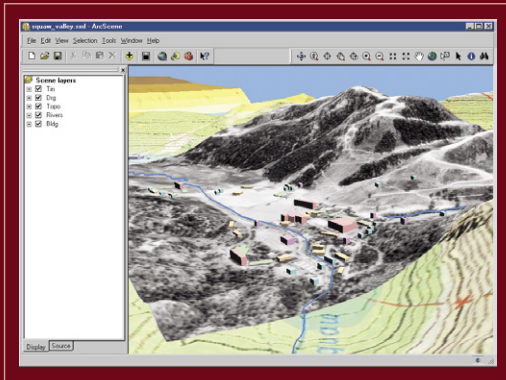# ESRI® GIS Solutions for Museums

Comprehensive GIS Solutions
for Today's Changing World

Seeing Is Believing

Museums provide a gateway to the newest developments in science and technology as well as a window to the past. They are places where learning is hands-on and fun for people of all ages and backgrounds. To create the exhibits that help visitors see and understand their world, museums need tools to visualize and explore information. A geographic information system (GIS) organizes information about places, people, and events. Using GIS, you can put interactive maps into your exhibits or support your research staff with sophisticated spatial analysis tools.

Most information in your collection includes a geographic component that ties it to a particular location—where an artifact originated, for example. GIS provides tools to use geographic information in analysis and visualization, providing a more complete picture of whatever you are investigating. With this geographic information and GIS software, you can

- Integrate a variety of data sources including maps, photographs, field notes, and databases.
- Manage geographic information in your collection databases using standard RDBMS tools.
- Visualize data and related information using dynamic maps.
- Query data and display the results as maps, charts, and tables.
- Perform modeling and analysis.
- Print maps in a variety of formats from page size to poster size.
- Publish interactive maps on the Internet.
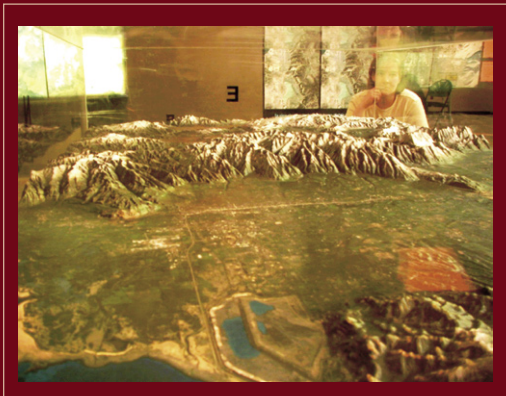
How GIS Works

A GIS stores information about the world that can be linked together by geography. This simple but extremely powerful concept has proven invaluable for solving many real-world problems from tracking animal movement to recording details of an archaeological excavation to modeling global atmospheric circulation. Geographic information contains either an explicit geographic reference, such as a latitude and longitude coordinate, or an implicit reference such as an address, postal code, forest stand identifier, or road name. An automated process called geocoding creates explicit geographic references from implicit references. These geographic references allow you to locate features, such as a forest stand, or events, such as an earthquake, on the earth's surface for analysis.

Descriptive information about these features is stored in a standard relational database so you can perform statistical analysis as well as geographic analysis of that data. One advantage of using GIS, however, is that representing information visually often leads to new insights—trends that are not obvious in rows and columns become clear when the same data is presented as a map.

GIS in Exhibits

It is not a coincidence that we often say, "I see" to indicate "I understand." Complex information often becomes clear when presented in a picture or a map. A GIS helps you visualize all kinds of information—rock types, colors, population distribution, air temperatures, vegetation patterns, fossil locations, and more.

GIS also provides options for presenting this information in multiple formats: printed maps for wall displays or publications, interactive maps for computer exhibits, and online maps for Web-based exhibits. Nearly any topic—weather, geology, wildlife, or archaeology—can be explored and understood through maps and images. A GIS also integrates geographic data with other information, such as text, videos, databases, charts, and diagrams, to help you tell the whole story.

