



Environmental Protection with GIS

Streamline Processes with GIS for Efficient and
Effective Environmental Reviews



Environmental regulations are often seen as barriers to development, but geographic information system (GIS) technology streamlines review and permitting processes while improving environmental outcomes. Esri, the global market leader in GIS technology, provides the ArcGIS® platform, empowering agencies to accelerate processes and improve efficiencies, streamline coordination and collaboration, and adapt and integrate systems with confidence.

By eliminating paper workflows, breaking down data silos, and enabling real-time collaboration, ArcGIS accelerates project timelines while advancing environmental stewardship. Governments worldwide rely on ArcGIS to modernize outdated systems, improve transparency, and deliver consistent and defensible processes. With ArcGIS, environmental protection becomes a catalyst for sustainable growth, not a constraint- supporting smarter infrastructure, healthier ecosystems, and resilient communities.

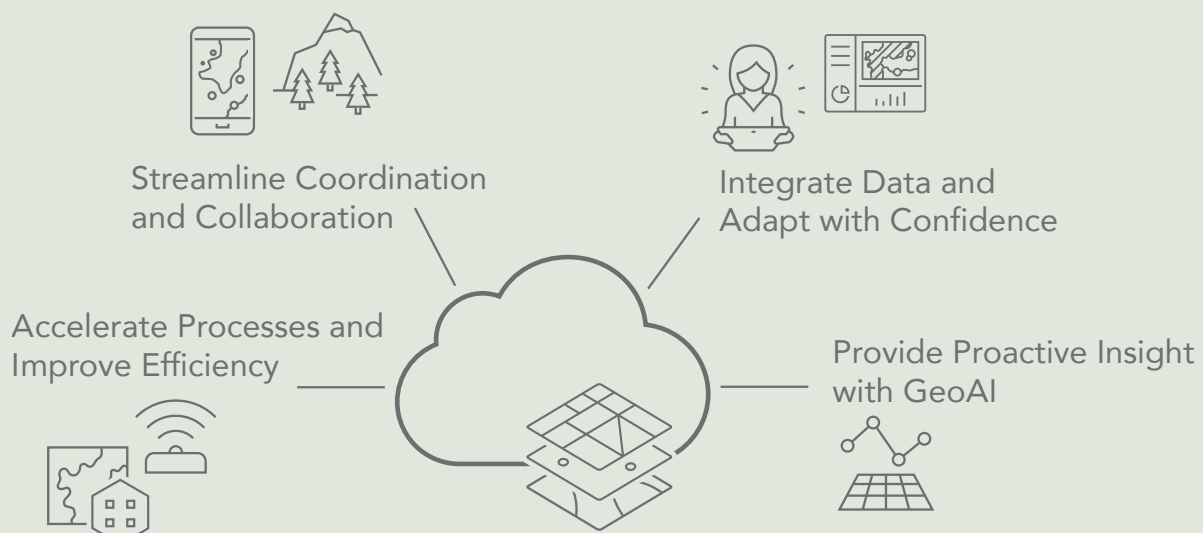
Streamline Processes Without Compromising Environmental Integrity

ArcGIS allows organizations to deliver predictable and consistent environmental reviews on shortened timelines, increase collaboration and communication, track status updates, and provide greater transparency to stakeholders and the public. All this leads to greater environmental regulations compliance and sustainable growth.

- Accelerate Processes and Improve Efficiency
- Streamline Coordination and Collaboration
- Integrate Data and Adapt with Confidence
- Provide Proactive Insight with GeoAI

Geospatial Framework for Environment Protection

Esri provides ArcGIS software, training, and guidance as you modernize every step of your environmental workflows:



Accelerate Processes and Improve Efficiency



Environmental organizations face many challenges, including staffing shortages, budget constraints, and loss of institutional knowledge. This leads to delays, stakeholder frustration, and rising costs, and hinders environmental protection. Leading agencies use ArcGIS to eliminate paper-based workflows; automate routine tasks; and enable consistent, data-driven processes that help meet deadlines and improve outcomes. With ArcGIS, organizations can do more with less—boosting efficiency, enhancing quality, and building trust through greater transparency and performance.

