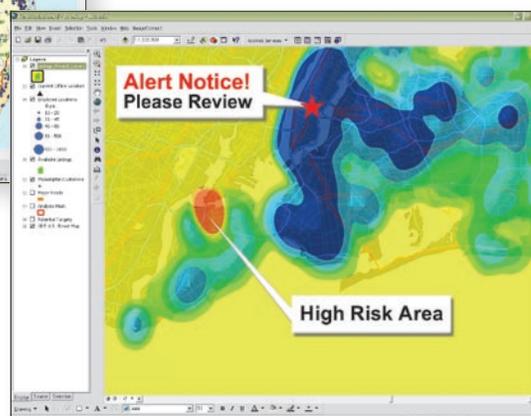
Business Continuity Postdisaster

A BCP that is tied to a community's disaster management strategy will allow for a quick recovery of the community as a whole, meaning the public, private, and citizen sectors are collaborating toward a common goal of resuming normal operations. Without a proper business continuity plan, a natural or man-made disaster can compromise a community's ability to do business, thereby impeding the response and recovery process. The speedy recovery of commerce can mitigate the effects of a disaster by reestablishing civic quality of life within the community.
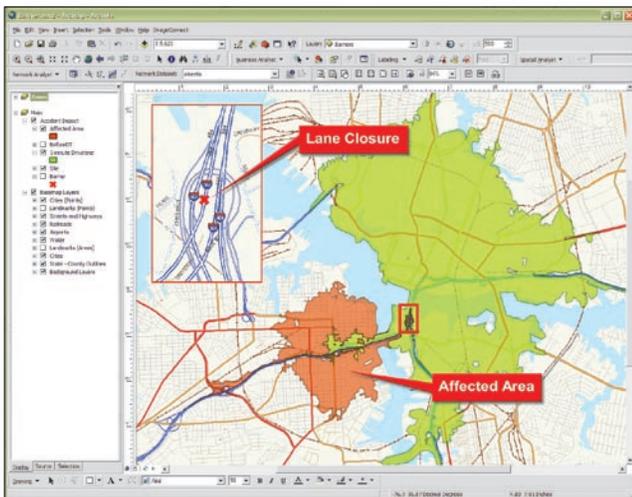

Impact of freeway lane closure on commuter travel. Red area will be subject to increased congestion and delays.
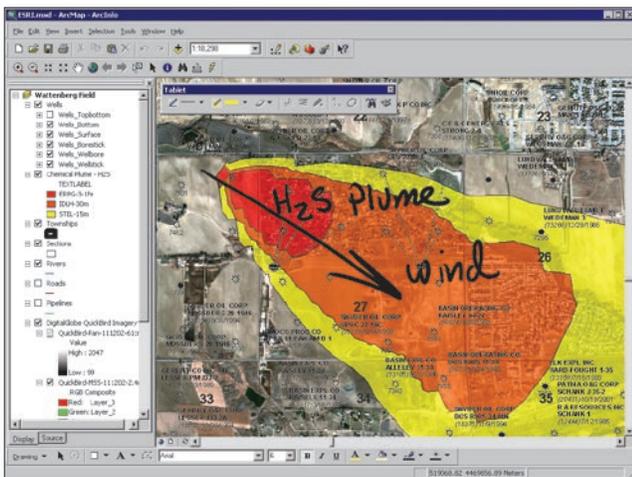
Information captured on handheld devices can be integrated with other data feeds to improve operational understanding.

Building a Comprehensive Business Continuity Plan

- Analyze business workflow and involve key departments:
  - Compliance and Operations
  - Corporate Communications
  - Corporate Security
  - Employee Relations
  - Executive Management
  - Facilities Management
  - Human Resources
  - IT
  - Legal
- Assess risk and identify mitigating strategies.
- Develop strategy and create response plans.
- Communicate the BCP to staff, then rehearse.
- Refine the BCP through the identification of weaknesses in lines of communication and the decision-making process.
- Implement operational redundancy where appropriate for mission-critical services.
- Establish backup or off-site facilities for data storage.
- Advise key clients, suppliers, and partners of the BCP and their part in its execution.
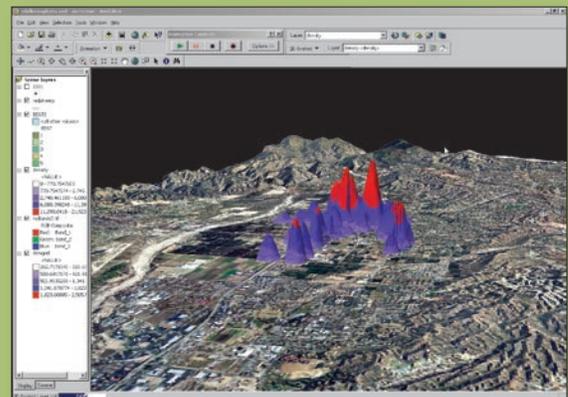
*Crime Risk Viewed against Facility Locations*

