

Integrating Public Health and Equity into Transportation Planning for Federal Land Management Agencies



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16. Abstract As attention to public health and equity continues to grow, there is particular interest in understanding and improving the relationship between public health, equity, and transportation and mobility. However, incorporating public health and equity considerations into transportation planning is not yet standard practice across Federal land management agencies (Federal land agencies) and warrants further study to improve future transportation planning outcomes on Federal lands. Federal lands are a key resource for the nation's residents, and finding ways to better integrate health and equity considerations should ensure that these areas improve opportunities for addressing public health concerns into the future. This research project developed recommendations for a framework that integrates public health and equity considerations into transportation planning processes for Federal land agencies. This study relied on surveys and interviews with Federal land agency staff, case study research, and site visits to Federal lands to develop project-level and process-oriented recommendations for Federal land agencies to integrate public health and equity into transportation planning. The research also generated an implementation plan, which includes actions that are needed at the headquarters and unit-level for Federal land agencies to transform these recommendations into action.			
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Acronyms and Abbreviations

ACP	Area of Concentrated Poverty
ACS	American Community Survey
ATSDR	Agency for Toxic Substances and Disease Registry
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
CDC	Centers for Disease Control and Prevention
CDT	Continental Divide National Scenic Trail
CEJST	Climate and Environmental Justice Screening Tool
DOI	U.S. Department of the Interior
EAP	Equity Action Plan
EKO	Every Kid Outdoors
FAST Act	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
GIS	Geographic Information Systems
GNRC	Greater Nashville Regional Council
HHS	U.S. Department of Health and Human Services
HIA	Health Impact Assessment
HUD	U.S. Department of Housing and Urban Development
JEDIA	Justice, Equity, Diversity, Inclusion, and Accessibility
KPI	Key Performance Indicators
MAP-21	2012 Moving Ahead for Progress in the 21st Century Act
MDOH	Minnesota Department of Public Health
Met Council	Metropolitan Council (the MPO of the Minneapolis-St. Paul Twin Cities region)
MnDOT	Minnesota Department of Transportation
MPO	Metropolitan Planning Organization
NEPA	National Environmental Policy Act
NPS	National Park Service
RAISE	Rebuilding American Infrastructure with Sustainability and Equity
Reclamation	U.S. Bureau of Reclamation
RTP	Regional Transportation Plan
STEP-HIA	Studying Trail Enhancement Plans-Health Impact Assessment
STIP	State Transportation Improvement Program
SVI	Social Vulnerability Index
TAG	Technical Advisory Group

TIGER	Transportation Investment Generating Economic Recovery
TIP	Transportation Improvement Program
USACE	U.S. Army Corps of Engineers
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
WINGS	Women in Nature Gaining Skills

1. Introduction

Transportation is an important part of the built environment that directly and indirectly affects an individual's physical, mental, and social health. A recent examination of the linkage between transportation and public health noted “a growing awareness that transportation systems and their impacts and consequences have an important role in the incidence and magnitude of health issues over and above simply being the source of unhealthy pollutants” (Meyer & Elrahman, 2019). Further, transportation can affect the ability of all citizens to access resources and destinations essential to healthy living and well-being. Transportation planning has and can produce inequitable outcomes, especially for those who have been historically underserved and vulnerable, including older adults, children, low-income populations, and communities of color. Incorporating public health considerations into transportation planning can promote health equity by reducing health disparities related to transportation and access and prioritizing projects for historically underrepresented and vulnerable populations that meet their needs.

Federal Land Management Agencies (Federal land agencies) have responsibility for a significant percentage of the lands in the United States. The Federal Government has title to about 650 million acres, or about 30 percent of the country's total area of 2.3 billion acres (Congressional Research Service, 2020). Additionally, the Federal Government holds approximately 55 million acres in trust on behalf of Tribal Governments. Various Federal land agencies manage these Federal lands, including the Bureau of Indian Affairs (BIA), U.S. Forest Service (USFS), the National Park Service (NPS), the U.S. Fish and Wildlife Service (USFWS), the Bureau of Land Management (BLM), and the U.S. Army Corps of Engineers (USACE). In each case, the Federal land agency depends on transportation infrastructure and services to achieve the full potential of health benefits. Expanding access through equitable, innovative, and inclusive transportation policies, plans, and projects can:

- Reduce and prevent motor-vehicle-related injuries and deaths.
- Promote healthy lifestyles through active transportation.
- Reduce air pollutant emissions.
- Reduce chronic diseases and limit the spread of infectious diseases.
- Stimulate economic development.
- Improve mental health.
- Improve access to opportunities afforded by Federal lands.

This study (1) examined how Federal land agencies currently consider public health factors in their transportation planning efforts; (2) investigated the use and usefulness of health-related transportation performance measures; (3) synthesized and disseminated examples of the successful integration of public health and equity into transportation planning; and (4) developed an implementation plan for disseminating useful data and lessons learned, best practices, and recommendations from interviews and the evidence-based research.

This study is a starting point for practitioners at Federal land agencies to think about how to integrate public health and equity into transportation planning. Ultimately, the findings from this study led to the generation of three key outcomes to support Federal land agencies in this process: (1) process-oriented practices strategies that are intended to support agencies and staff to change practices and build capacity to integrate public health and equity into their work, (2) project-level strategies to support integrating public health and equity considerations into specific project decisions at Federal lands, and (3) an implementation plan to guide action on these recommended strategies.



Practitioners can consider public health, equity, and transportation planning and decision-making in the context of Federal lands in many different ways. For example, the Federal Highway Administration (FHWA) describes aspects of the transportation planning process into which public health and equity can be integrated, including visioning, long-range planning, bicycle/pedestrian planning, sustainable transportation, data capture/assembly, performance measurement development, and monitoring (USDOT, FHWA, 2021). This study used the different phases of a transportation planning process as a guide to identify where and how public health and equity—as it relates to access and equitable public health and transportation outcomes—could be better integrated.

The report is organized as follows:

- Section 2 describes the study approach.
- Section 3 presents definitions of key terms; illustrates the relationship among public health, equity, and transportation planning; and introduces the transportation planning framework used in this research.
- Section 4 describes key features of the current state of transportation planning and public health and equity for Federal land agencies, including describing performance measures and their relation to public health. Section 4 also describes the current Federal efforts to address equity.
- Section 5 presents the process for identifying effective practices and summarizes key findings from the case studies by transportation planning phase.
- Section 6 summarizes the recommended process-oriented and project-level strategies and practices.
- Section 7 presents hypothetical examples of the application of the process-oriented strategies to demonstrate how Federal land agencies might adopt and operationalize these practices.
- Section 8 offers an implementation plan with actions Federal land agencies can take to implement the study results.
- Appendix A lists the members of the Technical Advisory Group (TAG) and additional subject-matter experts who provided invaluable input into this study.
- Appendix B presents a summary of the survey questions.
- Appendix C presents detailed descriptions of the case studies and abbreviated case studies.
- Appendix D presents a detailed summary of Federal equity goals and data tools.

Throughout the report, findings from the abbreviated case studies are summarized in text boxes to highlight key findings that are relevant to different Federal agency contexts.

2. Study Approach

The study was organized in six major steps:

- Step 1: Establish the baseline of current Federal land agency efforts at integrating public health, equity, and transportation.
- Step 2: Document and compare health, equity, and transportation performance measures among Federal land agencies and the U.S. Department of Transportation (USDOT).
- Step 3: Identify and synthesize case studies of successful Federal land agencies and state/local transportation agencies integrating public health and equity concerns into transportation planning.
- Step 4: Develop a transportation planning, public health, and equity framework.



- Step 5: Summarize and communicate findings.
- Step 6: Develop a plan for implementing study findings.

The study was guided by a multidisciplinary TAG consisting of Federal agency representatives, subject-matter experts, and other agency representatives who are knowledgeable about public health, equity, and transportation planning. The TAG met quarterly throughout the study and provided input and feedback on study data, findings, and products. On two occasions, the TAG meetings were expanded to include other subject-matter experts in a facilitated, online workshop format. The list of advisory group members and additional workshop participants is provided in Appendix A.

3. Public Health, Equity, and Transportation Planning

This section describes the foundational elements of the project, including definitions used and the transportation planning framework that was central to identifying effective practices and generating recommendations for Federal land agencies. These elements served as the basis for how the study team conducted the research and laid the foundation for the recommendations summarized in Section 6.

3.1. Definitions

The following definitions are used throughout the study:

- **Health** is a “dynamic state of complete physical, mental, spiritual, and social well-being and not merely the absence of disease or infirmity.” (World Health Organization, 1998)
- **Public health** is the science of protecting and improving the health of people and their communities.¹
- **Equity** focuses on the fairness and opportunity with which impacts are distributed among different populations.

Executive Order 13985, *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*, defines equity as “the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment, such as Black, Latino, and Indigenous and Native American persons, Asian Americans and Pacific Islanders and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality.”

Mesa County Healthy Trails Program and the Bureau of Land Management

The Grand Valley Strategic Trails Plan establishes a road map for planning, creating, and managing trail recreation in Mesa County, Colorado, to better realize the potential for economic development and for improved public health outcomes (Kuhr, 2019). This plan found that only 32 percent of trail users resided in Mesa County, and opportunities existed to increase trail and public land use by local residents. In 2019, Mesa County’s Department of Public Health hired a Public Health Trails Coordinator to coordinate trail maintenance and improvement activities to increase public accessibility to nonmotorized trails (Kuhr, 2019). The coordinator has collaborated with BLM in implementing the plan, including partnering through a grant provided by a non-profit to perform trail maintenance and identify new trails.

¹ The TAG developed this definition for the purposes of this study.



- **Transportation planning** is a cooperative process designed to foster involvement by all users of the system, such as businesses, community groups, environmental organizations, the traveling public, freight operators, and the general public, through a proactive public participation process (USDOT, 2022a).

3.2. **Defining the Relationship Between Transportation, Public Health, and Equity**

For purposes of this research, the study team identified seven primary ways that Federal agency transportation planning and decision-making connects with public health and equity, including (see Table 1):

1. Provides access.
2. Provides safe passage (roads, trails, personal safety).
3. Provides emergency response capabilities.
4. Offers physical activity, mental health, and active transportation opportunities.
5. Optimizes nature/health, promoting experiences for all.
6. Reduces pathways for the spread of infectious disease.
7. Reduces environmental and climate change impacts.

These seven characteristics framed the study approach and were the focus of identifying Federal agency strategies to promote public health and equity outcomes for transportation projects. Surrounding and nearby towns, Tribal lands, and gateway communities to Federal lands might also need to be included when considering public health considerations in transportation planning, policies, education, and programs.



Table 1 Linking Transportation, Public Health, and Equity Goals for Federal Land Agencies.

Transportation Planning Objectives							
	Provide Access	Provide Safe Passage (Roads and Trails, Personal Safety)	Provide Emergency Response Capabilities	Offer Physical Activity, Mental Health, and Active Transportation Opportunities	Optimize Nature/Health-Promoting Experiences for All	Reduce Pathways for the Spread of Infectious Diseases	Reduce Environmental and Climate Change Impacts
Public Health and Equity Goals	Provide easy, affordable access to parks, recreational areas, cultural resources, transit, and other important destinations. Access refers to the ability of people to enter Federal lands, how they do so, and the extent to which they can use the amenities within, such as trails and campsites.	Promote safety and eliminate serious injuries for all users through implementation of a Safe System approach that is proactive, redundant, and shares responsibility for the management and implementation of improvements that consider humans make mistakes and vulnerability.	Ensure emergency vehicles can access Federal lands quickly and efficiently, and plan and implement robust evacuation routes and procedures that allow for adequate ingress and egress in the event of an emergency or natural disaster.	Provide opportunities for safe and convenient active travel. Ensure that health-promoting experiences afforded on Federal lands and their benefits are available to all.	Optimize exposure to nature and associated health benefits afforded by programs, facilities, and environments on Federal lands, including mental and physical health with benefits such as reducing blood pressure, increasing levels of immunity, and improving memory and mood.	Mitigate the spread of potentially harmful human to human diseases at Federal lands, such as nature centers and offices, to the surrounding communities and beyond. Mitigate spread to and from and among wildlife including pandemics like COVID-19, norovirus, or zoonotic diseases (i.e., Bubonic Plague, West Nile Virus).	Reduce chronic diseases that are related to air pollution, including heart, stroke, and other cardiovascular diseases. Reduce greenhouse gas (GHG) emissions and potential effects of climate change on the Federal land agencies' transportation systems. Reduce water, air, dust, soil, and litter pollution and their associated impacts. Protect natural resources and ensure facilities and infrastructure are resilient. Reduce air emissions and noise pollution and its impact on wildlife populations, visitors and nearby communities and Tribal lands especially related to construction, renovation, and operation. Mitigate the potential for and impact of worsening natural disasters (i.e., wildfires, flooding, mudslides, and drought because of climate change).
Transportation Topics to Consider	Provide access points for alternative forms of transportation, including bikes and transit. Implement staff training and hiring practices. Provide interpretive signage that includes languages other than English. Include accessibility features, such as large print or braille and auditory options, in messaging materials. Develop written materials for various readability levels. Provide interpretive signage describing historical/cultural events. Provide access for people of all abilities and ages (e.g., on trails, wayfinding, Americans with Disabilities Act)-compliant parking, access to park features, shelter/shade, handrails).	Implement Vision Zero goal of zero deaths and serious injuries on Federal lands. Encourage no risky behavior (i.e., attentive, calm, and unimpaired driving). Reduce traffic congestion, e.g., transit, pedestrian/bike accommodations. Implement commercial vehicle strategies (e.g., truck underride guards, improvements to direct vision). Implement safe road designs/improvements (i.e., separation of pedestrian/bike from auto traffic). Design with human mistakes in mind. Increase walking trail safety (i.e., cliffs, drainage, wildlife). Implement USDOT Complete Streets guidance.	Increase emergency vehicle access to lands and recreation areas. Require specialized training for emergency medical services and search and rescue services that serve Federal lands. Design evacuation routes for natural disasters and emergencies. Build sufficient ingress/egress routes. Develop shelter-in-place strategies. Enhance Federal land manager coordination with local (non-Federal) search and rescue groups.	Reduce auto-dependency. Increase access to sustainable transportation. Make walking and cycling safer and more attractive to encourage people to visit parks to experience Federal lands. Develop accessible trails and multiuse paths. Improve nonmotorized transportation networks and connectivity. Implement bike share programs. Build on-street bicycle and pedestrian infrastructure. Implement Safe Routes to Schools Programs (BIA) and consider implementing safe routes to parks programs.	Maintain or enhance greenspace, tree canopy and native vegetation along transportation corridors, comfort stations, shuttle stops and access points. Implement structured programs, community campaigns, and improved access to natural environments. Implement "walking school bus" programs that include pathways in and near natural environments. Protect natural sound environments.	Establish protocols for potential threats with local, state, Federal health agencies, and Tribal Governments. Build and maintain sanitary and accessible restroom facilities. Establish protocols and procedures for monitoring and addressing wildlife with infectious diseases (e.g., rabies).	Promote active transportation, auto-free zones, and zero-emission vehicles (park service vehicles and visitor vehicles). Introduce/expand transit such as shuttle to bring visitors into and through a park to reduce vehicle load and idle emissions and increase walking. Provide accessible, free, safe drinking water options, especially in hot months. Promote environmental justice principles and address health disparities. Mitigate dust generated by cars and buses on dirt roads has health implications that are aggravated by climate change and is prevalent in Tribal communities.



Transportation Planning Objectives							
	Provide Access	Provide Safe Passage (Roads and Trails, Personal Safety)	Provide Emergency Response Capabilities	Offer Physical Activity, Mental Health, and Active Transportation Opportunities	Optimize Nature/Health-Promoting Experiences for All	Reduce Pathways for the Spread of Infectious Diseases	Reduce Environmental and Climate Change Impacts
Transportation Questions Related to Public Health and Equity	<p>Do all individuals, regardless of their race/ ethnicity, age, gender, income, and ability, have equal access to Federal lands?</p> <p>Do the Federal land agencies' transportation programs and/or policies have a disproportionate impact on any one particular population group over another?</p>	<p>What laws, programs, and campaigns can be implemented or improved to encourage users to engage in safer behaviors?</p> <p>What road/trail designs can be considered to improve safety (e.g., road diets, modal separation)?</p> <p>What are the posted speed limits at different Federal lands?</p> <p>Does the design of roadways support the posted speed limit?</p> <p>Are there opportunities to make trails accessible to wheelchair users?</p>	<p>What are Federal land agencies' key evacuation routes out of Federal lands and surrounding communities?</p> <p>How can emergency services be tailored to meet the most significant health risks on Federal lands?</p> <p>How can emergency supplies, personnel, and services reach affected people or populations?</p> <p>What kind of emergency response and management partnerships exist between Federal land agencies and Tribal Governments?</p>	<p>How do we get more people moving and physically active at Federal lands?</p> <p>What are the barriers to all users being able to choose to walk or bike or roll (wheelchair, walker)?</p> <p>How do we entice people to visit Federal lands and stay longer for the benefit of their own physical, mental, social, and spiritual health and return to Federal lands more frequently?</p> <p>What barriers, such as disruptive noise or limited accessibility, and safety concerns discourage users from being active?</p> <p>How can non-vehicular trips be measured and monitored on Federal lands?</p>	<p>How do we entice people to visit Federal lands and stay longer for the benefit of their own physical and mental health?</p> <p>How can transportation systems optimize exposure and interaction with the health benefits of nature?</p>	<p>How can transportation systems/services at Federal lands support the prevention of the outbreak and spread of infectious diseases?</p> <p>How should Federal lands staff respond in the event of an outbreak?</p>	<p>What strategies can help reduce GHG emissions at Federal lands and surrounding communities?</p> <p>What transportation projects severely and/or inequitably impact human or natural environments and resources?</p> <p>How do the Federal lands' transportation systems impact regional and site-specific air and water quality?</p>



3.3. Transportation Planning Framework

Additionally, the study identified seven phases of Federal land agencies' transportation planning process where public health and equity concerns could be considered and addressed. Table 2 shows these seven phases along with bulleted key components associated with each phase. The planning process will likely vary from one Federal land agency to another, but generally, the key phases are likely to be found in every transportation planning and project development effort.

The individual phases in the framework represent key points in agency decisions that could lead to greater consideration of public health and equity in transportation planning. This framework serves as the basis for the recommendations provided in subsequent sections of this study. More detail on these phases is provided in the following sections.

Table 2 Transportation Planning Framework.

Transportation Planning Process Phases	Key Components
Enabling/Building Organizational Capacity	<ul style="list-style-type: none"> • Partnerships and collaboration • Education • Training • Guidance
Policy Planning (Agency)	<ul style="list-style-type: none"> • Agency visioning/mission statement • Policy research and development • Policy implementation, guidance, and dissemination
Long-Range Planning	<ul style="list-style-type: none"> • Agency visioning statement • Goals, objectives, and strategies • Community/regional visioning • Air quality planning • Plan performance measures • Innovative public and stakeholder engagement
Technical Planning	<ul style="list-style-type: none"> • Corridor planning • Project planning • Bike and pedestrian planning • Park transportation planning • Traffic operations study • System, area, topic specific, emergency planning
Programming/Prioritization/ Project Selection	<ul style="list-style-type: none"> • Local/State transportation improvement programs • Funding
Project Development	<ul style="list-style-type: none"> • Project planning • Environmental analysis • Preliminary and final project design
Implementation, Monitoring, and Evaluation	<ul style="list-style-type: none"> • Maintenance • Operations • Monitoring/performance measurement and management • Construction



4. Current State of Transportation Planning for Federal Land Agencies and Federal Equity Initiatives

The initial stages of research were focused on how Federal land agencies currently integrate public health and equity considerations into transportation planning and the performance measures that Federal land agencies already use that relate to public health. The study team also conducted research on the ways the Federal Government is prioritizing equity in its agencies and programs. The following sections highlight key findings from this research, emphasizing the need for continued focus in this area to integrate public health and equity into transportation planning for Federal land agencies.

4.1. Survey and Interviews with Federal Land Agencies

The study team conducted interviews with staff at NPS, USFS, BLM, USACE, and USFWS. Additional interviews were conducted with staff from the Centers for Disease Control and Prevention (CDC). Following the initial interviews, the study team administered a survey to Federal land agency staff. The purpose of the planning survey was to better understand whether and how Federal land agency staff integrate public health into transportation planning, programs, and policies. The survey was framed within the context of a broad definition of public health, as defined with support from the project's TAG. Respondents were asked to consider the multiple audiences that public health issues may affect, including Federal land agency staff, Federal land agency visitors, and/or local communities adjacent to public lands.

Prior to distributing the survey, the study team conducted six interviews with Federal land agency contacts to inform survey development and learn about existing efforts and opportunities for integrating public health into transportation planning. The survey intended to reach a larger number of Federal land agency staff beyond the interviewees, such as region/district-level and unit-level staff. The survey also informed research into case studies and project examples of noteworthy practices in public health and transportation planning on Federal lands.

The survey was open from March 11 to April 14, 2021. The survey was distributed to 100 Federal staff members. Members of the TAG (or other Federal agency headquarters staff) provided the study team with a list of approximately 15 to 20 contacts from their agency. In addition, the survey invitation encouraged invitees to forward the survey link to their colleagues. Agency staff from BLM, USFWS, USFS, NPS, and USACE completed the survey.

Given the relatively small sample size and the mix of different staff, the survey results are not representative of the Federal land agencies; rather, they provide qualitative insights and a snapshot of general themes. The study team coded open-ended responses by various categories including by the study's public health definition topics. Some "Other" responses have been coded into existing answer choices, as appropriate. Appendix B includes a summary of the survey questions.

The findings of the survey highlight that Federal land agencies generally address public health in the context of safety; active transportation; environmental impacts, climate change, and resilience; and nature-based design/exposure to nature. These survey results align with the interview findings, where the study team learned that Federal land agencies address public health issues in their transportation planning or projects, but they typically do not frame these efforts in terms of "public health." Rather, the public health benefits are viewed as an indirect benefit or byproduct.

Most respondents (83 percent) reported that their agency is considering aspects of public health in their transportation planning processes (even if indirectly); however, the extent to



which the agencies have established public health-related goals, objectives, and performance measures is unclear. Most respondents (54 percent) indicated that they do not know if their agency is engaging in this work. About a third of the respondents reported having developed public health-related goals and objectives, and only 8 percent have developed performance measures. These survey findings suggest public health is not explicitly defined in mission statements and/or transportation planning workflows at Federal land agencies. Common challenges that agencies face in incorporating public health into transportation planning include limited number of staff, lack of funding, and limited public health expertise.

When asked for suggestions on how public health could be better integrated into transportation planning, some respondents pointed to the need for Federal land agency leaders and decision-makers to provide direction and vision. One respondent noted “developing the tools, process and timelines for improvement must begin from where we are, rather than where we think we should be.” Overall, the findings indicate that practitioners have preliminary tools to begin integrating public health and equity into transportation planning, but more capacity building, research, and collaboration is needed to fully integrate public health into Federal land agency transportation planning, programs, and policies.

Public-Facing Federal Land Agency Health Programs

Women in Nature Gaining Skills (WINGS), Indiana: Launched in 2019, WINGS offers free events focused on teaching women about outdoor skills. It is a collaborative effort between female outdoor professionals in the Indiana Division of Fish and Wildlife, Indiana State Parks, Hoosier National Forest, Monroe County Parks and Recreation, and the City of Bloomington Parks and Recreation Department.

