GIS in Transportation

GEOSPATIAL DATA-SHARING PEER EXCHANGE

Raleigh, North Carolina
May 20-21, 2014

Host agency:
North Carolina Department of Transportation

Participating peer agencies:
Maryland State Highway Administration
Missouri Department of Transportation
Pennsylvania Department of Transportation
South Carolina Department of Transportation
West Virginia Department of Transportation

U.S. Department of Transportation
Federal Highway Administration

ACKNOWLEDGMENTS

The U.S. Department of Transportation John A. Volpe National Transportation Systems Center (Volpe Center) in Cambridge, Massachusetts, prepared this report for the Federal Highway Administration's Office of Planning. The Volpe Center project team wishes to thank the participants in the peer exchange, which are listed in the agenda in Appendix A, for providing their experiences, insights, and editorial review. The time they kindly provided was vital to preparing the exchange and reviewing this final report.

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INTRODUCTION

Background

This report provides highlights from a peer exchange held in Raleigh, North Carolina, on May 20-21, 2014. The exchange was part of the Federal Highway Administration's (FHWA) Geospatial Data Collaboration (GDC) initiative. A companion report to this document—Geospatial Tools for Data-Sharing: Case Studies of Select Transportation Agencies—provides additional information on the GDC initiative and includes case studies from 23 State Departments of Transportation (DOTs) and others that are developing, using, and maintaining a variety of applications and tools to support GDC goals. Six of those 23 agencies participated in the Raleigh peer exchange.

FHWA's Office of Planning (HEPP) sponsored the peer exchange and the North Carolina DOT (NCDOT) hosted the event. FHWA HEPP also sponsored a second GDC peer exchange on May 28-29, 2014, hosted by the Colorado Department of Transportation (CDOT). The CDOTpeer exchange convened a separate set of State DOTs to explore the same topics as the Raleigh event. Highlights from the Colorado peer exchange are available here.

Goals

FHWA's GDC initiative encourages State DOTs and others to use geospatial tools to streamline transportation decision-making and improve data sharing within an agency and with external stakeholders. The North Carolina peer exchange aimed to provide opportunities for State DOTs to share noteworthy practices, success factors, and challenges encountered in using, developing, and maintaining geospatial tools that support improved data-sharing, the core goal of GDC.

Format

The NCDOT peer exchange was held at NCDOT's offices in Raleigh. Participants included staff from NCDOT, Maryland State Highway Administration (MDSHA), Missouri Department of Transportation (MoDOT), Pennsylvania Department of Transportation (PennDOT), South Carolina DOT (SCDOT), and West Virginia DOT (WVDOT) (see Appendix A for a complete participant list).

This exchange followed a two-day format, which began with a brief round of introductions and information on FHWA's GDC activities, followed by peer presentations and demonstrations to highlight agencies' geospatial activities relevant to data-sharing. After the presentations/demonstrations, peers convened for a series of roundtable discussions that addressed pre-identified topics of interest. The peer exchanges concluded with a discussion of next steps and final remarks from FHWA that summarized recurring themes (see Appendix B for the peer exchange agenda, including roundtable discussion topics).

Types of Data-Sharing Efforts

Participating agencies shared their experiences related to many different kinds of data-sharing efforts (see Table 1 below).[1] For the purposes of this report, these efforts were grouped into three categories:

- **Repositories** are compilations of geospatial data tailored to users with Geographic Information Systems (GIS) expertise or capabilities; examples include clearinghouses, libraries, warehouses, and inventories.

- **Gateways** offer users (including those without advanced GIS expertise) the ability to visualize geospatial data or share data; examples include data viewers, screening tools,[2] and portals.

[1] Appendix D of the Geospatial Tools for Data-Sharing: Case Studies of Select Transportation Agencies companion report provides more detail on these agencies' efforts.

[2] Screening tools are specifically designed to support users in identifying a transportation project's potential impacts during project planning or development processes.

Gateways typically provide features that allow users to communicate with one another through the tool itself.

- **Coordination efforts** seek to harmonize information or processes; examples include developing data standards or templates to ensure a consistent data "look and feel" for information or participation in inter- and intra-agency groups to discuss common goals.

