Esri News
for Environmental Management
Spring 2013

Environmental Platform Improves Management

EPA Builds Map Service on ArcGIS Online

The United States Environmental Protection Agency (EPA) is a federal showcase of GIS web applications, such as its Environmental Dataset Gateway, Facility Registry Service, and EnviroMapper.

Recently, EPA launched EPA GeoPlatform based on Esri's ArcGIS Online. EPA GeoPlatform is a framework for coordinating geospatial activities, applications, and data across the agency. EPA administrators announced that EPA GeoPlatform is available to every EPA employee as a foundation for all the agency's geospatial applications. Its policy now is that all geographic data and tools be built on EPA GeoPlatform.

Administrators also cited benefits of EPA GeoPlatform, including increased access to place-based decision-making tools, a standardized look and feel for map products, and applications supported by a core set of national data services. It eliminates redundancy in deployment and use of GIS, which leads to cost savings.

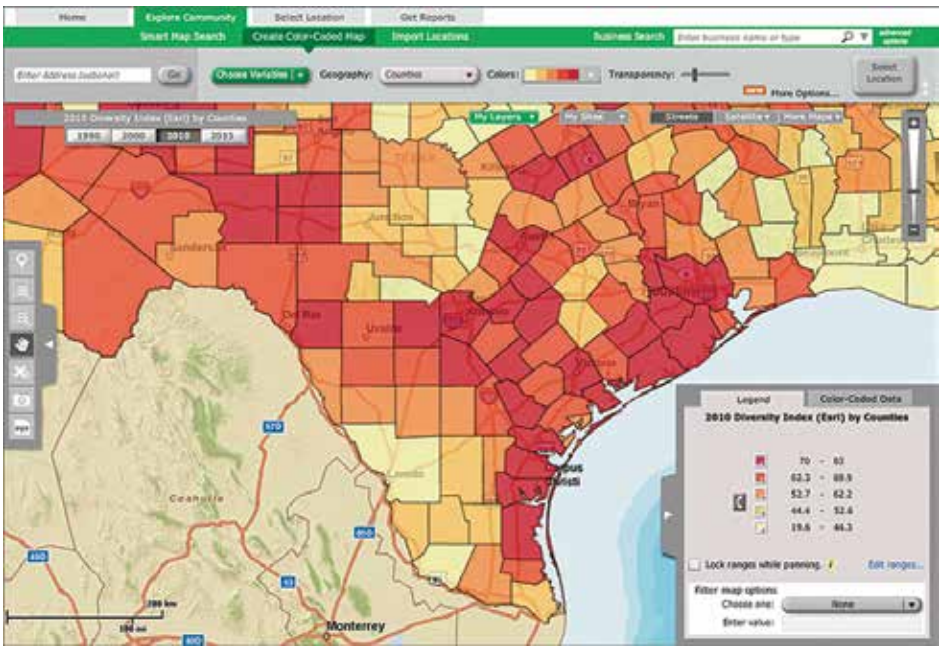
"Applications, data, and models served on EPA GeoPlatform help people do their jobs better and enhance environmental decision making," says Harvey Simon, EPA's acting geographic information officer.

The agency-wide web mapping service allows EPA to use the Esri-hosted infrastructure in a managed, secure, and scalable cloud-based environment. EPA retains control of the service and security to administer role-based members and public and private groups. It can track usage and monitor storage and reports.

EPA GeoPlatform includes three components: a public GIS cloud subscription service for accessing data and building web applications, a private cloud configuration for sharing data internally using role-based security, and data and application services built and distributed on its GIS server infrastructure in both public and private environments. It employs cloud service tools, viewers, and applications from ArcGIS Online, Community Analyst, and ArcGIS Explorer Online to make geospatial analysis more mainstream within the agency.

EPA GeoPlatform supports EPA enforcement targeting, community-based grants analysis, and environmental justice screening. It also provides a wide range of data, applications, and maps to support its staff's community-based work.

Users work in a self-service environment to search for web maps and consume data from EPA's dataset gateway, as well as from data.gov and ArcGIS Online. EPA GeoPlatform has a metered service so that the agency can watch traffic and load on its servers and respond by dynamically increasing or decreasing service support. The EPA map store helps staff members discover or publish web maps so that others can use them. Using a public-facing viewer, citizens can add their data to a map and use that map to support discussion.



↑ EPA GeoPlatform, built on ArcGIS Online infrastructure, serves data, maps, and reports to EPA management and staff.

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The Role of GIS in Sustainable Economies

By Geoff Wade,
Natural Resources Manager, Esri

The goal of sustainable environment planning, policies, and governance is to design processes that return our planet to a more balanced level of use. To do so, we must align our values with the earth's ability to support them. The success of this effort is dependent on a foundation of science, a means of collaboration, and the implementation of sustainable policies and administration. Geographic information system (GIS) technology is an essential tool for designing and implementing sustainable processes at a scale ranging from local to global.

