

**AASHTO GIS-T Symposium 2022
FHWA Elevating Equity Workshop
Proceedings Report**



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Introduction

The Federal Highway Administration (FHWA) sponsored a four-hour interactive workshop on Elevating Equity through Spatial Analysis and Visualization at the American Association of State Highway and Transportation Officials' (AASHTO) 2022 Geographic Information Systems for Transportation (GIS-T) Symposium. The purpose of the workshop was to present and explore practices for advancing environmental justice (EJ) and equity using spatial analysis and visualization tools for better decisions in transportation planning, programming, project development, and operations. The workshop also provided an opportunity for peer learning, networking, and knowledge sharing.

Background

The [AASHTO GIS-T Symposium](#) is an annual event that brings together the public and private sectors to share best practices, connect and share information with colleagues in the field, and learn about new technological developments and applications for GIS in transportation. AASHTO hosted its 2022 symposium on April 19-22, 2022, in North Charleston, South Carolina. Speakers from the U.S. Department of Transportation (USDOT), FHWA, State Departments of Transportation (DOTs), regional planning and transportation commissions, private firms, and universities demonstrated GIS tools and presented on GIS applications for planning, data monitoring and analysis, and asset management.

Of the 406 total attendees at the 2022 GIS-T Symposium, 161 work for a highway or transportation department at some level of government, 201 work in the private industry, 130 work at State DOTs, and 20 work for the Federal government. Across all organizations, 46 percent of attendees identify as GIS specialists – either as analysts, developers, or managers.

Workshop Overview

The objectives of FHWA's Elevating Equity through Spatial Analysis and Visualization Workshop were for participants to learn applications for geospatial data sets, analysis techniques, and visualization tools to design and deliver transportation projects that advance EJ and equity. Through presentations and peer sharing, attendees had the opportunity to learn more about using both quantitative and qualitative information in equity and EJ analysis. The workshop objectives are in line with [AASHTO's strategic equity plans](#) and [equity resolutions](#), the Administration's equity priorities.

FHWA asked workshop participants to respond to a voluntary poll on their workplace, goals for the workshop, and familiarity with GIS tools. Of the 15 participants who reported their workplace¹, 5 were from Metropolitan Planning Organizations (MPOs), 4 were from State DOTs, 2 were from the Federal government, and 4 were from the private sector. Attendees included staff from FHWA, South Carolina DOT, Arkansas DOT, Broward MPO, Atlanta Regional Commission, Hillsborough Transportation Planning Organization, Acadiana MPO, Caliper Corporation, and Timmons Group. Of those who responded to the poll, 65 percent reported a moderate level of knowledge about data and tools to address equity, while 24 percent reported that they have little knowledge.

Polled attendees reported that they were seeking tangible guidance such as tools and techniques that could be applied to mapping equity, equity-centered metrics and analyses, and processes to bring equity

¹ A total of approximately 40 participants attended the Elevating Equity Workshop. Poll results reflect only a subset of attendees who chose to participate in the polls.

into project selection. They also reported a desire to know about higher-level equity goals; for example, one attendee expressed interest in learning more about [Justice40](#) applications and implications. Other attendees indicated a desire for peer sharing and learning about how other agencies and communities think about equity and apply emerging best practices for supporting and advancing equity.

Workshop Summary

Emily Lawton, South Carolina Division Administrator, and Jennifer Hall, Deputy Director and Chief of Staff at AASHTO, provided opening remarks, framing the importance of equity and providing an overview of the workshop. The workshop was organized around a series of panels, each of which included brief presentations from panelists and group discussion. In addition to panel discussions, the workshop included an interactive breakout exercise for workshop participants and a close-out discussion on key takeaways from the workshop and how AASHTO, FHWA, and other Federal partners can best support participants' equity efforts moving forward.

Panel Summary

The sections below briefly summarize presentations from each workshop panel.

Panel 1: National-level Data and Transportation Equity

Jordan Riddle (Statistician, Bureau of Transportation Statistics, USDOT) presented on how USDOT modes use GIS and data in national databases and transportation equity frameworks. For example, the Federal Railroad Administration created a safety map and equity assessment using a Social Vulnerability Index and their own heatmap of train incidents. The Maritime Administration mapped pollution and population characteristics for the areas around their ports to screen for environmental impact. FHWA has a series of resources, including over 30 maps in [HEPGIS](#) and the [Screening Tool for Equity Analysis of Projects](#). FHWA is also developing new tools like the beta [Transportation Typology Exploratory Tool](#) to measure population, demographic, and transportation network characteristics in greater detail than simply a rural or urban category.

