U.S. Department of Transportation
Federal Highway Administration

FHWA Planning & Data Sharing Partnerships Case Study Series

Alaska Transportation Working Group

Interviewed Organization(s): Federal Highway Administration, Alaska Department of Transportation & Public Facilities, U.S. Forest Service, National Park Service)

Forming a Data Sharing Partnership

The Alaska Transportation Working Group (TWG) formed in 2008 and consists of the following members:

- Federal Highway Administration (FHWA), Western Federal Lands (WFL) Division and Alaska Division
- Bureau of Land Management (BLM)
- National Park Service (NPS)
- U.S. Fish and Wildlife Service (FWS)
- U.S. Forest Service (FS)
- Alaska Department of Transportation & Public Facilities (DOT&PF)
- Alaska Municipal League (AML)
- Denali Commission
- Fairbanks Area Surface Transportation (FAST) MPO (joined in 2022)
- Anchorage Metropolitan Area Transportation Solutions (AMATS) MPO (joined in 2022)

The TWG initially formed to develop a Collaborative Long-Range Transportation Plan (LRTP) for federal lands in Alaska. At that time, the national surface transportation authorization required that federal land management agencies develop LRTPs, and the partners in Alaska chose to work together to develop their first LRTPs in the state together. Through this process, they developed a forum for sharing data, collecting new data to support research, and planning efforts, and coordinating project programming and delivery. Since formation, the TWG completed its initial LRTP in 2012 and an update in 2020, conducted joint research on a range of transportation management topics, and has been a forum for members to identify and complete projects of mutual interest. The TWG continues to meet monthly via teleconference and holds annual project coordination meetings.

Lessons Learned

***Lesson #1* – The project champion**

One lesson of the Alaska TWG is the importance of a champion who can convene, organize, and support the group's activities. This champion is responsible for keeping the group moving forward and providing vision and institutional memory. WFL has assumed the facilitation lead for the Alaska TWG, and individual agency staff play the champion role for different TWG focus areas.

Lesson #2 – Set common goals

It is important to have established, common goals and objectives to drive a collaborative planning effort's success. This can take the form of a Collaborative LRTP like the Alaska TWG, or it could be another type of organizing vision and purpose.

Data Fields & Tools

Because the TWG was originally formed to develop the first Collaborative LRTP in the state, it was not initially obvious what data the group needed. The group worked together to identify the data needed to establish baselines, analyze trends, and develop performance measures for the LRTP's six goal areas: system management, user experience, safety and mobility, environment, climate change, and partnerships. Through this process, the TWG members shared existing data on their respective transportation systems. The TWG also identified data gaps and developed joint research projects to fill those gaps. These projects included the Collaborative Visitor Transportation

Survey (CVTS), which conducted a survey of visitors to federal lands across Alaska; a safety performance baseline analysis that combined a wide range of multimodal transportation incident data; and case studies of climate change impacts on transportation infrastructure such as permafrost melting and coastal erosion.

Implementation Challenges

The TWG's first challenges were organizational in nature. It took substantial work to identify the correct contacts at each agency and to establish the working group. The initial TWG members also had to communicate the value of the group to their agencies' leadership to justify the time and resources required for participation. Maintaining agencies' management support for the TWG has been an ongoing challenge, yet critical to the group's success. To justify the TWG's effort, the TWG communicates its achievements in planning, programming, and project coordination. The TWG has particularly benefitted from the Federal Lands Access Program (FLAP) because they have demonstrated how the TWG's project coordination has led to projects of mutual benefit. As the TWG continues to collaborate, limited staff resources in member agencies presents an additional challenge to implementation, particularly for smaller agencies.

The TWG has also encountered data-related challenges in terms of both data sharing and compatibility. In terms of data sharing, TWG has struggled to overcome agency firewalls and access to data sharing platforms. Different agencies' IT departments support or block different data sharing platforms, which makes it difficult to transfer files between agencies. In terms of data compatibility, different agencies often collect or maintain data in different formats or with different attributes, which can make it difficult to conduct analyses across agencies. For example, the TWG has put substantial effort into developing a common understanding of transportation asset condition, which has required cross-walking between different agencies' asset management datasets.

Results/Main Takeaways

The Alaska TWG has achieved success in a wide range of joint projects, including the development of two Collaborative LRTPs, joint research projects, and ongoing project coordination. The TWG has provided a forum for identifying and developing FLAP projects and other projects of mutual benefit. Coordination on projects across jurisdictions has helped the TWG members achieve more efficient projects; for example, combining nearby projects can reduce contractor mobilization costs. TWG members also stress the value of relationship-building. Understanding the transportation system outside of agency borders and knowing the right staff at the TWG partner agencies to work with has been valuable for a range of planning and project needs. The TWG membership continues to grow as new agencies see the benefit of coordinating with the TWG.

Looking Forward

The Alaska TWG continues to work together after over 14 years of collaboration. The TWG currently focuses on implementation of its 2020 Collaborative LRTP update. The TWG also continues to work on improving data collection and standardizing as much data as possible to encourage better coordination across jurisdictions. The Alaska TWG's model of collaboration has been duplicated through a TWG in Oregon and Washington, and integrated planning efforts in Colorado and Nevada have also drawn on lessons from the Alaska TWG.

Quick-Reference Information

- **Project Phase:** System and Project Planning, Project Selection and Programming, Project Design and Environmental Review
- **Agencies/Partners Involved:** Federal Highway Administration, Bureau of Land Management, National Park Service, U.S. Fish and Wildlife Service, U.S. Forest Service, Alaska Department of Transportation & Public Facilities, Alaska Municipal League, Denali Commission, Bureau of Indian Affairs, Fairbanks Area Surface Transportation MPO, Anchorage Metropolitan Area Transportation Solutions MPO
- Location: Alaska (statewide)
- **Type(s) of Data Shared:** Transportation systems geospatial data, asset condition, safety, visitation, environment, climate, and resilience
- **Method of Data Sharing:** Working group charter, collaborative planning efforts, annual project coordination meetings

Special Thanks

- Kevin Doniere, Alternative Transportation Program Manager, Alaska Region, NPS
- Amy Thomas, Deputy Director of Engineering, U.S. Forest Service
- Paul Escamilla, Project Engineer, U.S. Forest Service
- Eric Taylor, Transit Program Manager, Alaska Department of Transportation & Public Facilities
- Roxanne Bash, Transportation Planning Team Lead, FHWA WFL

U.S. Department of Transportation
Federal Highway Administration

FHWA Planning & Data Sharing Partnerships Case Study Series

Collaborative Visitor Transportation Survey

Interviewed Organization(s): USDOT Western Federal Lands Highway Division, US Forest Service, USDOT Volpe Center

Forming a Data Sharing Partnership

The Alaska Transportation Working Group (TWG) – a group of federal land management and transportation agencies in Alaska – convened in 2008 to develop their first Collaborative Long-Range Transportation Plan (LRTP) and to coordinate on projects of mutual benefit. While developing their first LRTP, the TWG identified a need to collect better data on user experience. As such, they conducted a statewide, multi-agency survey of users of federal lands to better understand their transportation experiences to and within federal lands sites.

One barrier to collecting user survey data is the need to obtain Office of Management and Budget (OMB) clearance for survey questions in compliance with the Paperwork Reduction Act (PRA) of 1980. To address this challenge and to create a resource for other public lands and transportation agencies across the U.S., the TWG developed the Collaborative Visitor Transportation Survey (CVTS), which is a generic clearance with a range of public lands transportation-related questions. The Alaska TWG implemented the CVTS at several public lands sites across Alaska in 2016 and used the results of the survey in the 2020 Collaborative LRTP update.

The CVTS is a multi-agency collaboration with a range of specific roles, led by FHWA's Western Federal Lands (WFL) Highway Division with technical support from the U.S. Department of Transportation's Volpe National Transportation Systems Center. The U.S. Forest Service houses the CVTS Generic Clearance and submits use requests to OMB for final approval. Other CVTS users and contributors include the Bureau of Land Management, National Park Service, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, and the Alaska Department of Transportation and Public Facilities.