People around the world continue to compile scientific data about resources, ecosystems, and human impact. GIS enables us to visualize and analyze these massive collections of data. By establishing a base for determining cause and effect, GIS tracks ecological change and provides the chains of evidence of human impact. It tracks people's land use; methods of resource extraction; and peripheral activities, such as supporting road networks, and it shows levels of correlation. GIS manages large databases, depicts and prioritizes problems, models scenarios of both positive and negative practices, and predicts environmental outcomes. It provides the quantified information and analytic capabilities required for making location-based decisions that increase economic efficiencies and reduce consumption and contamination.

People's stakes in our environment vary. GIS gives us a lens to understand different objectives and create an environment for collaboration. Among these objectives are economic potential, equality, environmental and social justice, environmental preservation, and land use. Understanding these concerns requires data and analysis. Many countries have set up spatial data infrastructures (SDI) that enable data exchange via standards and interoperability. Organizations have created GIS portals that enable fast access to geodata and map services. GIS platforms serve as frameworks for multidisciplinary collaboration in designing sustainable practice policies, implementation, and administration. These technologies promote dialog by helping different organizations articulate their concerns within the scope of sustainable planning.

The environment is a global responsibility. Forests do not stop at a country border, one ocean touches many coastlines, and climate change impacts every continent. The implementation of sustainable policies and administration must cross borders. The common language of geography, expressed through the tools of GIS, brings people together.

This issue of *Esri News for Environmental Management* shows a few ways our users have considered the environment in designing their projects and thereby helped tip the balance toward a more sustainable planet.

Geoff Wade has more than 20 years of experience in the application of GIS technology to a broad array of natural resource disciplines and helps coordinate Esri's community outreach activities across the sector globally.

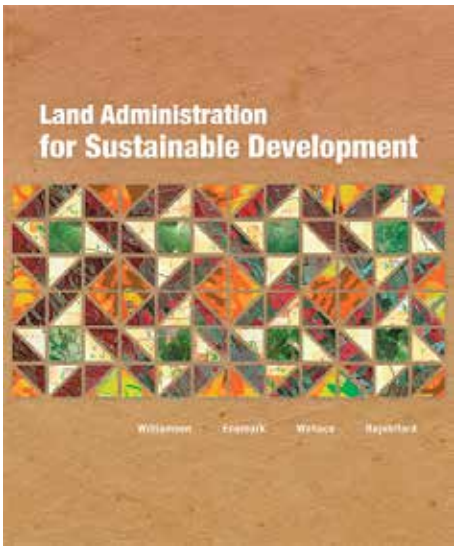
Land Administration for Sustainable Development

Examine global land administration systems at different levels of maturity. *Land Administration for Sustainable Development* tells how countries can establish basic infrastructure to implement land-related polices and land management strategies. These help ensure social equality, economic growth, and environmental protection.

Order this book from Esri Press at esri.com/esripress.

Authors: Ian Williamson, Stig Enemark, Jude Wallace, and Abbas Rajabifard

Esri Press
524 pages, $69.95
ISBN: 1-58948-081-3



Fishing Limits Easier to Enforce With ArcGIS

Tracking Fishing Vessels Supports EU Sustainable Fishing Policy

Croatia is using ArcGIS to monitor the location and activity of its fishing fleet. The European Union (EU) requires that fisheries be sustainable and not jeopardize fish stocks for future generations. Even so, Europe's fish populations continue to decline.

The EU Commission Reform of the Common Fisheries Policy (CFP) has been assessing the way EU fisheries are managed and the challenges they face. The commission concluded that the main contributor to overfishing is that the fleet's fishing capacity is greater than its fishing opportunities.

To counter this problem, the commission has recommended baseline standards that will reduce the fleet's capacity. It also recommended stabilizing fish stocks by implementing catch quotas by species, creating seasonal closures, and restricting access to areas where young fish are developing. In addition, the commission noted that waters need to be managed within a regulated transparent and sustainable framework.

This is easier said than done. Tracking vessels and monitoring catches are overwhelming tasks. In 2010, the EU's 27 member countries registered 83,796 vessels. Fortunately, the EU's soon-to-be newest member, the Republic of Croatia, has an effective GIS fishing industry solution that helps it monitor vessels, gear, catches, seasonal fishing areas, and more.

Croatia's Ministry of Agriculture, Department for Fisheries, asked GDi GISDATA LLC, Esri's distributor in Croatia, to build a geoinformation system for fisheries. GISDATA developed the Vessel Monitoring System (VMS). The department uses it to identify and track the country's 260 large fishing vessels. This information can be used for monitoring boat activity and as evidence for law enforcement.

The main components of VMS are the department's centralized database, tracking devices, and ArcGIS. Whether at the department, in the harbor office, or on a boat, an inspector can access GIS to track a vessel and get information about its owner, type, and gear on board and a host of other information.