CAD Drawing

Video

Printed Reports

Photos

Database

GIS

Maps

Spreadsheets
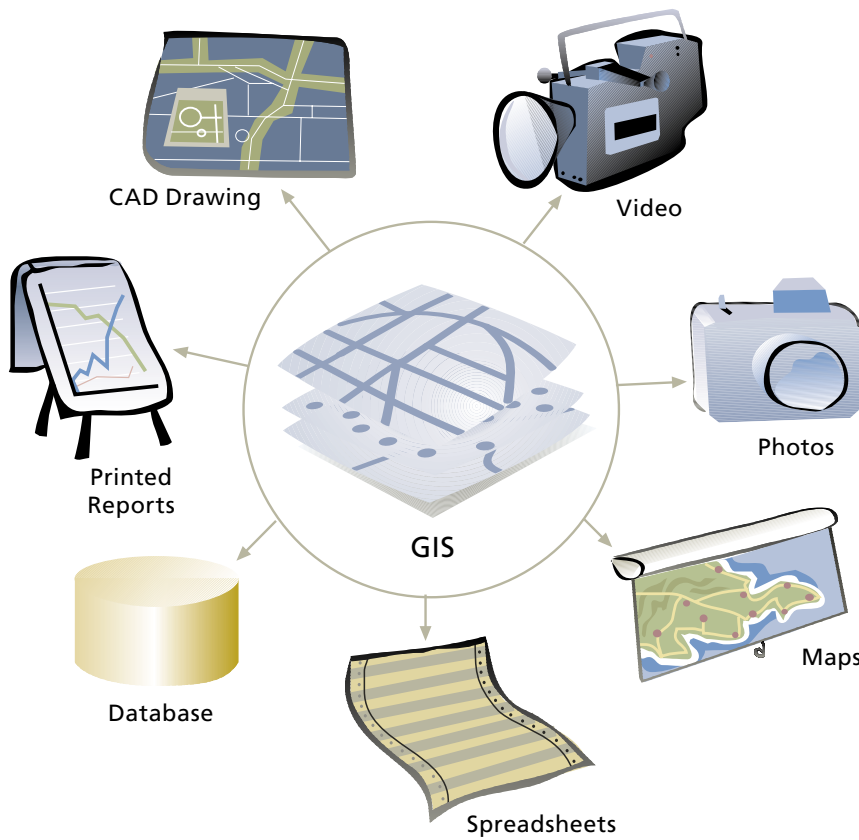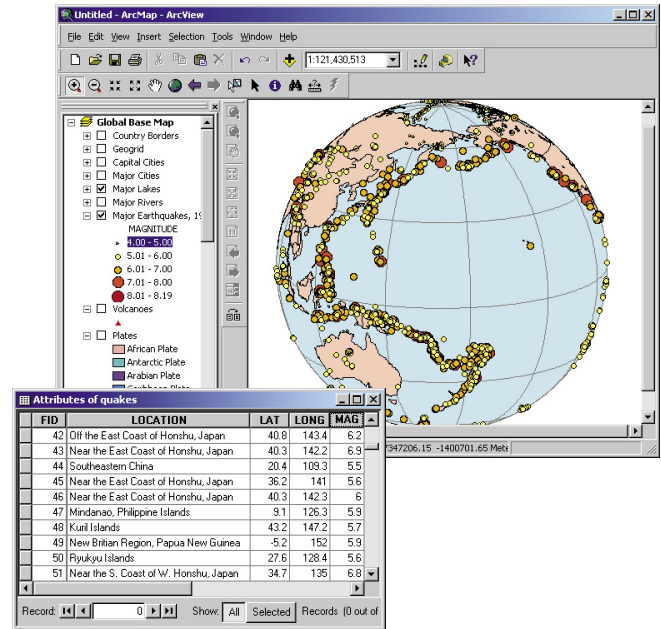
GIS for Marketing and Management