Table 1: Summary of data-sharing efforts reported by Raleigh peer exchange participants

Agency	Name of Data-Sharing Application/Effort[3]	Repository	Gateway	Coordination
MDSHA	MD iMAP (ArcGIS Online (AGOL)[4] site)		■	
	eGIS		■	
	Open Data Portal	■		
	One Maryland One Centerline		■	
	Maryland State Geographic Information Committee			■
MoDOT	Missouri Natural Heritage Program Database (MONHD)		■	■
	Missouri Cultural Resource Inventory	■		
	Missouri Spatial Data Information Service		■	
	Missouri GIS Advisory Council			■
NCDOT	AGOL		■	
	*Go!*NC and Spatial Data Viewer	■	■	
	OneMap		■	
	North Carolina DOT GIS Data – North Carolina State University Library	■		
	Archaeological Predictive Model	■		
	NC Geographic Information Coordinating Council			■
PennDOT	PennShare		■	
	PennDOT GIS Portal		■	
	Proposal Screening Tool	■		
	Pennsylvania Spatial Data Access		■	
	Pennsylvania Data-Sharing Forum			■
	PennDOT Next Generation			■
SCDOT	Project Screening Tool	■		
	Data Portal	■		
	Local Agency Data Collection (LADC)	■		■
	GIS Coordination Council			■
WVDOT	West Virginia GIS Data Clearinghouse	■		

[3] Efforts listed include both those the State DOT initiated and those in which the State DOT is a participant or contributing partner.
[4] Esri's AGOL cloud-based platform permits users to aggregate and share a wide array of geospatial information including mapping application and data layers.

Agency	Name of Data-Sharing Application/Effort[3]	Repository	Gateway	Coordination
	Our Solution with Integrated Systems (OASIS) (also known as the Enterprise Resource Planning [ERP] Suite)			
	WVDOT ESRI Roads and Highways			
	Data Catalog and Mapping Services			
	WVDOT Facilities			
	West Virginia GIS Policy Council			

PEER EXCHANGE HIGHLIGHTS

This section presents a compilation of highlights and recurring themes that emerged from the peers' presentations and roundtable discussions.

A. Motivating and Success Factors

Peers identified factors that motivated their agencies' data-sharing efforts or helped them successfully develop their related applications:

Federal requirements. Many peers chose to develop data-sharing applications in response to Federal requirements. For example, some peers developed GIS tools to develop federally required plans and programs such as the Statewide Transportation Improvement Plan (STIP) and Transportation Asset Management Plan. Many peers noted the need for geospatial tools to compile, consolidate, and share an expanding amount of data will only increase in the future due to Federal requirements and other factors. For example, the Moving Ahead for Progress in the 21st Century Act (MAP-21) requires that State DOTs report data on all public roads, including locally owned roads. GIS might be an important component of a tool that helps a State DOT report these data.

Peer example: Counties and municipalities in Maryland participate in MDSHA's One Maryland One Centerline initiative, which supports a unified statewide road centerline dataset containing route information and an inventory of roadway characteristics. The dataset generated by the initiative meets Federal highway performance reporting requirements and will be used both locally and in Maryland's iMap application.

Peer example: WVDOT's OASIS, also known as the ERP Suite, is a broad enterprise framework that WVDOT will use to pull data into one centralized location. Because OASIS integrates data across departments within the DOT, WVDOT anticipates it will be useful for exporting data to meet Federal reporting requirements for national-level information systems such as the Highway Performance Management System.

Natural disasters. The need for a coordinated response to natural disasters can provide an initial opportunity for State DOTs to demonstrate their geospatial capabilities and prepare for potential improvements. Peers also acknowledged; however, that maintaining enthusiasm for these efforts is challenging since interest in geospatial tools and efforts can sometimes fade in the wake of natural disasters.

Peer example: In the aftermath of Hurricane Sandy in 2012, the Federal Emergency Management Agency (FEMA) required extensive geospatial datasets from east coast States such as North Carolina. While a number of Federal and North Carolina State agencies, including NCDOT, collected aerial data on hurricane-related damage, the agencies were not always aware of what information the others were collecting or how to access it. This encouraged some local agencies in North Carolina to explore how to improve the sharing of geospatial data in the future and highlighted a need for increased coordination.

Peer example: After a round of severe flooding in West Virginia, WVDOT worked with the National Guard to produce a GIS application that determined the best route for emergency relief convoys based on over 50 different map services, including weather information, speed limits, and school locations. WVDOT has not yet developed the full infrastructure required to run the application because it has not yet been seen as a priority between storm events.

Champions. Several peers commented that it was valuable to have a champion, ideally within the agency's leadership, who could advocate for geospatial data investments or establish a vision

for improvements. Peers reported their champions have included elected officials (e.g., a Governor or Secretary of Transportation) or a mid- to senior-level official who is familiar with GIS through training or professional experience.