Carolyn Nelson (Environmental Protection Specialist, FHWA, USDOT) presented on the legal and policy background for equity initiatives in transportation, including [Executive Order \(EO\) 13985](#), which defines equity and requires Federal government agencies to pursue a comprehensive approach to advancing equity; and [EO 14008](#), which established the Justice40 Initiative requiring that 40 percent of the overall benefits of certain Federal investments flow to disadvantaged communities. The presentation also covered USDOT's methodology for developing its [Transportation Disadvantage Tool](#).

Krishnan Viswanathan (Principal, Data and Modeling, Cambridge Systematics) presented on his and JJ Zhang's process using [Census Transportation Planning Products](#) (CTPP) data to cross-tabulate equity metrics such as race, age, or poverty status with commute mode and timing data. This cross tabulation identified areas of interest, which the researchers combined with anonymized cell phone data to determine travel patterns by income, minority status, and other CTPP-defined equity variables and map transportation flows for disadvantaged populations.

Panel 2: Programming and Project Development

Jim Lam (Director, Transportation Applications, Caliper Corporation) presented on an effort to develop an accessibility tool to support Virginia DOT's Smart Scale project prioritization process. Caliper

compiled data on all streets, trails, and transit routes in the State and combined it with congestion metrics and demand forecasts to create a tool that calculates and scores the impact a given project would have on transportation access and duration for control populations and disadvantaged populations. Virginia DOT integrated the tool into the State's evaluation criteria for prioritizing projects to include access and equity as a project benefit.

Chase Nicholas (Geospatial Research Analyst, North Carolina State University, Institute for Transportation Research and Education) presented on the lessons learned in developing and refining a usable, versatile, and comprehensive tool for measuring a project's impact on surrounding communities in North Carolina's quantitative scoring system for transportation project funding. The final product measures and scores equity-related variables such as poverty, disability, or minority status in the region of a project's location. It also uses Python scripts to automatically update Census data and automated spatial analysis in GIS for ease of use by State planners.

Joy Riley (Director, I-526 Project, South Carolina DOT Office of Alternative Project Delivery) presented on EJ and equity in the context of [the I-526 Corridor](#) reconstruction project. The presentation covered South Carolina DOT's approach to mapping and visualizing their engagement efforts and the strategies they used to mitigate the burden on the community, including the DOT's role in developing new affordable housing for people displaced by the project.

Reese Brewer (Executive Director, Frontier MPO) presented on the strategies Frontier MPO uses to gather and use data to encourage equitable transportation and access to healthcare goals into planning. The MPO leveraged FHWA technical assistance to develop a transportation planning framework and supplemented it with products like CTPP and [EJScreen](#) for mapping. The presentation emphasized the importance of public input as a data source and explained how partnerships within nongovernmental organizations such as medical centers in the region have helped the MPO collect public comments through the Our Voice app and through traditional surveys.

Panel 3: Data and Planning

Tejas Kotak (Senior Planner, Transportation Access and Mobility Group, Atlanta Regional Commission) presented on the Commission's methodology for performing equity analyses, which includes comparing each Census tract in the Atlanta Metropolitan Area to a regional average for residents who are ethnic or racial minorities or who live below 200 percent of the Federal poverty line, and then mapping those concentrations to track changes in the region over time. Planners and policymakers can use this information for project siting, but the tool is not detailed enough for a full EJ analysis.

Joshua Barber (Planner II, Civil Rights Officer, ADA Coordinator, Hillsborough TPO) presented on the organization's [2021 Nondiscrimination and Equity Plan](#), which is intended to advance equitable processes and just outcomes above and beyond Federal and State requirements. To develop the plan, Plan Hillsborough reviewed historical planning documents and conducted comprehensive community mapping to identify communities of concern and connect current disparities to past discrimination through processes like redlining. The mapping project found a 20 percent higher severe crash risk and 13 percent more vehicle emission exposure in underserved communities than the county average. The TPO now reviews the proportion of funding dollars that are spent in low-income or majority minority neighborhoods, and it plans to include an equity needs assessment in the 2050 Long-Range Transportation Plan.