The fishery information system, built to accommodate the EU's fisheries registry requirements, includes various GIS data modules. The person-register module contains ID numbers, owner information, and fishing licenses, as well as vessel information, such as title, registration, length, gear, and equipment. To comply with the EU regulation, Croatia's fleet register keeps track of the vessel's entire life cycle from entrance to and exit from the fleet. Every data change for the vessel is recorded as an event, thereby keeping the entire fleet database current.

↑ A Croatian Fishing Vessel

A catch module includes information that fishers complete on an inquest register, as well as descriptions of the catch, catching effort, and rejected catch. An analyst can filter the catch module by date; regional unit; type of sea organism; fishing gear; and vessel type, length, strength, and weight. This gives the analyst a good picture of the relationship of fishing capacity and fishing opportunities.

The first sale module is used to compare catch data with sale data to reveal any discontinuity. The blue diesel module monitors fishing vessels' fuel consumption to gasoline quota. The aquaculture model contains fishers' preferences for farming freshwater organisms, and the marine culture module holds breeding site data. Other data modules include the sport and recreational sea fishing license, tuna fishing, and administration.

VMS in the Adriatic Sea is used to acquire, send, edit, and process data. Large vessels 14 meters or longer have onboard tracking devices that send vessel data to the database via general packet radio service (GPRS) and SAT (Iridium) satellites in different time intervals. GPRS/EDGE/UMTS (depending on signal quality and strength) have been customized to send data every 15 minutes or less (remote control) and over SAT every two hours.

VMS collects vessel information in real time, such as location, speed, direction, and even battery status. Developed on ArcGIS for Server using the ArcGIS API for JavaScript, the system integrates with vessel data stored in the Microsoft SQL Server database and publishes dynamic content.

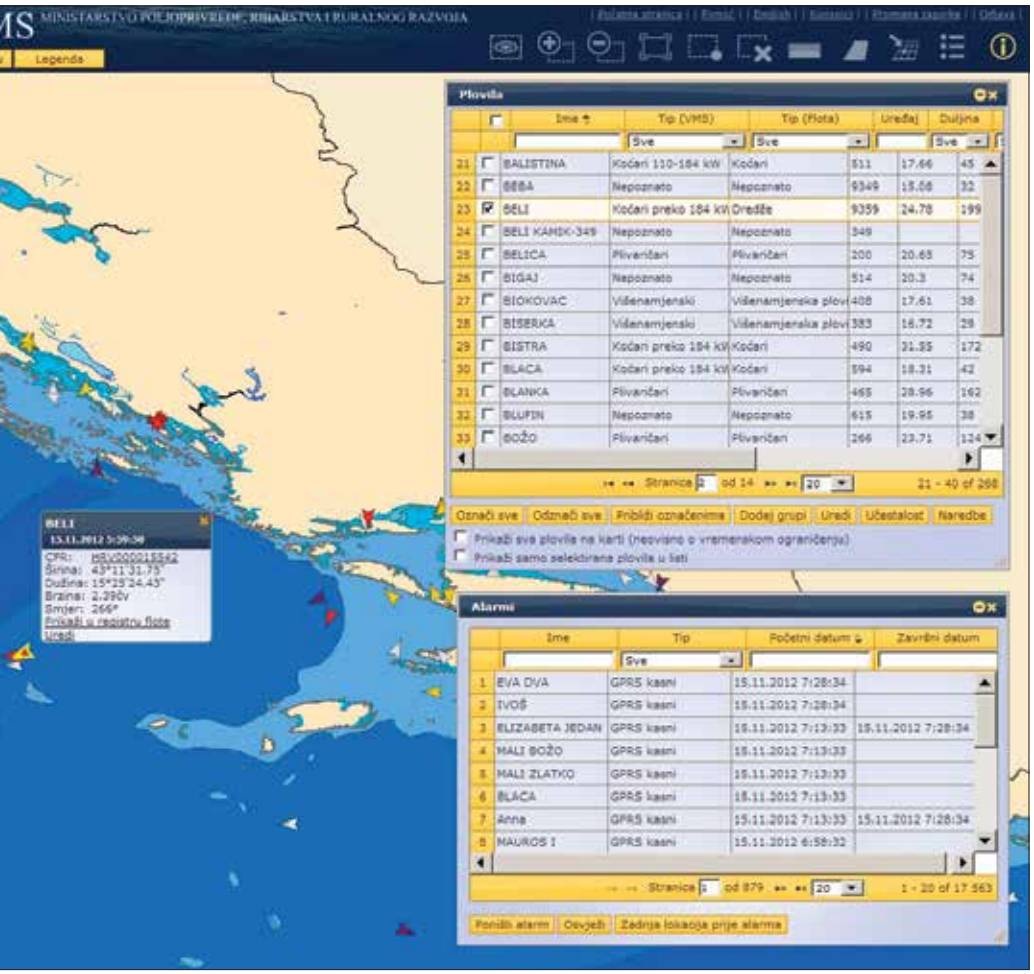
Users are then able to review and send detailed data reports about a vessel's position, speed, type, and so forth. Users can selectively manage and track historical and up-to-date data through filters and alarms. Alarms are divided into system alarms and spatial alarms alerting the department of problems in protected, forbidden, or time control areas. Alarms are automatically transmitted as text messages to inspectors in the field.

