

Standing Committee on Transportation Needs of National Parks and Public Lands (ADA40)
Steve Suder, Chair

Transportation Needs of National Parks and Public Lands

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INTRODUCTION

This paper is written in support of the 100th Anniversary of the Transportation Research Board (TRB), on behalf of the TRB Standing Committee on the Transportation Needs of National Parks and Public Lands (ADA40). The Committee focuses on the role of transportation in providing access to and mobility within National Parks and other public lands (e.g., U.S. Forest Service (USFS) units, U.S. Fish and Wildlife Service (USFWS) units, Bureau of Land Management (BLM) units, Army Corps of Engineers units (ArmyCorps), Bureau of Reclamation (Reclamation) units and state, county and local parks). It provides a forum for representatives from transportation and land management agencies, tourism groups, universities, consultants, and public officials to share information on a variety of management issues regarding access, circulation, travel modes, safety, congestion, performance-based planning, asset management, operations, maintenance, and wayfinding on public lands.

Established initially in 1998 as a task force (A5T55) within the Group 5 Council, the task force was upgraded to a full committee in 2006. This paper examines the history of the Committee and its progress in advancing research addressing the unique needs of National Parks and public lands. The paper concludes with a discussion of the future opportunities for the Committee.

YESTERDAY

To fully capture the story of the Committee, the paper will begin with “yesterday,” showcasing the history of how the Committee was created, its mission, changes over time, and the major accomplishments to date.

History of the Committee

In 1997, Alan Pisarski, Katie Turnbull, and Franz Gimmmler met with then TRB Staff Officer, Jim Scott, to discuss the important roles transportation played in supporting tourism, recreation, and leisure activities. They noted the growth in U.S. and international tourist travel, especially to National Parks and other public lands, and that this topic was not addressed by any of the

existing standing committees. The group was able to make a case that this topic warranted the attention of a separate committee of professionals.

Over time several chairs and TRB Staff Officers have guided the progression of the task force to its current status. Ronald Eck and Gene Wilson served as Co-Chairs, guiding the initial work of the task force with assistance from Jim Scott. Dr. Carol A. Zimmerman took over as the chair of the task force in 2003. Dr. Zimmerman, with assistance from Kim Fisher (TRB Staff Officer), was instrumental in guiding the task force to a full committee, and the 2006 Annual Meeting served as the first formal meeting of the new Committee. Dr. Zimmerman continued as the first chair until Mr. Steven Suder took over in 2014 with assistance from Jennifer Weeks (TRB Staff Officer).

Mission of the Committee

The mission of the Committee is to provide a forum for transportation challenges and opportunities related to conservation of the scenery, the cultural and national resources, and the quality of the visitor experience in National Parks and public lands.

Uniquely different from other TRB Committees (comprised mainly of state departments of transportation, consultants, and university researchers), ADA40 has significant representation from federal land management agencies (FLMAs), as well as gateway communities and state and local parks. This mix of Committee members allows ADA40 to discuss cross-jurisdictional transportation challenges (transportation within and access to public lands), as well as, multi-modal opportunities (both motorized and active transportation such as walking, biking, and paddling).

The Committee strives to (1):

- Examine the role of transportation in providing desirable and enjoyable visitor access and mobility to and within National Parks, Federal lands, and other public lands while furthering the mission of the managing public agency.
- Study alternative techniques, technologies, and implementation methods that show promise in serving park-related travel demand.
- Promote research that identifies and facilitates the implementation of multimodal transportation systems, supporting both motorized and non-motorized transport, that serve the unique mix of cultural, natural, and recreational values of each park and land unit.
- Better understand the complex relationship between park visitor travel, statewide recreational travel, and national and international tourist travel.
- Investigate the role of the many public and private planning, funding and managing institutions at all levels, in the development of active transportation systems in parks and public lands.

To accomplish the mission, the Committee participates in the TRB Annual Meeting each year, hosts mid-year meetings, and submits research ideas to the National Cooperative Highway Research Program (NCHRP) and Transit Cooperative Research Program (TCRP).

Along with the Committee and subcommittee meeting, ADA40 also features at least two podium sessions and several poster presentations at the TRB Annual Meeting. One podium session is typically dedicated to the presentation of the Committee's research papers that have been submitted through the formal TRB paper submission process. The second podium session highlights invited speakers on specific hot topics, while the poster sessions focus on the Transportation Fellows (previously called Transportation Scholars), as well as other topics of

interest to this Committee.