Peer example: State agency executive management and elected officials in Maryland are champions for the State agencies' geospatial efforts. State agency executive management officials, along with GIS specialists, help administer MD iMap–a publically accessible geospatial data and mapping portal intended to be the authoritative data source for statewide use (see Figure 1). The Governor of Maryland approved official protocols and standards for the application. MDSHA's efforts have also gained support and credibility through the agency's association with the Governor's StateStat Program that seeks to improve the accountability and efficiency of Maryland State agencies.

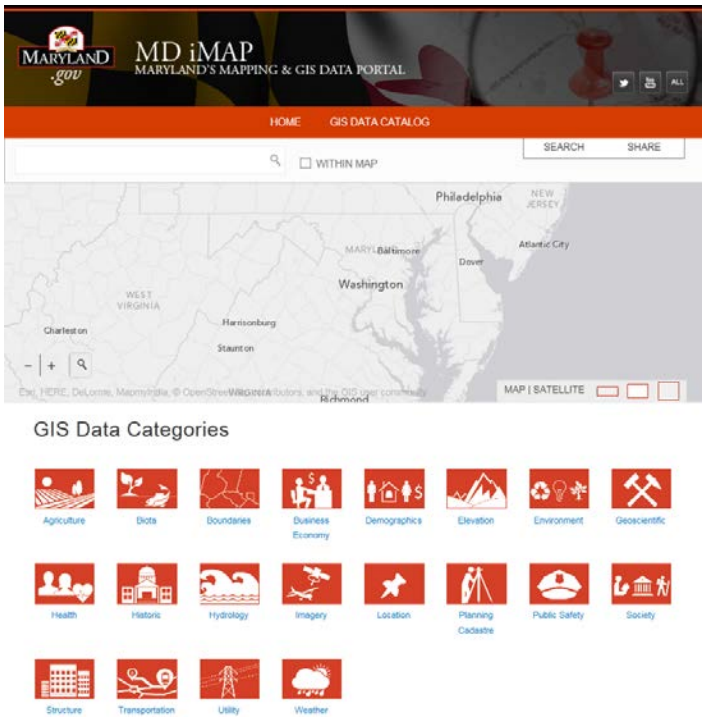

Figure 1: MD iMap, a data gateway accessible to State agencies and the public, for statewide data

Identification of benefits. Peers noted that identifying the benefits of data-sharing efforts can help justify current and future investments of time and funding necessary to build more robust data repositories, gateways, and other applications. Based on anecdotal evidence, the peers believe data-sharing can lead to more informed decision-making, increased efficiencies (i.e., time and cost savings), streamlined project review processes, increased transparency, and improved communications both internally within the State DOT and externally with other stakeholders, including the public. Identifying, documenting, and sharing these benefits is both an important motivating and success factor.

Peer example: By allowing South Carolina counties to own and submit their own roadway data to a common framework, SCDOT's LADC program will offer several benefits to both SCDOT and counties in the State. SCDOT anticipates that LADC will allow the agency to collect and maintain consistent and accurate roadway information; improve communication between SCDOT and local stakeholders; and help justify funding decisions related to local roads. Because LADC participation may lead to increased funding for county roads, local agencies in the State have a strong incentive to participate.

Peer example: The MoDOT and the Missouri Department of Conservation (MDC) are working together to develop a new memorandum of understanding that will help enhance agency coordination at the beginning stages of project development. The MoDOT and MDC are also working together to create a scoping and visioning document for the existing Natural Heritage Review (NHR) website. NHR website is publicly available and composed primarily of the Missouri Natural Heritage Database - a database of biological and ecological information that planning agencies use to review upcoming projects for impacts to threatened and endangered species (see Figure 2). Integration of data sets and providing it on the website will enhance the abilities of MoDOT and others to make decisions that conserve natural resources before projects are in the final phases. For example, MoDOT will be able to streamline its environmental review process and better assess the impacts of transportation projects on sensitive natural resources within the State. Furthermore, the improved website will allow counties, municipalities, and other stakeholders to access more robust biological and environmental data. The benefits of this effort will be well documented in future reports and case studies as part of a larger effort called Implementing Eco-Logical,[5] a Second Strategic Highway Research Program (SHRP2) initiative funded by FHWA.

