esri | THE SCIENCE OF WHERE®

GIS for Environmental Regulation

A Geographic Approach to Ensure Equitable Access to Clean Land, Air, and Water

Esri, the global market leader in geographic information system (GIS) technology, offers the most powerful mapping and spatial analytics technology available. This technology is leveraged across all levels of government including cities, counties, tribal communities, regional authorities, and states. GIS technology supports a framework for problem-solving, called the geographic approach.

A geographic approach informs policy, operations, and planning for improved decision-making across communities and organizations. Government leaders take a geographic approach to shape priorities, policies, and engagement tactics. Leveraging GIS technology, they use maps, apps, analytics, and dashboards to manage issues such as equity, economic development, transit, land management, health, and safety.

Maintain Policy Compliance through a Geographic Approach

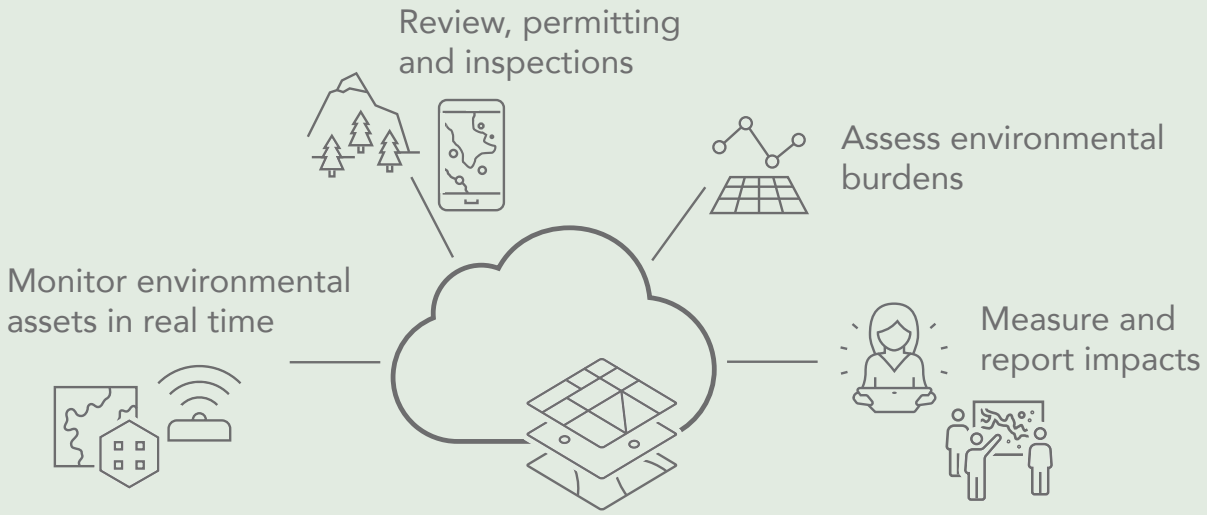
The vast majority of environmental organizations around the globe use GIS technology to assess project impacts, inform and implement policy, facilitate community engagement, monitor environmental assets in real time, and provide transparency for better outcomes for all. A geographic approach allows organizations to track the health of the environment, assess community burdens, identify the source of pollutants, and prevent environmental hazards from becoming a disaster. GIS provides better insights, faster.

Promote equitable access to clean land, air, and water in our communities. Use GIS to

- Monitor environmental assets in real time.
- Communicate policy and ensure compliance through review, permitting, and inspections.
- Assess environmental burdens.
- Measure and report impacts.

Geospatial Framework for Environment and Natural Resources

GIS supports all aspects of your organization's workflows. Esri provides the ArcGIS® software, training, and guidance you need when working to restore, protect, and preserve natural resources and the environment.



Monitoring and Visualization—Monitor Environmental Assets in Real Time

Environmental organizations use real-time apps and dashboards to easily understand critical information about environmental quality across land, air, and water. Using GIS to explore complex datasets allows environmental organizations to easily uncover significant patterns, trends, correlations, and relationships.

With GIS, organizations can tap into the Internet of Things (IoT) to analyze and display real-time data from sensors, devices, or other feeds. They can better understand and discover the hidden patterns and trends in massive datasets by applying spatiotemporal analytics. Using geographic analytics tools, environmental organizations gain situational awareness from streaming data, whether they are tracking moving assets or stationary sensors. Real-time monitoring and big data analytics empower organizations to focus on the happenings that matter most, so they can make the right decision at the right time.