Over the years, the Committee has hosted seventeen mid-year meetings at various National Parks and public lands across the nation. The changing locations for the mid-year meetings afford opportunities for Committee members and friends to learn about transportation issues from local representatives from both the parks and adjacent communities, and to provide comments, advice, and ideas to the locals. In some instances, the Committee took advantage of co-locating with other TRB Committees as part of larger mid-year meeting to further collaborations. The following are past Mid-Year Meetings/conferences held by ADA40:

- 2002: San Francisco Bay National Wildlife Refuge (NWR) (California)
- 2003: Portland (Oregon) – multi-committee meeting and tours of the Cascade Mountain Range
- 2004: Glacier National Park (NP) (Montana/Wyoming)
- 2005: Boston (Massachusetts) – multi-committee meeting and tours of Boston National Park Service (NPS) sites and Lowell NP
- 2006: Tacoma (Washington) – multi-committee meeting and tour of Mount Rainier NP
- 2007: Shepherdstown & tour of Harpers Ferry National Historical Park (NHP) (West Virginia)
- 2008: Denver (Colorado) - multi-committee meeting and tour of Rocky Mountain NP
- 2009: Cape Cod National Seashore (Massachusetts)
- 2010: Grand Teton NP (Wyoming)
- 2011: White Mountains National Forest (NF) (New Hampshire)
- 2012: Denali NP (Alaska)
- 2013: Acadia NP (Maine)
- 2014: 1st Conference on Transportation Needs of National Parks and Public Lands (Washington, D.C.)
- 2015: Salt Lake City (Utah) - multi-committee meeting with ADA00 Section and tour of Wasatch-Cache NF
- 2016: Zion NP and Bryce Canyon NP (Utah)
- 2017: 2nd Conference on Transportation Needs of National Parks and Public Lands (Washington, D.C.)
- 2018: Columbia River Gorge (Oregon/Washington) and Bonneville Lock and Dam Office (Cascade Locks, Oregon)

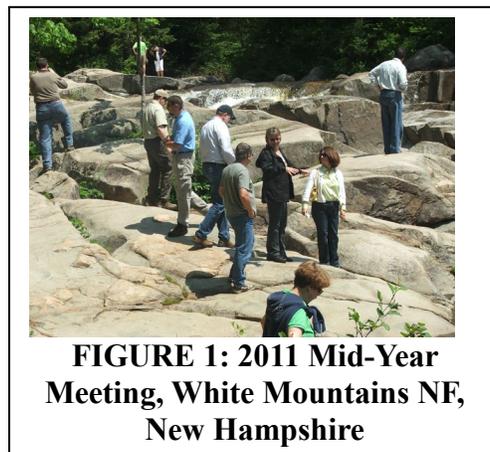


FIGURE 1: 2011 Mid-Year Meeting, White Mountains NF, New Hampshire

Another major task has been to advance research in transportation issues related to public lands and to disseminate these results throughout the world. Through proactively identifying and defining preservation and interpretation issues, the Committee has become a recognized leader for the transportation community.

Changes Over Time

Due largely to preservation concerns and changing demographics, the needs of National Parks

and public lands have changed and progressed over the years. The Committee has accommodated these needs, evolving from primarily Federal lands to a broader focus on public lands, and shifting reference of FLMA's to public land management agencies (PLMA's) (2). The shift from Federal lands to public lands is reflected within the Committee's membership, with, for example, a representative from the National Association of State Park Directors. The Bureau of Indian Affairs, U.S. Army, U.S. Air Force, and U.S. Navy, originally listed as part of the scope, were later eliminated to focus on lands accessible to the public (3). The Committee also monitors how challenges and opportunities of international natural areas may relate. International representation (e.g., Parks Canada) has fluctuated, but the Committee continues to seek increase international participation.

There has also been an expansion from a small number of core members (who are still actively engaged and vital to the Committee) to a growing friends list. In the first request for official committee formation, the authors noted that there is "tremendous demand" for membership (3). The enthusiasm and demand continue, with many long-standing members preferring not to rotate off. There is also a broader interest by consultants and universities in addressing transportation needs of public lands which did not exist when first formed, and an increased emphasis on engaging members of other TRB Committees.

Funding sources can significantly influence the ability of public lands to address transportation needs. Due to this, funding was discussed in the first application for full committee and remains a consistent topic of discussion (3). However, major changes in the availability of specific funding sources over the years have led to shifts in Committee discussions and research. For instance, the Paul S. Sarbanes Transit in Parks (TRIP) Program was originally authorized under the transportation bill, SAFETEA-LU in 2005 (4) and provided assistance specifically for transit. However, TRIP was not continued in subsequent transportation bills, requiring transit projects to compete with other modes for funding. In 2013, the program evolved into the Federal Land Access Program (FLAP) that provides funding for improvements to facilities not owned or maintained by Federal entities that link to Federal lands.