Every Kid Outdoors (EKO), National: Created in 2015 by the U.S. Department of the Interior, EKO allows 4th graders and family members free access to over 2,000 Federal lands and waters.

Hoosier National Forest, Indiana: The Hoosier National Forest and Indiana University Health Bloomington Hospital created the “Health and Public Lands” pilot program to provide therapeutic nature-based experiences for community members on national forest system lands and strengthen community ties to public lands.

Veteran Access to Public Lands, National: Since 2020, Gold Star Families and U.S. military veterans are eligible to receive free access to more than 2,000 Federal recreation areas, including national parks, wildlife refuges, and forests.

4.2. Performance Measures

The study team researched the current state of transportation planning at Federal land agencies through the lens of performance measures. Over the past 20 years, the Federal Government and many State and local agencies have adopted performance-oriented planning, decision-making, and program development. This emphasis in transportation was codified in the 2012 Moving Ahead for Progress in the 21st Century Act (MAP-21) and in the 2015 Fixing America’s Surface Transportation (FAST), which required the USDOT to establish transportation performance measures and required states and regions to set performance targets for those measures. Since the passage of these two laws, every State DOT and metropolitan planning organization (MPO) has established a set of performance measures that



can be used to monitor how investments in the transportation system are changing system performance and conditions over time.

Table 3 shows example performance measures currently used by Federal land agencies, including USFWS, NPS, and the U.S. Bureau of Reclamation (Reclamation), in long-range transportation plans. As expected, Federal land agencies have different ways of tracking performance, including an internal dashboard for tracking performance measures updated annually (used by NPS), and an annual benchmarking report that tracks performance measures and progress toward meeting long-range transportation plan goals (used by USFWS).

Table 3 Public Health-Related Performance Measures in Agency Long-Range Transportation Plans.

Public Health Topic	Performance Measures
Active Transportation	<ul style="list-style-type: none"> • Percentage of trail miles in good or excellent condition (USFWS) • Increase the total number of multimodal connections to refuges and hatcheries (USFWS) • Increase the number of multimodal transportation options on refuges and hatcheries (USFWS) • Increase number of projects that improve access at main ingress/egress points (USFWS) • Identify a list of high-use sites that have a high risk of turn back to determine whether there are transportation improvements needed (Reclamation)
Air Quality/Climate Change	<ul style="list-style-type: none"> • Percentage decrease in NPS transportation system emissions (NPS) • Reduction or offset of the carbon footprint of the transportation network (USFWS)
Equity	<ul style="list-style-type: none"> • Percentage of transportation contracts and projects that include accessibility language and comply with accessibility-related laws, regulations, and policies (NPS)
Safety	<ul style="list-style-type: none"> • Completion of the NPS Transportation Safety Management System (NPS) • Number of completed safety assessments for highly visited refuges (USFWS) • Reduction in number of transportation-related fatalities that occur on refuges and hatcheries (USFWS) • Reduction in number of wildlife/vehicle collisions (USFWS) • Identify a list of sites needing safety assessments or Road Safety Audits (Reclamation)

4.3. Equity and Transportation Planning at Federal Land Agencies

The study team also researched current Federal equity plans and initiatives to set the context for issues that Federal land agencies should be considering in their transportation planning. As Federal land agencies integrate public health considerations into their transportation planning processes, equity should be explicitly addressed. For example, it is important to consider how to expand transportation access to Federal lands specifically among underserved communities by providing affordable and efficient transportation options. People in these communities cannot experience the outdoors, and all of the health benefits those experiences provide, if they cannot afford to get to or access public lands.

Some of the statistics below highlight the existing inequities in access to and enjoyment of Federal lands. The USFS National Visitor Use Monitoring Results are summarized in Table 4. The data indicate that visits to national forests and wilderness areas are overwhelmingly made by white populations compared to other racial and ethnic groups.



Table 4 Percent of National Forest and Wilderness Visits by Race and Ethnicity for Fiscal Years 2016–2020. (USFS, 2020)

Race/Ethnicity	National Forest Visits (Percent)	Wilderness Visits (Percent)
American Indian/Alaska Native	2.0	1.8
Asian	3.0	4.3
Black/African American	1.2	0.9
Native Hawaiian or other Pacific Islander	0.6	0.6
Spanish, Hispanic, or Latino	6.9	6.0
White	95.2	94.4

Additional data from the NPS similarly indicates that non-white populations make fewer visits to national parks:

- Black/African Americans make up 13.4 percent of the total U.S. population as of April 2020. However, in 2018, 6 percent of visitors to national parks were Black or African Americans (NPS, 2019).
- The Hispanic/Latino population in the U.S. makes up 18.5 percent of the total U.S. populations as of April 2020. However, in 2018, 13 percent of visitors to national parks were Hispanics/Latinos (NPS, 2019).
- While Non-Hispanic/White Americans make up 60.1 percent of the total U.S. population as of April 2020, in 2018, 77 percent of visitors to national parks were White Americans (NPS, 2019).

These data points help illustrate inequitable access to USFS and NPS lands by race and ethnicity.

Federal agencies developed Equity Action Plans (EAPs) to lay out steps address these inequities in their respective subject-matter and geographical jurisdictions. Elements of these plans that relate to public health and equity in transportation planning for Federal land agencies are shared below.

4.3.1. U.S. DEPARTMENT OF TRANSPORTATION EQUITY ACTION PLAN

The 2022 USDOT EAP is a living document that establishes a foundation for equity, highlighting key actions and steps that USDOT will take to create a more equitable transportation system and country (USDOT, 2022b). The plan includes four focus areas—**wealth**

Access to Angeles National Forest for Diverse Populations

The USFS and its partners promoted improved access to Angeles National Forest for diverse populations who may have different social and activity preferences. Over the years, park officials, regional decision-makers, and community groups have worked collaboratively to better understand the access needs to the national forest and to examine the different strategies in providing this access (USFS, 2021).

Key steps made by the regional partners to enhance access to the national forest include forming a Transportation Work Group, conducting a pilot shuttle service for four weekends, and conducting a transit corridor analysis to examine alternative means of accessing the national forest, with special consideration for diverse populations (Volpe National Transportation Center, 2018), among other efforts.



creation, power of community, interventions, and expanding access. For each focus area, the plan describes:

- The desired outcome.
- Key performance indicators (KPIs).
- Critical gaps.
- Root drivers (i.e., of the problems).
- Timeline of USDOT actions.
- Opportunities.
- Key USDOT accountability actions.

Pueblo of Laguna Active Transportation

The Pueblo of Laguna is a Federally recognized Tribe situated in New Mexico. In 2009, the Pueblo of Laguna Planning Program initiated a comprehensive planning process across six villages to develop safer bike/pedestrian routes.

The Pueblo of Laguna Planning Program received a combination of Federal/State funding and technical support (e.g., from TIGER [Transportation Investment Generating Economic Recovery], now RAISE [Rebuilding American Infrastructure with Sustainability and Equity]), Transportation Alternatives Program, FHWA Recreational Trails Program, BIA) to improve and expand its regional bike/ped network (Henrich, 2015). The Pueblo developed a Bicycle and Pedestrian Route Plan in 2012 that assessed existing routes and recommended future projects (Pueblo of Laguna, 2012). These suggested improvements were largely based on collaborative input from community members.

Additional details about these focus areas are provided in Appendix D. The most relevant focus area for this research project is “**Expanding Access.**” This focus area describes the lack of transportation options and access among underserved communities (e.g., transit deserts, lack of multimodal options) as well as the disproportionate burden of transportation costs on lower income people. The EAP explains that the burden of transportation costs leads to inefficient transportation options that in turn lead to negative social, economic, and health outcomes. The goal of this focus area is to increase social and economic opportunities for underserved and disadvantaged communities by expanding access to transportation, including providing more affordable, multimodal transportation options and improving overall mobility.

The EAP identifies key accountability actions that USDOT will coordinate to expand transportation access. For example, USDOT will develop a national transportation cost burden

measure using existing and new data sources to address barriers to affordable transportation options and access. Once established, USDOT will incorporate elements of the measure into its funding programs and policy documents to screen transportation projects for funding. Federal land agencies can integrate these actions into their planning processes by, for example, integrating the related data sources and elements of the cost burden measure into their transportation-related programs and policies to support equitable project selection and decision-making on Federal lands.

Federal land agencies may also consider other EAP focus areas when trying to integrate public health and equity into transportation planning. For example, with regard to **interventions**, Federal land agencies pursuing projects that have health benefits may want to consider the demographics of the surrounding communities with the goal of increasing the number of projects on Federal lands where underserved communities are more likely to benefit from the project.



Likewise, the **power of community** focus area (often called community engagement in public health), suggests that underserved communities adjacent to Federal lands should be given a more meaningful role in providing input to public health-related plans and projects under consideration by Federal land agencies. Federal land agencies may want to consider ways to proactively engage with underserved communities to ensure that any proposed projects or plans are meeting their needs.

Additionally, the **wealth creation** focus area could be considered when developing programming at Federal land agencies and Federal lands and/or when developing projects. Federal land agencies can collaborate with Tribal communities or other communities in rural areas to create opportunities for wealth creation and site projects, such as new trails.

4.3.2. U.S. DEPARTMENT OF THE INTERIOR EQUITY ACTION PLAN

On April 14, 2022, the U.S. Department of the Interior (DOI, the Department) released Equity Action Plan (DOI, 2022). This plan states that, “Executive Order 13985, *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*, calls on [the Department] to advance equity so that it is not just an ideal, but a principle that is reflected in how the Department serves the American people and fulfills its mission.”

With regard to public health, the plan states that, “Public lands enable physical activity, promote mental health and wellness, and foster a sense of community through the preservation of ecosystems and interpretation of a shared heritage.” Along these lines, the Department “identified three focus areas that support the agency’s mission and have high potential for equity impact,” the third of which is:

- **Recreation on DOI-managed lands, waters and beyond.** Public land visitation data collected from the Department’s bureaus suggests that certain underserved communities are underrepresented as visitors to the more than 480 million acres of public land managed by the Department, relative to their presence in the U.S. population at large. Addressing barriers to recreation on DOI-managed lands and waters will enable more Americans to enjoy these sites and reap the physical and mental health benefits associated with greenspace and outdoor recreation. In addition, the Department, through its programs, can offer technical and financial support to promote and create equitable and close-to-home access to the outdoors beyond DOI-managed land boundaries (and specifically in underserved communities across the nation).

Accordingly, the Department is focusing its initial implementation of Executive Order 13985 on four priority actions. The fourth action is the most relevant to this research project: “Increase opportunities to access public lands and waters, prioritizing access to recreation areas and services in historically underserved or disadvantaged communities.” The plan provides significant detail on how the Department plans to perform this action and realize its benefits,

JEDIA Group, USFWS

A Justice, Equity, Diversity, Inclusion, and Accessibility (JEDIA) group or committee is a group at an institution or agency that comes together to incorporate the principles of justice, equity, diversity and inclusion into the institution’s programs and practices. USFWS has a JEDIA group within the Office of Diversity and Inclusive Workforce Management. The mission of the JEDIA group is to, “Advance the USFWS mission by providing recommendations, guidance and consultation in the development and implementation of strategies to promote and maintain a diverse and inclusive workforce that thrives in an environment accessible to all and free of employment discrimination” (ODIWM, 2020).



which include detailing barriers to be addressed (limited physical access, costs), priority actions and intended impact on barriers, tracking progress, and accountability. With respect to priority actions, the plan describes expanding the current partnership with USDOT, which includes expanding shuttle fleets and increasing bus routes. Additionally, these actions include supporting close-to-home recreation opportunities and strengthening partnerships.

4.3.3. JUSTICE40 INITIATIVE

Established under Executive Order 14008, *Tackling the Climate Crisis at Home and Abroad*, the government-wide Justice40 Initiative aims to deliver 40 percent of the overall benefits of certain Federal investments to disadvantaged communities across seven key areas (The White House, 2021) (USDOT, 2022c). The seven key areas include:

1. Climate change.
2. Clean energy and energy efficiency.
3. Clean transit.
4. Affordable and sustainable housing.
5. Training and workforce development.
6. The remediation and reduction of legacy pollution.
7. The development of critical clean water infrastructure.

The initiative intends to track performance toward this goal through the establishment of an Environmental Justice scorecard. Additionally, the initiative includes the development of a Climate and Environmental Justice Screening Tool (CEJST) to identify disadvantaged communities that are marginalized, underserved, and overburdened by pollution (Council on Environmental Quality, 2022). Building off the U.S. Environmental Protection Agency's (USEPA) Environmental Justice Screening and Mapping Tool (USEPA, 2022), CEJST provides socioeconomic, environmental, and climate information to inform decisions that may affect these communities. CEJST covers all U.S. census tracts, including those located within Tribal Nations.

Regarding the integration of public health into transportation planning, Federal land agencies could incorporate and use Justice40 Initiative's tools to inform planning and programming of transportation projects, particularly on Federal lands adjacent to underserved communities. For example, Federal land agencies could update the project evaluation and scoring processes of certain funding programs to incorporate the forthcoming environmental justice scorecard. This may include asking applicants to specify how proposed transportation projects benefit disadvantaged communities and giving higher scoring weights to equity considerations. The CEJST mapping tool could also be used in project prioritization and selection to ensure that transportation investments are in or nearby disadvantaged communities to create healthier and more equitable outcomes. The CEJST, Environmental Justice Screening and Mapping Tool, and other Federal data sources are described in the following section.

Table 5 summarizes Federal data tools that may be helpful to introduce equity into decision-making for transportation planning at Federal land agencies. A detailed description of each of these tools, including the base data sets and relevant measures is included in Appendix D.



Table 5 Federal Equity Data Tools.

Tool	Summary
<p>Council on Environmental Quality, Climate and Economic Justice Screening Tool (Council on Environmental Quality, 2022)</p>	<p>The purpose of the tool is to help Federal agencies identify disadvantaged communities that are marginalized, underserved, and overburdened by pollution. Using census tract data, the current version of the tool identifies communities that are disadvantaged for the purposes of the Justice40 Initiative and provides socioeconomic, environmental, and climate information to inform decisions that may affect these communities. This is a beta version of the tool, and updates are likely following the initial public comment period.</p>
<p>Environmental Protection Agency, EJScreen (USEPA, 2022)</p>	<p>EJScreen is an environmental justice mapping and screening tool that provides USEPA with a nationally consistent data set and approach for combining environmental and demographic indicators into Environmental Justice Indexes. All EJScreen indicators are based on publicly available data.</p>
<p>Centers for Disease Control and Prevention (CDC), Social Vulnerability Index (SVI) (CDC, 2022)</p>	<p>The CDC/Agency for Toxic Substances and Disease Registry (ATSDR) SVI is a database that helps emergency response planners and public health officials identify, map, and plan support for communities that will most likely need support before, during, and after a public health emergency. The tool uses U.S. Census data to determine the social vulnerability of every census tract, ranking each on 15 social factors, including poverty, lack of vehicle access, and crowded housing, and groups them into four related themes.</p>
<p>Department of Health and Human Services (HHS)/CDC, Minority Health Social Vulnerability Index (MH SVI) (U.S. Department of Health and Human Services Office of Minority Health, n.d.)</p>	<p>The HHS Office of Minority Health and CDC developed the Minority Health Social Vulnerability Index (MH SVI) to support the identification of racial and ethnic minority communities at greatest risk for disproportionate impact and adverse outcomes of the COVID-19 pandemic. Given evidence on common factors contributing to social vulnerability, the MH SVI could potentially be applied to other public health emergencies.</p>
<p>Federal Emergency Management Agency, National Risk Index, Social Vulnerability Measure (Federal Emergency Management Agency, n.d.)</p>	<p>For this tool, social vulnerability is understood as the susceptibility of social groups to the adverse impacts of natural hazards, including disproportionate death, injury, loss, or disruption of livelihood. A social vulnerability score and rating represent the relative level of a community's social vulnerability compared to all other communities at the same level. A community's social vulnerability score is proportional to its risk. A higher social vulnerability score results in a higher Risk Index score.</p>
<p>USDOT, Transportation Disadvantaged Census Tracts (USDOT, n.d.)</p>	<p>The Transportation Disadvantaged Census Tracts tool identifies disadvantaged communities based on six transportation disadvantaged indicators: transportation access, health, environmental, economic, resilience, and equity. This tool provides map data of census tracts that exceed the 50th percentile (or 75th percentile for resilience) in at least four of these indicator areas.</p>



5. Effective Practices and Strategies to Integrate Public Health and Equity into Transportation Planning

The study team used an iterative process to identify effective practices to integrate public health and equity into transportation planning and ultimately developed a set of process-oriented and project-level recommendations. This section summarizes the case study approach and discusses effective practices identified in the case studies.

5.1. Identifying Effective Practices and Strategies through Case Studies

The study team conducted a series of case studies, building on the planning framework and initial recommended strategies for Federal land agencies identified through a series of workshops, advisory group meetings, literature review, and the interviews and surveys. The case studies were intended to illustrate effective practices that have been adopted to purposely integrate public health and equity into transportation planning in the United States.

The case studies included:

- Minnesota Department of Transportation (MnDOT)/Minnesota Department of Public Health (MDOH).
- Clackamas County (Oregon).
- Grand Canyon National Park (Arizona).
- Continental Divide National Scenic Trail (New Mexico).
- Metropolitan Council (Minneapolis-St. Paul, Minnesota).
- Greater Nashville Regional Council (Tennessee).

Both Federal land agencies and non-Federal land agencies were selected for the case studies. Non-Federal land agencies were selected because they illustrated key concepts that provided lessons learned that would be relevant to Federal land agencies. The study team recognized that Federal land agencies, MPOs, and State DOTs operate in different contexts and follow different processes. As a result, the recommendations generated from the non-Federal land agency case studies were tailored to the Federal land agency context.

In addition to the six core case studies, the study team also identified and researched via desktop reviews additional examples of Federal land agency and non-Federal land agency practices and programs that address public health and equity on public and Federal lands. These are referred to as abbreviated case studies. Table 6 presents a list and brief description of the detailed case studies; a list of abbreviated case studies follows the table. As demonstrated in the table, each of the case studies relates to different aspects of public health, equity, and transportation planning.

Table 6 Case Study Descriptions.

Case Studies	Description
	Enabling/Building Organizational Capacity
MnDOT and MDOH	MnDOT and the MDOH signed an interagency agreement in 2015 to strengthen the linkage between public health considerations and equity, and transportation decision-making. The agreement was largely motivated by the recognition of both agencies that their respective missions overlap and that they could take mutually supportive actions.



Case Studies	Description
Clackamas County	Clackamas County, Oregon, hired a public health staff member to work with county departments to integrate public health considerations into the decision-making process. With guidance from this staff member, Clackamas County conducted Health Impact Assessments (HIAs) and incorporated equity criteria in the project prioritization methodology.
	Long-Range Planning/Project Development/Implementation, Monitoring, and Evaluation
Grand Canyon National Park	Grand Canyon National Park implemented public health precautions such as limiting capacity and rear-door boarding, to reduce the transmission of disease on its shuttle bus service during much of the COVID-19 pandemic. For the Hermit Road Improvement Project, park staff improved pedestrian and bicycle access along the route and improved access to vistas/outlooks, promoting public health and safety outcomes. An Inter-Tribal Working Group developed a concept plan to transform the Desert View site into an Inter-Tribal Heritage Site, which required some transportation/mobility-related improvements.
	Technical Planning
Continental Divide National Scenic Trail	The Studying Trail Enhancement Plans-Health Impact Assessment (STEP-HIA) focused on the health impacts of different potential locations of a Continental Divide National Scenic Trail (CDT) segment located in Cuba, New Mexico. The main health considerations included increasing physical activity, social connection, and economic benefits along with equity considerations. As a result of the STEP-HIA, the proposed CDT segment was connected to the Cuba community rather than being routed around it, bringing health and economic benefits to the historically underserved town residents.
	Programming
Greater Nashville Regional Council (Nashville MPO)	The Greater Nashville Regional Council (GNRC)—the region’s Metropolitan Planning Organization (MPO) and council of governments—implemented programs over the last ten years that integrate public health considerations into transportation project prioritization and selection. Through their household travel survey, the GNRC identified four conditions that corresponded most highly with poorer health outcomes: poverty, unemployment, being 65 years or older, and not owning a car. These conditions became the basis for GNRC to define Health Priority Areas in the region. For example, project scoring was adjusted to award more points to active transportation projects in these geographies.
Metropolitan Council, Minneapolis-St. Paul (Minneapolis-St. Paul Twin Cities MPO)	Metropolitan Council (Met Council)—the MPO of the Minneapolis-St. Paul Twin Cities region—implemented programs over the last ten years to integrate equity in project prioritization. From 2014 to 2018, Met Council scored projects based on the increased access that they could provide to residents in these underserved communities defined as Areas of Concentrated Poverty (ACPs). From 2020 onward, Met Council’s equity criteria shifted emphasis from the use of ACPs and evaluated projects based on demonstrated benefits to underserved populations and engagement with equity populations early and throughout the planning process. Equity criteria had different weights depending on the program type.



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The following abbreviated case studies were used to provide examples of how some Federal land agencies, Tribes, and State agencies have included public health and equity concerns in project and program development (many are briefly described in text boxes throughout this document):

- Pueblo of Laguna planning program (New Mexico).
- BLM, Mesa County Healthy Trails Program (Colorado).
- USFS, Angeles National Forest Access (California).
- JEDIA groups.
- Colorado and California outdoor equity grants.
- Public-facing Federal land agency health programs
 - Women in Nature Gaining Skills (WING) (Indiana).
 - Every Kid Outdoors (EKO) (National, Several Federal land agency participants).
 - Hoosier National Forest (Indiana).
 - Veteran Access to Public Lands (National, Several Federal land agency participants).

For each case study, effective practices were summarized based on desktop reviews and interviews with key staff. Figure 1 is a map of the case studies and abbreviated case studies. The green text and asterisk indicate abbreviated case studies. Full summaries for the case studies are included in Appendix C.