Department for Fisheries staff members use a web browser to access GIS web applications to see the following information:

- An overview of the last available position of every vessel
- An overview of archive positions of monitored vessels during certain time periods
- An overview of basic data from the informational system of fisheries—a chosen vessel's owner, dimensions, and so forth
- Statistical data about vessel movement

The application also gives users tools to perform analysis, such as determine a path or calculate fuel consumption. They can also choose raster or vector data background layers and generate reports.

↓ An overview of the last available positions of every vessel gives the Department for Fisheries a near real-time picture of vessel activity. Detailed information about a vessel is quickly accessible.



Staff use VMS tools in ArcGIS for Desktop. GDi GISDATA's ArcGIS extension, Vessel Analyst, enables users to generate spatial data from alphanumeric data in the VMS database for defined time periods, analyze it, and produce fishing vessel location maps. Depending on their work requirements, staff members can access VMS and work with basic GIS tools online or use a full range of GIS functionality in a desktop application. Security tools allow only authorized users access to the system. These users perform top-level content management and build maps using GIS to do these tasks:

- Create rich cartographic presentation in arbitrary scales and data layers
- Execute database SQL queries
- Publish configurable reports containing cartographic presentations
- Perform various spatial analyses using intersect, merge, and buffer tools

VMS is an open system based on standards and is compatible and easy to integrate with existing GIS environment and informational systems. It supports distributed workflows in the central office of the Department for Fisheries, county offices, and fishing vessel business offices.

Croatia is using VMS to study the impact of aquacultures on the environment. In the event of a storm, it helps responders alert vessels and rescue vessels in distress.

For more information, contact Andrej Lonĉariĉ, managing director, Core Markets, GDi GISDATA (e-mail: andrej.loncaric@gdi.net).

Locating Sustainable Income

Rain Forest Residents and Amigos de Iracambi Find Resources

By Barbara Shields, Esri Writer

The Atlantic Forest (in Portuguese, *Mata Atlântica*) lies along the southeastern coast of Brazil. The tropical forest contains 20,000 plant species. Scientists estimate that before the European conquest of the region, the Atlantic Forest covered more than 1.2 million km^2. Today, less than 10 percent of this magnificent forest remains. Much of this deforestation has been caused by farmers who have logged the forests, planted crops, farmed until the soil was depleted, and abandoned the site.

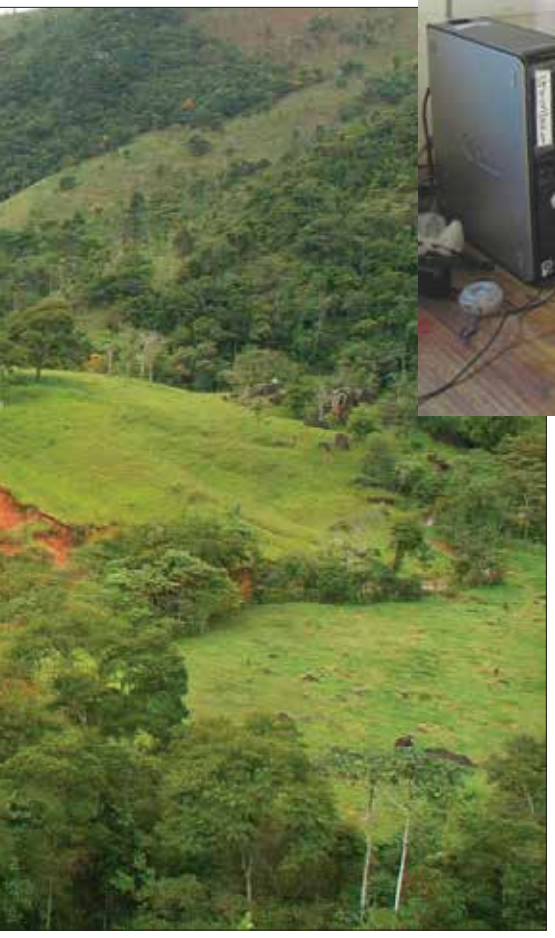
Amigos de Iracambi is a nonprofit organization that is raising a line of defense against deforestation. It is using ArcGIS to help local communities conserve the forest while earning forest-based income.

The Iracambi Atlantic Rainforest Research Center is based on a 500-hectare farm located next to Serra do Brigadeiro State Park in the mountains of southeastern Brazil. Residents practice restorative farming techniques including terracing hillsides, replenishing soil nutrients, and creating a nursery for crops and saplings. They also show that alternative sources of income, such as a fishery, medicinal crops, charcoal production, and ecotourism, are practical. The center has become a knowledge hub where local communities participate in projects and students from other countries come to learn and research sustainable practices. It's also where people become involved in the Iracambi-GIS (I-GIS) project.