Other topics addressed by the Committee over time addressed changes in practice and research developments. While piloting public transportation systems was an original goal, the current concern is addressing the operations and maintenance of these systems. Another shift has been from the automobile -centric to multi-modal access planning to address the peak congestion caused by heavy visitation to public lands during limited vacation periods from large urban areas. In general, while public lands may not be congested year-round, many public lands experience a large demand for a limited duration (e.g., summers and holiday weekends).

Greater emphasis was placed on research when the Committee restructured from having a single research coordinator to a form a research subcommittee in 2012. This subcommittee meets at the annual meeting, has periodic phone calls, and has a distribution list of about fifty people. The subcommittee also has several sub-groups that are currently working on developing Research Needs Statements (RNSs) to submit to TRB and the NCHRP.

Major Accomplishments

For over twenty years, the Committee has had many successes and continually strives to break new ground.

After successfully creating the task force, the task force and the Western Transportation Institute (WTI) at Montana State University (MSU) co-sponsored the *National Parks: Transportation Alternatives and Advanced Technologies for the 21st Century* in 1999. This conference brought in more than 200 attendees representing federal, state, and local agencies; National Parks and public lands; consultants; and industry groups to discuss transportation in

National Parks (3). The success of that conference has been followed up by two additional conferences on the Transportation Needs of National Parks and Public Lands in 2014 and 2017. These conferences each brought together more than 100 professionals concerned with this topic, highlighting both the relevance and challenges identified through the work of the Committee.

The Committee has been successful in raising awareness of the importance of travel to and within National Parks and public lands. The Committee helped organize and contributed articles to TR News in 2004 (5), and developed sessions at conferences sponsored by other Committees, including TRB Committee ADA30's Tools of the Trade conferences.

Another huge success for the Committee has been having three RNS chosen for funding through NCHRP. These include NCHRP Synthesis 329: *Integrating Tourism and Recreational Travel with Transportation Planning and Project Delivery: A Synthesis of Highway Practice* in 2004 (6), NCHRP 08-36 Task 83: *Innovative Transportation Planning Partnerships to Enhance National Parks and Gateway Communities* in 2009 (7), and NCHRP 8-132: *Accessing America's Great Outdoors: Understanding Recreational Travel Patterns, Demand, and Future Investment Needs for Transportation Systems* in 2019 (2). The later project has the support of two state DOTs and the AASHTO Special Committee on Research and Innovation (AASHTO R&I) and was the first from the subcommittee to have this high level of support. The subcommittee is currently developing three other RNSs and is actively looking for other committees to partner on their development and submission.

The research subcommittee played a crucial role as a stakeholder of NCHRP 20-122: *Rural Transportation Issues: Research Roadmap* (8). Along with attending stakeholder workshops and submitting the RNS for NCHRP 8-132 to AASHTO R&I through the support of this project, the subcommittee was able to ensure that National Parks and public lands were captured in the roadmap. The roadmap will include language stating that public lands should be included in all full RNSs created as a result of this project (as applicable). This partnership provides a potential avenue for additional research needs identified by ADA40 to be addressed in the near future.

The Committee has been highly successful in professional development for young professionals and has been a key supporter of the Public Lands Transportation Fellows (Fellows) Program for almost twenty years. The Fellows attend TRB's Annual Meeting and present at the Committee sponsored poster session (FIGURE 2).