Apex Office Supply Delivers No Matter What the Weather Is

A "Keep It Simple" Case Study

Apex Office Supply is a small office supply company based in Vinton, Iowa. The company, created in 1986, serves east central Iowa, which has a population of approximately 300,000 and includes two major cities, Waterloo and Cedar Rapids. Apex Office Supply brings services and products to 1,500 active customers and has a delivery radius of approximately 45 miles. The company runs five routes and makes approximately 200 deliveries a day.

Apex Office Supply uses ESRI® GIS to more effectively deliver products. GIS allows the company to use the same standard office procedures to process delivery orders each day. Now delivery is more efficient because each night, orders are transmitted to ESRI's ArcLogistics™ Route, which creates routes and prints invoices along with driving instructions including the stops for each truck. In the morning, drivers pick up the printed invoices that ArcLogistics Route has organized by order of delivery.

The company found the real power of ArcLogistics Route when deliveries could not be made due to inclement weather or other unforeseen problems. Instead of laboriously rerouting all deliveries by hand, the system can easily reroute and include these deliveries the next day. Like any company, Apex Office Supply is driven by its customers' needs. Using GIS allows the company to meet its customers' expectations, even when faced with unforeseen circumstances.
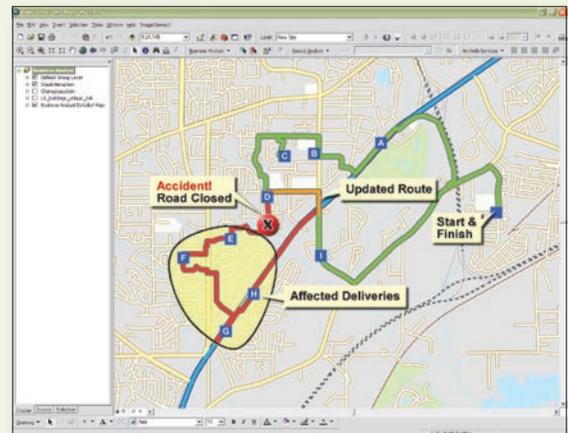
> *"As with any company, we are driven by our customers' needs. ArcLogistics Route has really saved us by helping us meet customers' expectations."*
>
> Jason Hicok
> Director of Information Technology
> Apex Office Supply

Southern Company Turned the Lights Back On after Hurricane Katrina with the Help of ESRI

A "Stay Connected" Case Study

Southern Company, a super-regional energy company and one of the largest producers of electricity in the United States, relies on the ESRI ArcGIS® integrated family of GIS software to run its business. All five operating companies of Southern Company—Alabama Power, Georgia Power, Gulf Power, Mississippi Power, and Savannah Electric—use ESRI GIS across the enterprise for analysis, visualization, and decision support. By relying on its GIS, Southern Company was able to respond quickly to Hurricane Katrina, which wiped out all the power to Mississippi Power Company's 195,000 homes and businesses in 23 counties. In only 12 days, Southern Company restored service to all customers whose homes and businesses were not destroyed.

For more than 25 years, Southern Company's affiliation with ESRI has meant better facility and asset management, improved business processes, and the ability to respond quickly in the face of catastrophe. Whether managing 26,000 employees or restoring power during one of this country's worst natural disasters, GIS makes it all work.
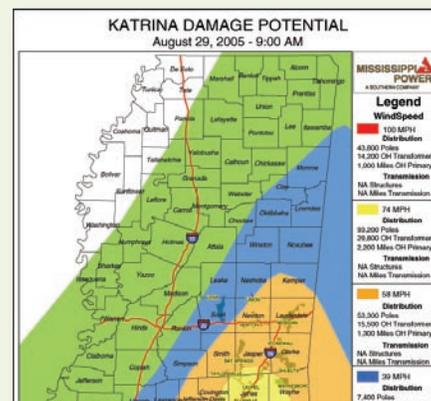
> *"We used ESRI ArcGIS extensively during the storm. I cannot imagine being able to coordinate the more than 9,000 people we had working, without using ArcGIS. We were able to put our staff to work efficiently and provide management-level data virtually on the fly."*
>
> Louis Occhi
> Mississippi Power Company

Handling Evacuations
A "See Your Company" Case Study

Identifying evacuation meeting points for employees who work in a specific building is another application of spatial statistics in a BCP. Although businesses typically prefer employees stay inside during an emergency until the situation is fully understood, an evacuation plan should be in place.