ArcGIS Capabilities

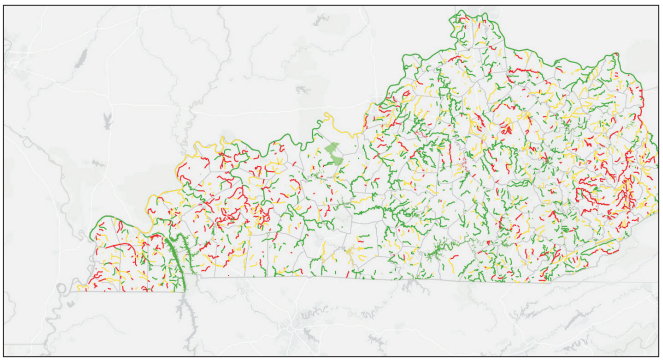
- Ingestion
- Analysis
- Storage
- Visualization
- Dissemination
- Actuation

Unlocking a Statewide Understanding of Water Quality in Kentucky

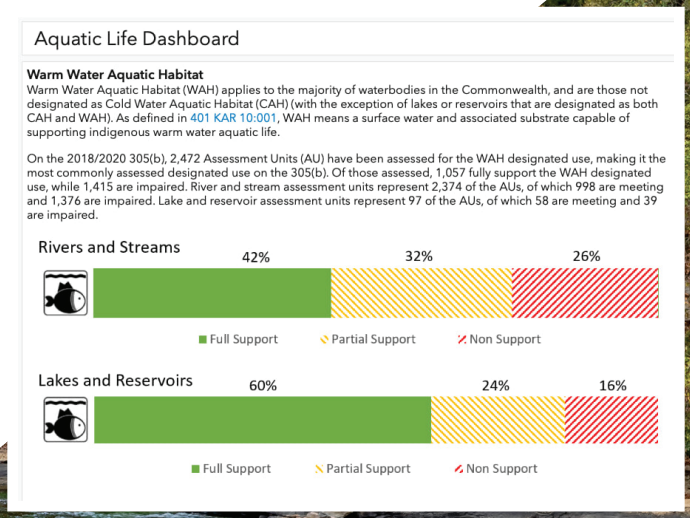
Challenge: With nearly 92,000 river and stream miles, roughly 440,000 acres of lakes and reservoirs, and thousands of acres of springsheds (areas of land that contribute groundwater to a spring), Kentucky needed a more efficient and transparent way to report accurate findings of water quality to the US Environmental Protection Agency (EPA).

Solution: Kentucky used ArcGIS Hub℠ to create a GIS-based hub site that includes interactive maps and dashboards showing assessment results and impaired waters. The site also provides explanations for concepts central to assessment, such as designated uses, reporting categories, monitoring programs, and assessment methods.

Results: Putting the data on an interactive map has helped communicate water quality issues and successes and allowed Kentucky to consolidate resources, educational materials, and program information in one place.



Kentucky Division of Water's report to Congress contains many dashboards that detail water quality metrics; the report includes the dashboard below, which shows the health of aquatic life.

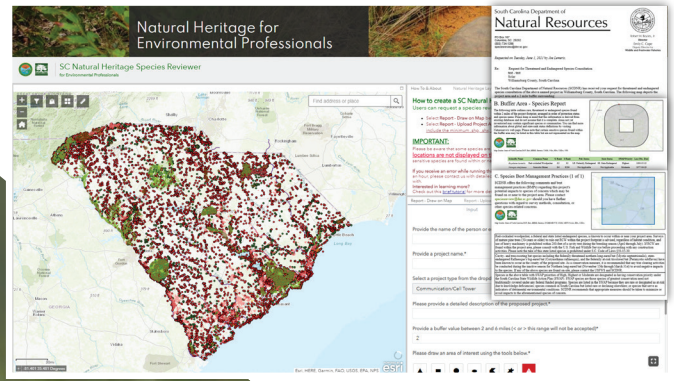


Operations and Field Mobility—Review, Permitting, and Inspections

Environmental organizations can ensure policy compliance by streamlining business processes. With GIS, staff can conduct paperless inspections offline, monitor assets remotely in real time, assess the status of processes, and automate tasks.

Organizations rely on the ArcGIS suite of field apps to transform disparate field activities and processes into a unified workflow. The power of location-based technology improves coordination and efficiency in field operations. Field staff use Esri's field apps to reduce or even replace reliance on paper. Organizations are able to improve the accuracy of field asset data through purpose-built data collection apps. Ensuring that field and office staff use the same authoritative data reduces errors, boosts productivity, and saves money.

An interactive form with a map viewer helps developers submit plans for threatened or endangered species review, which then feeds into reports that detail the presence of endangered species and shares best practices to minimize impacts.