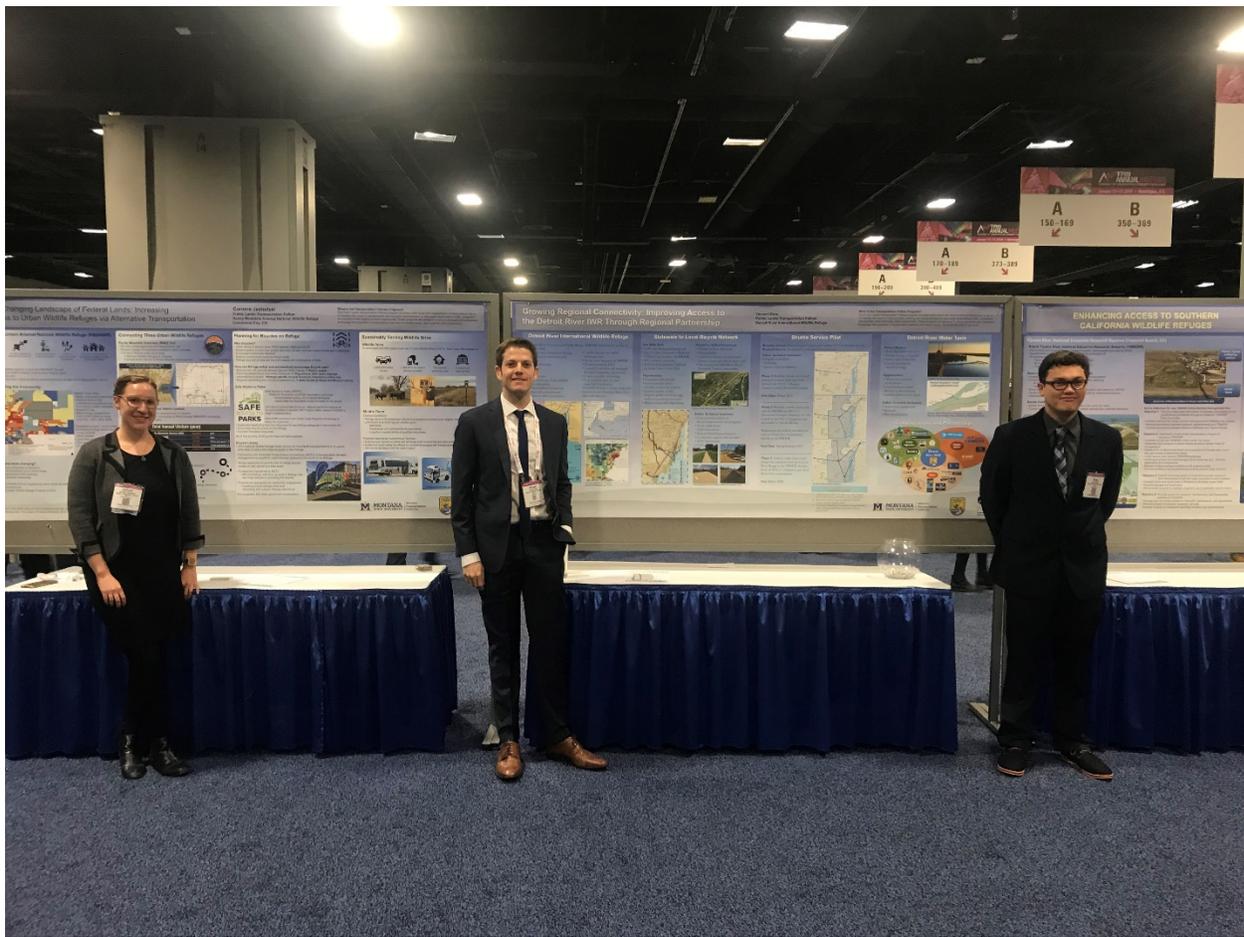


FIGURE 2: 2019 Fellows TRB Poster Session

They also attend the Committee meeting, all Committee sponsored sessions, and a Committee dinner. Professional development at the TRB Annual Meeting with the Committee is considered one of the highlights of the program. Started in 2000 by the National Park Foundation (NPF), NPS, and the Ford Foundation, the program has evolved over the years and is currently managed by WTI in cooperation with USFWS. Furthermore, NPS hopes to have Fellows again in future years. *Transportation Scholars: The Legacy, The Future* (9), provides additional background and context of the program. Many program alumni, including an author and founding Committee member, have continued to work in positions within or with an FLMA. One of the most exciting recent improvements to this program is that participants who complete their assignment are eligible for federal non-competitive hiring status for two years following the completion of their fellowship. This outcome creates a substantive avenue for young people to be drawn into addressing transportation needs of Federal lands.

The Committee has been successful at viewing the transportation system within a public land unit as part of a larger transportation system that includes gateway communities, state and regional systems, and other federal units. This has led towards interjurisdictional planning. One of the most notable examples of this change is the long-range planning process developed for Alaska (10). Two presentations were given at the 2008 TRB Annual Meeting on this topic: *Alaska Federal Lands Long-Range Transportation Plan, Part 1: Creation – What Can Be Learned from the Interagency Strategy for the Last Frontier?* And *Alaska Federal Lands Long-Range Transportation Plan, Part 2: Implementation – What Can Be Learned from the Interagency*

Strategy for the Last Frontier? (11). Presentations on the work in Alaska at a TRB Annual Meeting led the New Mexico Department of Transportation (DOT) to integrate Federal lands, which represent a large portion of the state, into their updated long-range transportation plan. The movement towards interjurisdictional planning was recently completed in Oregon and Washington as well. A by-product of the collaborative planning activities, encouraged by the Committee, was the implementation of a Collaborative Visitor Transportation Survey (CVTS) instrument approved by the Federal Office of Management and Budget (OMB). The CVTS allows Federal agencies to streamline the collection of survey data to better inform their research and performance-based planning.

TODAY

The Committee's story continues by discussing the state of the practice, best practices, research gaps, and relationships with other committees.