The location of the office affects the complexity of this task. It can be simple if the business is located in an office park. However, if the office is located in a densely populated city, such as New York City, logistics are more complex. If the emergency is isolated to a single building, it is easier to manage than if multiple adjacent buildings are affected. In the latter case, the plan must take into account the neighborhood surrounding the affected buildings.

After evacuating the office, employees usually meet at a specific location and decide what needs to be done next. Where should employees regroup? Factors such as how far from the building employees can travel with relative ease, taking into account those with disabilities and the presence of open spaces that can be used, must be considered. These sorts of questions are all geographic in nature.

The Hot Spot Analysis tool is used to find the location of statistically significant spatial clusters of high- and low-attribute values. This tool shows areas where higher-than-average values tend to be found near each other and where lower-than-average values tend to be found near each other.

Figure 1 shows a simple model illustrating how the ArcGIS Hot/Cold Spot Analysis tools were used for this analysis. This model geocodes the address of the building in question, then buffers that location by one-quarter mile (assuming all employees can travel that far). It clips a business location dataset that contains the area's daytime population by business address. Using this dataset, the model runs the Hot/Cold Spot Analysis tools to find statistically significant hot and cold spots for building employees.

The dark blue spots shown in figure 2 represent statistically significant cold spots—areas with few employees that may serve as good meeting places in the event of an emergency. To more clearly see the areas represented by these points, a continuous surface was created using the ArcGIS Spatial Analyst extension (as shown in figure 2). The surface reveals more generalized areas representing cold spots in the data, shown as dark blue spots. These areas are potential sites for meeting points. However, more information, perhaps obtained from orthophotos of the area, would be required before selecting a final location.

Figure 2: Using spatial statistics, GIS models help determine the best location to meet after evacuating a building.

Commercial organizations using ESRI GIS can provide high-quality, accurate BCPs that integrate many types of data from multiple sources, incorporate geography, and use new tools developed specifically for spatial statistical analysis. ESRI GIS, through the use of spatial techniques, enables BCP analysts to ask different types of questions and obtain better answers than they could previously using tools that relied solely on databases, spreadsheets, and traditional business intelligence packages.

ESRI works closely with Contingency Planning Exchange, Securities Industry Association, and Business Continuity Institute to understand business continuity. And since its technology is consistent with IT industry standards and philosophy, it follows a CIO's approach to business continuity issues.
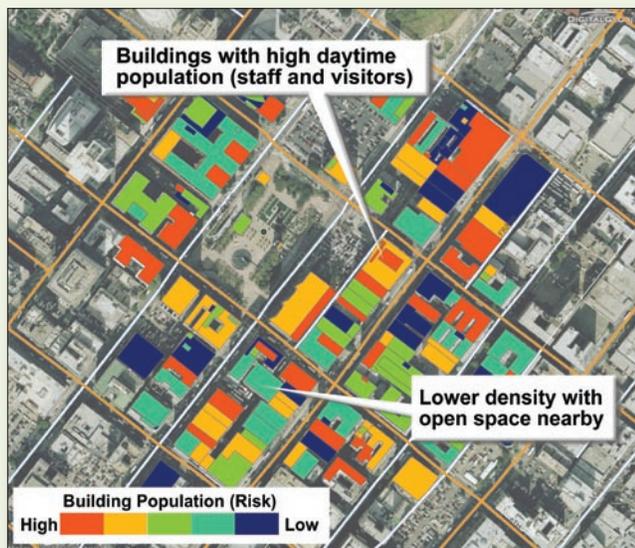

Figure 1: By identifying the daytime population in each building and the evacuation points, a GIS model can calculate how people will become clustered and concentrated when they are evacuated. Hot spots of overcrowding can be identified and better assembly sites found to improve public safety.