Even public institutions have to market themselves to the right audience to stay viable. GIS helps you identify potential visitors and reach them with targeted mailings such as announcements of new exhibits or invitations to special events. Mapping visitors by their address or ZIP Code can reveal patterns not apparent in a database or spreadsheet, showing you where you are reaching your audience effectively and where there is room for improvement. You can also use GIS for facilities management and planning. Blueprints and computer-aided design (CAD)-based maps can be combined with other institutional databases to help you allocate exhibit and storage space more efficiently, construct virtual models of exhibits in a three-dimensional perspective rather than plaster, and test the lighting scheme or traffic flow. A GIS helps you compare design alternatives before construction begins, saving time and money.
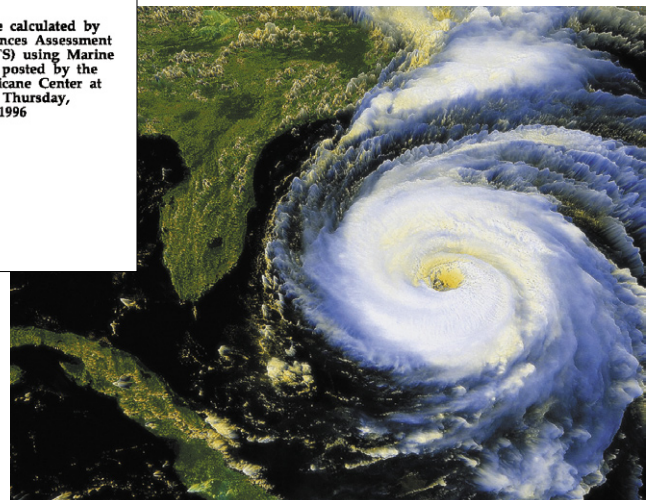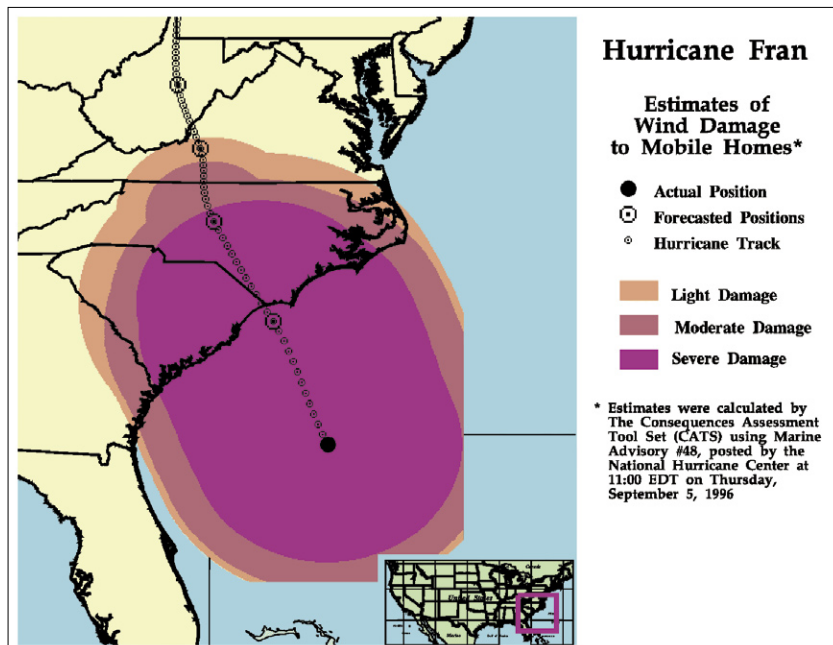
GIS for Research

Managing a museum's collection means not only knowing what exists and where each item originated but also being able to use that information to further our understanding of the past, present, and future. GIS can help you do both.