Peter Gies (Planning and Programming Systems Planning Manager, Broward MPO) and Carl Ema (Administrative Services Manager/Title VI Coordinator, Broward MPO) presented on the MPO's Transportation Planning Equity Assessment. The MPO pulled specific indicators from Title IV and other Federal nondiscrimination statutes and used Census data to map the indicators by block group and compare it to the county average. The MPO also convened a group of local stakeholders to incorporate on-the-ground knowledge and combined this knowledge with data to map the most vulnerable populations in the county. The MPO plans to use the assessment in long-range planning for project prioritization, in the Transportation Improvement Program to evaluate investment in different communities, and at the individual project level.

Ann Steedly (Founding Partner and Chief Operations Officer, Planning Communities LLC) presented on strategies to support transportation equity in planning. Strategies include identifying needs and services early in the planning process through public engagement and data analysis and conducting cross-discipline analysis to understand how concerns like environmental or climate hazards impact access to transportation. The presentation also recommended public visualizations like maps or dashboards to make equity metrics clear and to transparently demonstrate progress.

Interactive Breakout Session

Keith Moore (FHWA Resource Center) facilitated a 40-minute breakout session. Participants were divided into groups and assigned one of four discussion topics:

1. Geospatial data and resources, tools, and techniques
2. Staffing and training
3. Integration of equity and performance measurement
4. Partnerships, including non-traditional partners

The breakout groups discussed the top challenges their organizations face in using spatial analysis and visualization tools to advance equity in decision-making and identified best practices or good examples of effectively using spatial analysis and visualization tools to advance equity. After the discussion, the groups reported key takeaways to the full group.

Key Workshop Takeaways

Poll Response Themes

Throughout the workshop, attendees participated in polls to indicate their specific interests, experience with equity analysis, and takeaways from the workshop. The information from the participants who responded to the polls is summarized below.²

- ***Why is your organization interested in equity?*** Attendees indicated that they are interested in transportation equity because it is currently a blind spot in planning and project development, because they are seeking new tools for assessing burdens on disadvantaged communities, for better compliance with regulations and guidelines, because they want to help other organizations achieve their equity goals, and because they want to better serve their communities.

² A total of approximately 40 participants attended the Elevating Equity Workshop. Poll results reflect only a subset of attendees who chose to participate in the polls.

- **What are the greatest obstacles that you encounter while trying to address equity?** The greatest obstacles attendees face in trying to address equity are defining equity, developing precedents for equity work without guidance, accessing and analyzing high-quality data, using quantitative metrics to capture complex issues, inadequate staffing and funding, and finding tools to achieve equitable solutions.
- **What's one thing you learned today that you aim to implement in the future?** Attendees indicated that they plan to use qualitative data – either on its own or blended with quantitative data – through the specific applications, maps, and data that they learned about during the workshop. Participants also indicated intention to collaborate and focus on better public engagement, and found the specific Federal equity definitions useful for framing equity work.

Discussion Themes

Themes that emerged through presentations and subsequent discussion are summarized below. These themes relate to defining equity, implementing equity within an organization or in transportation projects, and building professional community to develop greater understanding of equity needs and solutions.

Incorporating equity into existing systems: State and regional transportation planning processes can be rigid, and it can be difficult to incorporate EJ and equity concepts in a comprehensive way. Practitioners are tasked with translating complex concepts of what it means to be “overburdened” or “underserved” into data that can be fed into project evaluation. Workshop presenters shared examples of data or combinations of data that they have used to incorporate equity and EJ into project evaluation and long-term planning; however, there is no one agreed-upon way to convert equity concepts into data without losing important nuance and detail. One presenter proposed designing analysis tools around the ultimate goal of delivering equitable projects. For example, if a State DOT makes transportation project funding decisions based on set formulas, adding a numerical equity score to the process would impact the residents of that state much faster than changing the entire review system.

Importance of partnerships: Many participants brought up the importance of peer-to-peer sharing and of working with other agencies to develop best practices and exchange experiences related to incorporating EJ and equity into transportation planning and implementation. Presenters shared examples of working with hospitals, universities, and housing providers to build robust and equitable transportation solutions. An AASHTO representative also discussed the organization’s expanded partnerships with organizations that focus on equity, including [Women’s Transportation Seminar](#), [Conference of Minority Transportation Officials](#), and the [Transportation Research Board Minority Student Fellows Program](#) to spur change in the organization and challenge current thinking on how to lead or prioritize equity in transportation planning and project development.