Lessons Learned

***Lesson #1* - Identify a project champion**

The CVTS demonstrates the need for a project champion to work with a range of project partners and move the tool forward. This project had a few key roles: project management (WFL), social science technical lead (USDOT Volpe Center), and tool host (U.S. Forest Service). The project champion is particularly important for maintaining institutional memory and bringing in new agency contacts as staff turnover.

***Lesson #2* - Design for flexible application**

One aspect of the CVTS that has made it successful is that its creators designed it to be applicable to a wide range of agencies and contexts. By designing the survey compendium with a range of questions that are generally useful for agencies who want to collect visitor transportation survey data, they have helped make the CVTS sustainable beyond their initial survey effort and created a tool that other agencies have used throughout the U.S.

Data Fields & Tools

The CVTS is a tool for collecting social science survey data to understand the transportation experiences and perceptions of public lands users. The CVTS generic clearance includes an OMB-approved compendium of

transportation survey questions and data collection methodologies. Public lands and transportation agencies can use the approved questions and data to measure user experience performance metrics related to transportation. They can also quantify users' transportation experiences to help target transportation improvements. By providing an OMB-approved compendium of questions, the CVTS streamlines the OMB approval process, reducing the time and expense required to conduct individual surveys. The CVTS allows for more uniform survey data responses across users by asking standard questions.

Implementation Challenges

The CVTS is a complex effort that requires staff input from several federal agencies. Identifying appropriate contacts from agencies and maintaining relationships despite staff turnover has been a challenge.

Having a consistent champion to maintain and promote the CVTS has been important to the tool's success. USDOT Federal Land Highways (FLH) has been the champion of the CVTS. Their role coordinating transportation investments across FLMAs gives them insight into the importance of user experience data when prioritizing projects. Additionally, FLH understands the OMB process as a federal agency that has engaged in the process and the value of having a shared streamlining tool.

The CVTS team emphasized communicating the value of the CVTS to potential users and to the OMB to ensure support for using the generic clearance approach for other topics of national and multi-agency interest.

Results/Main Takeaways

As CVTS is used consistently over time, agencies can monitor how patterns and perceptions shift. The CVTS streamlines survey collection by eliminating the need for separate agencies to go through the full OMB process each time, reducing administrative costs and timelines for developing user surveys. Some examples of projects that have used the CVTS include:

- Alaska: The BLM, USFS, USFWS, and the NPS collaborated on a statewide survey to measure visitor experience performance metrics. The partners then incorporated the data into their 2020 LRTP update.
- White Mountain National Forest (WMNF): The USFS collected information across several sites to evaluate and improve visitor transportation and recreation management for the WMNF.
- Beaver Lake: U.S. Army Corps of Engineers used information gathered to update of the Beaver Lake Master Plan and Shoreline Management Plan.
- Millennial and Baby Boomer Mobility Preferences: U.S. Fish and Wildlife (FWS) administered a survey to understand Millennial and Baby Boomer interests and preferences regarding access and circulation within FWS units in three western states – California, Colorado, and Texas.

Looking Forward

The CVTS is a continuing effort. WFL, Volpe, and USFS continue to manage the CVTS generic clearance and support agencies interested in using it. Looking forward, the CVTS team would like to share more information on how agencies have used surveys through the CVTS to improve transportation plans and projects. The CVTS team would also like to provide a clearinghouse for CVTS survey data in the future.

Special thanks:

- Roxanne Bash, Transportation Planning Team Lead, FHWA WFL
- Kenli Kim, Landscape Restoration and Ecosystem Services Research National Program Leader, USFS
- Margaret Petrella, Social Scientist, USDOT Volpe Center

Quick-Reference Information

- **Project Phase:** System and Project Planning
- **Agencies/Partners Involved:** Federal Highway Administration, Bureau of Land Management, National Park Service, U.S. Fish and Wildlife Service, U.S. Forest Service, Alaska Department of Transportation and Public Facilities
- **Location:** Alaska (statewide)
- **Type(s) of Data Shared:** Visitor transportation survey data
- **Method of Data Sharing:** OMB Generic Clearance, compendium of survey questions, coordinated survey data collection
- **Additional Resources:** Collaborative Visitor Transportation Survey (CVTS)

U.S. Department of Transportation
Federal Highway Administration

FHWA Planning & Data Sharing Partnerships Case Study Series

Cape Cod Commission Outer Cape Bike and Pedestrian Master Plan

Interviewed Organization(s): Cape Cod Commission

Forming a Data Sharing Partnership

In 2017, Cape Cod Commission (CCC) staff, in collaboration with the National Park Service Cape Cod National Seashore (NPS CCNS), completed the Outer Cape Bicycle and Pedestrian Master Plan (OCBPMP). This plan creates a framework for an interconnected bicycle and pedestrian network linking the towns of Wellfleet, Truro, and Provincetown with the Cape Cod Rail Trail (CCRT), CCNS, and other destinations within the three communities. There were numerous attempts over the years to initiate this project, but it did not formally begin until CCNS, the CCC, and representatives from the three regional towns received funding through the Federal Transit Agency Transit in Parks (FTA TRIP) program.

A partnership to share data was necessary as there were several gaps in data between the various stakeholders. For instance, NPS was able to provide cultural resource data within its boundaries, however for areas outside of these zones, the data was gathered from the Massachusetts Historical Commission's GIS database. NPS and towns did not have road data (such as geometries or traffic counts) for regional roads, so the CCC provided their own collected data on bike and pedestrian traffic and collaborated with MassDOT. Necessary data to accomplish the project were dispersed among many different agencies and stakeholders, requiring efforts for collaboration.

Data Fields & Tools

Data for the project included roadway data, GIS data of regional roads and paths, bike and pedestrian traffic data, as well as subjective information such as "roadway characteristics" collected from the general public at community meetings. CCC compiled data collected over the years of the project and provided GIS services,

Lessons Learned

Lesson #1 **– Establish efficient data digitization processes**

Digitizing data was found to be a time-consuming process. Some digitizing needed to be done by GIS staff, particularly converting raw data into usable data for GIS. Another form of data that required digitization was the input of public comments from community meetings. Sometimes this information was based on hand drawn maps and handwritten notes. There is a need to find means to modify qualitative data into quantitative data in a practical and time-efficient manner.

Lesson #2 – Establish mechanism for continued collaboration

A challenge that the partnership team encountered was that there was no mechanism to keep the team collaborating. In an ideal data sharing partnership, there would be an implementation plan to keep the partnership going. For instance, this could be an MOU incorporated as a part of the process to help determine when the plan is completed. After an initial plan is created, those involved are often exhausted and therefore the project lacks a champion to keep it going. The project team acknowledged that having some mechanism to help achieve an agreement among involved parties would have been beneficial earlier in the collaborative process. In addition, rotating the leads of meeting can help keep things fresh and allows smaller towns and collaborating stakeholders to have more buy-in in initiatives.

including sharing GIS shape files, which were used to layer a shared web map.

Implementation Challenges

Developing the scope of this data sharing partnership was a lengthy process, requiring nearly a year and involved both park land and non-park land involvement. Determining the responsibilities of various partners was a challenging process. One of the initial relationships established was between CCC and CCNS, collaborating under a cooperative agreement related to data sharing and planning. The partnership helped streamline the process of navigating the CCNS protocol for requesting and receiving data. This relationship was integral when interacting with local towns, particularly when pertaining to sensitive subject matter such as delegating responsibilities between NPS managing federal land and nearby towns facilitating non-park lands.

The project team achieved success sharing data and garnering community buy-in when developing the Bike and Pedestrian Master Plan. Despite this, the team has noted challenges related to executing the concepts presented in the Master Plan, siting slow progress as far as implementation is concerned. CCC does not own any land for implementation. A primary difficulty in implementing the initiatives developed thanks to shared data resources is a lack of a “champion” to push initiatives forward toward successful implementation. The towns and their unique governance and predispositions have been the cause of slow progress.