Case Studies and Abbreviated Case Studies

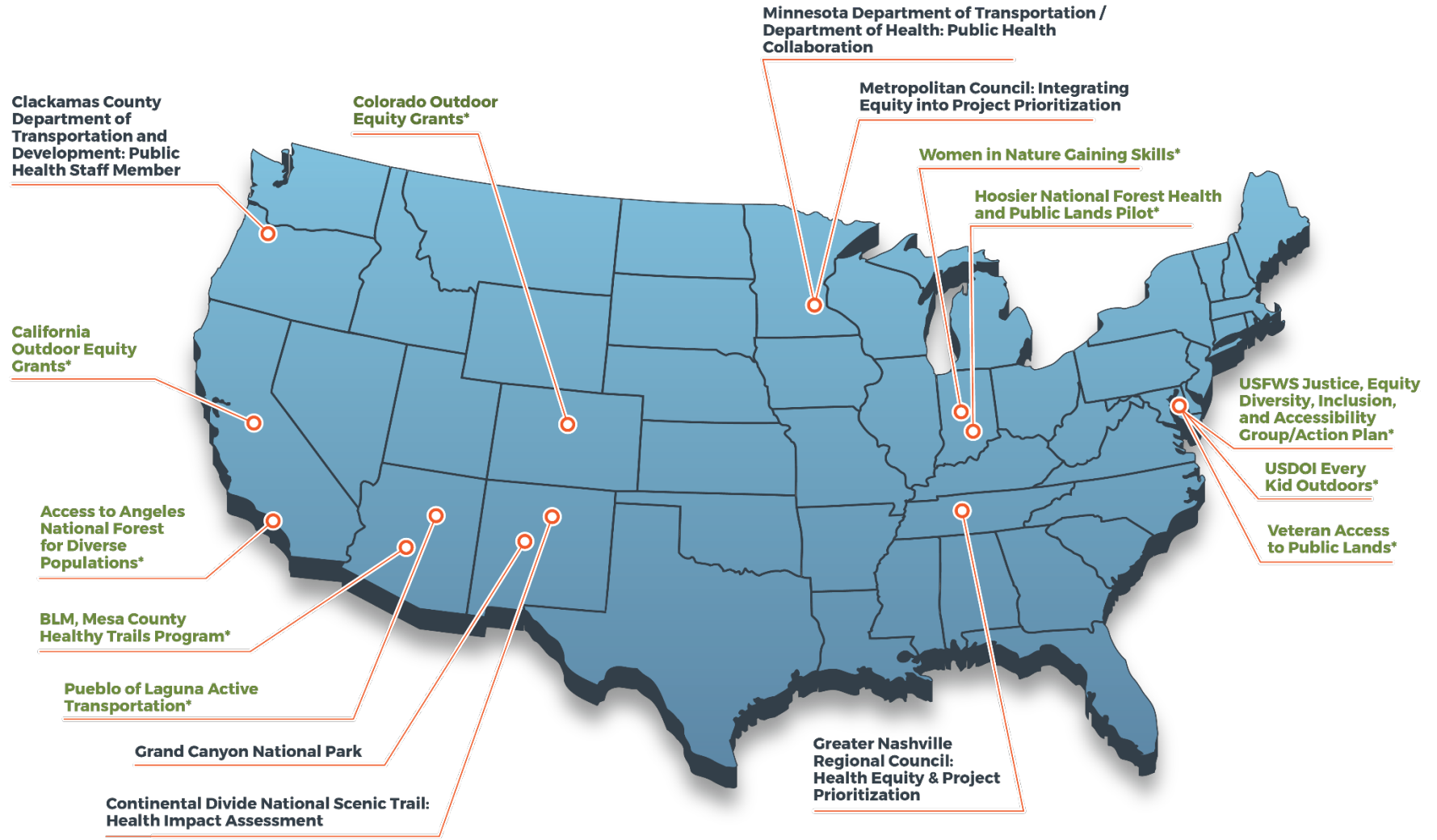


Figure 1 Map of Case Studies and Abbreviated Case Studies.



5.2. Summary of Effective Practices Identified through Case Studies

The case study research generated effective practices and strategies for integrating public health and equity into transportation planning for each phase of the transportation planning framework (see Figure 2). These practices and strategies are summarized in the following sections.

5.2.1. ENABLING/BUILDING ORGANIZATIONAL CAPACITY BUILDING

The study team identified several strategies in the case studies that enabled agencies to consider the public health, equity, and transportation planning relationship more effectively:

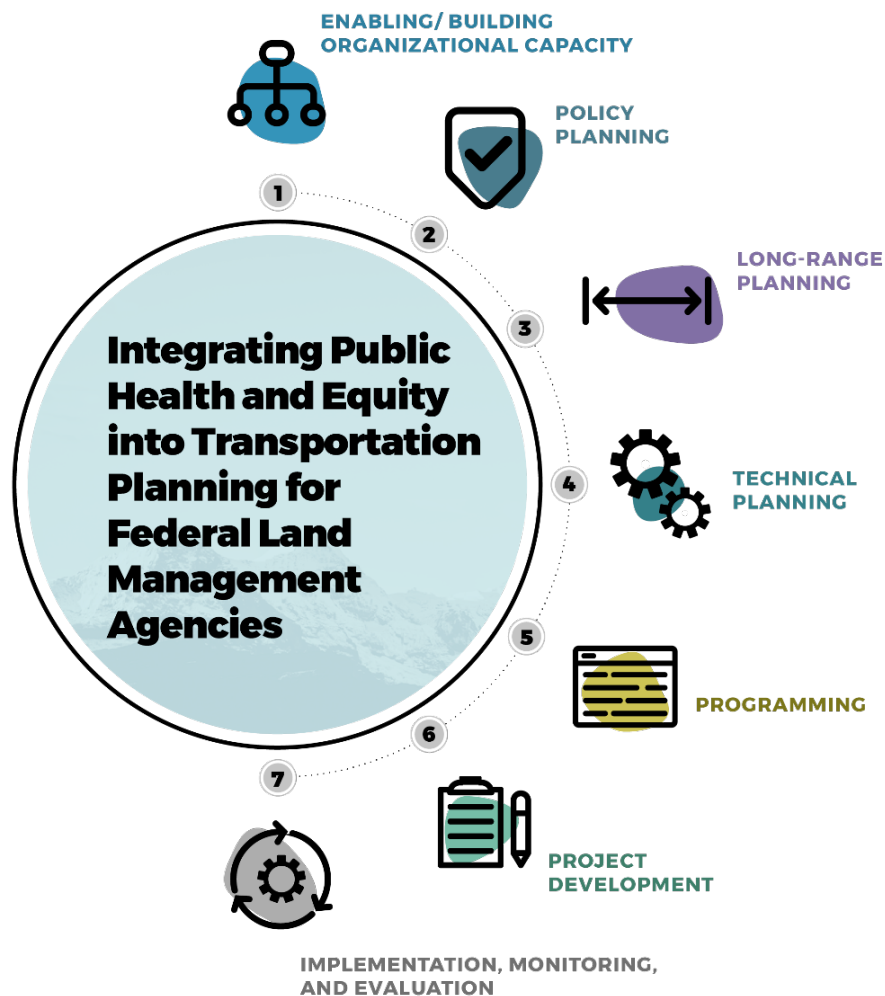


Figure 2 Transportation Planning Framework Phases.

- Leadership:* Leadership on integrating public health and equity into transportation planning was accomplished in variety of ways: an executive policy statement, Board of Directors’ adoption of public health and equity as agency concerns, and finding and supporting a public health champion in the agency, such as in the Clackamas County example. With respect to Tribal Nations, engaging Tribal leaders in the planning

process, such as through an Inter-Tribal Working Group, provided a strong institutional foundation for linking public health, equity, and transportation planning.

- *Responsibility and Accountability:* Executive-level directives can provide overall leadership for public health, equity, and transportation planning efforts (the “what”), and they can also establish the structure and responsibility for implementing the efforts (the “who”). Given the need for a multidisciplinary approach, the case studies illustrated the importance of developing shared goals and a common language among those participating in the efforts. Shared goals also allowed an agency to determine whether the overall desired outcomes were being achieved.
- *Partnerships:* Partnerships are an important strategy for successfully incorporating public health and equity concerns in transportation planning. For Federal land agencies especially, this partnership includes the U.S. Public Health Service. At Grand Canyon National Park, partnering with a public health agency was found to be an effective way of providing and interpreting public health-related data, especially safety data (and in helping craft a public health message). Interagency agreements served as a motivation to integrate public health and equity into transportation planning. Additionally, educating grantees about the importance of transportation and public health programs and of potential public health/equity considerations provided grantees with an entrance point into the planning process.

5.2.2. LONG-RANGE PLANNING/PROJECT DEVELOPMENT/IMPLEMENTATION, MONITORING, AND EVALUATION²

These planning phases include both technical components (such as data collection and analysis) and process components (such as incorporating public health and equity into planning studies). The case studies illustrate the following:

- *Process:* Tailoring the planning/project development/implementation phases to the Federal land agency context and their respective key audiences (e.g., visitors) provides an important perspective for identifying potential public health and equity benefits and costs. Case study participants noted that public health and equity concerns are very different from most of the issues facing transportation planners, and thus care must be given to develop a public health- and equity-sensitive technical planning process. For Tribal lands, redefining “access” to reflect Tribal heritage, such as through program development and integration into project planning, was important for Grand Canyon National Park to improve visitor access to Tribal heritage and also for Tribal communities to be able to share and benefit from economic opportunities. Several case study participants noted that it was important to understand that working with communities is often a long-term commitment. Identifying existing public health and demographic conditions and concerns early in the planning process led to their consideration during subsequent analysis.
- *Tools:* Case study agencies used a range of tools to include public health and equity into the technical transportation planning process. These tools included project checklists, health matrices, and in some cases HIAs (although these assessments were most often used at the project development level).
- *Monitoring:* The case studies did not provide any examples of direct measures of public health or equity outcomes. Monitoring public health outcomes of project implementation is often undertaken via surrogate measures (e.g., number of off-road,

² These phases were combined because the practices were common to each.

non-motor vehicle trails leads to more physical activity, which leads to healthier visitors).

5.2.3. TECHNICAL PLANNING

This planning phase primarily reflected the types of analysis and evaluation tools that were used in the case studies.

- *Tools:* Health Impact Assessments (HIAs) have been effective in identifying public health-related concerns as part of project impacts and at the planning level. Using an HIA as part of the National Environmental Policy Act (NEPA) environmental impact assessment process helped formalize the consideration of public health and equity benefits and costs in project development. Using the Integrated Transport and Health Impact Model helped to inform decision-makers on what types of impacts transportation systems have on public health. However, based on an interview with a subject-matter expert, the potential use of this model for Federal lands or rural areas was considered limited due to lack of data. Using the CDC *Community Guide* provided public health evidence-based assessments of potential interventions. In addition, incorporating outside expertise (especially for public health) added credibility to the planning process.

5.2.4. PROGRAMMING/PRIORITIZATION/PROJECT SELECTION

Prioritizing nonmotorized transportation modes, such as bicycle/pedestrian access, promoted a more active and healthy visitor experience. In addition, considering the public health, economic, and quality-of-life benefits of trail or other visitor amenities encouraged their consideration as stand-alone projects or as part of larger projects. Participating with local/regional coalition group(s) helped in understanding local priorities and identifying opportunities to provide benefits to communities in nearby and gateway communities. Establishing a methodology that considers the relationship between public health criteria and other prioritization criteria was an important influence in promoting more projects having public health benefits.

Colorado Outdoor Equity Grants

The purpose of Colorado's "Outdoor Equity Grant" program is to increase access and opportunities for underserved youth and their families, and to improve participation in outdoor activities and education. Colorado Parks and Wildlife's grant program is funded through a redistribution of lottery money from House Bill 21-1318 that raises awareness of and/or seeks to address the root cause of the disparities that Colorado youth experience while trying to access the outdoors. The program provides environmental, experiential, outdoor, or stewardship and conservation education for Colorado youth and families.

6. Recommended Process-Oriented and Project-Level Practices and Strategies

Largely derived from the case study research, the study team generated recommended process-oriented and project-level practices and strategies.

- Process-oriented: These practices and strategies are intended to adjust/change transportation planning processes and improve agency capacity to integrate these considerations into transportation planning for the agency.
- Project-level: These practices and strategies are effective actions that can be integrated into a transportation project on Federal lands, such as establishing infrastructure for zero-emission vehicles.

The recommendations are described in the following sections.

6.1. Process-Oriented Practices and Strategies

Table 7 displays the recommended practices and strategies that Federal land agencies can take to change agency processes and procedures that could ultimately lead to more public health and equity-oriented transportation projects. The recommendations are a culmination of best practices identified in the case studies as well as from the literature review and actions recommended from the advisory group workshops. The approach described in Section 3, served as the foundation for these recommendations, and the material below builds on these frameworks and adjusts them based on case study research and site visit findings.

Table 7 Recommended Process-Oriented Practices and Strategies for Federal Land Agencies to Integrate Public Health and Equity into Transportation Planning.

Transportation Planning Process Phases	Recommended Process-Oriented Practices and Strategies
<p>Enabling/Building Organizational Capacity</p>	<ul style="list-style-type: none"> • Create an interagency framework for public health and equity to guide Federal agency decision-making (e.g., Interagency Visitor Use Management Framework). • Create a taskforce with public health, equity, and transportation professionals. • Build trust-based relationships with Tribal leaders and engage with them during the planning process (e.g., Inter-Tribal Working Group). • Ensure staff have both public health and transportation education/expertise. • Train public health professionals to engage in transportation planning and train transportation professionals to engage in public health, including accessibility at Federal lands. • Educate prospective grantees about incorporating public health and equity into proposals. • Develop new policies that enhance public health, equity, and transportation planning linkage (legislation, regulation, leadership statement/charter). • Create new technical/design and planning guidance. • Develop a JEDIA advisory group. • Train transportation professionals about health-in-all-policies and conducting HIA (with health agency).

Transportation Planning Process Phases	Recommended Process-Oriented Practices and Strategies
	<ul style="list-style-type: none"> • Create formal partnerships with public health agencies (interagency agreement) and with the U.S. Public Health Service. • Support equity and public health training and professional development opportunities for agency staff. • Update funding evaluation criteria to prioritize public health and equity investments and for discretionary grants (e.g., health as an element of USDOT’s Benefit-Cost Analysis approach). • Conduct pilot studies to support public health and equity efforts. • Encourage/incentivize public health and equity champions within Federal land agencies. • Conduct research (e.g., on innovative technology use). • Incorporate public health components into project planning and design contracts. • Establish agreements to share data with other Federal and State agencies. • Designate a person or unit with health expertise to review and/or approve all project activities (similar to active transportation, traffic). • Develop shared goals, a common language, and definitions for concepts such as racial equity and identify strategy/pillars to address this in planning processes. • Establish guidance for standard operational procedures for public health and equity.
<p>Policy Planning (Agency)</p>	<ul style="list-style-type: none"> • Update and/or create reference manuals (or equivalent) to reflect public health and equity goals, including guidance on Tribal and public engagement. • Engage with Tribes early and often in the planning process. • Consider strategic plan/proactive integration of public health and equity into all activities and actions. • Assess health impacts of policies and programs (health checklist, HIA). • Assess equity impacts and benefits of policies and programs. • Work with local, State, Tribal, and Federal health organizations/agencies to engage in public health and equity campaigns. • Work with public health professionals to develop health policies/frameworks in collaboration with State departments of health, Tribal public health departments, and local public health departments. • Develop plan for meaningful and representative public engagement.

Transportation Planning Process Phases	Recommended Process-Oriented Practices and Strategies
<p>Long-Range Planning</p>	<ul style="list-style-type: none"> • Include data on health and target populations in long-range transportation plan/metropolitan transportation plan long-range plan development. • Engage/collaborate with MPOs and State/local/Tribal agencies on regional/local plans, link or incorporate those plans into Federal land agency plans. • Develop visioning and policy statement(s) that includes public health and equity goals/objectives. • Identify health-related community needs (e.g., active trips, health access,). • Solicit input from public health professionals, other stakeholders, and the public on goals/strategies/actions to promote health. • Assess whether to conduct an HIA of agency plans. • Create an advisory group with a mix of disciplines. • Identify funding partnerships to include public health and equity in transportation planning. • Develop a section in planning documents equity/environmental justice with input from affected groups (accessibility, social determinants of health, underserved populations, affordability). • Include public health and equity benefits (or costs) in criteria for selecting plan alternative or project that is best investment strategy.
<p>Technical Planning</p>	<ul style="list-style-type: none"> • Include public health considerations in all project scopes (as per our definitions). • Provide PH targeting outreach/input. • Link to any regional, local, Indian Health Services hospital health plan. • Conduct emissions/Air Quality and noise pollution analysis (if appropriate). • Assess whether to conduct HIA of corridor and other technical plans. • Use models and other analysis tools that consider PH impacts and consequences. • Explore and utilize innovative data collections technologies (e.g., app-based data collection). • Utilize PH framework in assessment, prioritization efforts, and actions.
<p>Programming/Prioritization/Project Selection</p>	<ul style="list-style-type: none"> • Develop programming in partnership with Tribal communities. • Identify projects from public health plans and or assessments to be included in transportation planning programs. • Incorporate health measures/criteria/weighting. • Develop external funding/categories/partnerships. • Identify percentage of funds that benefit disadvantaged communities. • Use health and equity criteria for scoring and evaluation.

Transportation Planning Process Phases	Recommended Process-Oriented Practices and Strategies
Project Development	<ul style="list-style-type: none"> • Incorporate public health and equity considerations and recommended actions from prior steps into project scoping and funding decisions. • Incorporate Tribal considerations in project development. • Determine project-level health needs. • Assess potential health and equity impacts. • Have public health professionals assist with public outreach. • Incorporate public health and equity in project design and construction. • Include a public health and equity section in any environmental documents created for the project. • Leverage public health models and theories to develop projects and plans (e.g., Health Belief Model, Theory of Planned Behavior).
Implementation, Monitoring, and Evaluation	<ul style="list-style-type: none"> • Review multimodal accessibility during construction. • Collaborate on public health campaigns. • Collect and analyze health data. • Monitor and assess performance related to health and equity using public health and equity-related performance measures. • Establish check in points during implementation to ensure that public health and equity stakeholders are continually and meaningfully engaged. • Revise vision statements, goals, and objectives based on feedback. • Monitor and assess performance of contractors.

6.2. Project-Level Strategies

Changes to agency decision-making processes and project development procedures to better reflect public health and equity concerns could result in project designs and supporting strategies that are more sensitive to these concerns. Figure 3 shows examples of different types of project strategies that reflect the different public health and transportation focus areas of this research—Safety; Active Transportation; Infectious Disease Prevention, Detection, and Response; Access; Emergency Response; and Environmental Considerations. Note that the center of this figure represents key considerations that could be the focus of any such strategies, e.g., staff and visitors, the built environment, and surrounding communities. The next circle out from the center indicates two characteristics of effective public health and equity-sensitive project development processes—coordinating with transportation and public health agencies, and considering and addressing equity concerns.

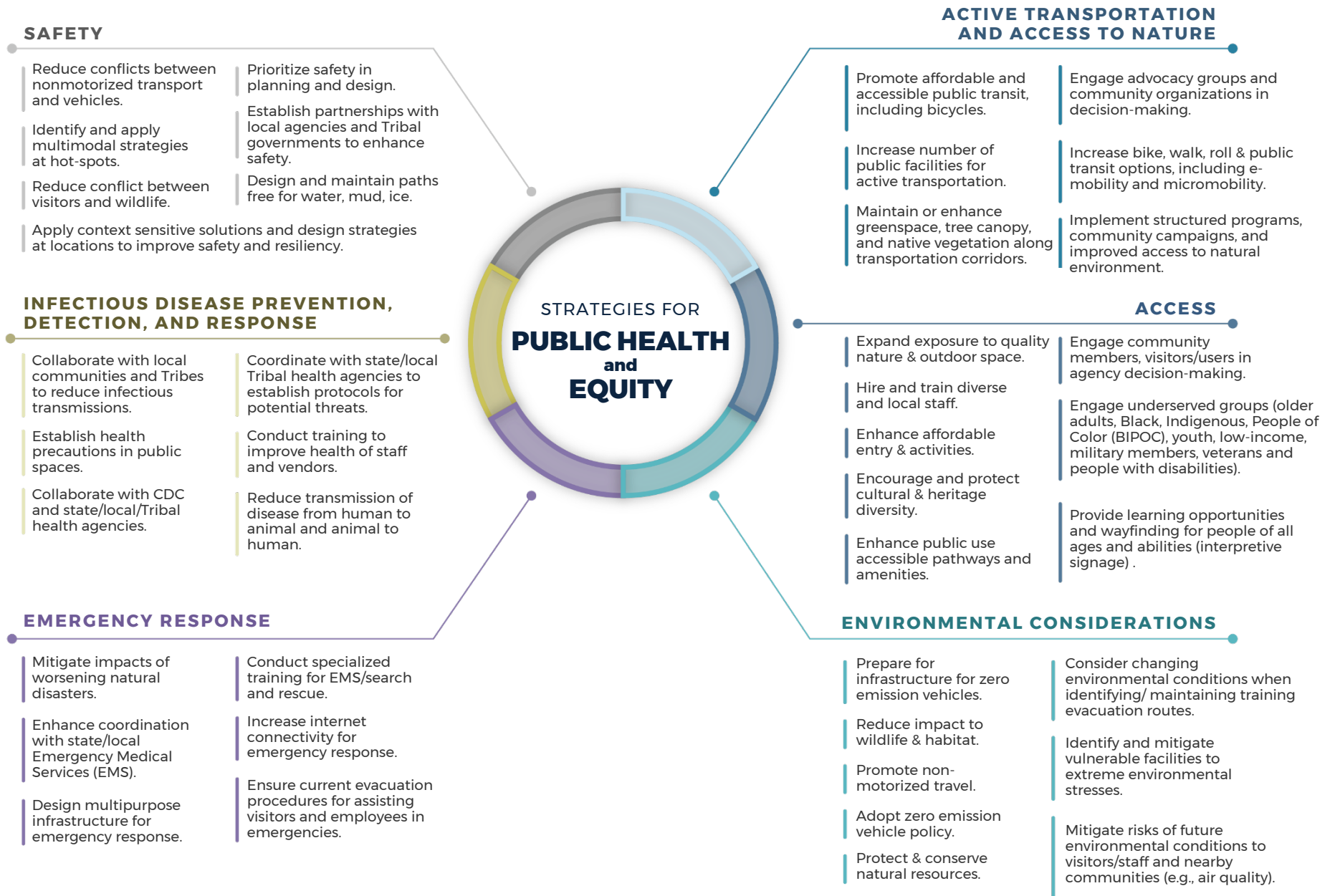


Figure 3 Project-Level Strategies for Integrating Health and Equity into Transportation Planning for Federally Managed Lands.

7. Example Applications of the Recommended Practices and Strategies

This section demonstrates how the recommended process-oriented and project-level practices and strategies can be applied in the transportation planning process. These hypothetical applications are meant to illustrate how these recommendations can be operationalized in existing Federal land agency processes.

7.1. Enabling/Building Organizational Capacity and Policy Planning

The enabling legislation for the agency has been amended to include required efforts to better integrate public health and equity considerations into agency decision-making. The agency executive leadership has requested the agency units develop an implementation strategy for their areas of responsibilities. The unit responsible for transportation planning and project development in the agency (headquarters and field offices) develops the following strategy for implementing the new mandate.

1. Work with agency leadership to **create (or support if one is already established) a JEDIA advisory group** and, when formed, use its expertise to advise on appropriate strategies for implementing public health recommendations in the unit's areas of responsibility.
2. Conduct an **assessment of the public health and equity** implications and long-term consequences of transportation decisions made by the agency.
3. Identify a **point of contact** in the unit to liaise with agency-wide public health and equity initiatives and support field office efforts.
4. Develop **public health and equity policy guidance**, including articulating goals and desired performance outcomes and identifying the criteria for using a more detailed HIA process in agency planning and project efforts.
5. Work with headquarters and field office staff to develop a **strategy for conducting pilot studies** that incorporate public health and equity concerns into transportation planning and project development decision-making processes. The focus of the pilot studies would be how to proactively consider health and equity in transportation activities and actions.
6. Develop strategies for and guidance on **developing partnerships** with Federal, State, regional, and local health and transportation organizations/agencies for engaging in public health and equity studies and information campaigns.
7. In coordination with the U.S. Public Health Service, **develop and offer professional development and training opportunities** for agency staff on approaches and methods for more closely linking public health and equity concerns in transportation project decision-making.

7.2. Long-Range Planning

The agency's transportation planning responsibilities encompass all aspects of transportation planning, including planning that occurs at different scales of application (e.g., long-range planning, corridor planning, and site-specific planning). They also include the process of prioritizing projects as part of the capital programming process.