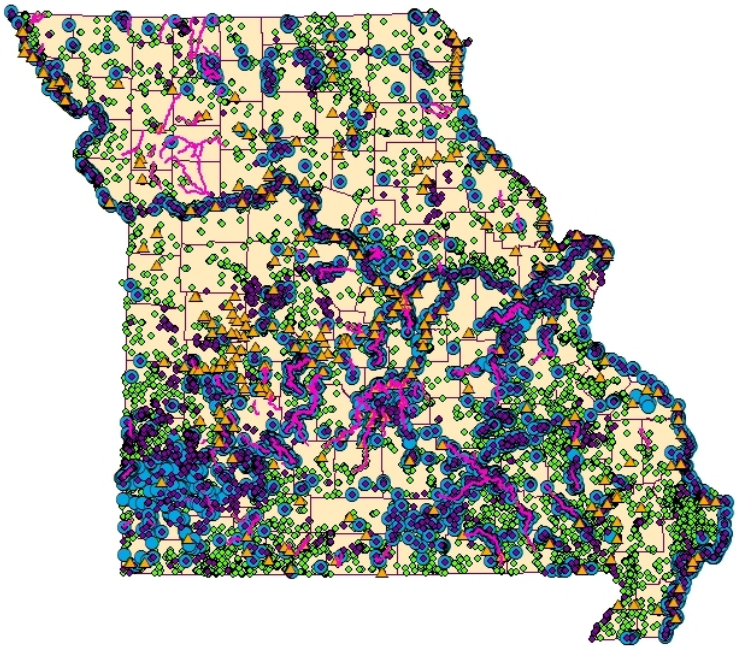

Figure 2: Map from the Missouri Natural Heritage Database displaying locations of environmental resources in the State

B. Technologies and Platforms

Many peers reported using commercial off-the-shelf software (COTS) solutions, such as Esri ArcGIS Online (AGOL), as a platform for their data-sharing applications (this was also true in the Denver peer exchange). The COTS software used by the peers allows agencies to compile, aggregate, and share geospatial data and mapping applications without investing as much time or resources in developing their own software. These platforms also allow users without formal GIS training to apply geospatial technologies that meet specific business needs. Other peers chose a combination of different platforms,

[5] Eco-Logical is an approach to avoid or minimize environmental impacts, as well as plan future mitigation, through the prioritization of natural resources in early infrastructure planning. As one of 14 Implementing Eco-Logical funding assistance recipients, MoDOT is using funding from FHWA to make improvements to the Missouri Natural Heritage Database, as described above.

including some COTS solutions and some customized or developed by the agency itself. In each case, peers noted they carefully selected a software solution to best meet their agency's specific data-sharing needs.

Peer example: Maryland's MD iMap, an AGOL site, allows State agencies to provide a variety of stakeholders access to their geospatial data and other mapping tools in a centralized location. Maryland State agencies no longer need computer programming expertise to develop individual mapping applications, since the AGOL site includes web mapping application templates and webpages. MDSHA's eGIS is a custom-built portal the agency developed in order to provide more specific work flow functionality for the agency's specific business units than any existing COTS solution could provide.

Peer example: PennDOT's PennShare is a gateway that provides information (particularly project and environmental data) to a broad range of internal and external users. PennDOT chose AGOL to develop a large-scale data-sharing process for the entire agency. AGOL will be used as a content management system, helping staff deliver time-sensitive, short-lived, or unique mapping products efficiently. PennDOT also chose AGOL because it offers visualization tools without requiring extensive processing capabilities.

Peer example: NCDOT's *Go!*NC, the agency's primary geospatial data gateway, is also an AGOL site (see Figure 3). NCDOT chose AGOL because it offered an ability to share or restrict access to information at a very fine-grained level (e.g., *Go!*NC administrators can allow different levels of access to various user groups while restricting access to other information that may be sensitive).