Data management and storage are integral components of any GIS. A GIS records both location and characteristics of items and provides the means to search a database by location as well as by attribute(s). Any database can tell you how many fossils are in your collection, but a GIS also can tell you how many of those items were found within 10 miles of the Mississippi River as it passes through the present-day city of St. Louis. Of course, simply having information is only the first step. Seeing the connections between pieces of information is what leads to understanding, and GIS modeling and analysis tools help you put the pieces together. Whether you want to reconstruct historic landscapes from drill cores and pollen samples or construct a predictive model showing how a pollutant might move through groundwater, GIS provides the means to visualize and analyze information through time and space.

Where can you use GIS?

GIS tools for data management and spatial analysis can be put to work in exhibits, marketing, research, and collection management throughout your museum.

- Anthropology
- Archaeology
- Botany
- Conservation
- Ecology
- Environmental Science
- Forestry
- Geography
- Geology

- Historic Preservation
- History
- Hydrology
- Meteorology
- Oceanography
- Paleontology
- Seismology
- Soil Science
- Zoology

Hurricane Fran

Estimates of Wind Damage to Mobile Homes*

● Actual Position
⊙ Forecasted Positions
⊛ Hurricane Track

Light Damage
Moderate Damage
Severe Damage

* Estimates were calculated by The Consequences Assessment Tool Set (CATS) using Marine Advisory #48, posted by the National Hurricane Center at 11:00 EDT on Thursday, September 5, 1996

The ESRI Family of GIS Products

ArcGIS—A Scalable System

ESRI® ArcGIS™ is a family of software products that forms a complete geographic information system built on industry standards that provides exceptional capabilities out of the box. ArcGIS is an integrated, scalable system for spatial data creation, data visualization and geographic analysis, map production, and data management and distribution.

With its sophisticated suite of analysis and modeling tools, ArcGIS is the leading GIS available today. ArcInfo™ integrates graphic or spatial data in the form of maps with descriptive information from an organization's internal databases. ArcGIS includes support for commercial database management systems (DBMSs) such as IBM® DB2®, IBM Informix®, Microsoft® SQL Server, and Oracle®, so you can leverage your existing database for mapping and analysis.

ArcGIS incorporates all the functions found in desktop mapping systems, enabling users to integrate vector and raster data, photographs, scanned documents, satellite images, CAD drawings, and multimedia data types for display and query. In addition, ArcGIS provides multiple strategies for sharing information, such as map publishing (in print or on the Web), and distributed access to GIS data and services throughout your organization.

The ArcGIS Desktop products are a scalable trio—ArcView®, ArcEditor™, ArcInfo—that provides additional functionality as you move from ArcView to ArcInfo. These three software products share a consistent user experience, common code base, and single development environment. This dramatically increases usability and interoperability while retaining flexible end user deployment options.

ArcView
ArcView provides core mapping and GIS functionality including geographic data visualization, query, analysis, and integration capabilities along with the ability to create and edit geographic data.

ArcEditor
ArcEditor includes all the functionality of ArcView and adds the power to edit topologically integrated features in a geodatabase. Additional functionality includes support for multiuser editing, versioning, custom feature classes, feature-linked annotation, and dimensioning.