Depending on the issues being addressed, headquarters may lead some of these efforts, while other efforts might be led by a field office. Depending on the circumstance of the study, other

public agencies could be involved in the planning study. For example, for Federal lands near urbanized areas, the designated MPO for the region could have transportation data that would be useful for the study. In addition, State DOTs, State departments of health, Tribes, and regional Indian Health Service offices might have important data and information on the general transportation and public health context for the study. At a more local or site-specific level, community public health and transportation officials and special interest advocacy groups (such as those supporting active transportation programs) could provide critical input into project planning.

The Federal land agency adopted the following strategies for integrating public health and equity considerations into long-range transportation planning and decision-making.

1. Adopt a **public health and equity template** to guide the consideration of such concerns in transportation planning and decision-making, depending on the study context and scale. The template should include the following steps:
 - a. Include public health and equity considerations when developing the **scope of the planning study**.
 - b. **Collaborate** with Federal, State, regional, Tribal, territorial, and local agencies and advocacy groups during the project development process to define the public health and equity issues that will be of most.
 - c. Develop a **public health and equity advisory group** (if the scale of the study warrants) that will help in public health and equity considerations throughout the study. This group could include public health professionals and representatives from transportation, public health, equity, and other special interest groups concerned with public health and equity outcomes.
 - d. Include a public health and equity section as part of the **proposed outline for the final report** and in other information disseminated as part of the study.
 - e. Include public health and equity in the study **vision, goals, and objectives**.
 - f. **Identify** the populations and Federal land agency property **user groups** that could be affected by public health-related issues and find data sources that provide insights on impacts. Given the planning context, this might include using the results of plans already developed by other public agencies.
 - g. Determine whether an **HIA** is an appropriate approach to be included as part of the planning study. As indicated in the sidebar on the next page, an HIA has several possible levels of engagement and analysis. Part of this decision would be determining which level of engagement would be most appropriate. If an HIA is not appropriate, alternative assessment methods include detailed checklists, such as that used by Tri-County Health Department.
 - h. When available, **use public health and equity data** from Federal, State, regional, and local agencies. These data can provide useful input into the analysis and evaluation of different transportation planning alternatives.
 - i. Use **analysis tools and methodologies** that assess the public health and equity impacts of transportation projects. In some cases, these tools and methodologies are commonly used by transportation planners (e.g., air quality models), whereas for others (e.g., equity analyses), they are not as well developed (and often rely on

identifying spatially defined at-risk population groups through geographic information systems [GIS]. Appendix C lists Federal Equity Data Tools that are available.

- j. Include **public health and equity frameworks** in plans and project-level evaluations. Public health and equity professions have developed assessment and evaluation frameworks that can be used to identify the types of health and equity impacts that are associated with different types of transportation plans and program investments. Such **public health and equity frameworks** should be included in plan and project-level evaluations.
- k. Identify those components of the plan and proposed projects that could lead to public health and equity impacts. If a study identifies specific project alternatives, include **mitigation actions** for these impacts.

- 2. Identify and adopt strategies for **involving public health and equity professionals and advocates** in the planning process. Public health and equity professionals are the source of potentially important perspectives on the types of issues being addressed by a plan. For example, most hospitals have a health plan associated with long-term and emergency care for the populations they serve. These plans could be an excellent source of information for a planning study.
- 3. Include **public health and equity benefits (or costs)** associated with a plan or project in the criteria for selecting which plan alternative or project is the best investment strategy.
- 4. Where possible, **identify possible funding partnerships** with agencies and organizations that are advocating the inclusion of public health and equity considerations in transportation decision-making.

Figure 4 Steps of an HIA. (The Pew Charitable Trusts, 2014)

The Steps of HIA



7.3. Project Development

Federal land agency officials noted that the eventual characteristics of a project (and likely impacts and consequences) are determined during the development process. Although transportation planning can set the “bigger picture” of the relationship among transportation, public health, and equity, the design criteria and standard operating procedures of the design unit are influential in determining project designs. This suggests that these criteria and procedures be examined for their linkage to public health and equity, and implies that there should be a strong linkage between the decisions made in transportation planning and the inputs used for the design process.

The Federal land agency adopted the following strategies for integrating public health and equity considerations into its project development process. Given the linkage between transportation planning and project development, many of the project development recommendations are similar to those found in the long-range transportation planning effort, modified to reflect the major products of the project development process.

1. Most project development processes begin with the definition of a project scope that outlines the general purposes of a project, the type of impacts that are anticipated, and the constraints within which the project design must operate. Federal land agency officials **modified agency guidance** on project scoping to include project-level public health and equity considerations/needs and recommended actions from prior planning steps.
2. In defining the project development process associated with a particular project, Federal land agency officials identify the outreach effort that will occur as part of the regulatory process (e.g., need for permits) as well the general outreach to the public and interested stakeholders. Similar to the recommended strategies for long-range planning, the Federal land agency included in its scoping process the need to collaborate with Federal, State, regional, Tribal, territorial, and local agencies and advocacy groups during the project development process to **define the public health and equity issues** that will be of most concern. This could **include representatives with public health and equity expertise** on any advisory group established for the project.
3. If an environmental review document is required as part of project development, include **a public health and equity section as part of the proposed outline** for the final report and in other information disseminated as part of the study. As part of the environmental study, identify the populations and Federal land agency property **user groups that could be impacted by public health-related issues**, and find data sources that provide insight on impacts.
4. If an HIA is part of the project development process (possible for large projects), include representatives of public health and equity groups as part of the advisory group. Such an effort would **use public health and equity data from Federal, State, regional, Tribal, and local agencies**, as appropriate. In addition, the HIA will rely on the use of **analysis tools and methodologies** that assess the public health and equity impacts of transportation projects. If an environmental assessment or HIA identifies public health or equity impacts, identify **mitigation actions** for these impacts.

8. Implementation Plan

The purpose of the implementation plan is to consider how the recommendations generated from this report can be applied at Federal lands and what needs to happen to transform these recommendations into action. The implementation plan is largely based on insights from site visits at Federal lands, and other aspects of the research, including the case studies, surveys, interview findings, and input from the TAG. The site visits consisted of conversations with staff at Federal lands and visits to projects and areas of these lands relevant to this study. The section is organized as follows:

- Overview, including recommended actions to support implementation and additional needs, and a discussion about future study needs, including a recommendation to conduct a similar study solely focused on Tribal needs and goals.
- Maturity model, which outlines how it is never too late to start adopting these recommendations and that while the recommended actions to support implementation are not yet realized, Federal land agencies can start to incorporate public health and equity strategies into their transportation planning processes.

8.1. Overview

The recommendations generated from this research were well received by Federal land agency staff in that there is interest in incorporating public health and equity considerations into their transportation planning process. Further, as noted earlier, some of the elements captured in the report are already part of the Federal land agency transportation planning process. The framework calls attention to these elements and allows staff to think about them in tandem with other transportation planning considerations. The site visits, along with the other results from this project, led to three core questions that must be answered to make the recommendations actionable:

1. What needs to happen to make these recommendations actionable for Federal land agencies?
2. What support does unit-level staff need to implement these recommendations?
3. What else is needed to implement these recommendations at the program and project level?

Recommended actions were identified in response to these questions. Figure 5 illustrates the relationship between these questions and needed actions identified for implementation.

Figure 5 Core Strategies Needed for Implementation.



8.1.1. WHAT NEEDS TO HAPPEN TO MAKE THE RECOMMENDATIONS ACTIONABLE FOR FEDERAL LAND AGENCIES?

Federal land agency staff indicated that for the recommendations to be implemented into their programs and projects, they need public health and equity to be priority concerns for their respective agencies. In addition to getting a directive from leadership, staff indicated that they need guidance on how to make these recommendations actionable, along with funding to help support staff capacity.

Further, two items rose to the top in these discussions: (1) the need for additional guidance on how to engage with, support, and work with Tribal communities, and (2) the need for agency-wide requirements for, and corresponding guidance on, community engagement for projects that do not require it through NEPA. The first item is discussed in greater detail in Section 8.1.4.

The recommendations below offer insights for how leadership can help implement the actions of this study.

- Policy and Guidance
 - Establish guidance for agency standard operating procedures relating to public health and equity during the planning and programming processes.

- Incorporate public health messaging into agency goals and policy statements on transportation integration for all related activities, including websites or other digital media. This includes establishing public health and equity in the Secretary's or Administrator's priorities.
- Establish guidance in collaboration with USDOT and other state agencies on recommended data sources that can be shared related to public health and equity.
- Update management frameworks for Federal land agencies to include public health and equity.
- Establish contracting guidance on how to include public health and equity in contracts.
- Establish or update guidance related to Tribal coordination and how Tribal input can influence public health decisions.
- Establish requirements and guidance on community engagement for projects that do not require it through NEPA.
- Partnerships
 - Establish interagency agreements with Federal agencies and State/local and Tribal partners to integrate public health and equity into transportation planning from a broader systems perspective.
 - Seek and establish partnerships with State, local, and Tribal agencies to facilitate public health-related planning.
 - Establish stronger agreements between the U.S. Public Health Service and Federal land agencies for public health, equity, and transportation.
- Capacity Building and Training
 - Establish or modify existing training to incorporate and emphasize public health and equity considerations as they relate to transportation planning and programming.
 - Encourage/incentivize public health and equity champions within Federal land agencies.
- Project Prioritization/Funding
 - Incorporate public health and equity criteria into transportation project and program prioritization as part of technical guidance and funding.
 - Identify sources of funding for considering public health and equity considerations.
 - Update funding evaluation criteria to prioritize public health and equity investments with respect to transportation planning, especially for flexible funding sources.
 - Where possible and feasible, modify existing criteria for discretionary grants to include public health and equity.
 - Enable Federal land agencies to use funding for capacity building to incorporate these recommendations into their programs and projects.

8.1.2. WHAT SUPPORT DO UNIT-LEVEL STAFF NEED TO IMPLEMENT THESE RECOMMENDATIONS?

In conversations with Federal land agency staff, additional more discrete actions were identified that can be taken once headquarters has established public health and equity as priorities. Two of the primary recommendations include: (1) updating reference manuals or their equivalent that set procedure for how to conduct planning activities, and (2) creating an interagency framework to further integrate these recommendations into Federal land agency

and's planning activities. Updating the reference manuals may include newly created reference materials (or separate manuals) for equity or public health to introduce these principles into the planning process. The interagency framework could look similar to the Interagency Visitor Use Management Framework, which establishes a detailed process and maturity model for managing visitor use of Federal lands. The first step in developing such a framework would be to establish an interagency committee on public health and equity.

A comprehensive set of actions that would support unit-level staff to implement the identified recommendations is provided below:

- Policy and Guidance
 - Establish common public health and equity-related language, terminology, and definitions for transportation staff and public health staff.
 - Update reference manuals or their equivalent to include public health and equity.
 - Create an interagency framework to further integrate these recommendations into Federal land agency and's planning activities.
- Partnerships
 - Seek interagency agreements with Federal agencies to integrate public health and equity into transportation planning.
 - Establish an interagency committee on public health and equity.
- Capacity Building
 - Identify/assign/support public health and equity champions in agency offices.
 - Recognize barriers for using and/or collaborating with public health agencies and data sharing. Define strategies for overcoming these barriers.
 - Make hiring practices more equitable and inclusive, such as extending the area for contiguous hiring authorities.
- Technical Planning
 - Apply levels of HIAs or components thereof for project planning and studies.

8.1.3. WHAT IS NEEDED TO IMPLEMENT THESE RECOMMENDATIONS AT THE PROGRAM AND PROJECT LEVEL?

Conversations with Federal land agency staff also provided insight on the inputs needed to better inform how public health and equity can be integrated into programs and project development. Most notably, new data sources are needed to determine what types of public health and equity impacts could be associated with planned projects and programs. This could include studies on existing data gaps and data collection barriers. Additionally, new studies are needed to help Federal land agencies develop a better understanding of future risks, such as understanding how public health risks to staff, visitors, and communities will change as a result of changing climate conditions. Additionally, Federal land agency staff indicated that studies on the benefits of electric vehicles as well as guidance on adoption/implementation would be beneficial. The funding needed to develop these data sets and studies is described below.

8.1.4. TRIBAL CONSIDERATIONS AND NEEDS

A need that consistently arose throughout this project and during site visits is the necessity of dedicating more time and attention to the public health and equity needs of Tribal partners. This need is related to each of the levels of implementation described above. Clear leadership and guidance, and support for unit-level staff, data collection, and studies were identified as priorities.

The site visits helped to identify some specific areas of improvement for how to engage with and consider Tribes with respect to public health, equity, and transportation planning. First, Tribes need and require safe and equitable access to their Aboriginal lands. Many Tribal

members may have not had the opportunity to access spiritually significant places; in addition, the use of these lands may not align with how Tribes want these lands to be used and visited. It was also made clear that Federal land agencies need to identify a new set of tools for how to engage and partner with Tribes, starting with listening sessions and discussions about how to give ownership of land and decision-making back to these communities. Considerations and recommendations generated from this study on how to specifically improve public health and equity outcomes for Tribes in transportation planning are included below.

Tribal Public Health and Equity Concerns and Recommendations

Public Health and Equity Concerns

- The lack of general infrastructure in some Tribal communities has created public health issues that have been heightened by the COVID-19 pandemic. For example, some communities do not have running water or access to safe roads and there is no access to fast information (e.g., Intelligent Transportation Systems or internet for public service announcements, and some elders still rely on radio).
- Dust generated by buses/dirt roads in Tribal communities has health implications that are aggravated by climate change.
- Distance is generally a barrier for many Tribal communities. For some Tribes, the nearest grocery store or other essential services could be 60 miles away. Additionally, the cost of recreation activities may be outweighed by trying to meet basic necessities.

Recommendations

- Establish long-term relationships with Tribes through Tribal consultation plans and collaborate with Tribes early and often in transportation planning. These plans will vary based on the region and the Tribe, and Federal land agencies need to establish processes and approaches that work best in their context. This could include establishing an Inter-Tribal Working Group; paying for travel, expenses, and time for Tribal members to attend meetings; regularly and directly communicating with individual Tribal representatives; and partnering with Tribes on grant applications and projects.
- Ensure collaboration with Indian Health Services, which provides health care to many Tribal communities.
- Emphasize the importance of balancing equity/access with protection and preservation of Indigenous cultural and historic sites/locations and land features. Lands managed by Federal agencies are traditional homelands to many Tribes. For many Native American/American Indian, Alaska Native, Native Hawaiians, or Indigenous peoples, public health includes connecting to ancestors and self-identifying through the natural environment, such as considering impacts to animals. Degradation to these resources affects the well-being of Indigenous peoples.
- Act with cultural and historical sensitivity when visiting Federal lands. The Federal Government holds some Tribal community lands in trust, and some of those lands are tourist destinations. All Federal lands used to be Indigenous lands; the discussion is not just about reservations. Tribes want to protect these lands, even if they are maintained by Federal land agencies and they want to make users, visitors, and readers more aware of this history.
- Partner with Tribes on transportation data collection. Some Tribes lack documentation and data regarding their transportation network (e.g., GIS data) and may not have the resources to collect it. Federal partnerships could help Tribes fill this gap.

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- Partner with Tribes on climate data collection and decision-making. Many Tribes are or will be disproportionately affected by climate change, and they are actively responding to these threats. However, Tribes may not have climate projections needed to inform decisions, especially related to public health and transportation planning.
- Be a considerate neighbor. Consider and address the basic transportation needs of Tribal partners. Reservations neighboring Federal lands often rely on Federally managed roadways for access/egress and need Federal land agency support to ensure the road is open and well-maintained. This is especially important for emergency evacuations in rural areas with fewer alternative routes available.
- Where possible, be a co-applicant and project partner on Tribal grant applications to support their transportation planning and public health goals. Federal land agencies may also award funds to Tribes for these projects.

Limitations and Needs

While this study considered Tribal needs, the approach was limited. A Tribal advisory group did not inform this work, and Tribal members were not engaged during the site visits. Secondly, this study was grounded in research approaches that were limited in being able to identify and support Tribal needs. For example, research questions were framed around how to fit Tribes into established approaches and research methods. This meant considering how Tribal needs can be considered in traditional transportation planning practices. To achieve equity and justice for Tribes, research should start from the perspective first of Tribal needs—which will certainly be diverse. This diversity and nuance should be captured and considered.

Based on this study and its limitations, a separate study on public health and equity and transportation planning should be conducted that is solely dedicated to Tribal concerns to help establish a framework that appropriately recognizes the needs of Tribes and the desire and goals to reimagine the relationship between Tribes and Federal land agencies.

8.1.5. ADDITIONAL RESEARCH NEEDS

As noted in the introduction, this study serves as a starting point for practitioners at Federal lands to consider and implement public health and equity considerations in transportation planning. Further research is needed to continue to expand on this work and support Federal land agencies to integrate these topics into their work and improve public health and equity outcomes at Federal lands. Specifically, additional research on equity and its relationship to public health and transportation planning at Federal lands is needed. Equity was integrated into this study, but it was not the central focus of the study from the beginning. More research on this topic is needed.

8.2. Maturity Model

Integrating the recommended process-oriented and project-level strategies into agency practices and projects can occur at any time, and can be agency-wide or targeted on particular programs. The goal of the maturity model is to outline a framework for how/when Federal land agencies can integrate public health and equity strategies into their transportation planning processes.

The first step, before applying the maturity model, is to understand the context and needs at an agency or unit. Implementation strategies will vary in relevance or impact by Federal agency and local context.

The maturity model is meant to serve as a guide for unit and headquarters staff to affect change at their respective agencies. The model, depicted in Figure 6, has four stages of maturity, including:

- **Ad hoc**, meaning that project-level strategies are selected and implemented on an ongoing basis as opposed to strategically implemented or based on an updated process.
- **Some projects and programs**, meaning that process-oriented and project-level strategies are applied more widely across projects and programs to incorporate public health and equity into transportation planning.
- **Organizational standards**, meaning that the public health and equity project-level and process-oriented strategies are codified in organizational processes, standards, and projects.
- **Organizational culture**, meaning that public health and equity project-level and process-oriented strategies are engrained in the culture. Staff are well-trained on these topics; relationships and collaborations between relevant stakeholders are established with the goal of having public health and equity be standard considerations for transportation planning on Federal lands.

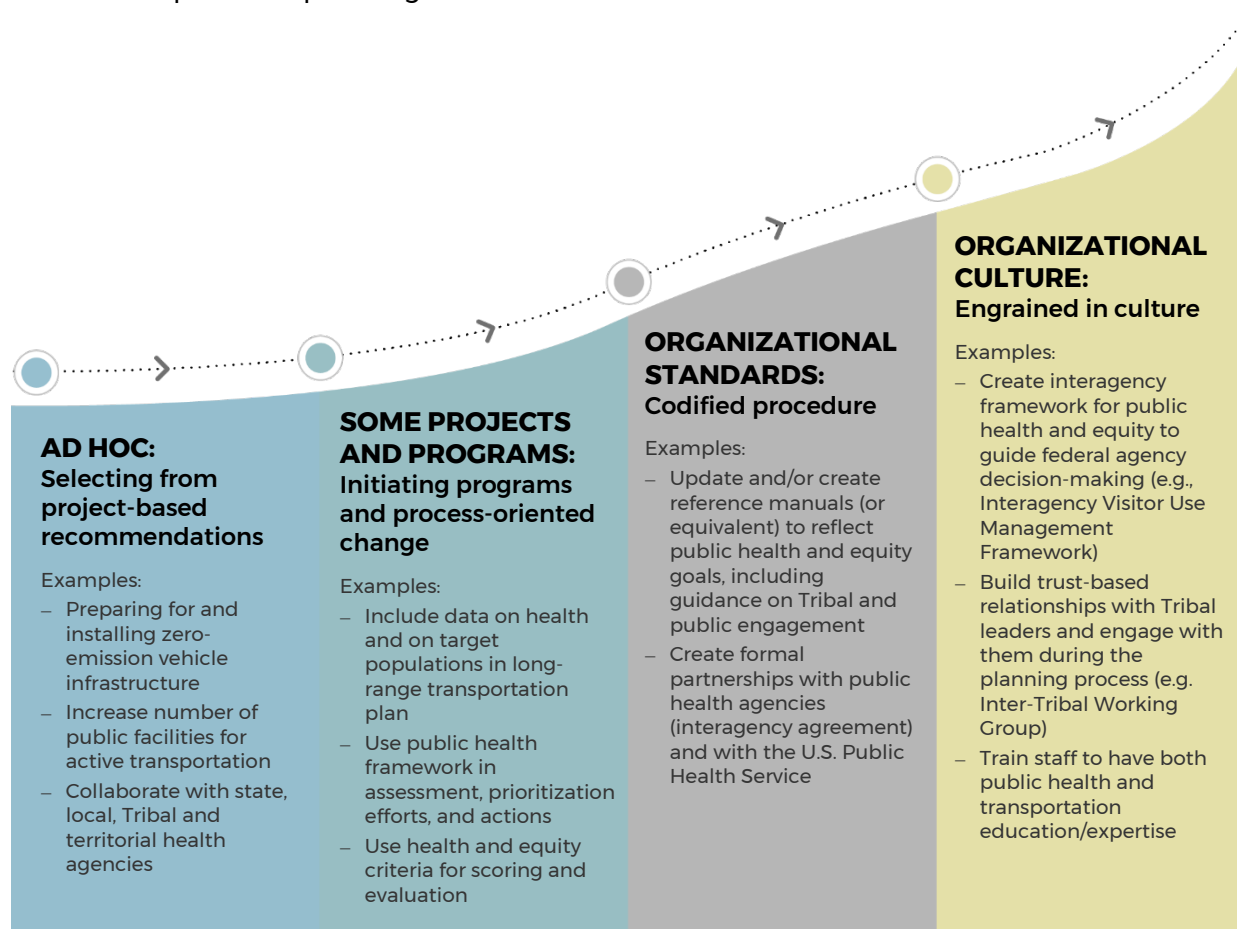


Figure 6 Maturity Model.

The maturity model can be used to determine where an organization currently is with respect to incorporating public health and equity into transportation planning. Establishing the current maturity stage of an agency allows the agency to (1) identify future desired levels of maturity, and (2) determine which strategies would lead to this desired maturity. For example, if an agency determines itself to be at the “some projects and programs” level of maturity, using the strategies presented earlier in this section, a program of action might include:

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Leadership

- Establish guidance for agency standard operating procedures relating to public health and equity during the planning and programming processes.
- Update the agency's management frameworks to include public health and equity.
- Establish interagency agreements with Federal agencies and State/local and Tribal partners to integrate public health and equity into transportation planning from a broader systems perspective.
- Establish or modify existing training to incorporate and emphasize public health and equity considerations as they relate to transportation planning and programming.
- Establish or modify existing training to incorporate and emphasize public health and equity considerations as they relate to transportation planning and programming.

Unit-level

- Update reference manuals or their equivalent to include public health and equity.
- Establish an interagency committee on public health and equity.
- Recognize barriers for using and/or collaborating with public health agencies and data sharing. Define strategies for overcoming these barriers.

By implementing such actions, the agency will be better-positioned to enhance its consideration of public health and equity in the transportation planning process.

