Using GIS Tools to Improve Project Delivery

State Departments of Transportation (DOTs) and other transportation agencies are increasingly exploring and utilizing tools that link technology with planning. As spatial data becomes more widely available, practitioners are capitalizing on the intersections between Geographic Information Systems (GIS) and required environmental review processes, to accelerate and improve the quality of environmental impact evaluations.

GIS is a collection of software, hardware, and data used to store, manipulate, analyze, and present geographically referenced information. The ability to consider a range of environmental impacts holistically is a valuable tool for expediting project delivery. GIS tools provide access to data that allows practitioners to consider important variables early in the planning process, ensuring that transportation decisions and discussions are driven by data. The Federal Highway Administration’s (FHWA) Geospatial Data Collaboration effort supports these practices and encourages the sharing of geospatial tools and technologies.

Data-Driven Decisionmaking Expedites Planning and Review Processes

Once GIS capabilities are in place, they significantly reduce the time agencies spend collecting, assembling, and managing data. To develop and utilize GIS tools, planners must first standardize geospatial data collection, integrate or consolidate the data into a common framework, and develop standards and common formats. Many agencies choose to build custom tools (e.g., screening tools, data libraries, or multi-agency decision support systems), but they may also emulate existing platforms, such as the Utah Department of Transportation’s (UDOT) UPlan.

With the help of GIS tools, planners can simultaneously display critical environmental attributes, such as streams, wetlands, and rare plant habitats, with planned roadway changes inside the geographic boundaries of proposed projects. This saves time and resources in performing analyses, as combining related datasets allows planners to easily visualize and document potential environmental impacts and investigate alternatives. These tools can also automate routine analyses.

UDOT’s UPlan Combines Data Sources for Improved Environmental Planning

UDOT utilizes UPlan to streamline its environmental decisionmaking through the Utah Planning and Environment Linkage (uPEL) Application, an approach developed by FHWA and modified for Utah. uPEL is a geographic planning tool that uses natural resource and demographic data to assess the impacts that a proposed transportation project may have on the environment. UPlan is an interactive planning and analysis web application that contains a wide range of datasets, including environmental, natural resource, and planning data. Data in UPlan is compiled from a variety of sources and displayed spatially on an interactive map. Reports, websites, and public comments can be spatially linked, so all data associated with a project or study is visible in one place.

Local businesses, UDOT partners, and the public may also access the data used to create the dynamic maps and analytical tools found in UPlan. Users can download and access data within other applications, through UPlan’s robust data repository—UGate. Both UPlan and UGate are accessible via mobile device, making the tools even more practical and user-friendly.

UDOT’s powerful analytical capabilities allow users to simultaneously measure a variety of environmental impacts. (Courtesy of UDOT)
GIS tools enable more effective projects by facilitating highly efficient planning and documentation, and saving time and money through reliable, pre-established datasets and analyses. As web-based tools continue to grow in popularity, agency collaboration will also likely increase, reducing industry silos and encouraging shared data pools. This move towards open data also promotes open government, inviting the public to understand and view the data behind decisionmaking processes. The relationships built through these projects—both interagency and with the public—can ultimately lead to project benefits across departments, agencies, and States.
Successes in Stewardship is a Federal Highway Administration newsletter highlighting current environmental streamlining and stewardship practices from around the country. Click here to subscribe, or call (617) 494-3719 for more information.

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Look What’s New!

- FHWA has added a variety of resources and reports to its new Pollinators Page on the Environmental Review Toolkit.
- The Transportation Research Board (TRB) published the National Cooperative Highway Research Program (NCRHP) report 809 "Environmental Performance Measures for State Departments of Transportation," which explores the relationships between agency activities and environmental outcomes.
- TRB will host a webinar on "The Vital Role of Operations and Maintenance in Supporting and Enhancing Sustainability" on October 15, 2015 from 1:00 PM to 3:00 PM ET.
- The U.S. Environmental Protection Agency announced $1.9 million in funding to support small business projects that will develop and commercialize technologies that tackle critical environmental problems.