Results/Main Takeaways

CCC was able to serve as a community liaison between CCNS and local towns connected along the bicycle and pedestrian network of the Cape Cod Rail Trail. This relationship underscores the benefit of having a partner in the community that has the trust of the public to gain their participation/buy-in. Establishing the relationship early helps the set up for sharing information. In the context of developing the OCBPMP, CCC facilitated discussions between CCNS and local partners, fostering improved trust and cooperation among the team.

Looking Forward

The data shared among the partnership established a good foundation of support for planning and decision making by the steering committee. Since the project, base data layers have been updated; however, there is not a regularly updated data set on the bike routes. This project was generally singular in approach, and there have been no major changes since.

Special thanks:

- Steven Tupper, Director of Transportation Program, Cape Cod Commission
- Sarah Korjeff, Planning staff, Cape Cod Commission
- Martha Hevenor, Planning Staff, Cape Cod Commission

Quick-Reference Information

- **Project Phase:** System and Project Planning
- **Agencies/Partners Involved:** Cape Cod Commission, National Park Service Cape Cod National Seashore
- **Location:** Cape Cod, MA
- **Type(s) of Data Shared:** Traffic volume data and cultural/environmental resource data
- **Method of Data Sharing:** GIS layers accessed via ArcGIS

U.S. Department of Transportation
Federal Highway Administration

FHWA Planning & Data Sharing Partnerships Case Study Series

Colorado Integrated Planning Project

Interviewed Organization(s): FHWA Central Federal Lands (CFL) Highway Division, Colorado Department of Transportation (CDOT), Grand Valley Metropolitan Planning Organization / Mesa County Regional Transportation Planning Office

Forming a Data Sharing Partnership

As part of the Colorado Integrated Planning Project, the Federal Highway Administration (FHWA) Central Federal Lands (CFL) Division convened a wide range of public land management agencies (PLMAs) and state and local transportation agencies to share information on project needs at regional and corridor scales. CFL established this partnership to determine where organizations had similar gaps in data and develop and create a communal platform to address these needs. Another goal of this data-sharing effort has been to support integrated planning to ensure state and local transportation agencies incorporate PLMA needs into their plans and programs, and vice versa. This can help agencies identify opportunities to collaborate on projects of mutual interest and can inform future funding and project prioritization. Through the Project, the CFL hosted a series of workshops and created an online GIS platform for local agencies to share standardized data on identified project needs.

Data Fields & Tools

Several agencies found that their primary gaps were qualitative data, particularly data demonstrating why travelers are going to a place. The CFL workshop series brought PLMAs and state and local transportation agencies together to share information on travel needs and to document qualitative data in a standardized way on a shared online GIS platform. Partnering agencies were then able to use this shared and standardized data to collaboratively build long term transportation plans and other building projects. Agencies were able to provide data and information they had available, allowing different agencies at the local, state, and federal level to work together towards common goals.

Lessons Learned

Lesson #1 – Create a standard platform for data sharing

CFL led workshops to review partner datasets and teach partner agencies how to access shared datasets, particularly HPMS data from CDOT. CFL invited participating agencies to incorporate their data into a shared online GIS platform and provided training on how to use the GIS platform. Agencies then added their transportation network and project needs datasets. As a result, the partners shared data on 170 projects throughout the state, strengthening the network writ large.

Lesson #2 – Link data sharing to future planning, projects, and funding opportunities

The Colorado Integrated Planning Project provided an opportunity for agencies to align their long-range transportation plans and programs of projects. The partners also used the findings to identify projects of mutual benefit and develop strategies to pursue funding through grant programs and other funding sources. This is especially important for programs like the Federal Lands Access Program (FLAP), for which PLMAs are not eligible applicants. Nevertheless, working with state, local, and tribal partners to support their application process is imperative.

The Colorado Department of Transportation (CDOT) and CFL entered into a data sharing agreement at the start of the project. CDOT shared Highway Performance Monitoring System (HPMS) data from their road dataset, and the partners used this data, along with PLMA road data, to supplement gaps in agency datasets, as well as to refine existing programmed projects.

By sharing data sets and working together, the agencies also developed a greater understanding of their respective planning processes. For example, local MPOs learned about the priorities of federal partners and were thus able to adapt their long-range transportation priorities to better position themselves as competitive applicants for federal funding.

Implementation Challenges

There were no barriers regarding the direct exchange of data. The primary implementation challenge was determining where data gaps existed.

Results/Main Takeaways

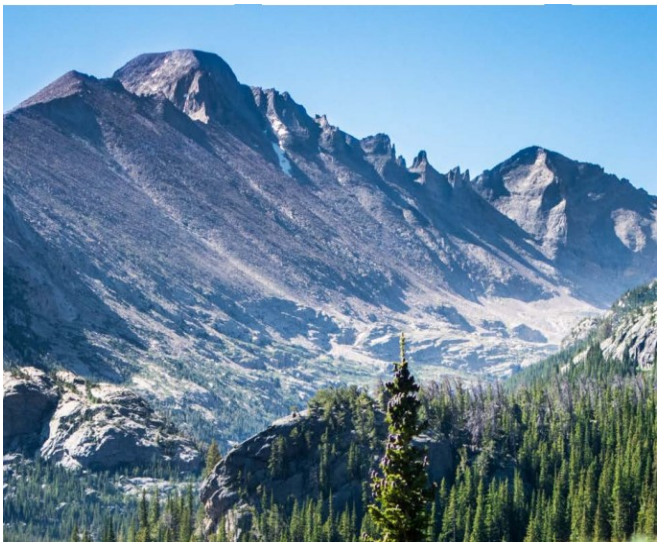
Sharing and comparing datasets across agencies highlighted overlapping data needs. Partner agencies incorporated the shared data into statewide long-range transportation and MPO plans to better position themselves as competitive applicants for federal funding.

Looking Forward

Partner agencies integrated data and findings from the Colorado Integrated Planning Project into their respective long-range transportation plans and programs of projects. CFL is establishing a similar integrated planning project in Nevada.

Special thanks:

- Aaron Bustow, Statewide and Metropolitan Transportation Planner, FHWA – Colorado Division
- William Haas, Metropolitan Transportation Planner, FHWA – Colorado Division
- Elijah Henley, Planning Team Lead, FHWA CFL
- Jeff Sanders, Transportation Planner, FHWA CFL
- Erica Cole, Transportation Planner, National Park Service
- Dean Bressler, Senior Engineer, Transportation Planning, Grand Valley Metropolitan Planning Organization / Mesa County Regional Transportation Planning Office
- Ross Mittelman, Mesa County Public Health Trails Coordinator
- Matt Muraro, Environmental Specialist/Regional Planner, Colorado DOT



Quick-Reference Information

- **Project Phase:** Planning, Programming
- **Agencies/Partners Involved:** FHWA Central Federal Lands (CFL) Highway Division, Colorado Department of Transportation (CDOT), Bureau of Land Management (BLM), National Park Service (NPS), U.S. Fish and Wildlife Service (FWS), and Colorado Metropolitan Planning Organizations (MPOs).
- **Location:** Colorado
- **Type(s) of Data Shared:** HPMS Data
- **Method of Data Sharing:** Online GIS Platform
- **Additional Resources:** https://www.codot.gov/programs/your-transportation-priorities/regional-transportation-plans

U.S. Department of Transportation
Federal Highway Administration

FHWA Planning & Data Sharing Partnerships Case Study Series

Bi-State Planning: Tahoe Regional Planning Agency

Interviewed Organization(s): Tahoe Regional Planning Agency

Forming a Data Sharing Partnership

California and Nevada established the Tahoe Regional Planning Agency (TRPA) in 1969 to protect harmony between ecology and transportation with the consent of Congress through a bi-state compact. The compact enables the formalized coordination of efforts for corridor level planning by identifying common goals for Federal, state, and local planning, as well as resource protection agencies and tribes in Lake Tahoe. The compact charges TRPA with establishing a regional plan to achieve environmental standards that emphasize the intersection of ecology, land use authority, and transportation, with a specific focus on access, recreation, and land use. TRPA's approach to transportation planning includes making their transportation demand model pairs with their travel demand model to build a recreational model.