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Appendix A: TAG Members and Stakeholder Workshop Participants

TAG Members

Name	Title	Institution
Diana Allen	Chief, Healthy Parks Healthy People Program	NPS
Roxanne Bash	Transportation Planning Team Lead	FHWA Western Federal Lands Highway Division
Deborah Benavidez³	Senior Strategic Initiatives Policy Analyst	Oregon Department of Administrative Services
Fred Bowers	Community Planner	FHWA Office of Planning
Meredith Bridgers	Branch Chief	USFWS
Dr. David Brown	Senior Behavioral Scientist	CDC, Division of Nutrition, Physical Activity and Obesity, Physical Activity and Health Branch
Dr. Andy Dannenberg	Affiliate Professor	University of Washington
Ed Fendley	Environmental Protection Specialist	USEPA Office of Community Revitalization
Kevin Gu	Assistant Regional Transportation Engineer	USFS
Faith Hall	Community Planner, Office of Planning, Environment, and Realty	Federal Transit Administration
Dave Jeppesen	Travel and Transportation Management Program Manager	BLM
Misty Klann	Program Planning Specialist	FHWA Federal Lands Highway Office of Tribal Transportation
Dr. Bethany Kunz	Research Biologist	U.S. Geological Survey
Joe Marek	Transportation Safety Program Manager	Clackamas County Department of Transportation and Development
Victoria Martinez	FHWA Environmental Protection Specialist - Lead of the USDOT Health in Transportation Working Group	FHWA Office of Natural Environment
Rebecca Mowry	Senior Transportation Engineer	Caltrans
Dr. Catherine Ross	Professor	Georgia Tech
Dr. Ingrid Schneider	Professor	University of Minnesota
Dr. Sonja Wilhelm Stanis	Professor	University of Missouri

³ Previously: Statewide Policy and Planning Coordinator at Oregon Department of Transportation

Name	Title	Institution
Nissa Tupper	Transportation and Public Health Planning Director	MnDOT
LCDR Michael Wandersee	U.S. Public Health Service Engineer	USFWS
Zhongren Wang	Supervising Transportation Engineer	Caltrans
Laura Whorton	Transportation and Data Management Branch Chief	USFWS
Vince Ziols	National Transportation Planner & Analyst	USFWS

Stakeholder Workshop Participants

Name	Affiliation
Beth Alden	Executive Director, Hillsborough County MPO
Diana Allen	Chief, Healthy Parks Healthy People Program, NPS
Melissa Kraemer Badtke	Executive Director/MPO Director for East Central Wisconsin Regional Planning Commission
Deborah Benavidez⁴	Senior Strategic Initiatives Policy Analyst, Oregon Department of Administrative Services
David Berrigen	Biologist at National Cancer Institute
Meredith Bridgers	Branch Chief, USFWS
David Brown	Senior Behavioral Scientist, CDC, Division of Nutrition, Physical Activity and Obesity, Physical Activity and Health Branch
Brian Carlstrom	Cape Cod National Seashore, NPS
Ivana Castellanos	Policy Analyst, American Public Health Association
Gil Cerise	Program Manager of Transportation Planning at Puget Sound Regional Council, working on the agency's transit, active transportation, and related programs
Ed Christopher	Transportation Planning Consultant
Kelly Clarke	Transportation Planner with the Central Lane MPO/Lane Council of Governments (Eugene/Springfield, Oregon)
Brian Cole	Assistant Professor-in-Residence, UCLA Fielding School of Public Health
Ellen Currier	Principal Planner, Central Lane MPO (Eugene/Springfield, Oregon)
Dr. Andrew Dannenberg	Affiliate Professor in the Department of Environmental & Occupational Health Sciences and in the Department of Urban Design and Planning at the University of Washington
Kevin Doniere	Landscape Architect, Municipality of Anchorage

⁴ Previously: Statewide Policy and Planning Coordinator at Oregon Department of Transportation

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Name	Affiliation
David D’Onofrio	FHWA
Preston Elliott	Deputy Commissioner, Chief of Environment and Planning, Tennessee DOT
Michelle Glickert	Principal Transportation Planner, Tahoe County MPO
Faith Hall	Community Planner, Office of Planning, Environment, and Realty, Federal Transit Administration, USDOT
John Kelly	Streetsmart
Sarah Larsen	Transportation Planner, MetroPlan
Todd Litman	Executive Director, Victoria Transport Policy Institute
Ted Mansfield	Senior Consultant, RSG
Joe Marek	Transportation Safety Program Manager, Clackamas County Department of Transportation and Development
Victoria Martinez	FHWA Environmental Protection Specialist - Lead of the USDOT Health in Transportation Working Group
Patrick McMahon	Senior Lead Environmental Specialist, Maryland Transit Administration
Will Nicholas	Director, Center for Health Impact Evaluation
Joe Regula	NPS
Dan Resmondo	Deputy Chief of Commercial Services, Grand Canyon National Park
Wade Reynolds	Senior Planner, Hillsborough County MPO
Kelly Rodgers	Executive Director, Streetsmart. Serves on Transportation Research Board Health and Transportation and Vice-Chair of ITE Health and Transportation. PhD candidate studying use and influence of health indicators in transportation.
Louis Rowe	Deputy Associate Director, Vis and Res Protection at NPS
Terry Schumann	FHWA Tribal Transportation Program
Dr. Ipek Sener	Research Scientist, Texas A&M Transportation Institute
Nissa Tupper	Transportation and Public Health Planning Director, MnDOT
LCDR Michael Wandersee	U.S. Public Health Service Engineer at USFWS - Manage projects and part of United States Public Health Service to improve health to low-income and vulnerable populations
Risa Wilkerson	Executive Director, Healthy Places by Design
Aaron Willis	Transportation Planner, Colorado DOT
Tristan Winkler	French Broad River, MPO (Asheville, North Carolina)
Vincent Ziols	National Transportation Planner & Analyst, USFWS

Appendix B: Survey Questionnaire

FLMA Public Health and Transportation Planning Survey

The purpose of this survey is to better understand whether and how Federal Land Management Agencies (FLMAs) integrate public health into transportation planning, programs, and policies. This survey is being administered as part of a research study led by the Federal Highway Administration (FHWA) Western Federal Lands Highway Division.

Please note that survey responses will be analyzed in the aggregate, and the names of survey participants will remain anonymous.

To navigate through the survey, please use the “Next” and “Prev” buttons at the bottom of each page.

If needed, you can exit out of this screen and reopen this web link to complete the survey at a later date and/or edit previous responses. Please complete the survey only once and click the “Next” or “Done” buttons to save your responses.

For the purposes of this study, public health may encompass multiple audiences, including FLMA staff, FLMA visitors/users, and/or local communities adjacent to public lands.

Public health relates to the **physical and mental health of populations** and may include:

- 1) **safety** (e.g., on roads, trails, and personal safety),
- 2) **active transportation** (e.g., walking, hiking, bicycling),
- 3) **air quality** (e.g., emissions, smoke, dust),
- 4) **transmission of infectious disease** (e.g., COVID-19),
- 5) **transportation equity** (i.e., consistent and systematic fair, just, and impartial treatment of all individuals, especially historically underserved communities, including access, travel options/modes, and the fairness of the distribution of benefits and costs [e.g., related to transportation access, services, facilities, activities]),
- 6) **emergency/disaster management** (e.g., evacuation during fires, natural disasters),
- 7) **environmental impacts/climate change** (e.g., water issues), or
- 8) **nature-based design/exposure to nature** (e.g., trails enabling access to natural sounds, vistas, trees).

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1. Please indicate your agency:
 - FHWA
 - Bureau of Land Management
 - Fish and Wildlife Service
 - Forest Service
 - National Park Service
 - U.S. Army Corps of Engineers
 - Bureau of Reclamation
 - Bureau of Indian Affairs
 - Other (please specify: _____)

2. Which one of the following best describes the agency level where you work?
 - Headquarters
 - Region/District level
 - Unit-level
 - Research or Technical Center/Office
 - Other (please specify: _____)

3. Does your work involve any of the following? *Please check all that apply.*
 - Transportation planning and/or project/program design
 - Transportation project/program implementation
 - Public health planning and/or project/program design
 - Public health project/program implementation
 - Other (please specify: _____)

4. In your view, how important to your agency is integrating public health into transportation planning, programs, and/or policies?
 - Very important
 - Somewhat important
 - Not too important
 - Not at all important
 - Don't know

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5. Does your agency consider public health in its transportation planning, programs, and/or policies?

NOTE: Public health relates to the **physical and mental health of populations** and may include 1) **safety** (e.g., on roads, trails, and personal safety), 2) **active transportation** (e.g., walking, hiking, bicycling), 3) **air quality**, 4) **transmission of infectious disease** (e.g., COVID-19), 5) **transportation equity** (i.e., consistent and systematic fair, just, and impartial treatment of all individuals, especially historically underserved communities, including access, travel options/modes, and the fairness of the distribution of benefits and costs [e.g., related to transportation access, services, facilities, activities]), 6) **emergency/disaster management** (e.g., evacuation during fires, natural disasters), 7) **environmental impact/climate change** (e.g., water issues), or 8) **nature-based design/exposure to nature** (e.g., trails enabling access to natural sounds, vistas, trees).

- Yes - **SKIP TO Q.8**
 - No
 - Don't know - **SKIP TO Q.8**
6. What are some of the reasons your agency does not consider public health in its transportation planning, programs, and/or policies? *Please check all that apply.*
- Agency does not have laws, regulations, or authorities related to public health
 - Lack of funding to support incorporating public health into transportation planning
 - Lack of funding to support projects/design elements or services that contribute to public health
 - Agency does not have enough staff to do so
 - Current staff do not have the needed public health expertise
 - Public health not viewed as a priority by the agency
 - Lack of guidance, templates, or tools
 - Other (Please specify: _____)
 - Don't know
7. What resources or tools would your agency need in order to start integrating public health into its transportation planning, programs, and/or policies? [OPEN END]

You have completed all of our survey questions. When you hit "Next" your survey will be submitted.

Thank you for your participation!

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8. What public health topics have been or are currently being considered by your agency? (By consider, we mean that your agency has implemented or plans to implement projects, programs, or policies related to these topics). *Please check all that apply.*

Active transportation/physical activity (e.g., walking, hiking, bicycling)

Safety (e.g., related to roads, trails, and personal safety)

Transportation equity (i.e., consistent and systematic fair, just, and impartial treatment of all individuals, especially historically underserved communities, including access, travel options/modes, and the fairness of the distribution of benefits and costs)

Emergency/disaster management (e.g., evacuation during fires, natural disasters)

Air quality (e.g., emissions, smoke, dust)

Transmission of infectious diseases (e.g., COVID-19)

Environmental impacts, climate change, and resilience (e.g., water issues)

Nature-based design/exposure to nature (e.g., natural sounds, vistas, trees)

- Other (please specify: _____)
- Don't know

9. Please provide examples where your agency (or a regional office or unit within the agency) has taken action to incorporate any of the above public health topics (or others) into transportation planning, programs or policies. For example, providing step counts or mile markers to encourage walking, or setting goals for zero-emission work vehicles.

Please include as many examples as possible, and we encourage you to be specific (e.g., include program names). [OPEN END]

10. Has your agency developed public health-related goals, objectives, and/or performance measures that are part of the transportation planning process? These do not need to be explicitly public health-related, but may indirectly support public health (e.g., safety goals, objectives, or performance measures). *Please check all that apply.*
- Yes, developed public health-related goals or objectives
 - Yes, developed public health-related performance measures
 - No, have not developed public health goals, objectives or performance measures **-SKIP TO Q. 12**
 - Don't know **-SKIP TO Q. 12**
11. Please list your agency's goals, objectives, and/or performance measures related to public health that are part of the transportation planning process. [OPEN END]

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12. Does your agency collect data that could be used to measure public health outcomes in transportation? For example, number of bicycle lanes; bicycle or pedestrian counts; vehicle, bicycle or pedestrian accidents, etc.
- Yes
 - No – **SKIP TO Q. 14**
 - Don't know- SKIP TO Q. 14**
13. What types of data are collected that could be used to measure public health outcomes in transportation? [OPEN END]
14. Does your agency's regional/district offices or local units collaborate with nearby local communities and/or local health agencies on public health-related issues that involve transportation?
- Yes
 - No – **SKIP TO Q. 16**
 - Don't know – **SKIP TO Q. 16**
15. Can you provide example(s) of collaboration between your agency and local communities and/or local health agencies on public health issues that involve transportation? [OPEN END]
16. What challenges does your agency face in trying to incorporate public health in transportation planning, programs, and/or policies? *Please check all that apply.*
- Agency does not have laws, regulations, or authorities related to public health
 - Lack of funding to support incorporating public health into transportation planning
 - Lack of funding to support projects/design elements, or services that contribute to public health
 - Agency does not have enough staff to do so
 - Current staff do not have the needed public health expertise
 - Public health not viewed as a priority by the agency
 - Lack of guidance, templates, or tools
 - Other (please specify: _____)
 - Don't know

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17. As you reflect on transportation policies, programs, and planning within your agency, please provide any suggestions for **where** and/or **how** public health could be better integrated with transportation. [OPEN END]

You have completed all of our survey questions. When you hit “Done” your survey will be submitted.

Thank you for your participation!

Appendix C: Case Study Reports and Abbreviated Case Study Summaries

To conduct the case study research, the study team performed desktop research and held interviews with staff at each of the identified agencies. Lessons learned for each case study are summarized at the conclusion of this section. The abbreviated case studies are based on desktop research.

Minnesota Department of Transportation/Department of Health: Public Health Collaboration

- **Planning process phase(s):** Enabling/building organizational capacity and long-range planning.
- **Public health/equity considerations:** Equity, active transportation, safety.

BACKGROUND AND INTRODUCTION

MnDOT and MDOH have worked collaboratively for many years to strengthen the linkage between public health concerns and equity, and equitable transportation decision-making.

TRANSPORTATION PLANNING AND PROJECT DEVELOPMENT

Both agencies signed an interagency agreement in 2015 (that has been updated several times since) that outlined mutually beneficial actions. This agreement was largely motivated by the recognition of both agencies that their respective missions overlap and that both can take actions to be mutually supportive. The transfer of MDOH staff members to MnDOT in the mid-1970s was the primary catalyst for this mutually supportive effort.

Specific Examples of Collaboration

The following examples were provided as illustrations of how both agencies have institutionalized this interaction:

- Quarterly meetings are held with representatives from both agencies primarily including MnDOT's Active Transportation group and MDOH's Active Living and public health improvement program staff (this unit gives grants to counties to enhance public health efforts).
- MDOH staff have been part of MnDOT's Safe Routes to School program, State Pedestrian Plan, and project-level planning efforts. MDOH staff prepared an HIA on MnDOT's Statewide Multimodal Transportation Plan.
- MDOH is providing data for MnDOT's Target Zero Deaths statewide safety plan.
- MDOH was part of MnDOT's project to reduce suicides on highway bridges.
- Both agencies are active at the subcabinet effort on climate change.
- A pilot HIA study is currently underway on a state project. MDOH is on the study committee and is advising on data needs and data interpretation.
- MDOH is working with MnDOT's traffic management center in interpreting and defining a "message" on fatalities and injuries.
- MDOH worked with MnDOT's air quality forecasting unit to help define health concerns. MnDOT is leading the study and coordinating with MDOH for input on how to enhance public health concerns.

As a means of institutionalizing public health into project development efforts, the State is currently looking at including public health requirements in environmental impact statement regulations.

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EQUITY

Equity is a new focus for MnDOT. It is expected that the next update of the interagency agreement will include equity concerns.

Specific Examples of Collaboration

- MnDOT has an equity coordinator on its staff with assigned responsibilities.
- Equity and health are being considered together. MDOH has a Center for Health Equity, and MnDOT has asked for technical assistance on how to better include equity concerns into project planning, including addressing the question “how should this be formalized and institutionalized?”
- Currently MnDOT is looking to establish proof of concept for equity consideration in its district offices.
- MnDOT is updating its Complete Street documents, the overall policy guidance to its staff working on state trunk highway projects, to include in the planning and project development processes diverse communities who experience disparities and transportation and health barriers. For the first time, MnDOT’s annual sustainability report includes health equity measures.
- Along with MDOH, MnDOT is looking at equity-related data to understand disparate impacts with respect to safety on different groups. MnDOT is also conducting internal research on effective equity performance measures.

LESSONS LEARNED

The MnDOT representative who was interviewed considered the collaboration to be very successful. As noted, such efforts have been valuable for incorporating public health and equity considerations into transportation decision-making. The collaboration has allowed MnDOT to integrate public health expertise into project planning, and the interagency agreement lends credibility to these efforts.

Lessons learned from this case study include:

- The interagency agreement did not establish a formal structure (e.g., advisory groups or management committees) to implement the intent. Interagency communications and relationships among staff were most important in establishing successful efforts. However, staff-established quarterly update meetings are very important for identifying overlap in agency efforts. The interagency agreement established the mandate to do this.
- At the project level, HIAs have been effective in identifying public health-related concerns as part of project impacts. HIAs have also been effective for doing so at the plan level (e.g., Pedestrian Plan, Statewide Multimodal Plan, and Traffic Safety Plan).
- The public health agency is effective at providing and interpreting safety data (and in helping craft a health message).
- Existing inflexible standard operating procedures present a hurdle for including both health and equity concerns in project planning.
- With respect to equity, the “authority” to look at equity concerns came from a directive from the Commissioner’s Office.
- A key challenge is gaining the trust of minority groups; communications need to be transparent and valuable to such groups. Key stakeholders from these groups should be included, and their participation incentivized (e.g., holding meetings around their schedules and compensating participants for their time).

Clackamas County Department of Transportation and Development: Public Health Staff Member

- **Planning process phase(s):** Enabling/building organizational capacity and long-range planning.
- **Public health/equity considerations:** Equity, active transportation, safety.

BACKGROUND AND INTRODUCTION

Clackamas County (Oregon) hired a public health staff member to work with county departments in integrating public health concerns into decision-making. One of the major interactions has been with the transportation department to conduct HIAs and establish equity criteria in the project prioritization methodology.

TRANSPORTATION PLANNING AND PROJECT DEVELOPMENT

The impetus for and process for hiring a public health-oriented staff member to work with county agencies occurred over 10 years. The staff member (with a Masters Degree in Public Health and Urban and Regional Planning) was hired three years ago and has worked with the transportation department in a variety of ways. The initial focus of the coordination was to add a public health component to the county's traffic safety program. The primary catalyst for hiring the public health professional was the Director of the Transportation Department who wanted to add a public health component to the department's decision-making.

Some early consideration of public health in department decision-making occurred in the county's Safe Communities Program (2005), which described the public health consequences of traffic safety to the county's communities. Public health was also linked to the county's efforts in reducing binge drinking and suicides, and enhancing mental health. The 2012 Safety Action Plan also included a public health component.

To provide this perspective, the Clackamas County Department of Transportation and Department of Health worked for more than two years to hire a public health staff member (who is located administratively in the Department of Health but is shared between the two agencies). There was little difficulty in hiring a public health professional given that the Department of Health had job classifications for public health staff.

Specific Examples of Collaboration

The following examples were provided by the interviewees as illustrations of how both agencies have institutionalized this interaction:

- Public health components were added to the Community Improvement Program, Safety Action Plan, and Strategic Priorities document (2016).
- The Board of Health reviewed the public health component of the Safety Action (there was not requirement to do so), which reaffirmed the transportation and public health linkage.
- An HIA was conducted on the county's pedestrian/bike crossing study.
- Another HIA is proposed for a major road corridor study. The major focus has been understanding the public health need as determined by the public outreach effort (cost is approximately \$500,000 of a \$4 million planning effort). The logic is that people living in the corridor will know best what the disparities are.
- An update of the pedestrian/bike has adopted a health/equity framework as part of its assessment process, including the use of the health equity prioritization framework.
- A new focus for the public health staff member is on obesity and the provision of active transportation modes.

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- A set of equity criteria has been added to the transportation methodology for project prioritization.
- The staff member has worked with project developers to enhance the consideration of public health considerations in decision-making.

The following are observations from the transportation director and the public health staff member about hiring.

- The hardest part of hiring the public health staff member was getting an agreement between the two agencies that public health was an important concern, and a staff member would be beneficial to both agencies.
- The initiative for this effort was at a grass roots level. The primary catalyst for hiring the public health professional was the Director of the Transportation Department who wanted to add a public health component to the department's decision-making.
- One of the first steps of the staff member was to review the DOT's prior year decisions to understand which of these decisions could conceivably have a public health impact. The staff member concluded that about 80 percent of prior year decisions had health and safety consequences.
- Starting with traffic safety and public health was an important foundation for lending credence to a public health perspective in project decision-making. This has led to other concerns, including active transportation and examining transportation barriers to health care.
- The public health framework recommended by the American Public Health Association is being used to consider public health in agency decision-making (American Public Health Association, 2021). This has led to a broader perspective of including housing into the transportation/public health nexus.

LESSONS LEARNED

The Clackamas County case study offers the following lessons learned:

- Finding a champion for public health in transportation is a critical point of departure for establishing the linkage between the two ("building bridges to other county agencies").
- HIAs have been effective in identifying public health-related concerns as part of project impacts and plan development. However, the public health staff member interviewed for this study noted that another good strategy is to take components of the HIA process (such as health screening, parts of the more detailed analysis) and include these in project development (without doing a full-fledged HIA). A more abbreviated HIA is certainly appropriate for many of the decisions facing the county.
- Other tools the staff member is considering for understanding health impacts include health matrices and checklists.
- After a year in the role, the public health staff member has been effective at providing and interpreting public health data, starting with traffic safety.
- One benefit identified by the public health staff member was developing shared goals and language with engineers. Another was establishing relationships with project engineers that provided an access point into the project development process.
- The structure of the county (five commissioner board), which hosts all the agencies "under one roof" made the process of hiring a public health staff member relatively easy to implement (could be harder with more complicated governmental structure).
- The strategy adopted by the county included some level of risk-taking.
- Including equity considerations into project prioritization was considered a major step forward.

Grand Canyon National Park

INTRODUCTION

Grand Canyon National Park provides several examples of effective practices related to transportation planning, equity, and public health. The examples are aligned with the following planning process steps: long-range planning, project development, and implementation, monitoring, and evaluation. Each of these exemplary effective practices relates to different aspects of public health and equity.

For the case study research, the study team conducted desktop research and interviewed planning and operations staff at Grand Canyon National Park and the U.S. Public Health Service. The study examples are summarized in the call out box and described in the next section. Lessons learned for each case study are summarized at the conclusion of this section.

Grand Canyon National Park Project Examples

- Shuttle bus service during the COVID-19 pandemic
- Hermit Road improvement project
- Desert View tribal cultural heritage site

SHUTTLE BUS SERVICE DURING THE COVID-19 PANDEMIC

- **Planning process phase(s):** Implementation.
- **Public health/equity considerations:** Transmission of infectious disease and access.

Grand Canyon National Park operates four shuttle bus routes. The number of boardings each year is on par with that of a transit service in a mid-sized city. Three of the shuttle bus routes operate within the park; two routes operate year-round (NPS, Grand Canyon National Park, n.d.). The Village (or Blue) Route operates within the village service area of the South Rim, acting as a city bus route moving visitors among hotels, restaurants, and the visitor center. The Village Route is provided year-round. The Kaibab/Rim Route (or Orange) Route, a shorter scenic route operating year-round, provides access to the South Kaibab Trail Head. The Hermits Rest Route (or Red) Route is a longer scenic route providing access to the greenway and hiking off Hermit Road. This route operates from March through November. The final route, the Tusayan Route (or Purple) Route, provides service from several hotels into and out of the park. This route runs during the summer, although it did not run during the COVID-19 pandemic. Collectively, the shuttle service provides a cohesive network throughout the South Rim.