State of the Practice

The TRB Annual Meeting allows ADA40 members and friends to connect on emerging issues, share best practices, and collaborate on mutually beneficial resources. Each year, Laura Loomis of the National Park Conservation Association (NPCA) provides a legislative update, summarizing in detail policy and funding changes that will significantly impact addressing transportation needs on Federal lands. The NPCA perspective on current policy conversations allows this Committee to prepare for future research questions that may be asked of FLMAs, and funding opportunities or challenges that are on the horizon. The Annual Meeting also includes updates on notable projects from the PLMAs and a discussion on emerging issues related to visitor access to public lands, transportation systems sustainability, and the quality of visitor experience. In addition, PLMA transportation programs and research interests are summarized by attendees, and speakers are invited to make presentations on research topics.

Best Practices

The Committee has created guidance materials that help address research needs identified by the subcommittee. For example, as the national focus moved from motorized vehicles to multimodal transportation, guidance for active transportation in the context of public lands was developed. In 2008, the *Guide to Promoting Bicycling on Federal Lands* (12) was created followed by *Good Practices to Encourage Bicycling & Pedestrians on Federal Lands* in 2011 (13), with the NPS releasing the *NPS Active Transportation Guidebook* in 2018 (14). There are also conscious efforts, along with funding sources such as FLAP, to create and link non-motorized transportation systems within a Federal land to gateway communities.

Research Gaps

Balancing access and conservation will remain a priority. This is evident in many of the National Parks and public lands, which have experienced significant visitation increases (15). These issues and concerns are also being experienced abroad (e.g., in Iceland and Italy) ((16), (17)).

Recreational travel and tourism continue to increase, calling for better management of congestion caused by tourism, which is often concentrated during specific events or activities (e.g., summer peak periods, solar eclipse). There is a need to better understand what drives tourism to enable better predictions of peak period demands.

There is widespread discussion at the national level and many initiatives continue to focus on moving toward connected and autonomous vehicles, as emerging technologies are just beginning to be discussed with public lands. From a public land's perspective, there is a need to

understand how PLMAs can take advantage of these new technologies. Other emerging technologies that may have applications within public lands include drones, e-bikes, scooters, safety innovations, asset management, and climate/natural hazard risk assessment.

Big data (using data from geospatial data points, such as cellphones) can be a benefit, but is often a challenge, as special programs and education may be necessary to make use of the data. Furthermore, there is a need to better understand how some of these data sources, like social media, can drive demand (e.g. Apostle Islands National Lakeshore (18)) but also be used to inform planning efforts.

Relationship with Other Committees

In the early years, the Committee focused on internally-identified needs, striving to focus on its unique perspective. Over the years, however, ADA40 has benefitted from cross-pollination offered by engagement with other committees, like the aforementioned co-located mid-year meetings. The Committee has co-hosted joint sessions: in 2019, ADA40 joined AP055 and ABE80 for Lectern Session 1770, *The Present and Future of Rural, Public Intercity, and Tribal Bus Service* (19). The Committee has incorporated a roundtable discussion from other relevant committees during their meeting, with reports provided by ADA40 members who serve as liaisons to other committees.

TOMORROW

To wrap-up we will discuss the future of the Committee, including the desired future accomplishments, evolution of the Committee, and trends and emerging issues to focus on.

Desired Future Accomplishments of the Committee

While the Committee has made great strides in twenty years and has several notable accomplishments under their belt, there is still significant work to accomplish.

As discussed in ADA40's 2017 *Triennial Strategic Plan* (20), over the next seven years, ADA40 will focus on how to capture innovations in transportation technology that could be easily and affordably used by public lands transportation managers, while proactively monitoring innovations that may negatively impact public lands. The Committee will actively work to ensure that the challenges of managing transportation on public lands are well understood and better integrated into the greater transportation network.

The Committee's emerging, critical, and cross-cutting issues *within* the Committee's scope include (20):

- Encourage involvement of the Committee's young members, and state DOTs and other partners
- Look for opportunities to pilot new transportation technology in a public lands setting
- Explore the use of underused planning tools such as scenario planning for transportation within a public lands setting
- Promote hands-on workshop problem solving to communicate the unique challenges of public lands transportation management
- Identify ways to contribute limited technical support directly to parks and other public lands sites
- Create a bridge between research and everyday, real-world challenges for land managers on the ground
- Foster the on-going dialogue and connection with gateway communities to public lands, and look for shared research needs and opportunities to improve access

Related issues that are outside of the Committee's scope along with future accomplishments can be found in ADA40's *Triennial Strategic Plan* (20). As an example, the Committee has long desired to achieve greater success in receiving funding for the RNSs developed by the subcommittee. While funding from the NCHRP and TCRP is important, it is necessary to identify other funding mechanisms that may be leveraged to address more unique research needs. This will likely include sharing RNSs beyond the TRB community and fostering a strong relationship with FHWA.