ArcInfo
Within the ArcGIS software family, ArcInfo is the top of the line. It includes all the functionality of ArcView and ArcEditor and adds the advanced geoprocessing capabilities that make ArcInfo the de facto standard for GIS.
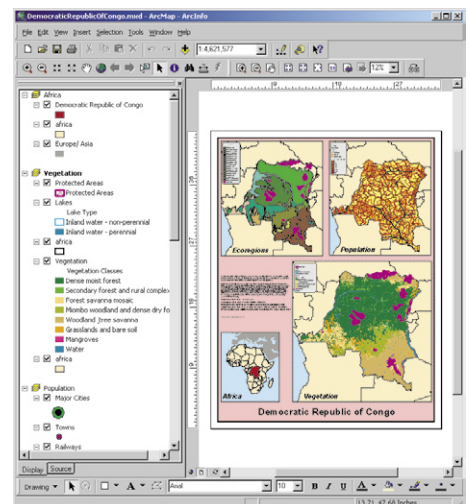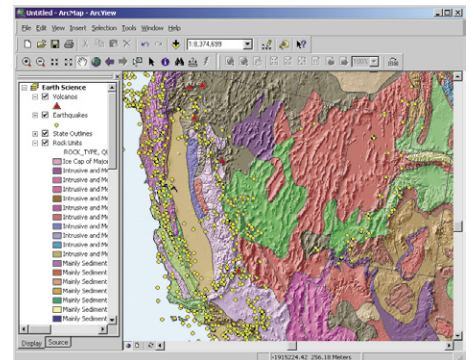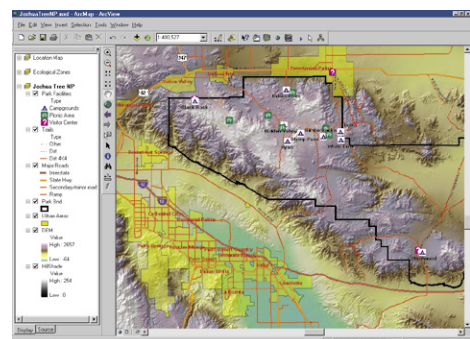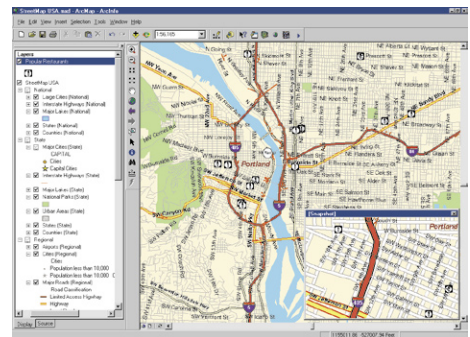
ArcGIS extensions are fully integrated software packages that enhance ArcGIS and support specific applications.

ArcGIS Spatial Analyst

Supports raster (cell-based) data and provides modeling tools

ArcGIS 3D Analyst™

Enables three-dimensional visualization and analysis

ArcGIS Geostatistical Analyst

Enables spatial data exploration and surface creation

ArcGIS Tracking Analyst
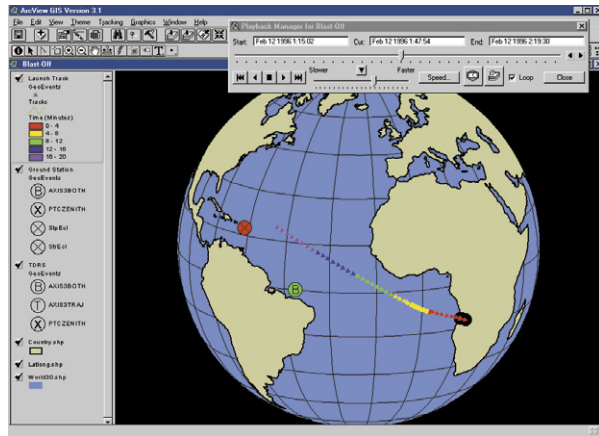
Manages real-time data

ArcGIS Publisher

Facilitates the sharing of electronic maps

ArcGIS Survey Analyst

Manages survey data in a geodatabase

ArcScan™ for ArcGIS

Scans and converts paper maps into vector data such as shapefiles or geodatabases

The ArcGIS server products—ArcSDE® and ArcIMS®—provide the infrastructure for distributing and publishing data, maps, and services on your network or across the Internet.

ArcSDE

ArcSDE provides a gateway between commercial databases (IBM DB2, IBM Informix, Microsoft SQL Server, Oracle) and your GIS clients. ArcSDE manages multiple users editing the same spatial database with long transactions, alternate versions, and history.

ArcIMS

ArcIMS provides the foundation for distributing maps and high-end GIS services via the Internet. ArcIMS software enables users to integrate local data sources with Internet data sources for display, query, and analysis in an easy-to-use Web browser and in other GIS clients such as ArcView.