Generally, the shuttle service has provided benefits to the South Rim and surrounding communities. Evaluation reports on the Tusayan pilot programs in 2008 and 2009 provide insights into the benefits of the shuttle service. The 2009 Grand Canyon National Park Tusayan Pilot Shuttle Evaluation Report, which evaluated the 2008 pilot shuttle program, stated that the shuttle service provided convenient access to the park, attracted a diverse group of visitors, and allowed shuttle riders to avoid the constrained parking conditions at the park (NPS, 2009). Additionally, the report notes that the shuttle enhanced transportation alternatives for local residents. Specifically, the shuttle helped to provide transportation for part-time and low-wage workers, children, youth, and other locals who did not have access to private vehicles. Overall, park visitors, Tusayan residents, and Tusayan business owners found the shuttle program beneficial. The Tusayan Route pilot was conducted again in 2009. The 2010 Grand Canyon National Park Tusayan Pilot Shuttle Evaluation Year 2 report indicated similar results to the first year of the pilot. It was recommended that the shuttle service be made permanent (NPS, 2010).

COVID-19 has posed significant challenges to operating the shuttle bus service safely throughout the South Rim. From mid-March through Labor Day of 2020, shuttle bus service was suspended. Following Labor Day, park officials resumed limited shuttle service and implemented COVID-19 precautions to make the service as safe as possible for riders and bus

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operators. The public health and personal safety strategies that the park implemented included:

- Installing driver shields to protect drivers.
- Requiring access/egress through the rear door.
- Reducing capacity to 15 people per shuttle bus.
- Maintaining 6-foot distance between passengers/drivers.
- Roping off every other seat row to create distance between visitors.
- Requiring masks (because Coconino County passed mask ordinance, the park was able to enforce it even without a Federal mandate).
- Putting signs up across park buildings/buses/bus stops to communicate requirements.
- Installing hand sanitizer dispensers.
- Suspending service for the Tusayan Route to focus on providing essential shuttle service necessary for accessibility within the park.

Park staff continue to implement some of these precautionary measures for the shuttle bus service even though the NPS no longer requires these measures. The park implemented these measures with support from the regional U.S. Public Health Officer whose responsibilities are to provide public health services for all Arizona parks, monuments, and historic sites. The day-to-day activities of this individual include assessing food facilities, water facilities, and back country conditions. In this role the public health officer is expected to respond to any sort of vector-borne or disease outbreaks by providing guidance to park staff. The U.S. Public Health Service is part of HHS, which has a memorandum of understanding with the NPS to provide this support. The U.S. Public Health Officer provided guidance and expertise to advise on the shuttle service plan and worked closely with the park staff and the shuttle bus contractor staff. Park staff continue to monitor the pandemic, including public health guidance, and adaptively manage shuttle bus service in consultation with the public health officer and the shuttle bus contractor.

HERMIT ROAD IMPROVEMENT PROJECT

- **Planning process phase(s):** Long-range planning/project development.
- **Public health/equity considerations:** Active transportation and access to nature.

The purpose of the Hermit Road Improvement Project was to rebuild the roadway, which was experiencing significant deterioration. Hermit Road, a route that was originally built in the 1930s, is a 7.5-mile segment of a longer historic road, with a paved width of roughly 20 feet. Park planning staff wanted to maintain the historic quality of the road while also accommodating traffic from the shuttle bus and bicyclists along the route. Additionally, park planning staff wanted to enhance vistas of the canyon rim and to make sure current views would not be substantially altered by the project.

A draft environmental assessment for the project was completed in 2006, and a Finding of No Significant Impact was issued in 2007. Three alternatives were considered in the environmental assessment (NPS, Grand Canyon National Park, 2006). The selected alternative was the one that best maintained the historic character of the road, a factor that was particularly important given that the road is on the National Register of Historic Places. Several key elements of the preferred alternative reflect public health considerations that increase opportunities for active transportation and accessibility:

- Rehabilitate paved path to Maricopa Point.
- Construct a connecting trail from Maricopa to Powell.
- Minimally improve an unpaved path from Powell to just west of the Abyss.
- Construct a Greenway Trail from west of the Abyss to Hermit's Rest.

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- Improve accessibility of Mather Point.

The design and implementation of the road project improved pedestrian and bicycle access along the route and access to vistas/outlooks. These improvements affect the public health of park visitors by fostering safe and healthy movement through the park. However, public health concerns were not key considerations when designing the project elements. Through the transportation planning process, park staff were able to provide new opportunities for physical activity and active transportation in the park and included smaller design elements to facilitate this, including bike racks at each shuttle bus stop and on the buses themselves. Park staff indicated that they wanted to find ways to make the shuttle bus system better integrated into bike/pedestrian access and for it to facilitate these activities. On Hermit Road, visitors can choose to walk, bike, or ride the bus for different periods to make it accessible for a broad group of visitors.

DESERT VIEW TRIBAL CULTURAL HERITAGE SITE

- **Planning process phase(s):** Long-range planning/programming.
- **Public health/equity considerations:** Access/Tribal heritage and collaboration.

An Inter-Tribal Working Group was established at Grand Canyon National Park in 2013 with the intent of holding informal meetings with the park's superintendent. The group developed a strategic plan relating to its concerns for park planning. Part of these concerns was the acquisition in 2015 of the Desert View Watchtower (See Figure 7). The Desert View Watchtower is located on the South Rim of the park and is a National Historic Landmark (NPS, Grand Canyon National Park, n.d.). As part of the strategic plan, the Inter-Tribal Working Group developed a concept plan to transform the full Desert View site into an Inter-Tribal Heritage Site—a place where Tribal members can:

- Conduct First Voice interpretation.
- Have one-on-one interactions with visitors from all over the world.
- Hold cultural demonstrations, such as storytelling, dancing, signing, silversmithing, and pottery making.

Tribal members receive a stipend for conducting cultural demonstrations and are able to sell items to visitors and collect proceeds. For years, the Tribes engaged with park staff about how to integrate revenue, sales, and their story into the Grand Canyon National Park experience. The Desert View project was one way to begin this integration. Additionally, through this work and by establishing the Inter-Tribal Working Group, the park is fulfilling the requirements of the Native Act, which requires “Federal agencies with recreational travel or tourism functions to update their management plans and tourism initiatives to include Indian Tribes, Tribal organizations, and Native Hawaiian organizations” (114th Congress, 2015-2016).



Figure 7 Desert View Watchtower. (NPS, Grand Canyon National Park, n.d.)

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Although no major transportation planning components were associated with the Desert View project, the park is planning to improve access to the area, including:

- Improve the pathways to compliant with the Americans with Disabilities Act.,
- Simplify the overall pedestrian circulation overall.
- Improve parking capacity and reconfigure existing parking.
- Relocate tour bus parking and drop-off sites.

ASSESSMENT

Each of these examples at Grand Canyon National Park illustrate effective practices that may be transferable to other Federal land agencies. The lessons learned from each case study are summarized below.

Shuttle Bus Service During the COVID-19 Pandemic

The way that Grand Canyon National Park staff managed shuttle bus service during the COVID-19 pandemic highlights a few key lessons learned:

- **Partnerships:** Key to the success of the shuttle bus program during this time was the park's relationship with the U.S. Public Health Service. Other Federal land agencies may benefit from a similar partnership to make informed decisions about public health concerns, particularly for infectious disease outbreaks.
- **Adhering to the park's needs and context:** Also central to the success of the shuttle bus program was the park's approach to making sure that decisions meet the needs of its operations, including contractors who are integral to offering shuttle bus service. Grand Canyon National Park has continued to implement COVID-19 safety precautions even in instances when these were not necessarily required.
- **Implementing shuttle service:** The park is also generally a good model of how to implement shuttle service outside the context of the COVID-19 pandemic. Shuttle service helps to promote "other than car" mobility through the park and links visitors to bicycling and hiking/walking modes.
- **Connection to local communities:** The Tusayan pilot shuttle reports indicate that the shuttle service has also provided benefits not only to park visitors, but also to local residents and businesses. These benefits include improved transportation options and mobility for local residents/workers, as well as likely increased access to local businesses for park visitors.

Hermit Road Improvement Project

The Hermit Road project provides the following lessons learned:

- **Public health elements are prevalent in transportation planning:** While the Hermit Road project did not intentionally focus on public health considerations, the project provides an example of how public health considerations can be integrated into project planning. In many ways, transportation planning can integrate public health elements, like active transportation and multimodal planning.
- **Centering and prioritizing different modes:** The Hermit Road project highlights the benefits of prioritizing different modes in the national park context. The project has enhanced recreational activities and created a multimodal network of mobility options in the corridor.

Desert View Tribal Cultural Heritage Site

The Desert View Tribal Cultural Heritage Site highlights several effective practices related to Tribal heritage and access:

- **Institutionalize Tribal engagement and leadership:** The Inter-Tribal Working Group is a good example of how to create a way for Tribal Nations to set their priorities and collaborate with the park and other Federal land agencies. This model could be adopted elsewhere to make sure that Tribes have a way to inform planning and program on Federal lands.
- **Redefine “access” to Tribal heritage:** This project also illuminates effective practices to provide access to Tribal heritage sites. Minor transportation refinements further enhance this experience.

Continental Divide National Scenic Trail: Health Impact Assessment

- **Planning process phase(s):** Technical planning.
- **Public health/equity considerations:** Physical activity, access, and equity.

The HIA referred to as the Studying Trail Enhancement Plans (STEP-HIA) focuses on the health impacts of different potential locations of a CDT segment located in Cuba, New Mexico. This case study illustrates how an HIA improved decision-making by incorporating public health and equity considerations into a Federal lands project. As a result of the HIA, the proposed CDT segment was connected to the Cuba community rather than being routed around it, bringing health and economic benefits to the historically underserved town residents.

HIA is “a systematic process that uses an array of data sources and analytic methods and considers input from stakeholders to determine the potential effects of a proposed policy, plan, program, or project on the health of a population and the distribution of those effects within the population. HIA provides recommendations on monitoring and managing those effects” (Committee On Health Impact Assessment, 2011). Figure 8 illustrates the six steps of HIA, with stakeholder input endorsed at each step (The Pew Charitable Trusts, 2014).

The University of New Mexico Prevention Research Center and Step Into Cuba Alliance, a partnership dedicated to increasing physical activity opportunities in the town, led the STEP-HIA (Kozoll, et al., 2015). This partnership was and continues to be representative of a broad group of stakeholders dedicated to improving the health of the Cuba residents and ensuring that the CDT trail segments are constructed.

The Steps of HIA



Figure 8 Steps of an HIA. (The Pew Charitable Trusts, 2014)

CASE STUDY CHARACTERISTICS AND PUBLIC HEALTH CONCERNS

Cuba, New Mexico, sits at 6,900 feet on the Continental Divide in the mountains of northern New Mexico, near the Santa Fe National Forest and about 80 miles north of Albuquerque. At the time the STEP-HIA was conducted, the Cuba area was described as a rural and lower-resourced community experiencing higher rates of chronic disease with, according to 2010 U.S. Census data, 4,178 people—American Indian or Alaska Native (2,358), Hispanic (1,129), White (662), and Other (29) (Kozoll, et al., 2015). Much of the health-related data and recommendations from the STEP-HIA were timely as they were used to inform the required NEPA environmental impact assessment of the proposed trail segments completed by the USFS Santa Fe National Forest and the BLM New Mexico Rio Puerco Field Office (Kozoll, et al., 2015). The STEP-HIA was “the first use of HIA to assist the USFS and BLM in maximizing the beneficial health effects of trail decisions, in this case a 15-mile CDT segment proposed near the rural community of Cuba, NM” (Davis, Cruz, & Kozoll, 2014). To date, 5.5 miles of new trail connecting the Village of Cuba with San Pedro Parks Wilderness Area has been constructed and is now formally designated CDT (Kozoll, Personal communication, 2021).

To ensure that community members were able to reap the maximum health benefits of the proposed CDT, a computer-based trail assessment instrument called Path Environment Audit Tool was used during the STEP-HIA to capture relevant trail design features that promote the use of the trail segment, including having multiple access points like trailheads; choosing trailheads with scenic viewpoints that also are appealing with minimal noise; offering trails to destination points with interesting landforms and landscape features; for safety and comfort, having some gentle trail slopes and enhanced signage with information about the trail and surrounding area; and amenities such as benches, restrooms, and garbage cans (Kozoll, et al., 2015).

In the Cuba STEP-HIA, the authors developed five different trail segment construction scenarios that ranged from not adding any CDT segment to developing the segments with varying levels of accessibility, access points, trail promotion, and trailhead design. Each scenario was accompanied by specific projections for health, economic, and social outcomes. Because the trail segments are not yet fully completed, changes in various health outcomes, such as physical activity levels are not yet fully known. The STEP-HIA recommendations included easy access from the Village of Cuba to the CDT trailhead via a pedestrian walkway and bikeway path; trail design that considered that the areas closest to each trailhead will be the most heavily trafficked; enhanced safety precautions, such as law enforcement patrol and trail construction to reduce hikers' water and mud exposure; and interpretive trailhead signs and distance markers (Kozoll, et al., 2015). Projected outcomes from the STEP-HIA include decreased mortality rates, increased visitor traffic leading to positive economic outcomes, and benefits to social capital for the area residents.

The main health considerations included in the STEP-HIA were related to increasing physical activity, social connection, and economic benefits along with the health equity considerations described below and additionally researched health-related facts.

Physical Activity

- The STEP-HIA describes the research on the benefits of physical activity and outdoor recreation, underscoring how trail design could influence trail use (Kozoll, et al., 2015). The Step-HIA expands on the connection between trails and health by stating that trails “provide community members and regional visitors with access to attractive, free, safe, and convenient places for outdoor walking and hiking” (Davis, Cruz, & Kozoll, 2014). As part of the HIA, two surveys were conducted of 73 persons from the broader Cuba area at multiple sites in 2013 and 2014. When those interviewed were asked, “How likely would you be to walk or hike the Continental Divide Trail/come to Cuba to walk or hike on the Continental Divide Trail once the new section of trail is finished?” more than

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80 percent of those surveyed said they were very likely or somewhat likely to do so (Kozoll, et al., 2015).

- The Community Guide (Community Preventive Services Task Force) offers strong evidence that creating or improving access to places for physical activity, along with providing information to the community, can lead to higher levels of physical activity (Community Preventive Services Task Force, 2001). Research indicates that only 25 percent of adults and 20 percent of adolescents in the United States meet physical activity guidelines (at least 2½ hrs. per week), and over 30 million adults over the age of 50 are considered inactive (CDC, 2020).

Equity

- The socioeconomic status, rural setting, and racial/ethnic makeup of the Cuba community and other similar communities mean residents are more likely to experience poorer health outcomes and less likely to engage in physical activity (Kozoll, et al., 2015). For example, between 2011 and 2013, the prevalence of diabetes for the Hispanic residents of New Mexico was two times higher compared to non-Hispanic white residents and three times higher in American Indian residents (Kozoll, et al., 2015).
- By overseeing the construction of trails that have been shown to be a vital health resource, public land managers, including Cuba CDT segment planners, “have the potential to reduce health disparities by creating access to this land to meet the local need for increased physical activity and by incorporating health into decision-making processes that do not traditionally consider health outcomes,” such as transportation planning (Kozoll, et al., 2015).
- Trails can be especially important in rural communities that often do not have access to other recreational amenities (Kozoll, Personal communication, 2021). The influence of public land managers underscores the importance of and need for education related to the intersections of their field with health and equity.
- The HIA process can advance equity by promoting community involvement in decision-making, even in areas where health equity is often not considered, such as transportation planning (The Pew Charitable Trusts, 2020).

Economic Benefit

- Recreation and tourism infrastructure and attractions such as trails could reduce economic disparities by drawing in outside visitors who might benefit the local economy (Kozoll, et al., 2015). The STEP-HIA surveyed potential visitors of the new Cuba CDT, and 95 percent of respondents (41 of 43) stated that they would be very likely to spend money in Cuba, whether it was at a restaurant, gas station, grocery store, lodging location, or on outdoor gear.
- Physical activity has economic as well as health benefits. One study estimated that \$117 billion in annual health care costs in the United States can be linked to insufficient physical activity (Carlson, Fulton, Pratt, Yang, & Adams, 2015).
- In 2018, Step Into Cuba celebrated the addition of a national park stamp for Cuba in connection with its proximity to the CDT and noted that more than 200 hikers attempting the CDT journey annually stopped in Cuba to rest and resupply.

State Capital/Connections

- Trails provide areas to walk, and walking outside with others in turn provides opportunities for social connection and improved physical activity that potentially enhances quality of life (Kozoll, et al., 2015). The STEP-HIA describes social capital as a quality-of-life measure, one that can be described as “the sense of an individual’s level

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of trust in his or her community” and which is positively associated with a community’s walkability and trail usage (Kozoll, et al., 2015).

- Trails can also support mental health (Curtis, 2017). Being in nature can support physical and mental health by lowering blood pressure; improving mood; and reducing stress, anxiety, and depression (NPS, 2018). More than 90 percent of respondents of the 2013 STEP-HIA survey stated that developing the Cuba CDT trail segment would provide economic, social, physical, and mental health benefits to the residents of Cuba (Kozoll, et al., 2015).

OUTCOMES AND LESSONS LEARNED

Outcomes

Trail segments are currently either completed, under construction, or still in the planning stages with no official completion date (Kozoll, Personal communication, 2021). More than 5 miles of new CDT-designated trail connect Cuba with the San Pedro Parks Wilderness Area.

Remaining CDT Design and Construction Challenges

To improve public access for one of the trail segments, a cleanup of an abandoned contaminated open-pit copper mine site just east of the village of Cuba is needed. To date, the USFS has created the groundwater cleanup plan. USFS is planning to create a 2-mile loop trail around the mine site with interpretive signage about the cleanup efforts. The loop trail will connect with the 5.5-mile CDT trail. The CDT is currently in use, but the public must walk along 4-5 miles of highway to get there because of the remaining gap in the CDT trail left to be developed (Kozoll, Personal communication, 2021).

Lessons Learned

This case study offers the following lessons learned:

1. HIAs can be used not only in the context of mitigating negative health impacts of proposed projects, but also can illustrate the potential positive health impacts of proposed Federal land agency projects. The STEP-HIA serves as an example of how to consider the health and economic benefits of trail or other amenity placement to benefit local residents and not just those who might access the amenity by traveling to or through it. The original plan for CDT was to go around Cuba, but the STEP-HIA recommended that the CDT go through the town to support residents and attract visiting trail users into town for economic benefit to the town.
2. The HIA structured process can bring more explicit public health and equity focuses to Federal land agencies’ transportation and recreation projects. HIAs coalesce issues of equity, determinants of health, cross-sector collaboration, community engagement, health promotion, evidence, and recommendations for improving decision- and policy-making, as well as implementation.
3. Federal land agencies can engage with local and regional coalition groups to increase community input in planning and decision-making. The Step Into Cuba Alliance, an organized community coalition of residents, University of New Mexico professors, a local physician, Sandoval County representatives, the state public health department, BLM,

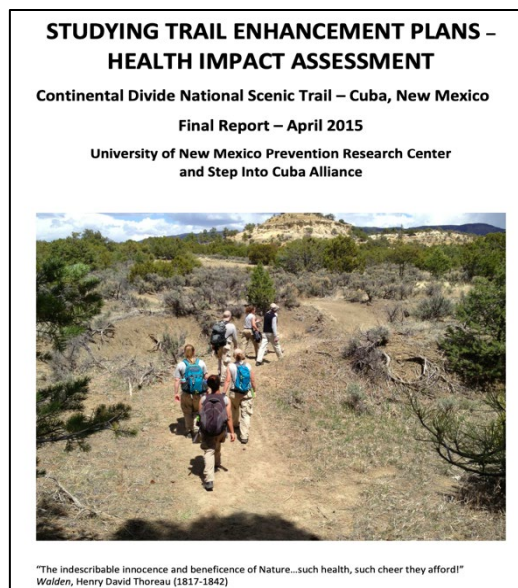


Figure 9 Continental Divide National Scenic Trail HIA.

NPS and USFS representatives, and others worked together to learn from each other, understand local priorities, and identify opportunities to provide benefits to communities bordering or near Federal lands.

4. Working with communities is often a long-term commitment requiring stakeholder persistence. Many of the proposed 15-mile trail recommendations were completed several years later, and some trails are still under construction or in design planning phase.
5. Trail placement, design, and access can have direct implications for improving public health and equity for visitors and the local community by increasing physical activity and supporting mental health with improved access to and opportunities for safe and convenient outdoor hiking and walking.
6. HIAs can be part of the NEPA environmental assessment process to ensure public health and equity are considered and addressed in the NEPA process.
7. The CDC Community Guide (CDC, n.d.) can be helpful to ensure Federal land agencies are consulting public health evidence-based interventions in their work.
8. Outside expertise can be used to educate stakeholders, for example, in this case, by including walkability and HIA workshops in Cuba, New Mexico.
9. Rural, Tribal, and historically underserved communities often live near the areas served by Federal land agencies. HIAs, by engaging stakeholders, can help to ensure these communities benefit in an equitable way (e.g., through resources, training, grants, data sharing, input). Stakeholders could include rural hospitals, universities, other rural health agencies, recreation, and transportation organizations.

Greater Nashville Regional Council: Health Equity and Project Prioritization

- **Planning process phase(s):** Programming/project prioritization.
- **Public health/equity considerations:** Health equity.

The Greater Nashville Regional Council (GNRC) is the MPO for the Nashville, Tennessee region. This case study describes how GNRC implemented programs over the last ten years that integrate public health considerations as part of its transportation project prioritization and selection process. GNRC currently serves a 13-county area serving over two million residents (GNRC, 2021); it also serves as the region's council of governments. Through its transportation planning efforts, the GNRC discovered public health disparities throughout the region and subsequently implemented a variety of planning programs to integrate public health as part of its transportation processes and programs, and address inequities across the region to increase equitable access to active transportation facilities that provide more opportunities for physical activity. Part of this integration involved the inclusion of public health criteria as part of GNRC project solicitation and a prioritization process to encourage more transportation projects that advance public health goals. Specifically, this effort to integrate public health into transportation planning was limited to the seven-county MPO area.

BACKGROUND

In 2012, GNRC conducted a household travel survey as part of efforts to better understand travel patterns in the region, predict traffic conditions and transit ridership across the transportation network, and inform other travel demand modeling efforts (Westat, 2013). This survey was distributed to the seven-county MPO area. Previously, GNRC had a method for prioritizing investments in active transportation projects in areas with a higher likelihood of health disparities, the "High Health Impact Areas" that were made up of census tracts with a higher-than-average presence of populations who are impoverished, minority, or elderly (Dawkins & Kroupa, 2011) and first used for GNRC's 2035 Regional Transportation Plan (RTP).

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The survey provided an opportunity to refine this measure and identify the specific conditions in the Nashville region that most strongly correlated with these health disparities to better target investments. Leading up to survey implementation, GNRC's Bicycle and Pedestrian Coordinator advocated for the need to integrate public health as part of the survey to collect general health and physical activity information about each household member in the entire survey sample, which would help GNRC better understand the relationship between the built environment, transportation access, and the health of area residents (Baker, Capparella, & Cooper, 2021). This occurred at a time when, according to GNRC staff, there was greater awareness of the negative health impacts of a sedentary lifestyle, or as a GNRC staff member said, "when sitting was the new smoking." It was through this coordinator's championing efforts and advocacy, along with prior activities and ongoing interest at GNRC to explore the role of active transportation in public health (CDC, 2013), that GNRC ultimately decided to include public health questions as part of the travel survey.