→ Harsh farming practices have decimated Brazil's Atlantic Forest.

↑ From ecotourism to medicinal plants, forests have much to offer.

Working in partnership with Clark University (USA) and GeoEnable Ltd. (United Kingdom), the Amigos de Iracambi team built I-GIS on Esri's ArcGIS for Desktop platform. The I-GIS database includes information from national and institutional resources, satellite imagery, and GPS data collected by volunteers. It outputs maps and other types of information that show environmental degradation hot spots (erosion, deforestation).



↑ The Amigos de Iracambi GIS team locates shaded areas suitable for coffee production.

In the past, a major challenge for volunteers was to share information. To solve this problem, Amigos de Iracambi has transitioned to a web-based GIS that leverages Esri's ArcGIS Online. This allows people who work with the organization to collaborate on a platform and maintain continuity in their information. Data collected by Amigos de Iracambi researchers in this remote area is sent to the I-GIS team members, many of whom work in other countries. Steven Eglinton, who once worked at the center, is now the founder and CEO of GeoEnable in London, United Kingdom, yet he still devotes time and expertise as a GIS coordinator for Amigos de Iracambi. He has organized the Iracambi GIS International Advisory Committee, a group of 25 GIS professionals and graduate students. They are devising rules and instructions to help guide researchers in the collection of data and the use of GIS to lay their data onto basemaps. Committee members also manage I-GIS, clean and process data, produce national and project maps, and participate in the education program.

Drawing from its geodatabase, the I-GIS team generates maps that help local people understand the land and design sustainable strategies. For example, the team is creating land-use maps of Serra do Brigadeiro State Park and its surrounding territory. This makes it possible for them to identify existing land resources and land-use patterns and assign conservation priorities.

Researchers use GIS to see forest fragmentation and study impedances—such as farms, cattle, fires, and cultural attitudes—to corridor development. GIS has also been used in corridor suitability studies that analyze fencing, seedlings, labor, and fertilizer costs as well as monitor new tree growth within the corridors.

Proving that the forest provides a variety of income resources is essential to changing farmers' attitudes toward sustainable forest management. GIS maps identify alternative income opportunities such as harvesting plants with medicinal properties. Members of the Iracambi Medicinal Plants Project are identifying and locating these species, and the center hopes to create a line of medicinal products to give farmers economic incentives to participate. For example, the resin and oil of the copaiba is used to treat pain, inflammation, ulcers, and cancer and tumor growth. Another medicinal plant is the capeba, which is put into cosmetic products and has medicinal properties used by the local community. Researchers record these plants' characteristics, such as proliferation and harvest seasons and preferences for shade or direct sunlight, flat or hilly land, and dry or damp soil. GIS processes this plant data to create suitability maps that show where medicinal crops would best thrive. Three-dimensional terrain models enhance the understanding of a location's crop potential.

Suitability maps are also used for sustainably growing coffee plants, one of Brazil's most highly valued cash crops. Many farmers have destroyed forests to create sun-grown coffee plantations, which require chemical fertilizers and pesticides and year-round labor. These plantations produce crops of beans for only 10 to 15 years, and eventually the fields are reduced to grass for pasture. Conversely, shade-grown coffee plants can produce crops of beans for up to 50 years. The forests' shade trees protect the plants from rain and sun, help maintain soil quality, and aid in natural pest control by birds. Furthermore, the demand for shade-grown, organic coffee continues to increase. Coffee-potential maps help people better understand where coffee can be grown and how best to cultivate it.

Back on the farm, project workers try to explain sustainable practices to people in the local communities, most of whom have never seen a map. To get across the concepts of geographic representations, people from the center use aerial imagery to help locals recognize familiar sites. The aerial imagery makes it easier for them to contribute their knowledge about land use. The center incorporates local terminology and forest references and uses them for better community collaboration. Education is the foundation of the Amigos de Iracambi program, and collaborating with the local community in planning and working on sustainable projects is crucial to the program's success.

The information in this article was provided by Steven Eglinton, GIS coordinator for Amigos de Iracambi and founder and CEO of GeoEnable, a geospatial and information management consultancy firm that embeds GIS into business processes. Contact him at steven.eglinton@iracambi.org.uk.