Developer Tools

MapObjects

ESRI's MapObjects® software is a powerful collection of embeddable mapping components for building applications or adding GIS capabilities to existing applications. MapObjects provides a wide range of map display, geographic query, and data retrieval capabilities including GPS data management, geometric functions, and thematic mapping. Sample applications, source code, a comprehensive data collection, online help, and printed references for getting started are included. MapObjects software is available for both the Java™ and Windows® programming environments.

MapObjects—Java Edition is an easy-to-use suite of more than 900 Java developer components that you can use to build cross-platform GIS applications.

MapObjects—Windows Edition consists of an ActiveX® control with approximately 50 automation objects that can be plugged into a variety of development frameworks including Visual Basic®, Visual C++, Visual Studio .NET, VB.NET and C#, Delphi™, Borland® C++ Builder, PowerBuilder®, and others.

MapObjects LT is a lightweight, royalty-free version of MapObjects—Windows Edition.

ArcWeb Services

ArcWeb℠ Services offer a way to include GIS content and capabilities in your applications without having to host the data or develop the necessary tools yourself. The result is significant savings of time, expense, and computer resources. Composed of spatial data and GIS functionality delivered over the Internet, these applications can be delivered to ArcGIS or to your custom Web applications.

A key advantage of ArcWeb Services is that you can combine multiple services and integrate them with your own application environment, leading to limitless possibilities for sharing geographic information.

Examples of available ArcWeb Services include
- **ArcWeb for Developers**
- **Geographic Data Technology (GDT) Canadian Streets**
- **GDT U.S. Streets**
- **Meteorlogix U.S. Weather**
- **Pixxures WebPix USGS, Digital Ortho Quarter Quads (DOQQ) Mosaic**
- **Tele Atlas U.S. Transportation and Basemap**
- **WorldSat Satellite Imagery**
- **…with more on the way!**
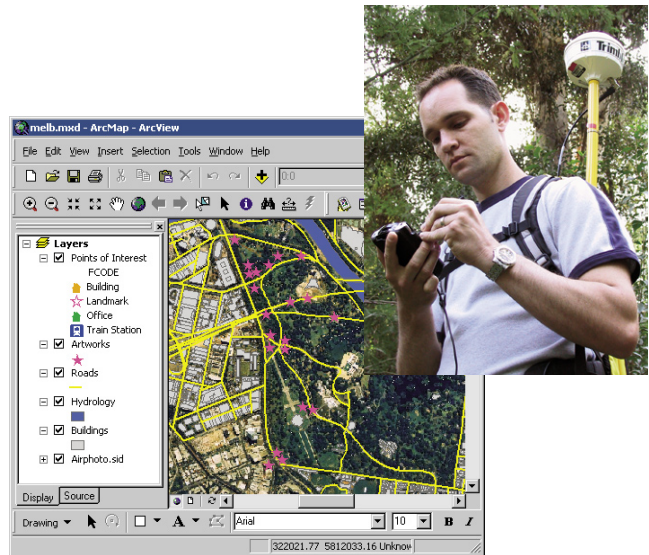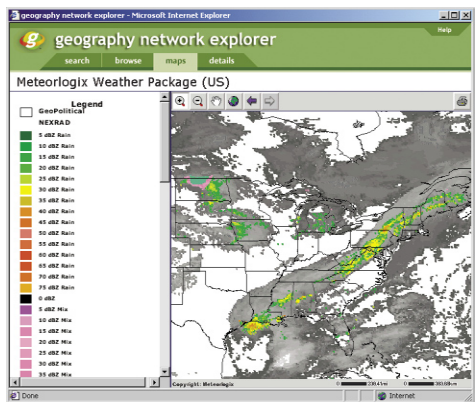
Field GIS

ArcPad

ArcPad® provides database access, mapping, GIS, and GPS integration to users out in the field via handheld and mobile devices. Data collection with ArcPad is fast and easy. GPS integration simplifies location measurement and allows for real-time navigation.