Tennessee Is in a Construction Boom and the State's Permitting Systems Must Keep Pace

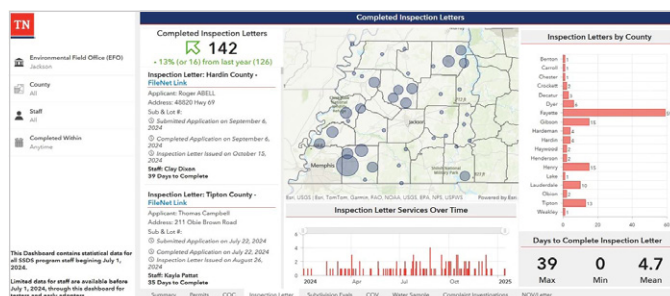
Challenge: Tennessee is experiencing rapid growth, which has created the need for faster, more efficient septic permit cycles. As recently as seven years ago, Tennessee septic permit data existed entirely on paper. Pulling a permit meant driving to a state office in the county seat and making photocopies.

Solution: The Tennessee Department of Environment and Conservation (TDEC) used ArcGIS to create a system that allows residents and developers to make permit service requests by filling out an online application. The system locates the request, assigns an inspector, and sends the appropriate form that guides the inspection work. Inspectors check the boxes, record the test results, upload photos and drawings, and issue letters and certificates—all from tablets in the field. Submitting the completed permit or inspection form through ArcGIS Survey123 generates PDFs that automatically go to the applicant, TDEC staff, and the database that syncs to the department's public site.

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.

Capabilities

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



TDEC staff now have a completed inspection report that details their work across the state and allows managers to keep an eye on the completion rate.

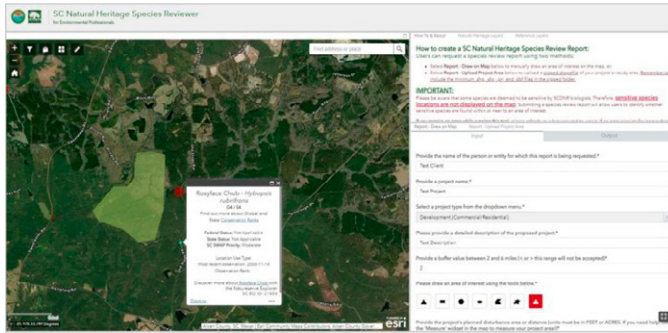


Streamline Coordination and Collaboration

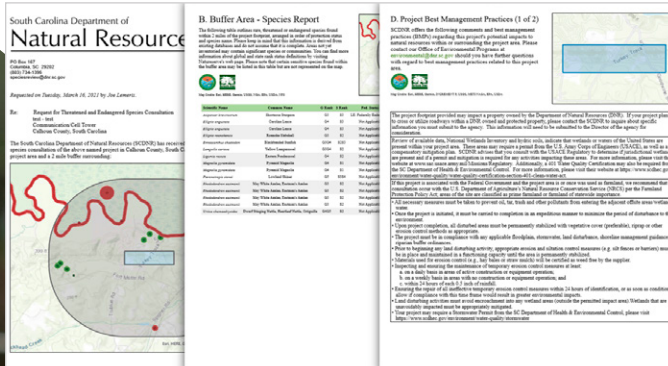


Environmental organizations are often required to collaborate across teams and jurisdictions and among stakeholders to complete environmental reviews. This can slow down project approvals and lead to confusion among agencies and stakeholders. ArcGIS allows leading environmental agencies to streamline coordination and collaboration through secure data sharing and real-time updates, eliminating redundancies while improving transparency through accessible and intuitive data visualization. With ArcGIS, organizations can move project reviews along quickly—shortening project timelines and promoting compliance.

An interactive form with a map viewer helps developers submit plans for threatened or endangered species review.



A sample report details the presence of endangered species and shares best practices to minimize impacts.



Capabilities

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

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. The system would help better communicate with stakeholders—including private developers, scientists, and the public—and ultimately preserve the state's biodiversity.

Solution: An ArcGIS Enterprise software-based 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.



Integrate Data and Adapt with Confidence



Environmental organizations often struggle to communicate regulatory changes while relying on legacy systems that are hard-coded for outdated processes. This can result in unmet requirements, reduced review quality, delays, and stakeholder frustration. Leading environmental organizations use ArcGIS to stay agile—adapting quickly to evolving regulations; integrating data with business systems; and deploying configurable, secure, role-specific apps. ArcGIS also enables performance tracking through key performance indicators (KPIs), supporting continuous improvement and more effective environmental protection.