As part of the survey, GNRC collected the following public health and activity information from approximately 6,000 participants (Westat, 2013):

- Daily time spent sitting on a typical weekday.
- Daily time spent sitting on a specific weekday (asked only if participant could not provide an answer to prior prompt).
- Overall level of physical activity.
- Overall level of health.
- Overall diet health.
- Height and weight.

The survey also collected general demographic information about each participant, which included age, household income, gender, employment status, and race, among other household and demographic indicators.

GNRC also asked a subsample of approximately 600 participants to wear a GPS tracker and activity monitor so GNRC could collect more granular data and create better findings. These participants were also interviewed to provide greater specificity about the characteristics of the participants' neighborhoods; individual-level behaviors and health status; physical activity; health-related quality-of-life and chronic health issues; and food security.

Ultimately through the survey, GNRC staff realized that four conditions corresponded most highly with poorer health outcomes (Meehan & Whitfield, 2017), including:

- Poverty.
- Unemployment.
- Being 65 years or older.
- Not owning a car.

These conditions became the basis for GNRC to define Health Priority Areas in the region. For GNRC, a Health Priority Area is one where a census block group in its jurisdiction has a higher-than-average rate in three of the four conditions (Meehan & Whitfield, 2017). As noted earlier, GNRC's previous measure, "High Health Impact Area," focused on census tracts with a higher-than-average presence of populations who are impoverished, minority, or elderly (Dawkins & Kroupa, 2011). GNRC subsequently modified the measure to reflect the conditions defined in Health Priority Areas since the Transportation and Health Study findings provided a data-driven understanding of the conditions correlated with poorer health outcomes in the region.

GNRC also revised its scoring criteria for the 2040 RTP project evaluation process to encourage a greater number of projects that provide more active transportation options to Health Priority Areas across the region, and has since been continued onto the 2045 RTP update (GNRC, 2016).

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GNRC evaluated projects using criteria outlined in the 2040 RTP and could award a maximum of 100 points for a single project. Projects that provide more active transportation in Health Priority Areas could receive up to 3 points, as part of the 15-point maximum that projects could receive in the Health and Environment category. The Health and Environment category also includes a criterion that could award 8 points to projects that provide more multimodal options in areas with a high degree of disadvantaged populations, providing an opportunity to award a potential of 11 points of 15 in this category to projects that increase equitable access to active transportation facilities. The 2035 RTP, on the other hand, only awarded up to two points for projects located in High Health Impact Areas, and could only award up to ten points in the Health and Environment category (GNRC, 2010).

Since implementing the new criteria, GNRC found that many more projects selected for funding include an active transportation component. As a result of these efforts, 77 percent of funded projects in GNRC's 2040 RTP included at least one element related to complete streets designs, up from 70 percent of funded projects in the 2035 RTP (Meehan & Whitfield, 2017). Approximately \$206 million was dedicated specifically to active transportation projects (Meehan & Whitfield, 2017), and \$1 billion in road reconstruction projects that included multimodal upgrades (Transportation for America, 2016). GNRC staff indicated that prior to 2020, the MPO was working with the Tennessee Department of Health to try and measure the impact of these programs and activities in relation to changes to the public's health (Baker, Capparella, & Cooper, 2021). GNRC previously collaborated with the CDC to model the potential impacts of these programs on public health using an Integrated Transportation and Health Impact Modeling Tool (Transportation for America, 2016), with findings suggesting that 112 deaths from chronic diseases could be averted by implementing these active transportation programs. However, given the COVID-19 pandemic, GNRC has not been able to collaborate with the Tennessee Department of Health to compare modeled findings with actual results. The effort would have involved collecting emergency room information by zip code for certain determinants that related to transportation or inactivity. GNRC hopes to reengage with Tennessee Department of Health to measure the impact of these programs in the near future.

LESSONS LEARNED

Four lessons were learned from GNRC's experience with integrating public health into its transportation solicitation, prioritization, and selection process. In sum, they include:

Finding a champion for public health or hiring a public health coordinator.

GNRC staff found that its work advancing public health was facilitated by an internal champion who advocated for considering public health as part of GNRC's transportation efforts. This person played an important role in illustrating the need for public health and the value it could provide to GNRC, and ultimately the findings from the Transportation and Health Study were strong enough to justify the continued inclusion and strengthening of public health criterion in the RTP. Federal land agencies may find it valuable to identify someone inside the agency who wants to champion public health and equity and enable them to become a leader in this space. Otherwise, Federal land agencies could establish a public health coordinator position within their agencies to take on this leadership role and dedicate their job to working across the different entities in the agency to advance public health and equity.

Educate stakeholders around program requirements and their importance.

GNRC staff noted that educating stakeholders played an important role in its success increasing the number of projects with an active transportation component. GNRC's shared data and maps about the Health Priority Areas helped applicants more easily identify projects that could score better in the solicitation process and incorporate the kinds of elements that would better address the intent of the criterion. Public health is not always a typical consideration in the transportation planning process, even though there is a clear relationship

between the two. GNRC hopes to work with new stakeholders in the future as part of its process to help stakeholders understand the public health components and educate them early on so they will more readily make the connection between the transportation and public health programs. Federal land agencies may find it valuable to work closely with applicants or other stakeholders around program requirements to help them understand how they can submit applications that integrate the needed criteria and have a greater chance of scoring well, and to provide Federal land agencies with the tools and data they need to identify appropriate projects on their own.

Identify existing conditions and improve decision-making with data to address these conditions.

GNRC's Transportation and Health Study provided a depth of data for understanding the type of public health challenges that the MPO could potentially address. The survey was effective in not only identifying the geography of public health issues across the greater Nashville region, but with tying it to travel behaviors so that GNRC could establish connections between the two and identify policy solutions that fit the scope of the MPO's transportation planning mandates. Furthermore, the survey was effective in providing a data-driven understanding of health and equity considerations at the community level, and allowed GNRC to develop a measure that could equitably increase access to active transportation facilities. In the end, the solutions that GNRC identified established a connection between four different socioeconomic factors and poorer health outcomes, and provided a means for GNRC to incentivize projects that incorporated active transportation in the Health Priority Areas. Federal land agencies may find it valuable to implement GNRC's strategy to collect data on the kinds of public health challenges that they may be able to address within their lands, and identify opportunities to link investment in active transportation programs in a manner that targets these public health and equity challenges.

Establish a methodology that considers the relationship between public health and other prioritization criteria.

Lastly, GNRC noted that the other prioritization criteria have clear connections with public health. For instance, GNRC also has criteria that generally prioritizes projects with active transportation elements, projects that reduce congestion and thus improve air quality, or projects that address safety and reduce deaths or serious injury to transportation network users. Establishing these kinds of connections helps show agencies or other entities how public health may already be embedded as part of their overall goals. Similar to the concept of health-in-all-policies, this approach provides others within an organization and stakeholders with an understanding that public health is already an important goal to the organization and more explicitly illustrates this connection to justify the need for public health programming or for strengthening the public health elements in existing programs. Federal land agencies may find this valuable in their efforts to integrate public health in transportation planning by identifying how existing agency programs have a public health connection and contribute to that goal, and either use it as part of the case for expanding public health programming or embedding public health more strongly in these other programs.

Metropolitan Council: Integrating Equity into Project Prioritization

- **Planning process phase(s):** Programming/project prioritization.
- **Public health/equity considerations:** Equity.

The MPO of the Minneapolis-St. Paul Twin Cities region, the Metropolitan Council (Met Council), implemented programs over the last ten years to integrate equity as part of its project prioritization process. The MPO serves a seven-county area encompassing 2,975 square miles and 2.85 million residents (Metropolitan Council, n.d.). Despite the region being home to 19 Fortune 500 companies, a highly educated workforce, one of the highest average incomes in the nation, and one of the lowest unemployment rates, the Metro area has some of the largest inequities by race and ethnicity among U.S. metropolitan areas. These inequities are demonstrated on the Met Council Visualizing Regional Inequities dashboard (Metropolitan Council, 2018) and stem from historical actions that include but are not limited to redlining, racially restrictive covenants, and other housing segregation and construction of interstate highways through communities of color (Schroeder, Ryba-Turres, & Plambeck, 2020). The present-day killings of George Floyd and Daunte Wright and the 2020 Minneapolis Uprising that followed, further illustrate the extent to which race and equity issues exist in the region and the need for Met Council to establish more equitable policies, processes, and programming in the region.

BACKGROUND

Met Council, as with all designated MPOs, is required by statute to run a competitive process for the Federal transportation funding it receives and solicit applications from stakeholders for needed projects across the region. In 2013, Met Council went through a solicitation process update to refine the competitive application framework and evaluation criteria (Schallberg & Wojchik, 2021). The new solicitation process involves applicants submitting applications by modal type rather than Federal program, which is meant to encourage higher numbers of applications since applicants may not fully understand the grant requirements for each program but understand the modal type of their project. Met Council found that applicants were previously discouraged from applying or were not completing applications correctly due to the challenges in understanding the nuances of the different Federal grants. Met Council staff and external stakeholders review these applications on their merits and score them accordingly, and if the project scores well enough to be funded, Met Council then assigns the projects to a Federal funding program based on the MPO's understanding of the project and funding requirements.

The timing of Met Council's solicitation process update coincided with the need to update its long-range plan. The plan, Thrive MSP 2040, included equity as one of five aspirational outcomes, and identified over 30 strategies for advancing racial equity. Met Council staff noted that the equity component of the Thrive MSP 2040 plan was the most challenging to incorporate. Thrive MPS 2040 emphasized Areas of Concentrated Poverty (ACPs) (an annual analysis of census tracts with high poverty rates)—as a key regional equity metric. ACPs were derived from an analysis and report known as a fair housing and equity assessment, required by HUD grantees. Most, but not all, ACPs were in the region's central cities of Minneapolis and Saint Paul, as well as first-ring suburbs. The public engagement in developing Thrive in addition to the regional conversations resulting from the HUD-required Fair Housing and Equity Assessment, which also had a public comment process and convened community advisory committees, put pressure on Met Council to name equity as one of five (aspirational/long-term) outcomes of Thrive. Thrive's adoption (2014) then guided Met Council's 2040 policy and systems plans—including the 2040 transportation policy plan and regional solicitation process to incorporate equity components. The introduction of equity was met with pushback. While it would be preferable to have more time to garner broader stakeholder support, Met Council was nonetheless able to integrate equity in the plan.

Met Council initially evaluated transportation projects by the equity benefits they provided to specific geographic areas rather than by the general benefits they provided to equity populations (Schroeder, Ryba-Turres, & Plambeck, 2020), which Met Council defined as “people of all races, ethnicities, incomes, and abilities” (Metropolitan Council, 2019a, 2019b, 2019c, 2019d, 2019e, 2019f, 2019g, 2019h, 2019i, 2019j, 2019k). As mentioned earlier, the key equity metrics were derived from a report called *Choice, Place, and Opportunity* (Metropolitan Council, 2014a) that Met Council wrote to satisfy HUD grant requirements. The report studied residential segregation by race and income, barriers to housing choice, and the uneven spatial landscape of ‘opportunity’ in the region. These analyses were largely prescribed by HUD, including the framework of ACPs. As defined in the study, ACPs are census tracts where at least 40 percent of residents have incomes below 185 percent of the Federal poverty threshold (Metropolitan Council, 2014a), which was about \$47,500 for a family of four in 2018 (Schroeder, Ryba-Turres, & Plambeck, 2020). HUD also required a subset of concentrated poverty areas where a majority of residents are also people of color (ACP50s) to recognize that residents of color are more likely to live in high-poverty neighborhoods than white residents, regardless of their income due to barriers in housing choice and other housing issues. Community advocates consistently voiced opposition to these measures for their lack of naming root causes of segregation, among other issues. In 2019, Met Council undertook an engagement project called “Rethinking Areas of Concentrated Poverty” where these concerns resurfaced, noting the tangible toll experience by ACP neighborhoods, and recommended more nuanced measures for understanding equity needs. As a result, Met Council revised its criteria for the 2020 solicitation to lessen the focus on ACPs and move toward broader equity benefits.

EQUITY IN MET COUNCIL PRIORITIZATION CRITERIA

From 2014 to 2018, ACPs and ACP50s formed the basis of Met Council’s equity criteria in the project solicitation process. The *Choice, Place, and Opportunity* study (Metropolitan Council, 2014a) adapted HUD’s ACP framework for studying equity on the basis that residents in these areas have uneven access to opportunities stemming from regional racial inequalities and residential segregation patterns. The subsequent prioritization criteria from 2014 to 2018 scored projects based on the increased access they could provide to residents in these underserved communities (Metropolitan Council, 2014b); (Schallberg & Wojchik, 2021). For the 2020 solicitation onward, Met Council’s equity criteria de-emphasized the use of ACPs and ACP50s: instead, recentering the assessment of “advancing equity” on the benefits to equity populations and engagement with equity population early and throughout the planning process. Equity criteria had different weights depending on the program type. Generally, across all years, transit and travel demand projects that involved transit expansion (Metropolitan Council, 2019a), transportation demand management (Metropolitan Council, 2019b), and transit system modernization (Metropolitan Council, 2019c) weighted equity more heavily than roadway including multimodal elements (involving roadway expansion) (Metropolitan Council, 2019d), reconstruction/modernization (Metropolitan Council, 2019e), and bridges (Metropolitan Council, 2019f), and bicycle and pedestrian facilities (Metropolitan Council, 2019g), (Metropolitan Council, 2019h), (Metropolitan Council, 2019i), with the latter receiving slightly higher weighting than the former (see Metropolitan Council, 2014b for comparison).

From 2014 to 2018, Met Council asked applicants to describe how their project provided a connection to underserved populations in ACPs and/or ACP50s, to census tracts above the regional average for share of lower income populations, or communities of color (Metropolitan Council, 2014b). The application also included a housing evaluation, which Met Council staff conducted to evaluate the access that projects provide to affordable housing. As noted earlier, applicants in 2020 needed to describe engagement with equity populations, equity population benefits, and impacts in which projects with benefits receive positive points and those with negative impacts receive negative points. Met Council awarded bonus points for

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applications that could illustrate benefits to ACPs, ACP50s, or census tracts where the percent of population in poverty or of color are above the regional average percent.

Met Council staff made this shift for the 2020 round of applications to address input received from local organizers and advocates, who directly experienced how the regional and local emphasis on ACPs and ACP50s could supplant community-defined needs and narratives, while also failing to address the systemic root causes of this concentrated poverty, like chronic private disinvestment and race-based devaluation (Schroeder, Ryba-Turres, & Plambeck, 2020). In other words, these organizers asserted that failing to prioritize these root causes places blame on people rather than on the institutions and systems that shape(d) the distribution of resources—and therefore opportunities. ACPs and ACP50s may be valuable as a starting point for assessing residential segregation by race and income; data are consistently available (Census Bureau’s American Community Survey [ACS] five-year estimates) and calculations are straightforward. However, focusing on concentrated poverty invokes prejudicial assumptions that high-poverty neighborhoods lack “opportunity” such as jobs, good schools, and stores and services. However, the Choice, Place, and Opportunity report’s approach to “opportunity” demonstrates that all places have assets and opportunities, just different mixes of these things. Though it is important to increase access across different opportunity mixes for historically marginalized groups (i.e., expanding choice), the equitable development of under-resourced neighborhoods is also important. In other words, when Met Council describes “expanding choice” as part of advancing equity, that spectrum of choice must include the choice to stay in one’s neighborhood as new investment or infrastructure occur and for existing residents to benefit from those changes. ACPs or ACP50 neighborhoods are also neighborhoods of choice for many, places that are more opportunity-rich for them than areas considered to be conventionally “high-opportunity” areas. Proximity to well-resourced neighborhoods does not organically create opportunities: race- and class-based discrimination continue to influence if or how an individual can capitalize on these opportunities.

The deficit narrative around ACPs and ACP50s contributes to perceptions that because an area lacks opportunity, investment in these areas is financially unwise, which reproduces and perpetuates disinvestment and redlining (Schroeder, Ryba-Turres, & Plambeck, 2020). It supports the theory that the most impactful use of funding is to replace assets in these communities instead of supporting them, which can lead to gentrification. Furthermore, Met Council found that ACPs are not areas where most low-income people live in the region. Focusing research and equity criteria around concentrated poverty ignores the majority of people in poverty who do not live in ACPs and implicitly suggests that poverty is acceptable as long as it is not concentrated. It also does not easily capture and measure trends like the suburbanization of poverty, which Met Council could miss if it chose to stick with measuring concentrated poverty alone.

NEXT STEPS FOR MET COUNCIL

Met Council staff plan to refine and update the equity criteria going into the 2022 solicitation process as part of a broader effort to rethink the role of equity in Met Council’s regional solicitation process to increase representation and participation of underserved and underrepresented populations in Met Council activities. For the 2022 solicitation, Met Council is proposing to use three different measures to measure Equity and Housing Performance, which include equity engagement, equity population benefits and impacts, and affordable housing access (Metropolitan Council, 2021). For equity engagement, the 2022 criteria ask applicants for all application types to:

- Outline how equity populations were engaged prior to and during project development, and illustrate how this engagement works to provide direct benefits or solve an expressed transportation issue while limiting and mitigating any negative impacts.

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- Describe the equity populations within a ½ mile of the proposed project, and place them in relation to the regional context, indicate how these populations were engaged, and describe the engagement activities in the project.
- Describe the direct benefits that the project provides to equity populations, and acknowledge any negative impacts and how the applicant would mitigate them.
- Identify the affordable housing located within a ½ mile of the proposed project and outline the benefits to current and future affordable housing residents within this area.

Met Council also plans on allowing bonus points for projects that are located within ACPs, ACP50s, or census tracts with a higher percentage of lower income or people of color than the regional average.

LESSONS LEARNED

Four lessons were learned from Met Council's experience with integrating equity criteria into its prioritization process. In sum, they include:

Educate stakeholders about the importance of equity criteria and overall program requirements.

Met Council found that taking the time to engage with stakeholders, especially those most affected by a project, to discuss the development of equity criteria and help them understand the role and importance of equity in the region's planning efforts and to their communities helped convert skeptics and eased their concerns about funding. Federal land agencies may find it valuable to follow the same practice and work with their stakeholders to bring awareness of equity programs and to help these stakeholders understand the role of equity in the planning process.

Use qualitative data gathered through engagement with affected populations to better understand and identify which issues to address.

Following engagement with advocates and other stakeholders, Met Council realized that its previous focus on ACPs and ACP50s was not advancing regional equity. The focus on ACPs and ACP50s came from grant requirements that Met Council may not have otherwise identified as the ideal criteria for identifying opportunities to address regional inequality. The work of Met Council since suggests that better equity criteria and measures could have been identified through grassroots engagement with affected communities rather than a top-down approach. Met Council's work in the 2020 prioritization process and its plans for the 2022 prioritization indicate that this kind of engagement is needed to understand and identify the types of equity considerations to address, and to ensure that these criteria address the needs of the community rather than potentially contribute to further issues. Federal land agencies may find it valuable to engage with equity populations to identify the types of equity concerns that they would find most relevant and most important in the transportation planning process.

Addressing equity from a deficit narrative may prevent agencies from identifying potentially effective solutions.

As part of its engagement with advocates, stakeholders, and other community members, Met Council gained an appreciation for why the use of ACPs and ACP50s were problematic. ACPs and ACP50s provided a deficit narrative toward addressing equity, or one that defined a community or an area only by what it lacked and as being undesirable rather than trying to understand the qualities that otherwise make these communities and areas good places and desirable to the people who choose to live there. Taking this approach also helped shift Met Council's focus away from specific geographies of concentrated poverty, and more easily account for considerations such as the suburbanization of poverty or for addressing other equity needs in the region that are not geography-dependent. Met Council is even considering

the inverse of ACPs (areas of concentrated wealth) as a potential analysis tool for analyzing equity in the region. For all these reasons, Federal land agencies may find it valuable to develop equity criteria that are not tied to specific geographies but rather those that can be applied to multiple geographies, or at least to consider the implications of their work and whether it is grounded in or reproduces existing inequalities rather than addressing them.

It is challenging to integrate equity criteria into solicitation or planning processes if these processes are already undergoing significant change.

Met Council found that the ongoing updates to its solicitation process complicated efforts to integrate equity in its regional planning process. Because stakeholders depend on this funding to implement needed projects in their communities, they may be more reactive to any perceived threats to their ability to receive this funding. While organizations may find that there is never an ideal time to implement a new project or initiative simply because it is too critical to not do so, there may be periods where successful implementation of these initiatives can occur more easily. This is not to justify the continual postponement for implementing critical initiatives like the integration of equity in the transportation planning process and in project prioritization criteria, but rather to note that if an organization can avoid implementing an initiative like this on top of another large-scale effort, it should consider doing so. Federal land agencies may find less resistance and greater success with their efforts for integrating equity in their transportation planning processes, or at least more opportunity to direct an organization's efforts to working through and resolving any challenges in this effort, by determining the appropriate timing to initiate this effort.

Abbreviated Case Studies

PUEBLO OF LAGUNA

The Pueblo of Laguna is a Federally recognized Tribe situated in New Mexico, consisting of about 4,000 community members across six villages. In 2009, the Pueblo of Laguna Planning Program initiated a comprehensive planning process across six villages to develop safer bicycle/pedestrian routes. Community members who feel unsafe on existing routes are dissuaded from walking and bicycling, contributing to obesity and related conditions including type 2 diabetes. Health concerns include snakes, unrestrained dogs, mountain lions, narrow roads with no shoulder, unsafe crossing areas (I-40) and intersections (especially at Highway 124), erosion or unstable soils, flooding and drainage issues, blind corners, and isolation and limited access to help. Improved methods of active transportation have the potential to increase physical activity and provide access to existing health and exercise destinations that can improve overall well-being.

The Pueblo of Laguna Planning Program received a combination of Federal/State funding and technical support (e.g., from TIGER [now RAISE], Transportation Alternatives Program, FHWA Recreational Trails Program, and BIA) to improve and expand its regional bicycle/pedestrian network (Henrich, 2015). The Pueblo developed a Bicycle and Pedestrian Route Plan in 2012 that provides an overview and assessment of existing routes and recommendations for future projects (Pueblo of Laguna, 2012). These suggested improvements are largely based on collaborative input from community members. The Community Biking and Walking Advisory Group comprising representatives from each village was established to oversee the program and to ensure that new routes reflect community needs and raised safety concerns. Partnerships with Pueblo of Laguna public health groups, including the Community Health and Wellness Department, Sports and Wellness Program, Diabetes Program, Healthy Heart Program, and Public Safety Department also supported this objective.

Forty-eight of 103 miles of routes were determined to be priority projects. Several of these top-priority projects have been completed, and involve the construction of separated trails, new roundabouts, and pedestrian and bicycle safety accommodations. These projects have been highlighted in numerous publications (e.g., Safe Routes to School fact sheet and FHWA Fostering Multimodal Connectivity newsletter) and presented at events such as America Walks webinars.

The Pueblo of Laguna Planning Program emphasizes the value of active, widespread public participation and feedback in project planning and design (Pueblo of Laguna, n.d.). Collaboration between community members by way of the Community Biking and Walking Advisory Group enabled community public health concerns to be heard and considered in design and construction, resulting in successful and prompt project completion despite limited staff and resources.