Surviving the Next Pandemic

Protecting Employees, Maintaining Operations, and Serving Customers

The SARS epidemic of 2003 reinforced the importance of planning for local disease outbreaks. More recently, government health authorities have been warning the business community that an influenza pandemic will occur at some point in the near future, as they have in the past (1918, 1957, and 1968).

Businesses are developing specific plans regarding how they will protect their employees, maintain operations during a pandemic, and anticipate changes in consumer behavior. GIS is essential for

- Understanding locations of health risks
- Predicting hospital capacity shortages
- Locating vaccine/antiviral delivery sites
- Identifying employee households at risk

A pandemic will impact different business locations at different times. GIS enables informed decision-making regarding how the geographic spread of disease is impacting employees, operations, and customers. Executive dashboards can be built using real-time news feeds and notification systems. Using the latest information from public health authorities and other sources, any business can understand the impact of the pandemic on their organization, suppliers, and employees.
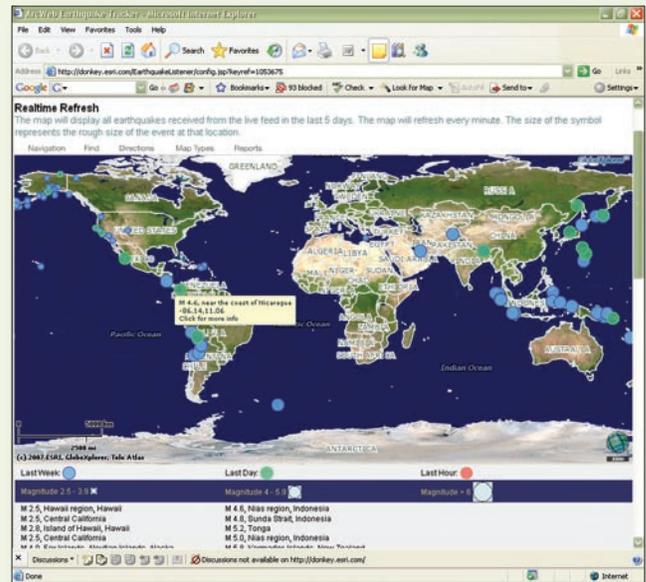
Real-time data feeds can be mashed up with mapping and GIS analysis. An earthquake-tracking application provides input to ArcWeb Explorer, which automatically triggers notices and map views for the business continuity manager. Similar systems monitor diseases and community risks.
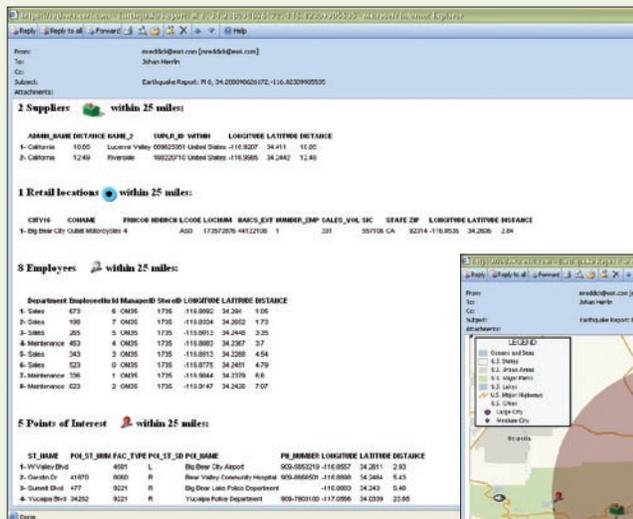
Event-driven e-mail notification alerts you if the application finds potentially affected company-owned facilities, employees, or other assets.
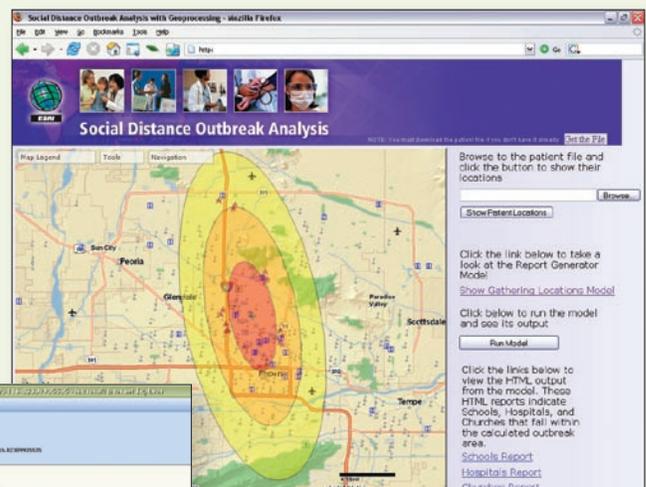
Using home addresses, geoprocessing tools identify distribution of sick people and compare the distribution to places where people typically gather such as schools, churches, and hospitals.
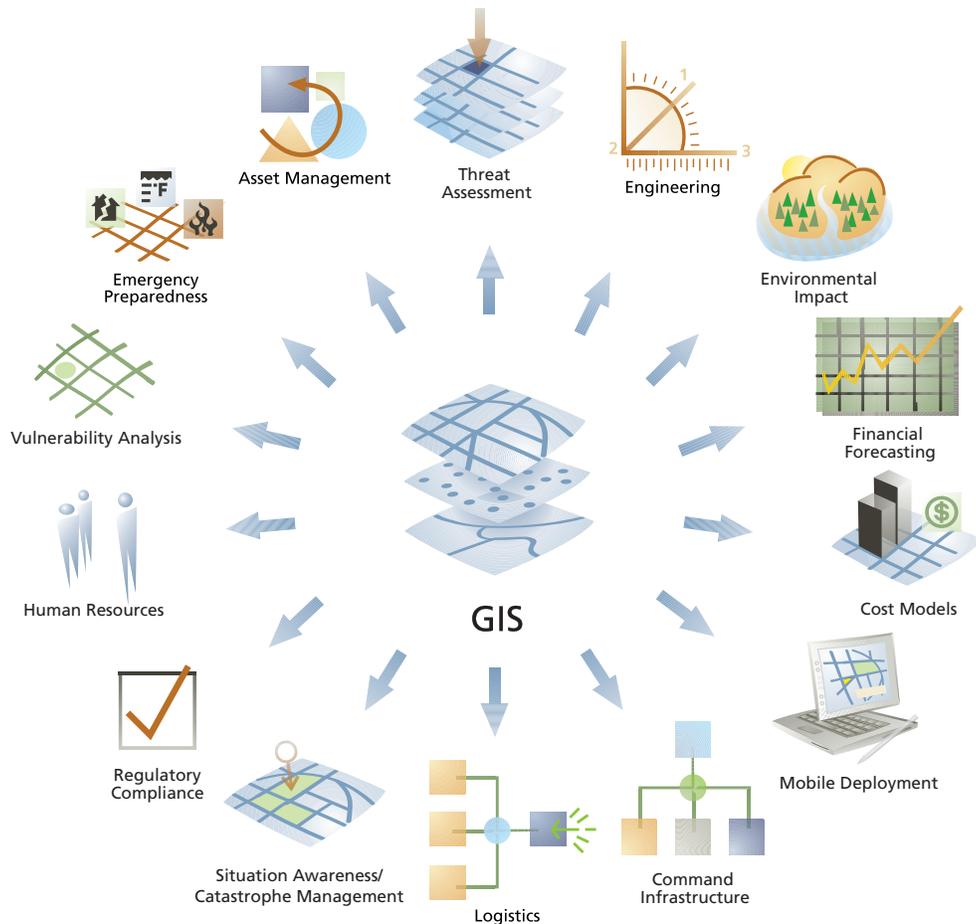
Enterprise GIS Integrates Business Continuity Operations