Partner agencies within the compact share datasets and together determine data gaps that will address common goals. They regularly coordinate to understand each other's challenges and work to find solutions via agreements, charters, and other compact activities. This supportive problem solving, and ongoing support helps the partners realize the long-term value of participation and managing the corridor.

Data Fields & Tools

As an increasingly popular tourist destination, there is an overarching need for visitation data for the Lake Tahoe area, such as trip origin data, to understand travel behavior and how it impacts transportation and land use planning in the region. The partner agencies provide their data to TRPA who then pull it into the clearinghouse. Topline data showing the travel connections between the jurisdictions is a starting point for sharing. Data cleaning by TRPA staff is often necessary once it is acquired and before it can be added to the clearinghouse. They recently outsourced the data cleaning and travel demand modeling so in-house staff can shift to data management and communications.

The TRPA conducts a travel mode survey to collect data on travel behaviors at different areas of the lake. The survey generates information on zip code of residency and income ranges to get an idea of who the traveler is, if they're a local or visitor, and where they're coming from and going. Bicycle counters are spread throughout the lake area and are now required for new trails. Parking data was recently added to the clearinghouse dataset; however, it isn't received regularly. Survey results are shared in the clearinghouse available to TRPA and its partners.[1]

Lessons Learned

***Lesson #1* – Focus on the question**

Given the amount of data available across the transportation and resource protection sectors, it is critical to focus on the question at hand and the data that will answer it. Collecting and analyzing data beyond what is needed can become overwhelming and waste critical time and resources without addressing the original need.

***Lesson #2* – Regular coordination**

Partner agencies and the TRPA are in regular communication with one another to understand each agency's needs work to ensure those needs are being met by the collaboration. In addition to regular meetings, TRPA hosts an annual summit to reaffirm their commitment to the compact.

Implementation Challenges

TRPA has had difficulty determining which of hundreds of indicators and data sets will best address long-term needs. To keep the process manageable, TRPA works to identify the most critical needs long-term and then focuses efforts to obtain that data to power the dashboards for decision-making with planning level data. They have started to prioritize data that supports decision-making for climate change initiatives, such as forest fuel hazards, because climate impacts are a high-priority goal for many agencies in the area.

Another challenge is concisely communicating what the data says to the public. Partner agencies often use different data measures to describe similar things. If the message is not clear, the public doesn't understand what the agencies are trying to convey. TRPA convenes discussions to select a single data point to report on and not confuse the community. Ultimately, it helps the partners speak with one voice, especially when they are advocating for funding or legislative action.

Results/Main Takeaways

The TRPA's longevity and success is firmly rooted in the bi-state compact and having committed partner agencies that engage with each other frequently. TRPA's collaboration with partners maximizes efficiency, providing higher-quality results by identifying common data needs, gaps, and sources that are then pulled into a common location with joint access. Their work advances the region's transportation goals, protects the lake and its resources, and supports the economy by ensuring recreational travel is captured in the data and decision-making. It establishes a clear mission for transportation and resource protection for Lake Tahoe.

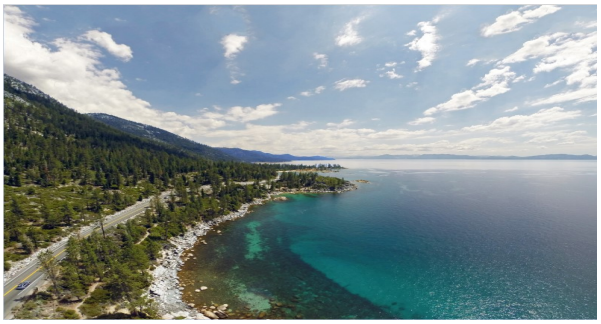
Looking Forward

TRPA is focusing on what data best addresses the compact partners' needs and provides the greatest support for decision-making in the most cost-effective way. This includes more focused datasets that TRPA can use repeatedly and power decision-making dashboards with planning level data. Data relevant to planning for climate change are resiliency are especially important to TRPA in this effort.

TRPA is also connecting with planning agencies in the broader California and Nevada area to understand recreational travel in the area to better plan for and support the future generations and resources at Lake Tahoe. TRPA is working to better correlate weather patterns, gas prices, and economic disposable income to model travel in a better way than a long-term model that glosses over those impacts.

Special thanks:

- Michelle Glickert, Principal Transportation Planner, Tahoe Regional Planning Agency
- Julie Regan, Chief, External Affairs/Deputy Director, Tahoe Regional Planning Agency
- Nick Haven, Division Manager, Long Range and Transportation Planning Division, Tahoe Regional Planning Agency



Quick-Reference Information

- **Project Phase:** Planning and Programming
- **Agencies/Partners Involved:** Tahoe Regional Planning Agency
- **Location:** Lake Tahoe Region, Nevada, and California
- **Type(s) of Data Shared:** Visitor survey results, air, soil, and water quality, land use, and transportation data
- **Method of Data Sharing:** Via email; building data clearinghouse for partnership
- **Additional Resources:** https://www.trpa.gov, https://www.trpa.gov/programs/maps, https://gis.trpa.org/mapmaker/

U.S. Department of Transportation
Federal Highway Administration

FHWA Planning & Data Sharing Partnerships Case Study Series

MARAD and University of Arkansas TransMAP

Interviewed Organization(s): U.S. DOT Maritime Administration, University of Arkansas, U.S. DOT University Transportation Center (UTC)

Forming a Data Sharing Partnership

University of Arkansas academics and industry specialists teamed up with the U.S. DOT Maritime Administration (MARAD) to form a data sharing partnership to address the challenges of sourcing maritime freight data, overcoming barriers to accessing this specific data, and improving accessibility to data portals. MARAD and the University of Arkansas established the Transportation and Maritime Analytics Partnerships (TransMAP) Hub project to create an open access online visualization platform to collect, analyze, and disseminate transactional and dynamic maritime freight data across multiple software platforms. The project team made the datasets available on a real-time basis to government agencies, industry, and citizens based on open-source data management software tools. TransMAP houses valuable interagency information and is an example of a project that successfully incorporated as a university research project as a mechanism for its upkeep and maintenance.

Data Fields & Tools

The online tool, TransMAP Hub, pulls together maritime freight systems data that would otherwise be widely dispersed and difficult to align for public users. The data are organized by categories, including vessel movement in and out of lochs, vessel type, as well as the frequency and types of commodities transported through a port. This data may be pertinent to researchers who seek to download and utilize data for assessment of local trade and maritime transportation. MPOs and other transportation decision makers at US ports can use TransMAP to understand freight systems and guide planning related to travel patterns.

Lessons Learned

Lesson #1 – Beta-test publicly available tools

The objective of TransMAP is to centralize public data into one place to improve data-informed maritime transportation planning. The partnership team benefited from initial “beta-testing” groups that sought out access to TransMAP for their own independent research and planning initiatives. The feedback from these groups was incorporated to improve Hub data collection and cleaning processes. Beta-testing the application ensured a high-quality tool for future users. future users.

Lesson #2 – Establish API standards

A significant problem with building data integration platforms is keeping them current. Many of the input data sources are formatted for human reading, but it is difficult and expensive to write and maintain software to integrate these documents (spreadsheets, pdfs, etc.) into the Hub. Websites like TransMAP rely on well-documented Application Programming Interfaces (API) to access these data sources as they update, use metadata to understand the data collection goals, make transformations to the data and data formats as they occur. While many of the sites use APIs to varying degrees, many do not, or the APIs are experimental and subject to change. Thus, established standards for APIs would allow for less expensive and more reliable data sharing.

To develop the platform, project collaborators from the University of Arkansas and U.S. DOT MARAD delegated roles among industry experts and academic specialists. Industrial engineers provided industry expertise by scoping and assessing relevant data sources. They also maintained access to integral industry contacts and stakeholders. On the technical development side of the project, university academics and graduate students assumed the responsibility of aggregating data and integrating it into interactive maps and dashboards.