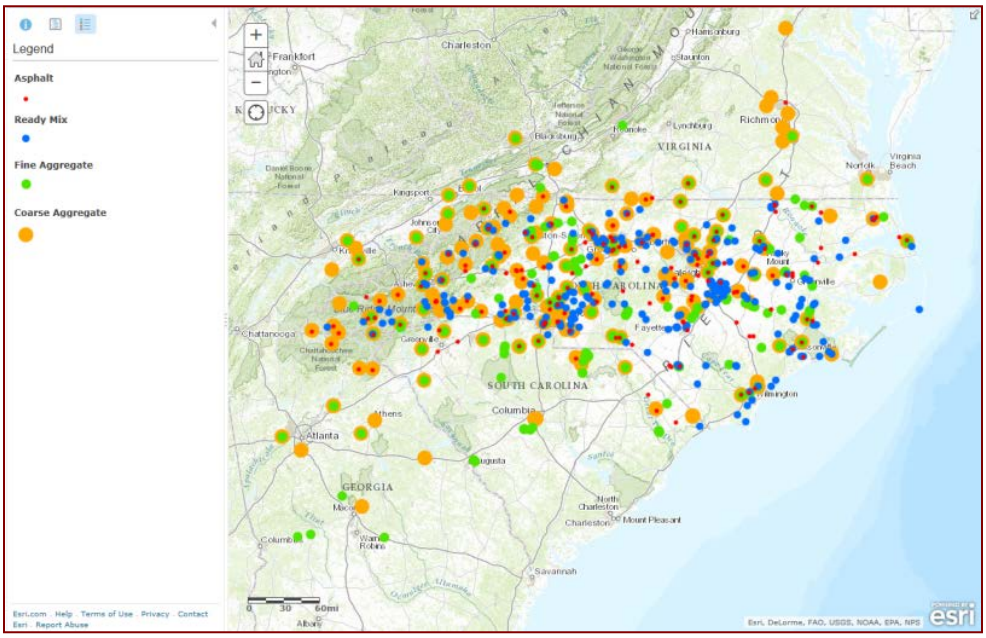

Figure 2: *Go!*NC is an AGOL-based gateway that consolidates, aggregates, and shares geospatial information, such as the location of paving materials as displayed here

Peer example: SCDOT's LADC is a GeoMedia and SharePoint-based application that allows the State's 46 counties to upload and share local roadway GIS line work and attributes with SCDOT. SCDOT then integrates these data with its Roadway Inventory Management System (RIMS), an Oracle-based system that contains all of the State's road network information. SCDOT chose to use GeoMedia and SharePoint to support LADC because the agency was already familiar with these two applications, and SharePoint offers the possibility to easily share database information with users.

C. Data Management and Governance

Peers noted that as improved technology makes it increasingly easy to collect, store, and share geospatial data, State DOTs must carefully consider how to manage and administer this information. Peers discussed several strategies for developing data guidelines and governance, with a particular focus on establishing metadata standards.

Data owners. Throughout the exchange, peers discussed the difficulty of establishing authoritative data sources and maintaining data quality over time. Agencies have to decide who is responsible for maintaining data that may be submitted and shared through a common platform or framework. One common solution to this challenge discussed by peers was to assign data providers ownership of the information, ensuring they take responsibility for updating their own data.

> *Peer example:* PennDOT considers different business units to be "data owners." Each owner is responsible for ensuring the information submitted to the agency's GIS gateway, PennShare, is accurate. PennDOT has also developed a formal PennShare administrative system to reduce duplication. For example, users must sign a user agreement and fill out a product form before creating a map. PennDOT GIS staff then check this product form against existing maps to ensure maps are not duplicated. In addition, PennDOT has a robust data approval process: a quality control group reviews all data before it is published. PennDOT's public affairs staff also reviews any publically accessible data before it is published to ensure consistent branding.

> *Peer example:* NCDOT's GIS Unit also gives different business units a data ownership role. The GIS Unit reviews Go! NC standards, roles, and responsibilities with data owners before granting them access to the tool. As a result, the GIS Unit is able to minimize poor-quality data and duplicative datasets while at the same time encouraging data owners to use the tool.

Standardized data. Many peers established formal policies to standardize the data included in their repositories and gateways. Others were in the process of creating enterprise linear referencing systems (LRSs) or other types of data inventories that united existing datasets into a centralized database according to a common set of data standards.

> *Peer example*: MDSHA's One Maryland, One Centerline initiative will create one centerline geometry by electronically collecting and combining authoritative road data from counties, municipalities, and the State into a single, common framework. MDSHA will collect these data and distribute the information through the MD iMap infrastructure, allowing for access and use across the State.

> *Peer example:* SCDOT's LADC program has established a consistent data format to which South Carolina counties can voluntarily adhere. The intent of the common LADC format is to make it easier for counties to collect and update local roadway data and for the DOT to use the data for their RIMS and LRS.

Metadata. Metadata provide the filing system necessary to organize geospatial data and enable users to make better decisions on how to use a given geospatial dataset. Peers agreed that reliable metadata are necessary to support accurate and usable geospatial data. Information such as map projection, date/location of collection, author, owner, data definitions, references to data dictionaries, and edit history provide useful background on datasets and help prevent duplication.