Build a Foundation to Support All Your Departments

An ESRI enterprise GIS is an integrated, cross-departmental resource composed of interoperable components that support all aspects of the business continuity mission. It provides broad access to geospatial data and analysis through a common standards-compliant application architecture.

ESRI enterprise GIS customers can realize major improvements to the way they analyze, plan, and mitigate threats associated with business interruption and disaster management. These benefits include

- Improved collaboration and communication across command, control, and response teams
- Reduced data redundancy coupled with improved accuracy and management integrity of geographic information
- Increased ability to analyze and respond to events as they unfold by using a single, common view of the field of operations
- Improved analysis, visualization, and decision support
- Common operating views to understand areas of business risk as well as business opportunity

Asset Management

Threat Assessment

Engineering

Environmental Impact

Emergency Preparedness

Vulnerability Analysis

Financial Forecasting

Human Resources

Cost Models

GIS

Regulatory Compliance

Mobile Deployment

Situation Awareness/ Catastrophe Management

Logistics

Command Infrastructure

ArcGIS

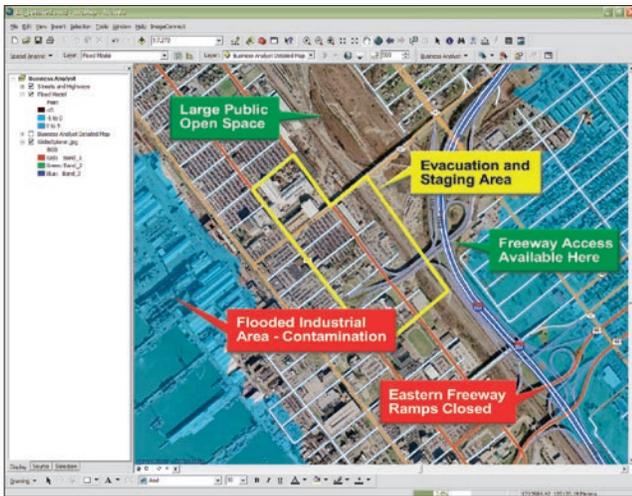*The Complete Geographic Information System*

As a complete geographic information system, ESRI ArcGIS allows you to easily author data, maps, globes, and models on the desktop; serve them to a GIS server; and use them through Web, desktop, and mobile clients. The ArcGIS family of products includes ArcGIS Desktop, ArcGIS Server, ArcGIS Mobile, and ArcGIS℠ Online.

As a developer, you can access the capabilities of ArcGIS through the ESRI Developer Network (EDN℠), an annual subscription-based program that provides you with the resources you need to build a wide range of custom GIS solutions.

Desktop GIS

Desktop GIS allows you to see your data on a map and analyze it to reveal patterns, relationships, and trends that are not readily apparent in tabular data, improving your decision making. Desktop GIS lets you create and edit data and includes ready-to-use tools that let you build process models, scripts, and complete workflows to help you better test predictions, examine relationships in your data, and answer questions such as

- Where are my customers and where should I put new facilities?
- Who does an emergency impact?
- How will a power outage affect my operations?
- What is the impact of new urban development?

Desktop GIS
ArcGIS Desktop
ArcGIS Engine
ArcGIS Explorer

Server GIS
ArcGIS Server
ArcGIS Image Server

Mobile GIS
ArcGIS Mobile
ArcPad®

ArcGIS

Online GIS
ArcGIS℠ Online

ESRI Data
Community™ Data
StreetMap™
ESRI Data & Maps

Compile, author, analyze, map, and publish geographic information and knowledge.

Server GIS

Server GIS lets you share and maintain the data that you create with Desktop GIS with a large number of users across the enterprise using focused, easy-to-use applications. Server GIS enables you to push your maps, models, and tools out to engineers, schedulers, and planners in a way that fits into their workflows. Staff in customer care and out in the field can query accurate, up-to-date data, increasing their productivity.
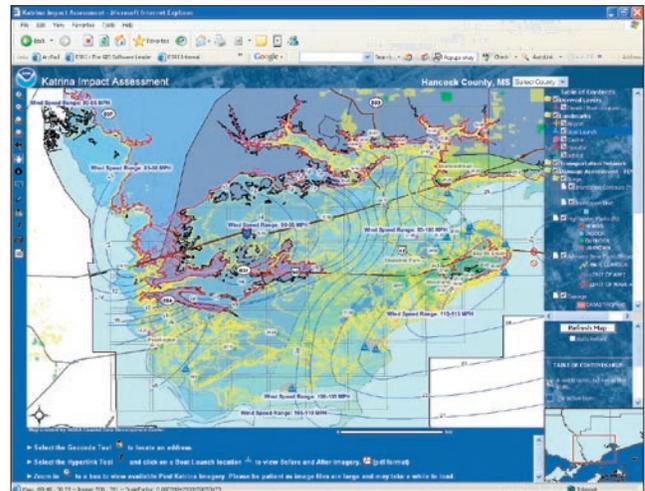
Centrally host GIS applications and data, delivering GIS capabilities to large numbers of users.

Mobile GIS

Mobile GIS is the expansion of a GIS from the office into the field. Wireless connectivity, geoservices, and Web mapping applications allow your inspectors and repair personnel to complete database transactions in near real time. Whether connected to or disconnected from the database, this increases efficiency and provides users who may have little or no GIS experience with access to previously unavailable data.