Implementation Challenges

Implementation of the program was time intensive. The MARAD and University of Arkansas partnership was established as a three-year project, where the first two years were dedicated to developing the TransMAP Hub. The third year focused on testing and validation of the Hub. The TransMAP development team is developing a user guide to assist users to navigate and use the system. A challenge of creating this data sharing platform has been establishing necessary modifications to provide a publicly accessible resource without jeopardizing sensitive information. For instance, information specifying exact routes and schedules of commodities shipments could result in a breach of national security, and thus it was imperative to omit this type of information.

Results/Main Takeaways

The TransMAP Hub centralized diverse datasets into one location. Even though all the data included in the Hub are free and publicly available, it would otherwise be difficult for individuals to find because it is so dispersed. Creating the Hub required collaboration and input from all partners. The partnership brought together industry experts with academic specialists who each learned from each other in the process. Industry experts learned how to interact with the collected data and the academics learned from the specifics of maritime transportation data.

Looking Forward

The project is currently focused on the development and deployment of the TransMAP Hub, with the three-year partnership anticipated to culminate in September of 2022. However, there is interest to extend the project for a second phase to include enhanced data dashboards and analytics. An example of how to extend the project for a second phase could include increasing the scope of the TransMAP Hub to include other modes of transportation data, which would enhance its applicability. This would require partnerships with other modal agencies who could provide usable data access.

Special thanks:

- Jackson Cothren, Director, Center for Advanced Spatial Technologies, University of Arkansas
- Heather Nachtmann, Ph.D., Associate Dean for Research, College of Engineering, Director, Maritime Transportation Research and Education Center, University of Arkansas
- Travis Black, Acting Director for the Office of Ports and Waterways and lead for Port Infrastructure Development Planning Program of the US Department of Transportation, Maritime Administration (MARAD)

Quick-Reference Information

- **Project Phase:** Project Design and Environmental Review
- **Agencies/Partners Involved:** U.S. DOT Maritime Administration, University of Arkansas, U.S. DOT University Transportation Center
- **Location:** National
- **Type(s) of Data Shared:** Physical and socioeconomic data related to multimodal transportation for visualizing human geography, area-value data, and travel times
- **Method of Data Sharing:** TransMap, a centralized online tool
- **Additional Resources:** https://castuofa.github.io/transmap/

U.S. Department of Transportation
Federal Highway Administration

FHWA Planning & Data Sharing Partnerships Case Study Series

Mississippi National River Recreation Area Paddle Share Program

Interviewed Organization(s): Mississippi Park Connection, National Park Service, Volpe Center

Forming a Data Sharing Partnership

Mississippi National River Recreation Area (Mississippi NRRA) was created in 1988 to help facilitate recreational access to the Mississippi River; however, the National Park Service (NPS) did not have a formal program to support nonmotorized boating access to the river until 2016. The Mississippi Park Connection (MPC), a 501c3 non-profit partner of the Mississippi NRRA, has a common interest in river education and recreational use with the Mississippi NRRA (along with share office space). Beginning in 2014, MPC established relationships between NPS and other organizations interested in supporting a paddle share program. In addition to establishing the locations for paddle share stations, the partnership provided a mechanism for engaging with vendors to supply kayaks and lockers and operate the service. MPC manages the vendors and, together with the municipal and park district partners, owns the equipment, which NPS is unable to do because of limitations around maintenance costs and liability. Mississippi NRRA collects the use data and analyzes it for trends to help the partners manage the system's performance, inform schedule and route changes, and demonstrate how paddle share meets the program goals. For instance, the Minneapolis Park and Recreation Board uses the shared data to learn whether people with a Minneapolis zip code use the paddle share system, which helps validate the Park Board's involvement in the program. MPC is also able to use the data to advocate for funding subsidies based on the results.

Data Fields & Tools

The data includes information about when paddle share users reserve kayaks, where and when they pick the boats up, where the boats are returned, and approximately how long they were out. The data is shared through a portal (called Checkfront) set up by the operating vendor. Data from the portal can be downloaded to a spreadsheet and requires little data cleaning. MPC, NPS, and the vendor can look at the number of reservations for upcoming days, right-size on-duty staff, and communicate to user groups when there are reservations available to encourage more use. NPS analyzes the data and provides the results to MPC. During the off-season, data from the previous year of operation is reviewed to inform decisions about modifying

Lessons Learned

***Lesson #1* – Good working relationships**

Relationships between staff are vital to creating and establishing planning and data sharing partnerships between organizations. Good staff communication and coordination across agencies combined with positive data demonstrating the success of the partnership program fosters trust and confidence in the outcomes and continued collaboration.

***Lesson #2* – Details in contracting**

When working with a partner organization or vendor through an agreement or contract, it is critical from the outset to articulate the data points to be shared, the frequency of data reporting, the points of contact for sending and receiving data, and how they will be used, as well as the responsibilities of each signatory group. Mississippi NRRA and MPC realized that they should have been more explicit about their data needs and reporting requirements after the contract with the vendor was signed.

operations, such as adding more boats or reservation opportunities to the busiest stations. Nice Ride, the local bike share that is operated by Lyft, co-locates bike share stations next to paddle share stations wherever possible and shares its use data from these stations. The Nice Ride data helps MPC and NPS understand the multimodal nature of paddle share trips.

Implementation Challenges

Initially, there were challenges with the amount of data that the vendor would share with MPC and NPS. The initial agreement did not specify data reporting outside of monthly invoices. The parties were able to come to an agreement on data sharing by repeatedly asking the vendor to provide back-end access to the reservation system software. Since paddle share is the vendor's top customer, the vendor eventually provided this access.

NPS is constrained in its data collection through visitor surveys by the Paperwork Reduction Act and rules about collecting any data that contains personally identifiable information. When possible, it is better for NPS to leave the collection of data that contains this information to its partners. Surveys are an important tool in gauging the satisfaction of paddle share users. A subsidiary of MPC, Mississippi River Paddle Share LLC, was able to collect annual post-trip survey data to share with the partnership.

The remaining challenge is consistent funding revenue. The paddle share program partners are all non-profit organizations or local governments. Modest annual subsidies from each of the partners helped cover any gap between expenses and revenue from paddle share user fees. Operating costs have been increasing, especially as the kayaks and other equipment age. At the same time, grants have been shrinking. The partners are taking a strategic look at how to balance funding and costs.

Results/Main Takeaways

The paddle share system has expanded over the years and the partnership has been successful due to continued collaboration and support amongst the partner organizations. The paddle share uses data to inform cost-effective changes that sustain the program year after year. The data demonstrate high system usage and sufficient revenues to justify the program's continuation. Mississippi NRRA benefits from the partnership by fulfilling its mission to increase recreational access to the river; MPC benefits from higher visibility and a greater ability to gain support for its other programs.

Looking Forward

For improving the data sharing and planning aspect of the partnership, Mississippi NRRA and MPC would like the vendor to improve its reservation interface, enable more customizable reports, and allow for real-time weather-related and emergency shutdowns, as well as information on invoicing.

As the paddle share program continues, partnering with local institutions, such as the University of Minnesota Twin Cities, to spread the word about the program may attract more users and make the program more financially resilient. Many people who engage with the University and even metro area residents do not realize the Mississippi River is close by, it is part of the National Park Service, nor that there is paddle share nearby to enjoy.

Special thanks:

- Katie Nyberg, Executive Director, Mississippi Park Connection
- Karen Katz, Outdoor Recreation Planner, Mississippi NRRA
- Ben Rasmussen, Public Lands Team Lead, U.S. DOT Volpe Center

Quick-Reference Information

- **Project Phase:** Operations and Maintenance
- **Agencies/Partners Involved:** Mississippi Park Connection, National Park Service; secondary: Three Rivers Park District, City of Brooklyn Park, City of St. Paul, Minneapolis Park and Recreation Board, Mississippi Watershed Management Organization, Nice Ride/Lyft
- **Location:** Minneapolis and St. Paul metro area, Minnesota
- **Type(s) of Data Shared:** User data
- **Method of Data Sharing:** Data portal, regular in-person, and virtual meetings
- **Additional Resources:** https://www.nps.gov/miss, https://parkconnection.org, https://www.paddleshare.org

U.S. Department of Transportation
Federal Highway Administration

FHWA Planning & Data Sharing Partnerships Case Study Series

National Park Service National Capital Area Regional Count Program

Interviewed Organization(s): National Park Service, National Capital Region

Forming a Data Sharing Partnership

The National Park Service National Capital Area (NPS NCA) engages with multiple partners on planning and data sharing. NPS NCA is part of the National Capital Planning Commission (NCPC), the regional Metropolitan Planning Organization (MPO), which meets monthly to discuss the current and upcoming projects, as well as any issues related to them. The Commission members also include representatives from other Federal agencies, District of Columbia DOT (DDOT), Virginia DOT (VDOT), Maryland DOT (MDOT), and some presidential appointees.