Evolution of the Committee to Meet Future Challenges

The mission is not anticipated to change in the future and will continue to include all public lands. The biggest change is anticipated to be in the amount and types of collaborations with others for research, awareness, and knowledge transfer.

To ensure more success in addressing research needs identified by the subcommittee, the Committee will continue to look for partnerships to elevate and leverage research that contributes to the mission, thereby maintaining interest and engaging those outside of the direct group. Recent changes to membership have brought a fresh perspective on research needs while continuing to engage and make use of the long-term knowledge and contributions of those who have been engaged with the committee for a long tenure.

The Committee has made great strides towards awareness of transportation challenges and opportunities for public lands, but it is still not common for other transportation agencies to include public lands as a stakeholder in transportation planning and implementation activities, which is why examples like that from New Mexico are notable. As a whole, the Committee should continue to work to better educate peers on issues related to transportation within PLMAs, focusing on enjoyment, preservation, safety, mobility and partnerships. In particular, there is a need to better engage representatives of state DOTs. While state DOTs may be historically focused on the efficiency and safety of the state network, there are overlapping interests with public lands, as access is often provided by roadways maintained at the state level. Furthermore, cooperation with state DOTs may assist with providing opportunities, while leveraging expertise via public transportation systems and potentially with state-level active transportation systems. An additional opportunity of the future is also engaging metropolitan planning organizations (MPOs) to address accessibility needs. Opportunities for such implementations were seen during the 2018 Mid-Year Meeting in Cascade Locks, Oregon, where program participants rode a public transportation system from Cascade Locks to Multnomah Falls. Partnerships between state DOTs and public land managers can also potentially allow leveraging other funding sources, such as Recreational Trails Program (RTP) funds.

In order to best understand the needs of gateway communities, it is desirable to engage these communities. However, engaging with the Committee as a regular member may not be an option, therefore, continuing to host the mid-year meeting in various locations and seeking other opportunities to bridge this gap will be important.

Another challenge that the Committee faces is how to continue to provide information about design innovations to public lands. For example, changes to guardrails to ensure safety, new road formats like advisory bike lanes, and mobility options like e-scooters, enabled by technology, will continue to evolve.

Trends and Emerging Issues

There are many trends and emerging issues that affect public lands that could be investigated by the Committee either through research or presentations. The below section describes some of

these challenges that are unique to public lands.

One of the trends that the Committee will need to tackle in the future is the impact of closing public lands on the local economy. Many gateway communities rely heavily on recreation and tourism spending generated by visitors traveling to public lands. The history of providing access to our public lands has helped to build and sustain critical infrastructure needed for the current and future vitality of these communities. However, visitor experience can be impacted by the infrastructure of the gateway community if it affects travel to the public land unit. More recently, the closures of these public lands from extreme weather events (i.e., impacts on Cascade Locks, Oregon from fires in the gorge) and from government shutdowns have had significant negative impacts on the economic well-being of these communities. There is a need to better understand, quantify, and provide solutions to minimize the impacts on these, often small, gateway communities.

While visitation is increasing, more problematic is the concentration of visitation to public lands. While multimodal connections have been proposed and implemented to address the congestion, there is a need to better understand how reductions to private vehicle parking may be needed when public transportation provisions are added. Related, is there an induced demand based on where multimodal stops may be placed? Furthermore, some attempts at addressing peak congestion have sought to redirect potential visitors to areas in proximity to the destination that may offer similar amenities. The first large-scale use of intelligent transportation systems (ITS) in parks was the demonstration project at Acadia National Park around 2000. Congestion, redistribution, and customer satisfaction were some of the impacts studied during the project. There were also efforts made to spread peak congestion out to different time periods, (e.g. ITS at Rocky Mountain National Park (21)). Yet little is known about the effectiveness of peak spreading or if the potential visitor will view this as a preferred practice. Furthermore, how does congestion impact visitor satisfaction? What kind of environmental impacts do increased visitation have on public lands? With the hesitancy to cap visitation, what are alternatives to address overcrowding and resource degradation due to congestion?

Like many agencies, public lands are finding that data is more readily available than ever before and is a powerful tool for managing visitor travel, however the volume is complicated and presents challenges. Furthermore, while many visitors want to remain connected to WiFi and cellular services while on Federal lands, others may travel to public lands with the hope to disconnect to better engage with the natural environment and their families (22). Balancing the need for connectivity, there may be opportunities to partner with other rural and urban transportation agencies such as MPOs and state DOTs, and private sector entities (e.g. communication firms) to share costs and research capabilities to address these needs.