Despite the importance of metadata, peers noted several challenges that make it difficult for State DOTs to develop robust metadata. Many agency staff have a limited understanding of the need for metadata. Some agencies struggle to decide which of many approved or suggested metadata standards to use. Others face issues related to establishing data ownership and defining who is

responsible for developing and updating metadata. While rigorous metadata standards and policies are helpful to reduce information gaps and address data quality issues, having standards that are considered too demanding may also deter data owners from sharing their information. In response to these challenges, peers have engaged in different strategies.

Peer example: North Carolina's State Mapping Advisory Council, part of the State Geographic Information Coordination Council (GICC), is investigating the new International Organization for Standardization (ISO) metadata standards and may recommend them for State agency use.

Peer example: MDSHA is working to inventory all SHA-owned geospatial data and create a metadata form for data owners to complete during their regular data updates. MDHSA has found; however, that there are many different user needs and options for managing data. There is no single method of metadata collection that works for all data owners.

D. Coordination

A key topic at the peer exchange was the importance of coordination among all stakeholders involved in geospatial data-sharing efforts, including application users. Peers discussed that typically, both intra-agency coordination (such as with information technology (IT) staff and between agency business units) and interagency coordination (such as among State and local agencies) are required for successful geospatial data-sharing efforts. However, the extent of coordination needed may depend on the specific purpose of the effort.

Intra-agency coordination

IT coordination. Peers noted that coordination with IT is important, but often difficult to achieve. GIS staff typically rely on IT support to meet geospatial hardware and software needs, but many IT departments do not have adequate staffing resources to meet their workloads. Peers discussed that when an agency's GIS office is organizationally located within the same division as the IT group, GIS and IT staff sometimes have stronger working relationships. When GIS and IT staff are separated into different business units, or when a State DOT shares IT staff with other agencies across the State, collaboration between GIS and IT staff can be more difficult.

Data silos. Peers noted that different business units within their agencies often collect their own geospatial data or store data locally. Staff are either unaware that data could be useful to other offices/units or else staff are concerned that their information is of inadequate quality and may not be useful to share. Overall, peers believed there were important opportunities to increase awareness of how individual data efforts might connect with each other, or how locally collected data could feed an existing centralized repository or gateway. Peers also discussed the fact that State DOTs are often divided into business unit silos, completing tasks without being aware of related activities occurring elsewhere in the agency. They may only become aware by chance encounter or ad hoc communication, rather than through more strategic and sustained coordination.

Peer example: PennDOT's maintenance and Transportation Improvement Program (TIP) bridge data were traditionally stored in spreadsheets or in separate geospatial databases. PennShare now allows planning and engineering staff to view these data on the same map, improving coordination between business units. Other States noted their geospatial data-sharing efforts are helping to publicize data that has traditionally been kept private.

Interagency coordination

Formal agreements. Peers discussed the benefits of drafting formal operating or data-sharing agreements, such as MOUs, with partner agencies that outline how partners will share data.

Peer example: MoDOT is in the process of developing an MOU with the Missouri Department of Conservation (MDC) to outline how the agencies will share natural resource information, integrate transportation and conservation planning, and update and/or create best management practices to protect sensitive species from the impacts of transportation projects. This MOU may be extended to include other agencies, such as the U.S. Fish and Wildlife Service and the U.S. Army Corps of Engineers. MoDOT also partners with the State Historic Preservation Office to share geospatial data through the Missouri Cultural Resource Inventory database.

Informal arrangements. Several peers who have not developed formal data-sharing agreements reported they have a culture of informal networking that supports strong coordination among Federal, State, and local agencies.

Peer example: North Carolina's GIS community is relatively small and tightly knit, which has made it easier for agencies to establish good working relationships around sharing geospatial information. Through an informal data-sharing arrangement, NCDOT readily shares data with other State agencies, such as the North Carolina Wildlife Resources Commission and the Department of Health and Human Services, through its *Go!*NC application. Although NCDOT has no formal data-sharing agreements in place with other State agencies, it is also using *Go!*NC to help agencies leverage their resources and get started with their own geospatial data-sharing efforts.

Peer example: Maryland has deployed its Open Data Portal, a data repository that will serve as a one-stop-shop for current, accurate, and non-spatial datasets from every State agency. No formal agreement mandates that State agencies submit data; rather agencies will voluntarily provide data to increase efficiencies in data-sharing. In the near future, the State aims to tie this repository to MD iMap, so that spatial and non-spatial data can be integrated between the two systems.