NPS NCA established a cooperative agreement to conduct a coordinated count program throughout the region. The goal is to install more counters, collect better data, and store it in a database available to participants. The partner agencies benefit from the economies of scale in trail counters, the technical support for maintaining them, and the resulting processed data. NPS NCA has a partnership with DDOT focused on traffic counts and has also proactively engaged with the NCPC to coordinate trail data collection and analysis. DDOT places temporary traffic counters on federal roads and shares the data with NPS. NPS shares any traffic data it collects with DDOT, as well. The two agencies also coordinate on projects that entail road closures and other construction phases that impact traffic flows. Regarding trails, NPS has more than 50 miles of trails that connect to other trails within the region. The centralized approach to trail count data facilitates continued data collection despite regular staff turnover at public lands agencies, especially for staff with specialized skills in data counting technology and analysis.

Lessons Learned

***Lesson #1* – Cross-agency relationships**

Relationships across agencies are critical to establish sustainable, long-term collaboration. Inter-agency relationships must be maintained with regular communication and coordination of projects impacting each partner.

***Lesson #2* – Collaborate on data collection and management**

Maintaining data counters in good working order requires consistent monitoring and a specific skill set to troubleshoot problems. Data management and processing are also required to apply the information in decision-making. These tasks pose funding and bandwidth challenges for many agencies. Collaborating on collection and access to data can distribute the costs over multiple agencies and allow all to benefit from economies of scale.

Data Fields & Tools

DDOT and NPS share traffic counts and related data through the Highway Capacity Software (HCS), which applies the methodologies documented in the Highway Capacity Manual (HCM). The Federal Lands Highway Field Operations Technical Support Center (FOTSC) collects traffic data for NPS that can be used for traffic studies upon request, and then shared through the HCS. The transfer of traffic data is usually a single transaction based on individual project need rather than a consistent schedule.

The regional trail count data is pulled directly from the counters into a database that is managed through a contract with the University of North Carolina (UNC), which manages technical work done by Virginia Tech and Portland State University Transportation Research and Education Center (TREC). While TREC is responsible for maintaining the counters in addition to processing the data in the database, NPS first established the counters and has access to the database.

Implementation Challenges

Maintaining good relationships is a challenge as staff change across agencies. In the scope of the National Capital Region, the NCPC must work with the Federal Government which owns much of the land in Washington, DC. There are many actors involved, including the NPS regional office, NPS units, DDOT, and other members of the NCPC.

Another challenge is maintaining the funding to collect data. DDOT and other smaller agencies have funding and staff constraints limiting their ability to maintain their own counter program, let alone bear the cost of increasingly advanced counter technology. NPS has worked to establish a 5-year agreement with UNC, funded through FHWA for research, for UNC to conduct research and manage the regional trail count data collection efforts by Virginia Tech and TREC.

Looking Forward

The longer-term goal for NCA is to issue an annual report with information beyond raw counts about the number of trail users. The goal is to translate raw collected data into performance measures, such as crash reduction and emissions reductions, to communicate regional data trends across several sectors, such as public health, environment, and safety.

Special thanks:

- David Daddio, National Capital Area Regional Transportation Manager

Quick-Reference Information

- **Project Phase:** System and Project Planning
- **Agencies/Partners Involved:** National Park Service (NPS), District of Columbia Department of Transportation (DDOT), National Capital Planning Commission (NCPC), Metropolitan Washington Council of Governments (MWCOG)
- **Location:** Transportation networks and recreation trails in the greater DC metro area
- **Type(s) of Data Shared:** Traffic count data, trail count data, project plans and schedules
- **Method of Data Sharing:** Database downloads, digital file transfers, Regional Transportation Data Clearinghouse (RTDC), coordination meetings
- **Additional Resources:** https://www.ncpc.gov/; https://www.mwcog.org; https://rtdcmwcog.opendata.arcgis.com; https://www.mwcog.org/file.aspx?&A=X1FahAYWSbbzUZJeicVZ7SznncgkG4CQ0pQ9QDUYRNw%3D

U.S. Department of Transportation
Federal Highway Administration

FHWA Planning & Data Sharing Partnerships Case Study Series

Oregon Coast Trail Action Plan

Interviewed Organization(s): Oregon Parks and Recreation Department, Association of Oregon Counties, Oregon Solutions, Federal Highway Administration (FHWA)

Forming a Data Sharing Partnership

The Oregon Coast Trail Action Plan is a regional collaborative planning effort to identify and inventory existing conditions, plan for improvements and realignments, and plan for long-term maintenance and governance of the Oregon Coast Trail. The Action Plan partnership includes the Association of Oregon Counties, Oregon Parks and Recreation Department, and Oregon Solutions. Partners compiled existing geospatial trail data with existing facilities and ownership data to determine baseline conditions. They also regularly engage with the public, tribes, and local elected officials to identify areas where the trail needs safety improvements. Qualitative information from the public engagement is regularly converted to geospatial data and added to the existing database, which is then used for long-term decision making and governance.

Once existing conditions are inventoried, several products will be developed: Declarations of Cooperation between trail segment owners for the North, Central, and South Segments and a Declaration of Cooperation for the overall trail's long-term governance. The Declarations of Cooperation will be incorporated into a final planning document that will include, to the degree possible, conceptual drawings and cost estimates to advance future design and construction to address trail gaps.

Lessons Learned

Lesson #1 **– Establish data storage and access plan**

The Oregon Coast Trail Action Plan partnership recommends establishing a protocol for how to store data, who can access the data, and how they will access it. After several staffing changes over the course of the project, partners have learned that it is imperative to establish a development framework to ensure the project moves forward regardless of staff turnover.

Lesson #2 – Identify tasks based on individual skillsets

It is helpful to identify and complement other partners' strengths and regularly communicate with partners. Team members can identify who will complete each task based on their skillset. Individual agencies may be best positioned to assume tasks based on a specific data focus or audience. This ensures everyone is on the same page while maximizing the team's efficiency without repeating work.

Data Fields & Tools

The Oregon Coast Trail Action Plan has a wide range of data inputs. The majority is geospatial data followed by natural and cultural resource data. There is also qualitative through-hikes data from other land management agencies, information from public engagement, and hiking books. The team is establishing a framework to accurately capture word-of-mouth data in a format that is meaningful to the Action Plan.

The Action Plan team has a contract with Parametrix, an environmental planning and engineering firm, to collect, clean, house, and disseminate data through ArcGIS Online. Parametrix cleaned historical data where trail alignments differ from existing conditions, as well as gathered additional data for trail segments without existing data. Once clean, Parametrix added the data to ArcGIS Online. The ArcGIS online dataset is then used by Action Plan members to explore different alignments and layers and make governance and maintenance decisions. Following the Action Plan's completion, the ArcGIS data will be migrated to Oregon Parks and Recreation Department (OPRD) systems.

Implementation Challenges

In many cases, acquiring the most up-to-date data requires going to specific locations on the trail to "ground-truth" it, or walk the trail and validate the exact route and condition. This requires more time and resources to collect that data.

Results/Main Takeaways

Currently, the team is still collecting data that will be used for all aspects of the project lifecycle. The data collection and analysis from the Oregon Coast Trail partnership has been critical to developing the Action Plan and has also provided baseline information for other projects. The Action Plan will be used to set goals and priorities for the groups involved, identify gaps and funding opportunities for the trail, and prioritize gaps based on usership and cost.