Capacity and resources impact scale of equity work and innovation: Smaller organizations reported relying on the data and tools put out by national organizations and using Federal products like CTPP extensively. MPOs, State DOTs, and private companies with more staff and financial resources have more extensive data collection and analysis practices. Larger, more well-resourced organizations can leverage their resources to test multiple approaches and develop tools that can then be used as examples for others. Work produced by AASHTO and FHWA provides model frameworks for smaller organizations, so it is critical that their tools and guidance address the needs of smaller, under-resourced organizations and are widely accessible. Cross-agency coordination and peer learning

opportunities are important to ensure all practitioners can share methods and best practices in pursuit of a shared equity goal.

Understanding data sources and analysis methodologies are critical for delivering equity: Workshop participants were interested in understanding the specifics of data and information that is used for equity analysis and mapping, including the types of data and information that is available, what they can find in each data set, and how often data and information is updated. Some panelists presented an expanded definition of data, which includes public comments, focus group discussions, and other communications.

Equity beyond transportation – health, housing, and climate: The workshop presentations and discussions frequently recognized interconnections between equity and concepts such as climate and resiliency, public health, and housing. Practitioners demonstrated interest in understanding the intersection of these issues and how this understanding can lead to more equitable transportation outcomes. One panelist presented an example of partnering with a local hospital to gather data on whether people in the region could easily travel to access healthcare. Another panelist discussed the challenges of addressing climate threats to regional transportation systems when the causes of climate change occur at a much broader level. Notably, representatives from the South Carolina DOT discussed its partnership with a regional housing authority to develop new affordable units to mitigate the displacement caused by a highway rebuild. A comprehensive definition of equity includes consideration not just of transportation’s direct benefits and burdens, but also of the connected issues that feed into the strength and wellness of a community.

Next Steps

Workshop participants shared how AASHTO, FHWA, and other Federal partners can support their equity efforts.

Resources and instructional materials: AASHTO, FHWA and other large national partners can develop and centralize resources on equity in spatial analysis and transportation planning. Participants reported that they faced issues in day-to-day work on equity analysis because of challenges in accessing relevant data – such as detailed demographic information – and the tools to analyze that data. They also indicated a need for more resources on methodology, including how to apply qualitative analyses or examples of projects that effectively incorporated an equity analysis. Overall, attendees said that peer exchanges, deep dives, and case studies would be valuable to see a variety of examples and learn more from what others are doing, but that they also wanted independent resources like a case studies toolbox or a web-based repository of data sources.

Guidance and best practices: Participants expressed a need for guidance and best practices. They suggested a best practices handbook to cover data standards and the stages of equity analysis, including acquiring and analyzing the data, integrating equity into planning, working with partners, and developing performance metrics. Participants suggested that AASHTO and FHWA are well-suited to set practical definitions and create a shared, uniform understanding of equity analysis among transportation professionals.

Partnerships: Participants recognized the continued importance of working with partners and noted that they need assistance integrating equity work across multiple organizations or agencies and across

offices within those organizations or agencies. Attendees also suggested that more work can be done to facilitate collaboration on equity across Federal agencies, which can in turn communicate a collaborative, united approach to equity to State and local governments.

Reviewing funding and past policy: Participants suggested that FHWA and AASHTO could review policies or guidance to determine if they can update existing rules or requirements to add equity metrics or considerations. Participants suggested that FHWA use its funding authority to advance equity and tie more equity-related metrics to discretionary funding awards. FHWA can consider other points of implement more workforce diversity initiatives to bring more Disadvantaged Business Enterprises into the transportation project pipeline.

Conclusion

FHWA and AASHTO can continue to support State, regional, and local efforts to advance equity and EJ and address the challenge of using data analysis and visualization to better understand and advance equity at the project level.

Participants in the workshop expressed a desire to better serve their communities by improving existing processes or establishing new processes to evaluate the equity of their programs and projects. They identified barriers to performing robust equity analysis such as lack of prior experience, difficulty accessing data and tools, and resource and funding constraints.

Workshop participants shared information ranging from high-level Federal priorities related to EJ and equity to detailed tools and strategies for measuring the impact of an individual transportation project in a single community. The workshop also provided a place for participants to connect with peers and to communicate with Federal partners how their actions can best support transportation practitioners at all levels.

These insights will inform FHWA's approach to developing the tools, resources, and opportunities to advance equity across the U.S.