Local agencies. Peers noted that they have encountered some challenges in collecting geospatial data from local agencies, often as the result of staff and resource limitations at the local level. Some local agencies are reluctant to share data with State DOTs if they feel they are unlikely to benefit from this coordination. Several peers have developed innovative strategies to pursue stronger relationships with local agencies, particularly in terms of meeting Federal data reporting requirements.

Peer example: SCDOT's LADC program holds regular local user group meetings for both State and county transportation officials. SCDOT leveraged its relationships with other State agencies to communicate with local transportation agencies. For example, SCDOT coordinates with the State Office of Revenue to help communicate to local agencies that participating in the LADC program can help local economic growth.

CONCLUSION

This peer exchange provided important opportunities for State DOTs to share noteworthy practices, lessons learned, and challenges related to geospatial data-sharing. Peers agreed the exchanges helped provide momentum for developing a community of practice in this area. Peers also agreed that GIS personnel—who often serve various offices within an agency—are essential for developing these solutions as State DOTs continue to strive to shorten project delivery, enhance safety, protect the environment, and meet the needs of the traveling public.

During the final session of the peer exchange, participants identified several specific, current, GIS-related trends likely to influence their data-sharing activities in the future. Peers also discussed ways of referencing these trends to expand and improve the role of geospatial data in transportation decision-making:

Evolving data requirements and practices

- New and expanded Federal reporting requirements may result in an increased share of funding dedicated to roadway data collection, local data collection efforts, and the development of GIS tools and applications to help fulfill these requirements.

- Agencies may require data owners to take more responsibility for updating and maintaining information shared through data-sharing applications.

- There is likely to be increased emphasis on coordinating geospatial data-sharing efforts within and between State agencies as geospatial efforts mature and as business units and organizations become more aware of internal geospatial activities.

Advancements in technology

- Incorporating public feedback into the transportation planning process will likely advance through innovative crowdsourcing technologies, particularly geospatial tools through which the public can notify State DOTs about transportation needs (e.g., addressing potholes) using mobile devices.

- Improvements to data-sharing practices and data quality will likely occur through feedback mechanisms that allow data users to identify errors and information gaps in order to help data owners continually improve upon their datasets.

- The continued proliferation of field editing capabilities may occur as mobile and tablet technology continues to improve. State DOTs will likely continue to seek to streamline methods of data collection using in-the-field capabilities.

Funding challenges and solutions

- There may be a continued expectation for agencies to do more with less given decreasing budgets and increasing transportation needs, resulting in a clear need for cost-saving interagency collaboration and streamlining that can be supported through geospatial data-sharing tools.

- There is likely to be increased emphasis on government transparency and open data-sharing, including demonstrating the need for and benefits of transportation expenditures to the general public. Geospatial tools will play important roles in these areas.

- There may be increased use of State Planning and Research funds, in addition to funding from the National Highway Performance Program or other State funds.

Given the influence that these key trends are likely to have on data-sharing applications, systems, and initiatives in the future, State DOTs will need to take advantage of opportunities and prepare for emerging challenges. For example, broader acceptance and recognition of geospatial data will allow transportation

agencies to more easily secure management support for investment in data-sharing activities. Additionally, it will help identify new geospatial champions that can set a vision for future improvements to a state's geospatial data. Diminishing budgets, on the other hand, will continue to challenge the amount of resources that State DOTs can devote to geospatial data-sharing efforts.

It is expected that FHWA can support State DOTs in producing innovative data-sharing applications, systems, and initiatives that will make the most of limited resources and result in both faster decision-making and better transportation outcomes.

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APPENDIX A: PEER EXCHANGE AGENDA

Federal Highway Administration (FHWA)
Geospatial Data-Sharing Peer Exchange
North Carolina Department of Transportation (NCDOT)
Conference Room 436/437
4101 Capital Blvd at New Hope Center
Raleigh NC 27604
May 20-21, 2014

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Tuesday, May 20

8:30 – 8:45 **Welcome –** *North Carolina DOT (NCDOT)*

8:45 – 9:15 **Overview of FHWA Geospatial Data Collaboration (GDC) Activities –** *FHWA*

9:15 – 9:45 **Introductions and Discussion of Peer Exchange Goals** – *All Participants*

9:45 – 11:00 **Demonstrations/Presentations 1**

- NCDOT: NCDOT ArcGIS Online (AGOL) Site
- SCDOT: Local Agency Data Collection (LADC) program