Geodesign Plan Saves Dollars and Drives Efficiency

Alaskans Use GIS for Polar Pipeline Planning

By Charles Barnwell, GIS Manager, Michael Baker Jr. Corporation, Anchorage, Alaska

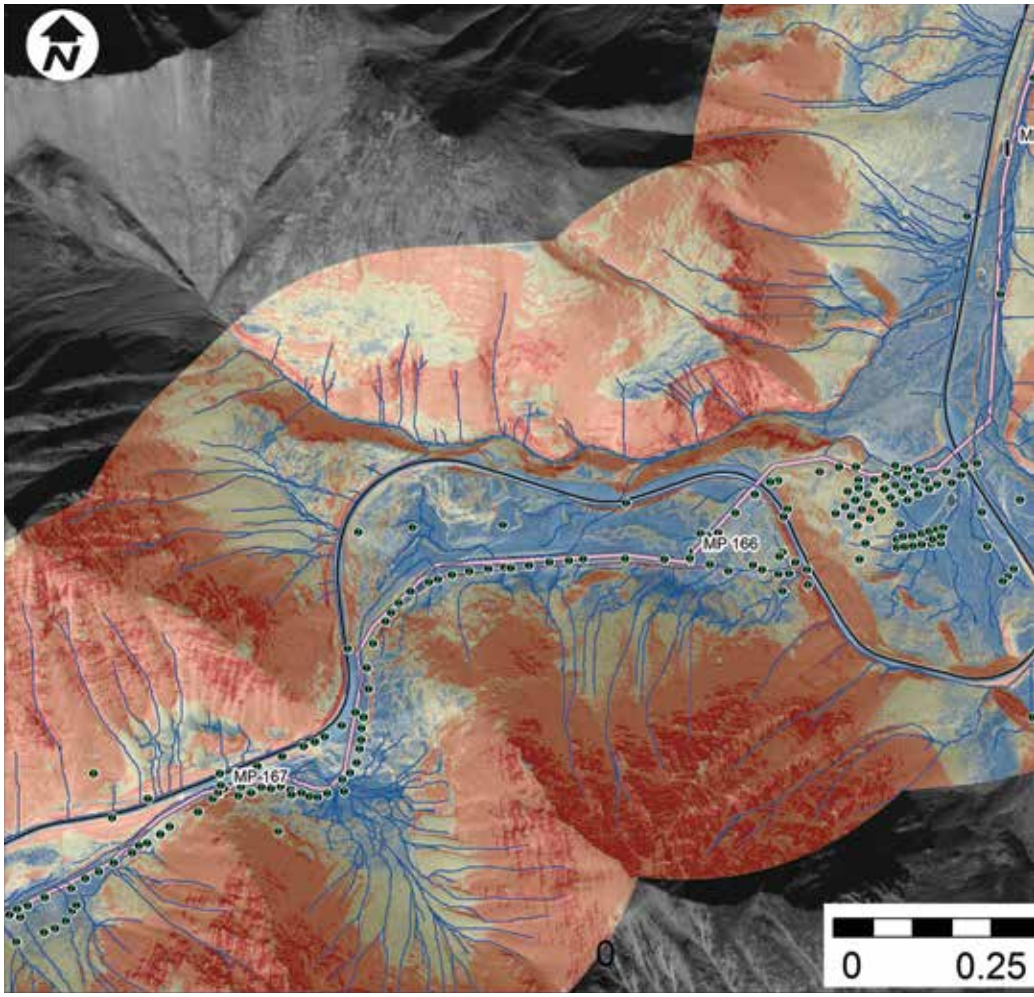
The North Slope region of Alaska is currently undergoing renewed oil and gas exploration activity. Alaska's rugged terrain and diverse ecosystems challenge exploration and production (E&P) projects and pipeline engineers, who need to consider permafrost, wetlands, soil stability, hydrography, water content, and wildlife in drawing their construction and land-use plans. North Slope oil and gas projects range from exploration in undeveloped areas to pipeline and facility development. Geographic information systems play a key role in these arctic projects by providing a foundation for a wide range of upstream and midstream analyses, from environmental impact to construction logistics.

Michael Baker Jr. Corporation (MBJ) has provided pipeline engineering and mapping services in Alaska for more than 45 years. The Trans-Alaska Pipeline was one of MBJ's early projects in the state, and to this day, MBJ is working to develop GIS solutions for this pipeline. The company relies heavily on a variety of geospatial technologies—lidar, mobile GIS, cloud-based data distribution, and others. MBJ engineers and planners use GIS to support pipeline planning, routing, engineering, design, and other applications. In addition, its geospatial specialists work with oil and gas companies' GIS teams to organize data and integrate solutions.