Capabilities

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

Idaho Transportation Department Increases Productivity Using a GIS-Powered Permitting Application

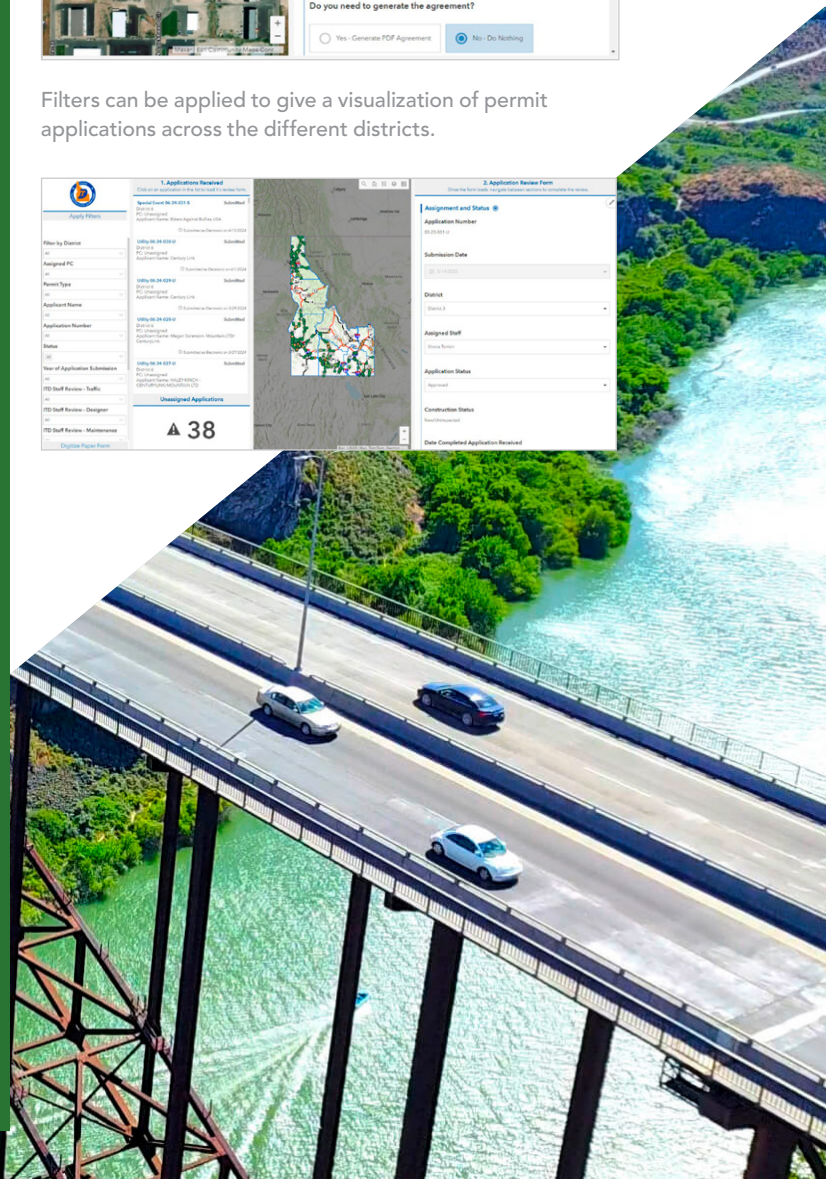
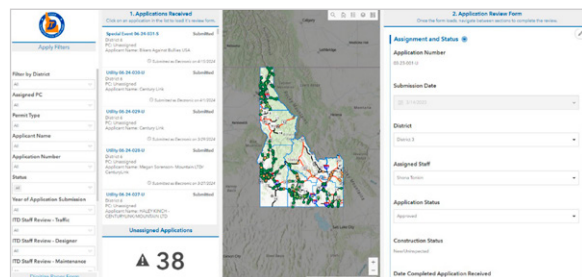
Challenge: Every year across its six districts, the Idaho Transportation Department (ITD) must handle 1,500–2,000 permit applications for state highway system access or encroachments. While it was already recognized that ITD's paper-based environment was prone to applications being misplaced or deadlines missed, it was the looming permits required for the rollout of 5G technology that brought the issue to a head.