Looking Forward

The Oregon Coast Trail Action Plan hopes to identify types of users of the trail, what they are using it for, the length of hikes, and other measures to better understand how the trail is used. This will allow the team to better support facilities and focus those efforts on the most used areas. The Action Plan will set the path for a complete, sustainable long-term Oregon Coast Trail.

Special thanks:

- Cole Grisham, FHWA, Transportation Planner
- Peter Dalke, Oregon Solutions, Project Manager
- Paul Reilly, Oregon State Parks, Program Coordinator
- Andy Smith, Association of Oregon Counties, County Solutions Director

Quick-Reference Information

- **Project Phase:** System and Project Planning
- **Agencies/Partners Involved:** Oregon State Parks, Association of Oregon Counties, Oregon Solutions, and FHWA
- **Location:** Oregon Coastal Counties
- **Type(s) of Data Shared:** Geospatial, natural and cultural resources
- **Method of Data Sharing:** ArcGIS Online
- **Additional Resources:** https://highways.dot.gov/federal-lands/projects/or/dot-2018-3; https://orsolutions.org/osproject/oregon-coast-trail

U.S. Department of Transportation
Federal Highway Administration

FHWA Planning & Data Sharing Partnerships Case Study Series

Oregon Department of Transportation Regional Integrated Transportation Information System

Interviewed Organization(s): Oregon Department of Transportation

Forming a Data Sharing Partnership

Oregon Department of Transportation (ODOT) purchased a Regional Integrated Transportation Information System (RITIS) enterprise license to collect and house data on traffic speeds and recreational routes for planning needs. RITIS is a data aggregation and dissemination platform for solving transportation problems, from the Center for Advanced Transportation Technology Laboratory at the University of Maryland.

Data on ODOT's RITIS platform is available to everyone in the state working in public transportation. RITIS serves as a data sharing platform, where ODOT inputs data in RITIS and becomes accessible to all ODOT users on the platform. It supports a broad range of tools and features and allows agencies to easily collaborate and share data. This enables better decision making and higher quality projects across the state.

Data Fields & Tools

ODOT'S RITIS platform houses a wide range of data across the state. Examples include state highway traffic volume data, incident and weather data, traffic signal locations, and congestion data and associated calculations, such as hours of delay, cost of delay, and contributions to delay. RITIS performs its own calculations from inputted data, eliminating any possible inconsistencies or errors from people completing their own calculations.

The RITIS enterprise platform has data format requirements, which requires ODOT to clean some data to have it added to the platform. There are no barriers for users to access and download data once it is on the platform. ODOT has training resources from RITIS available on their website for users, and plan on visiting agencies throughout the state to increase awareness of the tool and its benefits.

Lessons Learned

***Lesson #1* – Learn from peers**

RITIS has been available for many years longer than ODOT's use of the system, which has enabled ODOT staff to learn from other state that have a more mature working knowledge of the platform. ODOT's access to RITIS serves as an example of how a state agency can make transportation data available to its partners, which includes land managers. As the primary contract holder to RITIS, ODOT allowed for other agencies, particularly those that are smaller or less resourced, to utilize data under ODOT's contract without the burden of high start-up costs.

Implementation Challenges

ODOT has faced challenges determining how users are using the data in RITIS. RITIS is available to all ODOT employees, State of Oregon public agencies, and consultant or university staff performing work for a public agency in the State of Oregon. Non-ODOT RITIS accounts require an organization to sign an INRIX data use agreement to establish a new account for that organization. Users must fill out a login application and be approved by ODOT staff to gain access to RITIS.

While staff in various agencies in Oregon can use RITIS, it is their consultants accessing the data, which makes it difficult for ODOT to gauge who the "real" users are, identify what future data inputs would best serve its users, and which additional groups to include.

Results/Main Takeaways

RITIS has saved time and resources by having all the data ODOT and other agencies need in one easy-to-find location with many calculations already completed. ODOT has used RITIS to plan transit programs, especially in recreational districts that have experienced recent surges in population growth and tourism. The data has helped ODOT determine who is travelling on Oregon roads and their trip start and end points. This information and RITIS' calculations allow ODOT to tell road users the best time to visit destinations to avoid congestion and manage parking.

Additionally, RITIS has dramatically increased data access to users across the state, allowing them to answer questions they were unable to with only their agency's data. Furthermore, it ensures consistency across projects from various agencies because all calculations and necessary indices are preloaded into the tool.

Looking Forward

ODOT has a license for RITIS until 2030. They plan to visit agencies throughout the state to increase awareness of RITIS and its benefits. Project efficiency, quality, and decision making will increase statewide as more agencies use the tool, and reduce costs associated with making individual data purchases.

Special thanks:

- Thanh Nguyen, Oregon Department of Transportation, Senior Transportation System Analyst
- Chi Mai, Oregon Department of Transportation, Transportation Systems Analysis Engineer

Quick-Reference Information

- **Project Phase:** Evaluation and Reporting
- **Agencies/Partners Involved:** University of Maryland (RITIS owner), Oregon Department of Transportation, various State of Oregon public agencies
- **Location:** Oregon
- **Type(s) of Data Shared:** Traffic volumes and speeds, incident data, recreational routes
- **Method of Data Sharing:** Enterprise license to database
- **Additional Resources:** https://ritis.org; https://www.oregon.gov/odot/Data/Pages/RITIS.aspx

U.S. Department of Transportation
Federal Highway Administration

FHWA Planning & Data Sharing Partnerships Case Study Series

Collecting Multi-Jurisdictional Road Stream Crossing Data in Maine

Interviewed Organization(s): U.S. Fish and Wildlife Service **Forming a Data Sharing Partnership**

The Maine Stream Crossing Survey partnership formed in 2006 to collect and disseminate statewide data on stream barriers and barriers to fish passage throughout the state. The reason this group formed in Maine was to focus on improving habitat for the Atlantic salmon, an endangered species whose remaining habitat in the United States is almost entirely within the state of Maine. The partnership included the following partners:

- U.S. Fish and Wildlife Service (FWS)
- Maine Department of Transportation
- Maine Department of Marine Resources, Inland Fisheries, and Wildlife
- Maine Department of Environmental Protection
- Maine Forest Service
- Atlantic Salmon Federation
- The Nature Conservancy (TNC)

The partnership began in 2006 with a pilot study on fish passage in the Lower Penobscot River area. They developed their own data collection protocols and conducted a survey of stream crossing data to prioritize improvements at crossings. The team then expanded data collection to all public roads and some private roads[1] throughout the state, which it maintains in a database and disseminates through the Maine Stream Habitat online viewer. This dataset includes asset management and ecological information on road stream crossing structures, such as culverts and aquatic organism passage structures.

Lessons Learned

Lesson #1 **– Develop common goals among partners**

When creating a partnership with a myriad of groups with differing goals and capacity, it is important to focus first on the areas where the most parties have a shared interest. For example, the Maine Stream Crossing Survey partners found success by first working together on shared interests, like improving data on road conditions and aquatic habitat quality.

Lesson #2 **– Identify realistic goals for the partnership**

To be successful, partnerships should be conscious of their capacity and careful to set realistic goals.

Data Fields & Tools

TNC manages the partnership, including directing data collection, managing staff and volunteers, coordinating with private landowners, land managers, and public entities.

Additionally, TNC created a data use agreement for private landowners to increase their level of comfort with the data collection process. USFWS hosts and populates the stream crossing database. The database has 26,000 records that represent road stream crossings and includes associated resource and asset data attributes.

The stream crossing database feeds into the Maine Stream Habitat online viewer, which presents stream crossing data

and a network analysis tool. The viewer has layers such as stream crossings, fish passage barriers, priority habitats for various species, water features, and watersheds. The data available for each stream crossing includes potential impacts on aquatic species, watershed information, and other detailed crossing information. The viewer highlights the data that is most relevant and beneficial to the public users, but additional information is available to partners in the database.

Implementation Challenges

This partnership has encountered several challenges and Partner engagement was a significant reoccurrence. This project requires the participation of a wide range of agencies and private entities, including some whose primary mission is not environmental protection. It has been important to communicate the value of this dataset to a wide range of partners so that they support the project. The partnership has also had to build trust with private landowners and show them the value of this data for their land management.