ArcGIS Capabilities

- Plan
- Navigate
- Understand
- Capture
- Monitor
- Locate
- Share

Mapping to Protect Biodiversity in South Carolina

Challenge: The South Carolina Natural Heritage Data Program needed a centralized system to streamline the documentation and sharing of critical habitat and endangered species data in order to better communicate with stakeholders—including private developers, scientists, and the public—and ultimately preserve the state's biodiversity.

Solution: An ArcGIS Enterprise approach enabled staff to utilize a central, authoritative GIS-enabled portal to add and access data. Scientists conducted field surveys, inputting their data into ArcGIS Survey123 forms connected to the database.

Results: The success of the portal almost immediately began paying dividends in increased efficiency. The tool has enabled program staff to process quadruple the number of requests they previously could.

Analysis and Decision Support—Assess Environmental Burdens

With GIS, environmental organizations can analyze when, where, and how environmental burdens occur. Location-based technology allows this information to be combined with demographic data to show disproportionately impacted communities, promote environmental equity, and engage the public on these important topics.

Organizations can connect seemingly disconnected data and trends with the most comprehensive set of analytical methods and spatial algorithms available. Using location as the connective thread, GIS enables organizations to uncover hidden patterns; improve predictive modeling; and ultimately make better decisions about our environmental, economic, and social systems. With ArcGIS, environmental organizations can leverage the power of spatial analysis and data science on demand and at scale for the benefit of all.

ArcGIS Capabilities

- Data Engineering
- Visualization and Exploration
- Spatial Analysis
- Machine Learning/ Artificial Intelligence
- Big Data Analytics
- Modeling and Scripting
- Sharing and Collaboration

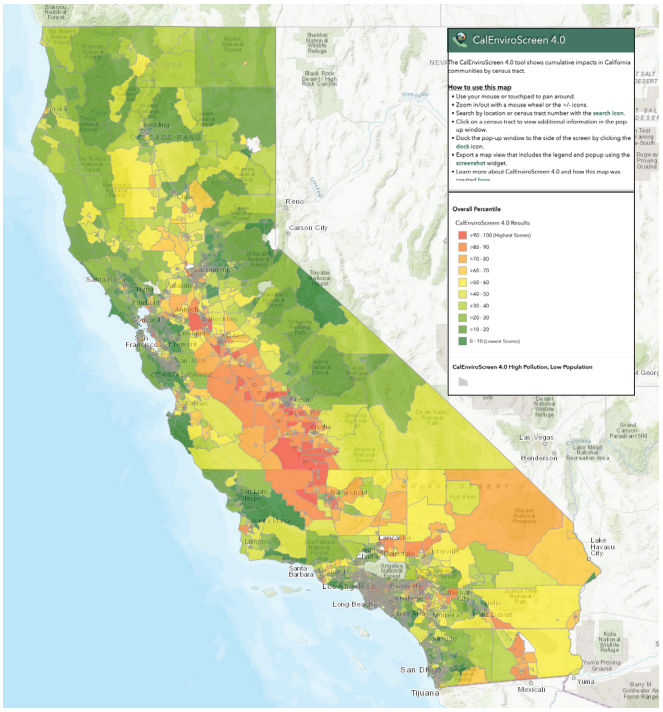
A Geographic Approach to Environmental Justice

Challenge: California Environmental Protection Agency (CalEPA) needed a way to identify communities disproportionately burdened by multiple sources of pollution.

Solution: Using GIS technology, the CalEnviroScreen tool ranks and color codes California's more than 8,000 census tracts to reflect vulnerability to pollution. The formula behind CalEnviroScreen considers population data, the presence of various types of pollution, and the prevalence of health problems that can be worsened by pollution.

Results: CalEnviroScreen facilitates a geographic approach to realize the goals of environmental justice by enabling organizations and municipalities to more easily examine and address inequities, revealing the link between pollution burdens and community characteristics.

CalEnviroScreen is used to help identify communities disproportionately burdened by multiple sources of pollution and with population characteristics that make these communities more sensitive to pollution.

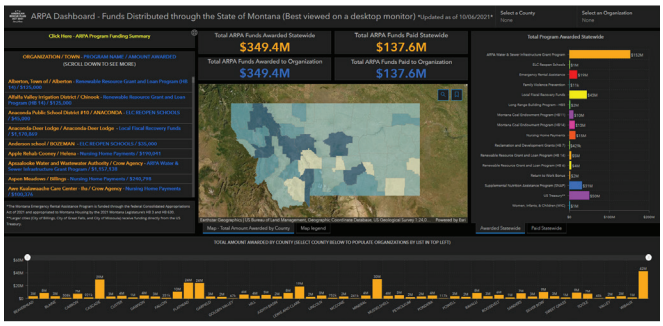


Share, Collaborate, and Engage—Measure and Report Impacts

Organizations can use ArcGIS StoryMaps[SM] and other mapping apps to easily communicate the potential benefits of projects—as well as their actual outcomes and impacts on the environment—with the public, executives, and other organizations. These location-based apps enable users to quickly measure and report on outcomes and progress.