Break

11:15 – 12:15 **Roundtable 1: Process & Structure –** *All Participants*

Lunch

1:15 – 2:30 **Demonstrations/Presentations 2**

- MDSHA: MD iMap, Enterprise GIS, MDSHA AGOL Site
- WVDOT: WVDOT AGOL Site, WVDOT Data Catalog, OASIS/ERP, other GIS data-sharing applications (e.g., WVDOT Facilities)

Break

2:45 – 4:00 **Roundtable 2: Technology & Data –** *All Participants*

4:00 – 4:15 **Day 1 Wrap-Up –** *FHWA*

Wednesday, May 21

8:00 – 8:15 **Day Overview –** *FHWA*

8:15 – 10:00 **Demonstrations/Presentations 3**

- PennDOT – PennShare (AGOL Site)
- NYSDOT – Metadata Clearinghouse, enterprise linear referencing system
- MoDOT: Missouri Natural Heritage Review Website, Missouri Natural Heritage Database

Break

10:15 – 11:15 **Roundtable 3: Benefits, Challenges, & Lessons Learned –** *All Participants*

11:15 – 12:00 **Roundtable 4: Future Directions & Next Steps –** *All Participants*

12:00 – 12:15 **Wrap-Up –** *FHWA*

12:15 **Adjourn**

Roundtable Discussion Questions

Roundtable 1: Process & Structure – *All Participants*

- What are some common needs that State DOTs identified which led the DOT to develop/build a geospatial data-sharing application/system/effort (e.g., data library, portal, inventory) or engaging in a data-sharing initiative?
- What are examples of different processes that State DOTs took to develop these applications/systems or initiatives?

    - Were these efforts initiated by leadership or were they "grassroots"?
    - How have State DOTs coordinated with both internal and external stakeholders (e.g., State GIS offices, resource agencies, local government agencies) for data-sharing efforts? What factors have helped make this coordination successful?
    - Was agency leadership involved in data-sharing efforts or initiatives? If so, how?
- Have State DOTs formally structured applications/systems/initiatives through any of the following?
    - Data-sharing agreements/memoranda of understanding or operating agreements
    - User documentation (e.g., user guide, best practices manual)
    - Governance or data maintenance guidelines
    - Other materials?
- How are end users using these applications/systems in their workflows? Do you have any examples of unexpected or unanticipated uses?
- What does "success" for data-sharing efforts look like or will look like? How do you know?
    - Has the State DOT developed or would it consider developing performance metrics to assess the application/system? If so, what are some examples of these metrics and how have they been used?

Roundtable 2: Technology & Data - *All Participants*

- Who are the main customers/consumers of State DOT data as shared through these applications, systems or initiatives?
    - What have State DOTs found to be the most effective methods for developing or making metadata available to these customers/consumers?
- Who is responsible for developing and maintaining data?
- It appears that many State DOTs are using ArcGIS Online (AGOL) as a platform for developing geospatial portals that make data "discoverable" by a broad range of users. Why have State DOTs identified AGOL as the appropriate platform for these portals? What other kinds of platforms or technologies are State DOTs using to share geospatial data, and why?
- How are State DOTs addressing the issue of sharing or storing sensitive data?
- What are State DOTs doing to facilitate inter-agency geospatial data-sharing during non-recurring emergency events such as major storms, earthquakes, etc.?

Roundtable 3: Benefits, Challenges, & Lessons Learned - *All Participants*

- What specific benefits and challenges have State DOTs encountered in terms of any of the following topics?
    - Developing, managing, or maintaining data-sharing applications, systems, or initiatives
    - Compiling, storing, and sharing data, developing metadata, including sensitive datasets
    - Database design
    - Using various types of GIS-based platforms or technologies
- How do these benefits support FHWA's GDC goals of increased collaboration, time/cost savings, improved information accessibility, and overall improved transportation decision-making?
- How have State DOTs successfully addressed any challenges?
    - What have been overall key success factors and lessons learned?

Roundtable 4: Future Directions & Next Steps - *All Participants*

- Are State DOTs identifying their data-sharing efforts as part of FHWA's Every Day Counts or Geospatial Data Collaboration initiatives?
    - If so, how? If not, why not?
    - What are the benefits of making these connections more explicit?
- What future plans does your State DOT have for data-sharing applications, systems, or initiatives?
- What can FHWA do to help either now or in the future?
- What do State DOTs see as some of the key current or future trends that are likely to influence data-sharing applications, systems, or initiatives in the future?