Solution: ITD decided to use its existing GIS platform, ArcGIS Enterprise, to move from paper and spreadsheets to a streamlined and transparent holistic workflow. The new system handles not only the permit applications but also the entire workflow, including taking payments and archiving permits.

Results: Since going live, there have been approximately 1.6 million interactions with the permitting application. It has proved to be a powerful tool, with a robust database schema allowing ITD to track things more completely. With all six districts now using the same process, ITD staff are now able to access permit and status information from any computer in the state. There are now far fewer walk-ins at the district office level, due to payments now being rolled into the suite of apps.

The Idaho Transportation Department's new permit application review form.

Filters can be applied to give a visualization of permit applications across the different districts.



Provide Proactive Insight with GeoAI

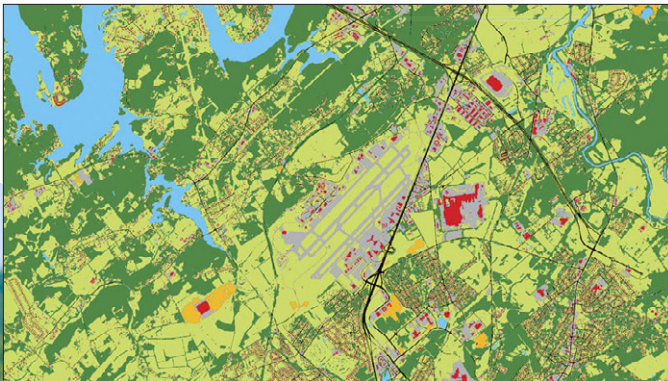


By accelerating processes, streamlining collaboration, and integrating systems, environmental organizations lay the foundation for advanced capabilities like GeoAI. These early phases reduce manual workloads, break down data silos, and ensure that systems are flexible and secure. This creates the conditions needed for predictive analytics to thrive. With this groundwork in place, organizations can harness GeoAI to anticipate environmental risks; optimize resource allocation; provide online support automation; and make faster, more informed decisions. GeoAI allows environmental organizations to overcome many challenges like limited staffing, fragmented data, and reactive planning.

Capabilities

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

Using the deep learning model helped the TDEC create higher-resolution land-cover images of the entire state—including Knoxville, shown here—than was possible with the 30-meter land-cover imagery from the National Land Cover Database (NLDC).



Tennessee Pioneers GeoAI-Based Wetland Screening Tool

Challenge: The Tennessee Department of Environment and Conservation (TDEC) faced the challenge of accurately identifying and mapping wetlands across the state. The existing National Wetlands Inventory (NWI) dataset was outdated, leading to inaccuracies and wetlands' being undocumented. This caused issues for property developers and owners who were unaware of jurisdictional wetlands on their property, resulting in delays and additional costs to TDEC's mapping project.

Solutions: To address this challenge, TDEC collaborated with Esri partner Skytec to develop a predictive model using the Esri Wetland Identification Model (WIM), ArcGIS Online, and ArcGIS Experience Builder. This model leveraged deep learning algorithms, high-resolution satellite imagery, and lidar data to create a comprehensive and up-to-date wetland screening tool.

Results: The project resulted in the identification of nearly 800,000 additional acres of wetlands, bringing the total to approximately 1.8 million acres. The model has become a valuable resource for state agencies, policymakers, farmers, developers, and conservationists, enabling better decision-making and supporting the protection and management of Tennessee's wetlands.



GIS Is the Toolbox for Environmental Protection

ArcGIS is comprehensive GIS technology, 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 use 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 stakeholder collaboration. These tools enable your organization to improve collaboration and coordination and build trust.

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

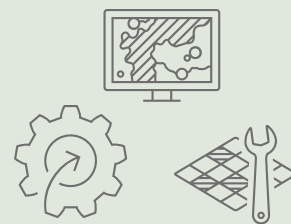
ArcGIS Pro
ArcGIS Spatial Analyst
ArcGIS Image Analyst
ArcGIS Business Analyst
ArcGIS Knowledge

ENTERPRISE

ArcGIS Enterprise Standard
ArcGIS Workflow Manager
ArcGIS Image Server
ArcGIS Tracker

ONLINE

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



Learn more at

go.esri.com/environmentalprotection



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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