BLM, MESA COUNTY HEALTHY TRAILS PROGRAM

In 2018, Colorado Mesa University in Mesa County conducted an economic impact assessment of the Grand Valley public trails system (Casey, Castenada, & Perry, 2018). The study found that users of the three trails in the system contributed over \$14.5 million to gross regional product, and the study also recognized the benefits of the trail system to physical and mental health of the community. These findings prompted the Grand Junction Economic Partnership and Powderhorn Mountain Resort to commission the development of a Grand Valley strategic trails plan to establish a road map for planning, creating, and managing trail recreation in Mesa County to better realize the potential for economic development and for improved public health outcomes (Kuhr, 2019). This plan found that only 32 percent of trail users resided in Mesa County, and that there were opportunities to increase trail and public land use by local residents.

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This plan provided a clear nexus between public health and economic development through outdoor recreation. Mesa County decided to help implement this plan and increase local use of public lands. In 2019, Mesa County's Department of Public Health (Mesa County Public Health) hired a Public Health Trails Coordinator to coordinate trail maintenance and improvement activities to increase public accessibility to nonmotorized trails (Kuhr, 2019). This kind of role is unique and goes beyond the suite of services traditionally addressed by county-level public health agencies but fits within this scope by taking an upstream approach to addressing community health through increased physical activity.

The Public Health Trails Coordinator collaborated with the BLM in implementing the plan, which has become more relevant given the COVID-19 pandemic and increased interest in the outdoors as safer places for physical activity and recreation (West, Mesa County wins trail maintenance grant, 2020) (Grant Funding Helps Mesa County Maintain Trails, 2021). The collaboration has involved securing funding, and the Public Health Trails Coordinator was able to secure a \$190,000 grant for trail maintenance from Great Outdoors Colorado, a non-profit foundation that invests Colorado lottery proceeds in various outdoors programs in the state (West, Mesa County wins trail maintenance grant, 2020). The grant supports a contract with the Western Colorado Conservation Corps to perform maintenance on trails, and will coordinate with organizations like BLM to identify potential new trails. The Public Health Trails Coordinator has continued to win new grant funding for 28 miles of proposed new trails that include a significant percentage of beginner trails (Trails don't just magically appear, 2021), and recently received Great Outdoors Colorado grant funding for additional Western Colorado Conservation Corps support to build and maintain the additional new trails (West, Fruita pursuing grant for trail construction at 18 road, 2021).

ACCESS TO ANGELES NATIONAL FOREST FOR DIVERSE POPULATIONS

The USFS has been concerned for many years about access to Federal lands, such as national parks and forests, by diverse populations. USFS recognizes that accommodating the demand for recreation opportunities must meet the needs of diverse populations who may have different social and activity preferences. The Angeles National Forest is an example of efforts made by the USFS and its partners in promoting improved access to such groups. The 662,983-acre Angeles National Forest, located within Los Angeles, San Bernardino, and Ventura Counties, represents an important natural resource to millions of residents in these counties. For example, all of the Los Angeles County residents live within 60 miles of the forest.

Over the years, forest officials, regional decision-makers, and community groups have worked collaboratively to better understand the access needs to the forest and to examine the different strategies in providing this access (USFS, 2021). Studies have shown some of the key constraints that inhibit access to the forest and to parks in general (Roberts, Chavez, Lara, & Sheffield, 2009). For example, USFS-sponsored research has found the following common barriers to national forest visitation by specific groups:

- Latinos – Transportation, lack of interest, lack of information, health or physical limitation, lack of money, safety, language barriers.
- African Americans – Lack of interest, health or physical limitation, lack of money, transportation, fear/safety, age, lack of information, discomfort/feelings of being unwelcome.
- Asians – Lack of interest, distance to travel, lack of information, health or physical limitation, no one to go with.
- Whites – Health or physical limitation, lack of interest, age.

Regional partners took the following key steps to enhance access to the national forest:

- Forest officials formed a Transportation Work Group to (1) increase access to the forest through alternative transportation options, particularly for low-income, underserved,

and carless households, and (2) reduce congestion and improve safety at recreation site parking lots. In particular, the Transportation Work Group has been interested in connecting popular recreation sites to the LA Metro Gold Line light rail stations.

- In 2016, the national forest conducted a pilot shuttle service for four weekends between the Arcadia Gold Line Station and Chantry Flat, a high-use recreation site. The pilot was successful, attracting over 800 riders, but the service could not become permanent due to lack of funding (Volpe National Transportation Center, 2018). In 2021, funding to provide this shuttle service was being sought via national legislation.
- A Southern California Consortium, serving the communities adjacent to the Angeles, Cleveland, Los Padres, and San Bernardino National Forests, has served as a focal point for fostering better access to the national forests and in promoting job opportunities for minority students (the consortium currently collaborates with two Los Angeles charter school in encouraging such opportunities).
- Los Angeles Metro adopted a “Transit to Parks Strategic Plan” that focused on improving public transportation options to access parks and open space in the county, including Angeles National Forest.
- In 2018, the USFS/Angeles National Forest sponsored a transit corridor analysis to examine alternative means of accessing the forest, with special consideration for diverse populations (Volpe National Transportation Center, 2018). The study also examined four business models for operating such service.

COLORADO AND CALIFORNIA OUTDOOR EQUITY GRANTS

Despite the many outdoor activities available in Colorado, some Colorado youth and their families face obstacles to accessing nature-based recreation (Outdoor Equity Grant Bill to Support Outdoor Access for Underserved Youth, 2021). House Bill 21-1318 establishes a grant program for outdoor organizations focused on creating opportunities for underserved youth and their families to get involved in recreational activities and experience Colorado’s open spaces, state parks, public lands, and other outdoor areas.

The purpose of the Outdoor Equity Grant Program is to increase access and opportunity for underserved youth and their families. Outdoor recreation costs can include long-distance travel, specialized outdoor recreation gear, and activity instruction that adds up and becomes prohibitively expensive for lower-income households. This can be discouraging for some families, making them unable to experience the nature of their beautiful state.

The Outdoor Equity Grant Program’s mission is to make outdoor recreation inclusive and accessible for Colorado youth. Coalition members say that lack of access to gear and transportation is often the greatest barrier to marginalized communities engaging in outdoor pursuits. The Outdoor Equity Grant Program Coalition recognizes the positive health and wellness benefits for children who spend time in nature/the outdoors: improved health and cognitive functions, reduced stress, and enhanced social skills. Students from low-income backgrounds tend to perform better on standardized tests, demonstrate more enthusiasm toward school, and have fewer attendance problems when they spend more time outdoors (Colorado Office of Economic Development and International Trade, n.d.).

In July 2021, California announced a similar program called the Outdoor Equity Grants Program (Moreno, 2021). Grant applications were encouraged from nonprofits and public agencies working to improve participation in outdoor activities and education for all Californians, with a focus on improving access for under-resourced rural and urban communities. The hope is that, like the Colorado program, the program will increase access to and enjoyment of California’s outdoor areas and public lands.

JUSTICE, EQUITY, DIVERSITY, INCLUSION, AND ACCESSIBILITY GROUPS AND ACTION PLANS

A JEDIA group or committee is a group at an institution or agency that convenes to incorporate the principles of justice, equity, diversity, inclusion, and accessibility into the institution's programs and practices. Resources are available for agencies to learn best practices for how to establish a JEDIA group within their agency, including the Keck Graduate Institute's resource on the mission and vision of its JEDIA committee and definitions of each of the JEDIA components (Keck Graduate Institute, 2021). Rutgers University also has relevant resources on how to establish a JEDIA committee (Rutgers University, 2021).

USFWS has a JEDIA group within the Office of Diversity and Inclusive Workforce Management. The mission of the JEDIA group is to, "Advance the U.S. Fish & Wildlife Service mission by providing recommendations, guidance and consultation in the development and implementation of strategies to promote and maintain a diverse and inclusive workforce that thrives in an environment accessible to all and free of employment discrimination" (ODIWM, 2020).

Other non-Federal land agencies also have JEDIA groups, including the California Coastal Conservancy and the California Department of Fish and Wildlife. The Coastal Conservancy maintains JEDIA guidelines, which outline the commitment of the Coastal Conservancy, a state agency, to addressing injustices and inequities (Coastal Conservancy, State of California, 2020a). The three primary components of the guidelines are:

- Advance equitable access to the environmental, social, and economic benefits of California's coast through improving its policies, programs, and practices.
- Address current and prevent future inequities in hiring, community engagement, grant funding, etc. through monitoring and modification of related practices and priorities.
- Increase historically underrepresented communities' involvement in decision-making.

The actions that the Coastal Conservancy have taken include holding open-access webinars on equity-related topics throughout 2019, instituting a new grant application process that is two-stages to reduce the burden on applicants, and developing a "Tips for Community Engagement" guide (Coastal Conservancy, State of California, 2020b). The California Department of Fish and Wildlife maintain a JEDIA Action Plan, which also provides guidance to agencies interested in establishing a JEDIA working group or action plan (California Department of Fish and Wildlife, 2021).

Public-Facing Health Programs

Public-facing programs that promote equity and accessibility to public lands are an important and powerful tool to increase visitation and positive public health outcomes. These programs can remove the social and economic barriers for individuals who have historically lacked access to or felt excluded from outdoor recreation opportunities on Federal lands and introduce new communities to the benefits of outdoor recreation. Federal land agencies can use these programs to model future initiatives and track the outcomes and goals of long-standing, established programs to inform improvements or modifications. Focusing efforts on public health and equity allows Federal land agencies to broaden their impact, increase visitation, and improve visitor experience.

WOMEN IN NATURE GAINING SKILLS

Women in Nature Gaining Skills (WINGS) is a program launched in 2019 to get women outdoors in south-central Indiana. The goal is to encourage and empower women with the skills and confidence to partake in outdoor recreation and to build community. The program is a collaborative effort between female outdoor professionals in the Indiana Division of Fish and Wildlife, Indiana State Parks, Hoosier National Forest, Monroe County Parks and Recreation,

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and the City of Bloomington Parks and Recreation Department, organized primarily through Facebook. WINGS events are free and focused on teaching women 16 years and older about outdoor skills using hands-on training.

WINGS developed 13 programmed events in late 2019, and all were filled before the new year began. They included activities such as archery, hiking, kayaking, birdwatching, fishing, self-defense, dutch oven cooking, and a presentation on wild edibles. WINGS advertises these events via Facebook and word of mouth. Since all the revenue from hunting, fishing, and trapping licenses goes to the Indiana Division of Fish and Wildlife, expanding the network of license buyers not only helps women learn new activities but also helps to increase potential revenue, especially given that the number of purchased licenses in Monroe County declined from 11,266 in 2006 to 10,795 in 2019.

EVERY KID OUTDOORS

Every Kid Outdoors (EKO) was created in 2015 by the U.S. Department of the Interior so 4th graders and their families could discover wildlife, the vast resources in the outdoors, and history of the lands (DOI, n.d.). EKO allows fourth graders and family members free access to over 2,000 Federal lands and waters. EKO creates crucial connections to public lands and aims to create a future generation of visitors for national parks and other public lands. To obtain a pass, fourth grade students can visit the bilingual EKO website, participate in a short educational activity, and then print a paper voucher to bring with them to visit public lands and waters across the country. The immediate goal is to provide an opportunity for every 4th grade student across the country to experience Federal public lands and waters in person throughout the school year.

In the first two years of the program, more than 2 million kids downloaded the pass and over \$5 million in private investments were leveraged to support transportation and other costs for low-income children. Currently, EKO is up for funding review in Congress. The \$25 million in funding, currently under review, would help more than one million children each year visit national parks, launch targeted programs for underserved communities and children with disabilities, and provide transportation for kids and families that otherwise would not be able to reach the parks.

HOOSIER NATIONAL FOREST

The Hoosier National Forest and Indiana University Health Bloomington Hospital created the “Health and Public Lands” pilot program (USFS, n.d.) with goals to provide therapeutic nature-based experiences for community members on national forest system lands and strengthen community ties to public lands. The program planned six “wellness outings” that included a medical professional to guide participants in nature experiences. In addition, Indiana University Health team members can volunteer for the pilot program in the Hoosier National Forest, exposing them to the health benefits of nature while giving health team members the opportunity to provide health and wellness education to the USFS staff.

The major goals for the USFS are to strengthen communities and connect people to the outdoors. The agency recognizes the critical importance of working with community-based partners to support the interdependence of national forest system lands and neighboring gateway communities. The cooperative community wellness projects delivered by Indiana University Health and the USFS could enrich the economic, environmental, and social benefits that national forest system lands deliver to communities. These benefits include quality of life, personal wellness, understanding of the interdependence of healthy ecosystems, and community well-being.

“Indiana University Health recognizes the importance of national forest lands to provide inspiring settings to achieve personal health-related goals and enhance an individual's sense of purpose during recovery and/or treatment.” With the program, physicians can recommend

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wellness outings to patients who would benefit from outdoor experiences, including those with a mental health diagnosis, chronic disease, physical disabilities, those recovering from surgery, and at-risk youth.

VETERAN ACCESS TO PUBLIC LANDS

Since 2020, Gold Star Families and U.S. military veterans are eligible to receive free access to more than 2,000 Federal recreation areas, including national parks, wildlife refuges, and forests (Freibott, 2021). The free access program is a way to thank America's veterans and Gold Star Families for their support of the country and to encourage them to explore recreational opportunities on public lands and waters.

Veterans can benefit from nature-based therapies on public lands to relieve stress and symptoms of trauma endured during their time in service. The symbolic connection between veterans and the lands for which they fought can be a valuable part of nature-based therapeutic programs, made possible through partnerships between this program and public land agencies. Programs that involve hiking, servicing trails, restoration, and/or farming are all currently helping veterans.

Appendix D: Federal Equity Data Tools and Goals/KPIs

Table 8 Federal Equity Data Tools.

Summary	Base Data Sets	Relevant Measures
TOOL: Council on Environmental Quality (Council on Environmental Quality, 2022)		
<p>The purpose of the tool is to help Federal agencies identify disadvantaged communities that are marginalized, underserved, and overburdened by pollution. The current version of the tool provides socioeconomic, environmental, and climate information to inform decisions that may affect these communities. The tool identifies disadvantaged communities through publicly available, nationally consistent data sets.</p> <p>The current version of the tool identifies communities that are disadvantaged for the purposes of the Justice40 Initiative using census tracts, which are the smallest geographic unit for which publicly available and nationally consistent datasets can be consistently displayed on the tool.</p> <p>This is a beta version of the tool, and updates are likely following the initial public comment period.</p>	<p>ACS; National Risk Index; LEAD Score; USEPA, Office of Air and Radiation fusion of model and monitor data (from EJSCREEN); National Air Toxics Assessment (from EJSCREEN); Calculated from 2019 USDOT traffic data (from EJSCREEN); Comprehensive Housing Affordability Strategy data set (from EJSCREEN); Treatment, Storage, and Disposal Facility data calculated from USEPA RCRAInfo database (from EJSCREEN); Calculated from USEPA CERCLIS database (from EJSCREEN); Calculated from USEPA Risk Management Plan (RMP) database (from EJSCREEN); Calculated from Risk-Screening Environmental Indicators modeled toxic concentrations to stream reach segments (from EJSCREEN); CDC PLACES data; U.S. Small-Area Life Expectancy Estimates Project</p>	<p>Data categories:</p> <ul style="list-style-type: none"> (1) Climate change (expected agricultural loss rate, expected building loss rate, expected population loss rate) (2) Clean energy and energy efficiency (energy burden, particulate matter 2.5 in the air) (3) Clean transit (diesel particulate matter exposure, traffic proximity and volume) (4) Affordable and sustainable housing (lead paint, median home value, housing cost burden) (5) Reduction and remediation of legacy pollution (proximity to hazardous waste facilities, proximity to National Priorities List sites, proximity to RMP facilities) (6) Critical clean water and wastewater infrastructure (wastewater discharge) (7) Health burdens (asthma, diabetes, heart disease, low life expectancy) (8) Training and workforce development (low median income, linguistic isolation, unemployment, poverty) <p>All categories (low income, higher education)</p>

Summary	Base Data Sets	Relevant Measures
TOOL: Environmental Protection Agency, EJScreen (USEPA, 2022)		
<p>EJScreen is an environmental justice mapping and screening tool that provides USEPA with a nationally consistent data set and approach for combining environmental and demographic indicators. EJScreen users choose a geographic area; the tool then provides demographic and environmental information for that area. All of the EJScreen indicators are publicly available data. EJScreen simply provides a way to display this information and includes a method for combining environmental and demographic indicators into environmental justice indexes.</p>	<p>USEPA, Office of Air and Radiation fusion of model and monitor data; USEPA Hazardous Air Pollutants; Calculated from 2019 USDOT traffic data; Calculated from USEPA CERCLIS database; Calculated from USEPA RMP database; Treatment, Storage, and Disposal Facility data calculated from EPA RCRA Info database; Calculated from USEPA Underground Storage Tank Finder; Calculated from Risk-Screening Environmental Indicator modeled toxic concentrations to stream reach segments; U.S. Census Bureau's ACS</p>	<p>EJScreen includes:</p> <p>12 environmental indicators: Particulate matter 2.5, Ozone, Diesel particulate matter, Air toxics cancer risk, Air toxics respiratory hazard index, Traffic proximity and volume, Lead paint, Superfund proximity, RMP facility proximity, Underground storage tanks and leaking underground storage tanks, and Wastewater discharge</p> <p>7 demographic indicators: People of color, Low income, Unemployment rate, Linguistic isolation, Less than high school education, Under age 5, and Over age 64</p> <p>12 Environmental Justice indexes: combination of environmental and demographic information</p>
TOOL: Centers for Disease Control and Prevention, Social Vulnerability Index (SVI) (CDC, 2022)		
<p>The CDC/ATSDR SVI is a database that helps emergency response planners and public health officials identify, map, and plan support for communities that will most likely need support before, during, and after a public health emergency. The tool is commonly used across CDC/ATSDR, in addition to many emergency preparedness and response organizations.</p> <p>The CDC/ATSDR SVI uses U.S. Census data to determine the social vulnerability of every census tract. Census tracts are subdivisions of counties for which the Census collects statistical data. The CDC/ATSDR SVI ranks each tract on 15 social factors, including poverty, lack of vehicle access, and crowded housing, and groups them into four related themes.</p>	<p>U.S. Census Data</p>	<p>Themes:</p> <p>(1) Socioeconomic status (below poverty, unemployed, income, no high school diploma)</p> <p>(2) Household composition & disability (aged 65 or older, aged 17 or younger, older than age 5 with a disability, single-parent households)</p> <p>(3) Minority status & language (minority, speak English "less than well")</p> <p>(4) Housing type & transportation (multi-unit structures, mobile homes, crowding, no vehicle, group quarters)</p>

Summary	Base Data Sets	Relevant Measures
<p>TOOL: HHS/CDC, Minority Health Social Vulnerability Index (MH SVI) (U.S. Department of Health and Human Services Office of Minority Health, n.d.)</p>		
<p>The CDC and HHS Office of Minority Health developed the MH SVI to enhance existing resources to support the identification of racial and ethnic minority communities at greatest risk for disproportionate impact and adverse outcomes due to the COVID-19 pandemic. Given evidence on common factors contributing to social vulnerability, the MH SVI could potentially be applied to other public health emergencies.</p>	<p>ACS; U.S. Department of Homeland Security Homeland Infrastructure Foundation Level Data Open; Health Resources and Services Administration; Interactive Atlas of Heart Disease and Stroke, CDC; U.S. Diabetes Surveillance System, CDC Division of Diabetes Translation; Institute for Health Metrics and Evaluation</p>	<p>Divided into six themes: (1) Socioeconomic Status, (2) Household Composition and Disability, (3) Minority Status and Language, (4) Housing Type and Transportation, (5) Health Care Infrastructure and Access, and (6) Medical Vulnerability</p>
<p>TOOL: Federal Emergency Management Agency, National Risk Index, Social Vulnerability Measure (Federal Emergency Management Agency, n.d.)</p>		
<p>Social vulnerability is the susceptibility of social groups to the adverse impacts of natural hazards, including disproportionate death, injury, loss, or disruption of livelihood.</p> <p>As a consequence-enhancing risk component of the National Risk Index, a Social Vulnerability score and rating represent the relative level of a community's social vulnerability compared to all other communities at the same level. A community's Social Vulnerability score is proportional to a community's risk. A higher Social Vulnerability score results in a higher Risk Index score.</p> <p>The SVI is constructed using a statistical procedure called a principal components analysis. The output (factors that are generated) are then labeled and their influence on social vulnerability determined (increases or decreases). The factor scores and their directional adjustments (increases or decreases vulnerability) are then put into an additive model to generate the total score. The scores are then mapped using standard deviations from the mean, normally using either 3 or 5 classes.</p>	<p>Census Data Engine (primarily), Geographic Names Information System (ancillary), City and County Databook or individual county offices (alternate data sources)</p>	<p>(1) Wealth, (2) Race (Black) and Social Status (3) Age (Elderly), (4) Ethnicity (Hispanic) and Lack of Health Insurance, (5) Special Needs Populations, (6) Service Sector Employment, (7) Race (Native American), and (8) Gender (Female)</p>

Table 9 USDOT Equity Action Plan Focus Areas and KPIs

Focus Area	Outcome	KPIs	Key USDOT Accountability Actions
Expanding Access	Increase in social and economic opportunity for disadvantaged and underserved communities from the provision of affordable multimodal transportation options and the development of a transportation cost burden measure.	<ul style="list-style-type: none"> • Reduction in transportation travel cost as a percent of income. • Reduction in transportation travel time. • Increase in access to key destinations, including work, education, grocery stores, and health care. • Increase in mobility measured by number of trips at the individual level. 	<ul style="list-style-type: none"> • Develop criteria for incorporating transportation cost burden measure in project selection decision-making. • Incorporate elements of the transportation cost burden measure into funding programs and policy documents.
Interventions	Historically overburdened and underserved communities in urban and rural areas benefit from access to a generational investment in the nation's infrastructure through direct, hands-on technical support for transportation projects with local impact.	<ul style="list-style-type: none"> • Increase in the number of USDOT discretionary grant applicants from disadvantaged communities in urban and rural areas who have never applied for USDOT funding before. • Increase in the number of new projects in disadvantaged communities using formula funds added to Statewide Transportation Improvement Programs (STIPs) and Transportation Improvement Programs (TIPs). 	<ul style="list-style-type: none"> • Consult with the re-constituted Advisory Committee on Transportation Equity.

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Focus Area	Outcome	KPIs	Key USDOT Accountability Actions
Power of Community	Individuals and communities have a greater voice in transportation decisions that affect them.	<ul style="list-style-type: none"> • Increase in the number of State DOTs and MPOs officially adopting a quantitative Equity Screening component to their STIP and TIP development processes to incorporate community vision and need in project selection and design. • Increase in the number of meaningful and representative public participation engagements held by MPOs and State DOTs in the development of STIPs and TIPs in rural and urban communities. 	<ul style="list-style-type: none"> • Issue binding USDOT Orders on programmatic enforcement of Title VI and NEPA, including obligations for meaningful public participation.
Wealth Creation	Building capital, expanding business networks, and attaining new skills and experience through increased USDOT contracts.	<ul style="list-style-type: none"> • Increase USDOT direct contract dollars to small, disadvantaged businesses to an aspirational goal of 20 percent by FY25. 	<ul style="list-style-type: none"> • Incorporate elements of small, disadvantaged business goals into management performance plans.