ArcPad Application Builder

Although ArcPad is designed to be flexible and easy to use, you may want to customize the interface to reflect your own preferences and the way you work. Using the ArcPad Application Builder, you can design custom forms to streamline data collection or create custom tools and applications.

Free Viewers

ArcReader

ArcReader™ is a free, easy-to-use product that allows anyone to view, explore, and print published map files (PMFs). ArcReader was designed for viewing and sharing maps that access a wide variety of dynamic geographic data. Anyone with ArcReader can access high-quality maps created by ArcGIS Desktop.

ArcExplorer

ArcExplorer™ is a lightweight GIS data viewer that offers an easy way to perform basic GIS functions. ArcExplorer is used for a variety of display, query, and data retrieval applications and supports a wide variety of standard data sources. It can be used on its own with local data sets or as a client to Internet data and map servers.

ESRI

For more than 30 years ESRI has been helping people manage and analyze geographic information. ESRI offers a framework for implementing GIS technology in any organization with a seamless link from personal GIS on the desktop to enterprisewide GIS client/server and data management systems. ESRI GIS solutions are flexible and can be customized to meet the needs of our users. ESRI is a full-service GIS company, ready to help you begin, grow, and build success with GIS.

Corporate

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For more information
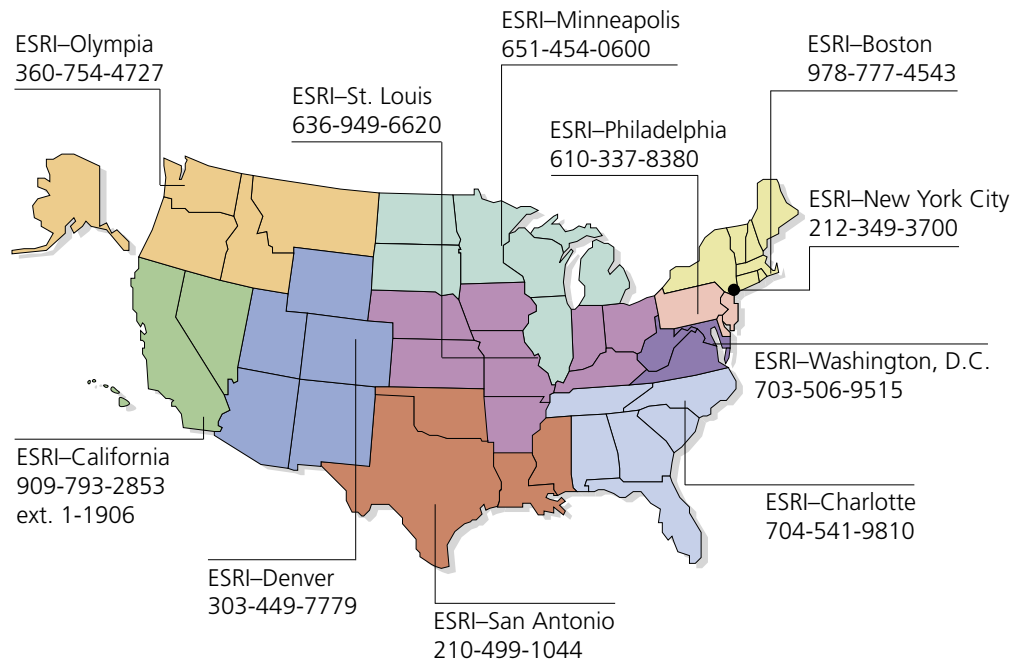on ESRI, call

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or contact an ESRI reseller near you.

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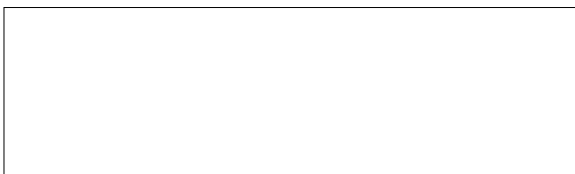
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