Many public lands are often accessed from state roadways, and some state roadways may divide a public land (i.e., Valley Forge NHP is divided by both SR23 and the Schuylkill River; Kenai NWR is bisected by SR1). This can create accessibility issues within the park, as well as fragmenting habitat migration corridors. Depending on how travelers visit the park (e.g. with a recreational vehicle (RV) or by camping), different types of traffic, ranging from passenger vehicles to bicycles to RVs, may be in conflict (23). Several agencies have undertaken a systematic approach to conducting road or corridor safety audits and studies as a means of collecting relevant safety data and using it to create safety management systems to address relevant safety concerns. Habitat fragmentation is both a safety concern (animal-vehicle collisions resulting in serious injury and fatalities) and an environmental resource concern (animals killed or prevented from migrating). There is also a question of should recreational travel be studied separately from driving for transportation? There is support for this approach within the non-motorized transportation realm, but is there really a difference and should it be

considered when designing facilities? For example, are there roadways that exist solely for recreation purposes, or does the trip from the origin to the recreation destination constitute transportation?

As emerging technologies continue to gain more traction across the nation, their applicability in public lands will require investigation. For example, the application of ITS within public lands continues to evolve to address a myriad of needs ((21), (24)); however, as technology continues to rapidly advance, there will be a need to provide more up-to-date information to public land managers (25). Efforts have also been made to provide better digital planning support to visitors (e.g. the Mississippi River Trip Planner) (26). This research should continue including how future trip planning tools can better address the needs of visitors, particularly with respect to improving visitor experience and whether these visitor planning tools can be used to incentivize spreading out peak visitation.

Demographic and tourism trends will need to be better understood. In particular, there are concerns with the relevance of public lands, particularly expressed by Federal land managers. Many public lands are found in rural areas of the United States. Therefore, while many technological developments have focused on urban areas, extending to public lands in urban and suburban areas, there is still a need for a greater understanding of the application within rural and more specifically, rural public land areas.

A transportation problem unique to public lands are wildlife-induced traffic congestion (e.g., bear jams). Policies regarding how to address, and more importantly mitigate or avoid, such congestion would be of value.

CONCLUSIONS

TRB Committee ADA40, Transportation Needs of National Parks and Public Lands, has had many successes in its tenure as shown in FIGURE 3.

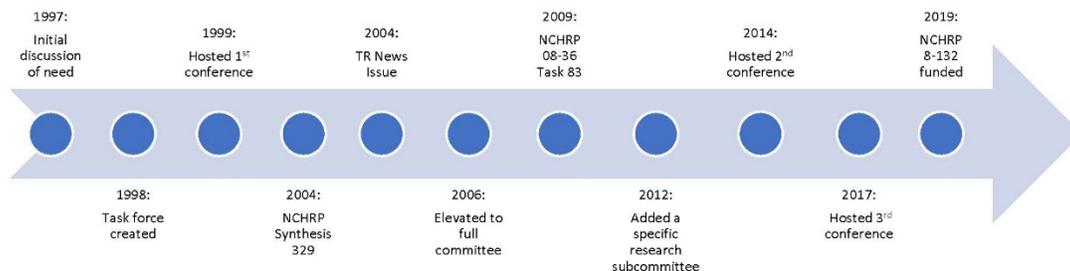


FIGURE 3: Summary of ADA40 Accomplishments

The Committee continues to evolve and adapt, as do the transportation needs of public lands. Moving to a more inclusive research of public lands affords opportunities for collaborative and cooperative research between state, local gateway communities, and public lands. Emerging technologies and advancements in the use of big data will afford the Committee ample opportunities for researching the best uses in the public lands setting. As the Committee finds its fit within TRB, the knowledge of its existence by other Committees will grow, as will collaborative opportunities.