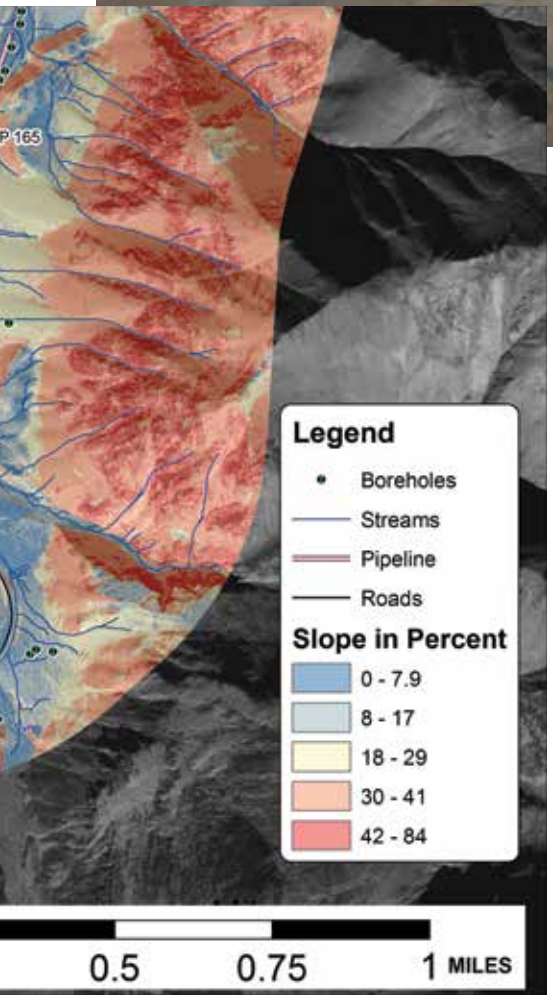
In 2008, Enstar Natural Gas Company contracted MBJ to evaluate alternatives for a pipeline system to deliver natural gas from the oil fields of the North Slope's Prudhoe Bay to Alaskan consumers. Using software by Esri, the world leader in GIS, MBJ evaluated the pipeline's feasibility and recommended the best pipeline corridor. Enstar used Esri products to store and manage core data and distribute GIS applications to its contractor team during the project for data management, visualization, and analysis. MBJ was also responsible for providing support for engineering assessments. Since 2009, the gas pipeline project has been managed by the State of Alaska, and MBJ continues to provide engineering support on the project.

One of the most powerful benefits of GIS is its ability to organize data and even people. The impact of GIS on an organization is often overlooked, but when data is better organized, the company is better organized. If managers understand the value of GIS, it can help them better coordinate different groups and activities. Therefore, it is essential that people's objectives are incorporated into their projects from the start. This is time well spent because it greatly increases the value of the project's data and GIS applications. When organizing data and building GIS solutions for pipeline projects, MBJ's GIS team follows these tenets to connect people to technology solutions:

- Establish GIS and data management standards and protocols early in the project. Get the entire project team on board with using protocols and standards.
- Develop a road map that includes phases for GIS implementation.



→ Part of a pipeline routing analysis, this image is derived from lidar data and shows elevations and stream courses. A concentration of geotechnical boreholes (green dots) is in an area of greatest concern for the pipeline route. (Map courtesy of the Office of the Federal Coordinator.)



↑ The Alaska North Slope coastline is the largest oil and gas play in the United States. (Image courtesy of ExxonMobil.)

- Designate a central point of contact for the GIS project, someone who will act as a data custodian, steward, and manager.
- Form a stakeholder user committee of contractors, engineers, and other experts and meet regularly to discuss GIS needs and concerns.
- Design the project's GIS to be accessible to all types of users at different levels of expertise—for example, managers, planners, permitting specialists, engineers, and scientists.
- Stay abreast of current technology and how to apply it in an appropriate and cost-effective manner.
- Focus on business drivers for GIS to ensure better decision making, particularly when location is critical.
- Use GIS to create intelligent maps that provide real value and satisfy workflow requirements, rather than just to create pretty maps.
- Use GIS as the common ground for multidisciplinary applications. Typically, large resource projects involve many disciplines, requiring that different types of data be referenced to a common geospatial framework.
- Build an authoritative GIS foundation based on data that's reputable and the best available.

Finding quality data for analyzing arctic conditions requires data mining and maintaining ancillary related data collected by contractors and others. Much North Slope data is not widely published. However, because MBJ has been working with oil and gas companies in Alaska for decades, it has acquired a large amount of high-quality data from public sources, particularly in the geotechnical and terrain mapping areas. This data has formed the foundation for building other derived layers and has contributed to the success of the company's many projects.

Over the years, MBJ has assembled a GIS library that is organized around Esri's basemap data model. Library data is categorized by

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Geodesign Plan Saves Dollars and Drives Efficiency continued from page 9

purpose, for example, transportation, habitat, and soil type. It is also categorized by region, for example, arctic, interior, and south central. The data model structures the data in a consistent way and enables the dependable growth of GIS.

By creating a solid data model at the beginning of each project, MBJ has been able to perform data mining that targets relevant sources. For instance, in 2009, the Office of the Federal Coordinator (OFC), an agency that is charged with overseeing large oil pipeline development, contracted MBJ to develop a GIS prototype. OFC addresses a large variety of data types—including environmental, engineering, and land—in its processes, and it coordinates with more than 50 agencies.

Before launching the project, MBJ's geospatial experts invested a lot of time working with the client's project manager, GIS team, contractors, and technical staff to develop a high-quality foundational geodatabase, designed specifically to store, query, and manipulate spatial data, and an authoritative basemap on which to layer other agency data. Using the map as a prototype, OFC teamed with the State of Alaska to fund a publicly available high-resolution lidar basemap for the main Alaska pipeline corridor.