Online GIS

Online GIS provides ready-to-use content for your GIS. You can access 2D maps, 3D globes, and tasks via the Web to quick start your GIS projects. Online GIS also provides developers with a comprehensive Web platform for integrating GIS content and capabilities into desktop, server, mobile, or Web applications.
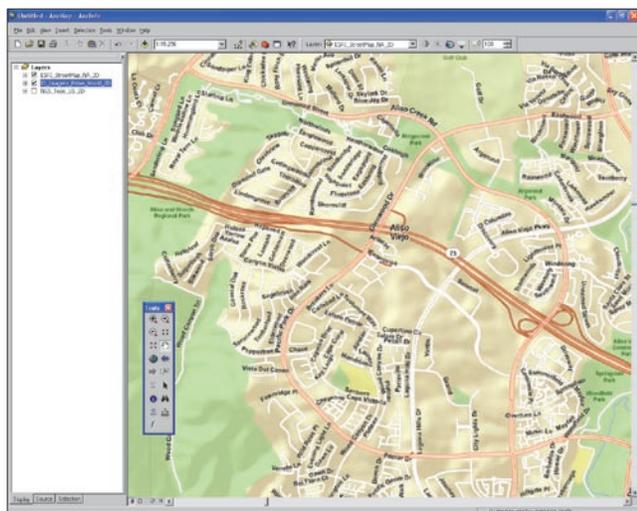
High-resolution street data from ArcGIS Online is available for the United States, Canada, and Europe.

ESRI Data

In addition to data provided as a Web service via ArcGIS Online, ESRI offers a full spectrum of ready-to-use geospatial data products delivered as packaged media.

Take Advantage of a Complete GIS

ArcGIS allows you to easily author data, maps, globes, and models on the desktop; serve them to a GIS server; and use them through Web, desktop, and mobile clients.

Easily Publish Your Geographic Information and Applications

With ArcGIS Server, it's easy to publish your geographic information and user-focused geospatial applications. You can serve models and applications authored with ArcGIS Desktop as GIS services that can be consumed by browser-based, desktop, and mobile clients. Out-of-the-box capabilities and templates let you get started creating services with no programming. ArcGIS Server also includes the new ArcGIS Explorer client, which supports a wide variety of 3D mapping services as well as geoprocessing services for spatial analysis.

Deliver your GIS capabilities to large numbers of users over networks with server-based GIS.

Learn more about ArcGIS at **www.esri.com/arcgis**.

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For more than 35 years, ESRI has been helping people make better decisions through management and analysis of geographic information. A full-service GIS company, ESRI offers a framework for implementing GIS technology and business logic in any organization from personal GIS on the desktop to enterprise-wide GIS servers (including the Web) and mobile devices. ESRI GIS solutions are flexible and can be customized to meet the needs of our users.

For More Information

1-800-GIS-XPRT (1-800-447-9778)
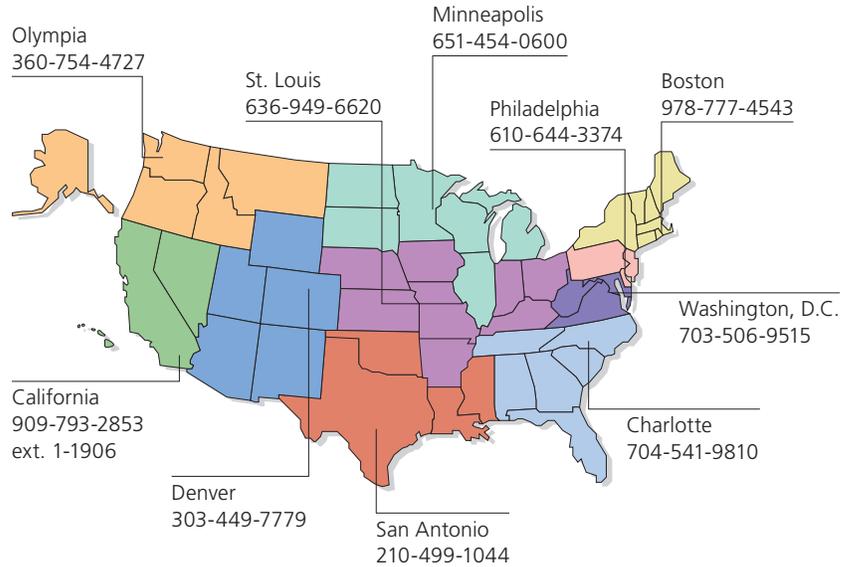
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GSA Federal Supply Schedule

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