Sharing its data story is key for an organization to inform its audience and inspire people to take action. Sharing its data information products enables the organization to promote awareness about key issues and collaborate with others to solve problems. ArcGIS technology gives organizations the power to share data the way they need to, with whom they need to—from specific groups to the general public. ArcGIS Dashboards and ArcGIS Hub allow users to leverage GIS data management tools to get their data story into the hands of those who need it in order to better collaborate and solve problems.

Montana DNRC used mapping tools and dashboards to track and share infrastructure spending and ensure equitable distribution of funds across the state.



ArcGIS Capabilities

- Promote Collaboration
- Organize around Initiatives
- Create Awareness
- Inspire Action
- Engage with Community
- Enable Storytelling

Maps Help Ensure Equitable Distribution of Infrastructure Funds in Montana

Challenge: Staff at the Montana Department of Natural Resources and Conservation (DNRC) needed to streamline the process of distributing the $900 million American Rescue Plan Act of 2021 (ARPA) funds allocated to the state's water and sewer systems.

Solutions: Using GIS, the DNRC built a public-facing map and dashboard to track and share the distribution of funds across the state, significantly reducing the complexity of the funding distribution process.

Results: DNRC's dashboard and map of grant applicants have served a dual purpose: promoting transparency by showing the public the geographic distribution of the grants, and allowing the DNRC to test various funding scenarios, which supports internal accountability.

GIS Toolbox for Environmental Regulation

ArcGIS is a comprehensive GIS system, complete with flexible licensing and deployment options, a suite of ready-to-use apps, authoritative data, developer tools, a vibrant user community, and robust training and technical support options to fully equip your organization.

Field Operations Bundle

Transition your workflows away from paper-based forms and ensure that field staff can easily share data and have the most up-to-date information in the field, online or offline. These tools enable your organization to instantly visualize critical information in the office through analysis and dashboards for improved decision-making.

DESKTOP
ArcGIS Pro
ArcGIS Spatial Analyst™
ArcGIS Image Analyst

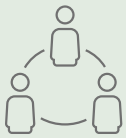
ONLINE
ArcGIS Dashboards
ArcGIS Field Maps
ArcGIS Survey123

Community Engagement Bundle

Expand your reach and transparency with improved community collaboration. These tools enable your organization to improve community trust and coordination, and ensure equitable outcomes.

DESKTOP
ArcGIS Pro
ArcGIS Spatial Analyst
ArcGIS Image Analyst
ArcGIS Business Analyst™

ONLINE
ArcGIS Dashboards
ArcGIS Field Maps
ArcGIS Survey123
ArcGIS StoryMaps
ArcGIS QuickCapture
ArcGIS Experience Builder
ArcGIS Hub Premium



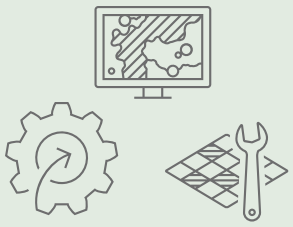
Permitting and Compliance Bundle

Improve customer service and securely route sensitive information throughout your organization. These tools enable your organization to automate alerts on project status, compliance, and application requests and to model complex criteria for suitable development sites and share with key stakeholders.

DESKTOP
ArcGIS Pro
ArcGIS Spatial Analyst
ArcGIS Image Analyst
ArcGIS Business Analyst
ArcGIS Knowledge

ENTERPRISE
ArcGIS Enterprise Standard
ArcGIS Workflow Manager
ArcGIS Image Server
ArcGIS Tracker

ONLINE
ArcGIS Dashboards
ArcGIS Field Maps
ArcGIS Survey123
ArcGIS StoryMaps
ArcGIS QuickCapture
ArcGIS Experience Builder
ArcGIS Hub Premium



Learn more at
go.esri.com/environmentalregulation.

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Esri, the global market leader in geographic information system (GIS) software, location intelligence, and mapping, helps customers unlock the full potential of data to improve operational and business results.

Founded in 1969 in Redlands, California, USA, Esri software is deployed in hundreds of thousands of organizations globally, including Fortune 500 companies, government agencies, nonprofit institutions, and universities.

Esri has regional offices, international distributors, and partners providing local support in over 100 countries on six continents. With its pioneering commitment to geospatial technology and analytics, Esri engineers the most innovative solutions that leverage a geographic approach to solving some of the world's most complex problems by placing them in the crucial context of location.

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