An example of good GIS planning is the multibillion-dollar ExxonMobil Pt. Thomson project in the northeast part of the North Slope. During the preplanning phase, MBJ worked with ExxonMobil's project manager Terrance Setchfield to develop a foundational geodatabase for ExxonMobil's GIS. Together, they met with contractors to define project boundaries, agree on data needs, and develop standards. The contractors' subject matter experts were consulted to ensure the best possible data in a given field was used. However, good data was not available when the project started. A GIS committee was formed and met weekly in the first six months to discuss data sources, data needs for the project, and GIS issues. Getting quality data for environmental sensitivity analysis was critical. The result of this preplanning effort was a robust data model and geodatabase that became the foundation for permitting, hydrologic analysis, and so forth. Good geodesign can result in savings of millions of dollars and contributes to greater project efficiencies.

As in the Pt. Thomson project example, environmental constraints have to be fully addressed in many oil and gas projects, so the geodatabase has to include layers ranging from fish, whale, and bear to different types of bird habitats. For instance, polar bear habitat data includes sites and species movement throughout the habitat area. Much of this data—such as that from the US Fish and Wildlife Service (FWS)—is publicly available. MBJ has a strong relationship with FWS and the people performing the wildlife studies and has confidence that the data is credible.

In addition to typical GIS data elements, such as wetlands, hydrography, and cultural data, MBJ has used high-resolution lidar data to create images of bare-earth surfaces and analyze information about vegetation, water bodies, and the moisture of the earth. Derivative mapping products from the lidar data were generated, and the point cloud data was formatted in a public file format for the interchange of lidar data. This file format, Log ASCII Standard (LAS), made the data usable in different software programs and ensured that it could be used in the future.

By using LAS files in Esri software, users save time and effort because they do not need to convert lidar data to GIS-specific formats. This has allowed MBJ specialists to use the lidar data to construct 3D surface visuals that provide a beautiful sense of the nature of the earth. For instance, hydrology land features shown in 3D have proved useful for planning stream crossings as well as understanding the route a spill would take and the bodies of water it would impact. Pipeline engineers used these geospatial renderings to look at a proposed pipeline corridor from all angles and see how pipe would run above- and belowground.

Getting a complete picture of the project based on quality data is the best way to ensure a planning process that meets client needs, environmental concerns, and regulatory compliance.

For more information, contact Charles Barnwell at cbarnwell@mbaker.com.

Environmental Platform Improves Management continued from page 1

Looking Forward

EPA is in the process of customizing Esri's ArcGIS Explorer as a viewer that integrates EPA GeoPlatform data and services and environmental queries and models. Staff will use it to add data, such as demographic variables and particulate matter, ozone, and chemical data, to maps. Eventually, the viewer will be installed on all agency desktops. EPA also plans to customize the full ArcGIS desktop client to provide agency GIS capabilities.

Working with Esri, EPA is customizing a version of Community Analyst called Environmental Analyst. It adds hundreds of EPA data layers to Esri's thousands of demographic, health, economic, education, and business data layers. Staff will be able to ask questions, such as, Where should I target environmental enforcement actions? Does the area around a chemical facility have potential environmental justice concerns? What is the violation history of this dry cleaner?

EPA GeoPlatform is at the center of EPA's hosted map services.

For more information, contact Latisha Petteway, press officer, United States Environmental Protection Agency (e-mail: petteway.latisha@epamail.epa.gov).

See What's New

Attend the Esri International User Conference

The people you will meet at the Esri International User Conference will change the way you see the environment and the work you do to save it. Come and meet these people:

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For more information and to register, visit esri.com/uc.

Explore GIS at the Environment Showcase

Because you care about the planet, you will want to visit the Environment showcase while you are at the Esri International User Conference (Esri UC). Beautifully displayed and centrally located at the heart of the EXPO, the venue will provide a relaxed atmosphere for you to connect with environmental organizations and other users. The reviews of last year's event were enthusiastic:

"My favorite aspect of the Environment showcase was the diversity of organizations that participated. You were able to learn something from just about every natural resource avenue you could think of," said Melissa Stepek, San Diego Natural History Museum.

"The Environment showcase is wonderful because people who have been involved in the environment can connect further with the community, and those who haven't can see how they might get involved," said Marta VanderStarre, NatureServe.

We look forward to seeing you at the Esri UC.

On the Road

Mark Your Calendar

2013 Esri International User Conference
July 8–12, 2013
San Diego, California, USA
esri.com/uc

Association of Fish & Wildlife Agencies
September 8–10, 2013
Portland, Oregon, USA
www.fishwildlife.org

The Wildlife Society Annual Conference
October 4–9, 2013
Milwaukee, Wisconsin, USA
www.wildlifesociety.org

COP 19
November 2013
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www.cop19.org

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