Additive to the partner engagement aspect, it has been difficult to maintain consistent funding for this partnership, which is necessary to keep the dataset current and to maintain the data-sharing site.

With regards to developing data protocols, the partnership needed to establish an agreed-upon data dictionary and data collection methodology that would meet the partners' specific needs related to ecology and asset management. The project developed a data collection protocol that has since become a model for other ecology data collection efforts in New England and other locations in the U.S.

Results/Main Takeaways

The stream crossing database and online viewer combines infrastructure and habitat information to identify high priority crossing sites for repair or replacement and areas at risk of flooding. This partnership benefits private and public users, such as municipalities, road owners, and other stakeholders. The database has also resulted in the development of a bond fund from the Maine Department of Environmental Protection to competitively fund crossing replacements. The Maine Department of Marine Resources has also used the results of this partnership to help set restoration and recovery goals. The Maine Stream Connectivity Work Group convenes to coordinate with partners on data collection, updates, and general work progress.

Looking Forward

The project partners would like to make the stream crossing database as accurate and up to date as possible and have a consistent host for the online viewer, as multiple partners have hosted the online viewer over the years. The partnership is also interested in incorporating LiDAR data in the database, as more imagery becomes available. Additionally, the project would significantly benefit from funding to support local rural road data collection.

Special thanks:

- Alex Abbott, GIS Analyst and Stream Restoration Specialist, U.S. Fish and Wildlife Service

Quick-Reference Information

- **Project Phase:** System and Project Planning; Maintenance and Operations
- **Agencies/Partners Involved:** U.S. Fish and Wildlife Service, Maine Department of Transportation, Maine Department of Marine Resources, Maine Department of Environmental Protection, Maine Forest Service, Atlantic Salmon Federation
- **Location:** Maine (statewide)
- **Type(s) of Data Shared:** Culvert and stream crossing data
- **Method of Data Sharing:** Data dictionary, database, and online web viewer
- **Additional Resources:** Maine Stream Habitat Viewer; Maine Road-Stream Crossing Survey Manual

U.S. Department of Transportation
Federal Highway Administration

FHWA Planning & Data Sharing Partnerships Case Study Series

Wasatch Front Regional Council Active Transportation and Congestion Management Programs

Interviewed Organization(s): Wasatch Front Regional Council, Utah Geospatial Resource Center, Utah Department of Transportation

Forming a Data Sharing Partnership

Utah has a strong network of public organizations sharing geospatial information system (GIS) mapping data that is coordinated by the Utah Geospatial Resource Center (UGRC). The UGRC is the map technology coordination office for the state of Utah. It is a common hub for the Utah Department of Transportation (UDOT) Planning Department, the Wasatch Front Regional Commission Metropolitan Planning Organization (WFRC MPO), and other local and state-level partners public agencies to share and access updated GIS data. UGRC serves as the coordinator among the agencies using the data and have the responsibility to improve the quality of collected and shared data and ensure consistency across projects. UGRC created a linear referencing system for projects across the state. All planned projects involving Utah Department of Transportation (UDOT) are based on this linear referencing system, which is regularly updated if roadway geometry changes. Federal land management agencies (FLMAs) have not been engaged in coordination outside one-off data requests.

Data Fields & Tools

State- and local-level GIS layers represent most data shared in the hub. State-level GIS layers include roads, address points, and boundaries. The local-level roadway centerline data has been especially useful for many projects because it has detailed information on roadway lanes, bike infrastructure, sidewalks, signal counts, pedestrian delay, and collisions. Other data sets include public lands boundaries, which are maintained by the Trust for Public Land, and aerial imagery that are available on the Wasatch Front Regional Council website.

Lessons Learned

***Lesson #1* – The project champion**

UGRC has established a strong statewide network of partners for sharing high quality geospatial data. The office provides a consistent, reliable centerline dataset that is used at all levels of government in the state. Strong partners, such as WFRC and UDOT, provide support to UGRC by being stewards of data relevant to their constituents.

Lesson #2 – Efficiency in common baselines

The linear referencing system that UGRC developed and distributed is used statewide. As new data is incorporated into the system, UGRC has quality control to ensure it references the correct geometry and imports into maps correctly. Until there is an active trusted exchange of accurate info, agencies are going to use their own datasets. Combining data from disparate sources often leads to compatibility issues that can be difficult to been resolve.

UGRC previously housed all the data; however, they have shifted to a distributed system. WFRC stewards data for their area and shares the data with other groups to further disseminate it. They also house state-level data on their website and index it with UGRC to maximize its audience. UGRC conducts quality control on data they receive, cleaning the data as needed. There are also some datasets where UGRC collects public input to crowdsource existing conditions. UGRC has an internal central multi-user database for the centerline data. Several years ago,

the agencies worked together to expand the data to include existing and planned bike facilities. UDOT updated linear referencing system and WFRC can log in and update data. UGRC ensures data from all the counties is accurate and reliable before publishing it.

Implementation Challenges

An authoritative and correct data source is key to efficient and effective transportation planning. If there is no coordination to bring the databases closer together, project staff first must validate the information, which is very time consuming. Eventually, the people who pick up the data later must determine which database is correct with little information on where to start. UDOT referenced an experience regarding active transportation plans in which planners had to retain and refer to multiple datasets throughout the project. It reduces efficiency and can lead to recurring issues.

Federal agencies have been minimally involved in the data sharing process, which has led to data gaps resulting in challenges with implementation on projects that intersect or border federal land. Federal agencies in the state aren't using this referencing system, so when they do share data with UDOT or others in the state there are some inconsistencies in the geometry.

It has been challenging to find the right person within the FLMA to engage. UGRC and UDOT have been trying to put together a federal user group to foster better communication with those other agencies. It's currently most active with U.S. Forest Service, Natural Resources Conservation Service, and the Farm Service Agency. Some agencies are more willing to participate than others.

The project team achieved success sharing data and garnering community buy-in when developing the Bike and Pedestrian Master Plan. Despite this, the team has noted challenges related to executing the concepts presented in the Master Plan, siting slow progress as far as implementation is concerned. CCC does not own any land for implementation. A primary difficulty in implementing the initiatives developed thanks to shared data resources is a lack of a "champion" to push initiatives forward toward successful implementation. The towns and their unique governance and predispositions have been the cause of slow progress.

Results/Main Takeaways

The partnership has ensured consistent high-quality data across the state. Organizations across the state, like planning agencies and police departments, rely on these data sets, which increases overall data efficiency and consistency. Local agencies can streamline project development because Wasatch Front Regional Council ensures high-quality and comprehensive input data.

Looking Forward

This is an enduring data sharing effort. UGRC is continuing to identify data stewards to ensure the data is maintained in the long term while continually working to improve datasets to ensure its high quality. As the data sharing network in Utah has matured, many data consumers became data contributors under the guidance of UGRC. It will be important for UGRC, WFRC, UDOT, and other proponents to communicate the benefits of data sharing in effort to institutionalize contributions to a common database. In the future, they would like to increase coordination with Federal agencies to determine data accuracy and ensure data exchanges moving forward.

Special thanks:

- Bert Granberg, Analytics Director, Wasatch Front Regional Council
- Matt Peters, Director, Utah Geospatial Resource Center
- Stephanie Tomlin, Central Planning Modeling, Data, and GIS Program Manager, Utah Department of Transportation

Quick-Reference Information

- **Project Phase:** System and Project Planning
- **Agencies/Partners Involved:** Utah Geospatial Resource Center, Utah Department of Transportation, Wasatch Front Regional Council
- **Location:** Wasatch Front Region, UT
- **Type(s) of Data Shared:** Roadway lanes, bike and pedestrian infrastructure, signal counts, pedestrian delay, collisions
- **Method of Data Sharing:** Housed on Utah Geospatial Resource Center website
- **Additional Resources:** **https://wfrc.org**; **https://gis.utah.gov**; **https://www.udot.utah.gov/connect**;