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REFERENCES

1. About. *TRB Committee on Transportation Needs of National Parks and Public Lands*. [Online] [Cited: January 25, 2019.] <https://sites.google.com/site/trbcommitteeada40/about>.
2. Collins, Rachel, et al. *Accessing America's Great Outdoors: Understanding Recreational Travel Patterns, Demand, and Future Investment Needs for Transportation Systems*. Washington, D.C. : TRBs Committee on Transportation Needs of National Parks and Public Lands, 2019.
3. Eck, Ronald and Wilson, Eugene. *Request for Committee Status for the TRB Committee on Transportation Needs of National Parks and Public Lands*. 2000.
4. Federal Transit Administration. Paul S. Sarbanes Transit in Parks Program (5320). *Program Overview*. [Online] March 16, 2016. [Cited: March 29, 2019.] <https://www.transit.dot.gov/funding/grants/grant-programs/paul-s-sarbanes-transit-parks-program-5320>.
5. Turnbull, Katherine F. *Transportation Research Board*. [Online] 2004. [Cited: May 7, 2019.] <http://onlinepubs.trb.org/onlinepubs/trnews/trnews233parks.pdf>.
6. Petraglia, Lisa and Weisbrod, Glen. Integrating Tourism and Recreational Travel with Transportation Planning and Project Delivery. *Transportation Research Board*. [Online] 2004. [Cited: May 7, 2019.] <http://www.trb.org/Main/Public/Blurbs/154775.aspx>.
7. Texas Transportation Institute (TTI) and Cambridge Systematics, Inc. *Transportation Research Board. Transportation Research Board*. [Online] October 2009. [Cited: May 2, 2019.] [http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP08-36\(83\)_FR.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP08-36(83)_FR.pdf).
8. Western Transportation Institute at Montana State University. Rural Transportation Issues: Research Roadmap. *Results & Findings*. [Online] [Cited: March 29, 2019.] https://westerntransportationinstitute.org/research_projects/rural-transportation-issues-research-roadmap/.
9. *Transportation Scholars: The Legacy, The Future*. Villwock-Witte, Natalie, Newman, Jason and Chesson, Katherine. Washington, D.C. : Transportation Research Board, 2014.
10. *U.S. Department of Transportation, Federal Highway Administration, Federal Land Highways*. [Online] September 2012. [Cited: May 7, 2019.] <https://flh.fhwa.dot.gov/programs/flpp/lrtp/documents/ak-lrtp.pdf>.
11. Transportation Needs of National Parks and Public Lands (ADA40). *TRB Planning and Environment Group, Annual Report of Committee Activities*. Washington, D.C. : Transportation Research Board, 2013.
12. Gleason, Rebecca. *Pedestrian & Bicycle Information Center (PBIC)*. [Online] [Cited: March 25, 2018.] http://www.pedbikeinfo.org/cms/downloads/01_promoting_bicycling_entire_document.pdf.
13. Villwock-Witte, Natalie, Gleason, Rebecca and Shapiro, Phil. *Western Transportation Institute at Montana State University*. [Online] [Cited: March 25, 2018.] https://westerntransportationinstitute.org/wp-content/uploads/2018/02/TRIPTAC-BikePedPlan_Full.pdf.
14. Sherwood, Krista, et al. Bicycles & Pedestrians. *National Park Service*. [Online] November 9, 2018. [Cited: March 25, 2019.] <https://www.nps.gov/subjects/transportation/bikeped.htm>.
15. Trenbeath, Eric. National parks scramble to keep up with the crowds. [Online] July 13, 2015. [Cited: March 29, 2019.] <https://www.hcn.org/articles/arches-crowds-tourism-national-parks-utah>.
16. Baraniuk, Chris. The country that tourism has taken by surprise. [Online] February 22, 2017. [Cited: March 29, 2019.] <http://www.bbc.com/future/story/20170222-the-country-that-tourism-has-taken-by-surprise>.
17. Orsi, Francesco. *Sustainable Transportation in Natural and Protected Areas*. London : Taylor & Francis

- Group, 2015.
18. Ivey, Mike. Apostle Islands overrun with visitors to ice caves. *The Cap Times*. [Online] February 19, 2014. [Cited: April 1, 2019.] https://madison.com/ct/news/local/writers/mike_ivey/apostle-islands-overrun-with-visitors-to-ice-caves/article_c3171454-998e-11e3-b455-0019bb2963f4.html.
 19. Annual Meeting Event Detail. *Transportation Research Board Annual Meeting Interactive Program Archive*. [Online] [Cited: March 25, 2019.] <https://annualmeeting.mytrb.org/interactiveprogramarchive/Details/11399>.
 20. Transportation Research Board, Committee on Transportation Needs of National Parks and Public Lands (ADA40). *Triennial Strategic Plan*. Washington D.C. : Transportation Research Board (TRB), 2017.
 21. Villwock-Witte, Natalie and Collum, Kourtney. Evaluation of an Intelligent Transportation System for Rocky Mountain National Park and Estes Park. [Online] [Cited: April 1, 2019.] https://westerntransportationinstitute.org/wp-content/uploads/2018/02/TA-ROMO_ITS-Eval.pdf.
 22. Villwock-Witte, Natalie and Clouser, Karalyn. Millennial and Silver Tsunami Mobility Preferences to Access National Wildlife Refuges. *Western Transportation Institute at Montana State University*. [Online] January 2, 2018. [Cited: April 1, 2019.] https://westerntransportationinstitute.org/research_projects/millennial-and-silver-tsunami-mobility-preferences-to-access-national-wildlife-refuges/.
 23. Upchurch, Jonathan. Zion National Park: Enhancing Visitor Experience Through Improved Transportation. *Transportation Research International Documentation (TRID)*. [Online] [Cited: April 1, 2019.] <https://trid.trb.org/view/1288529>.
 24. Sullivan, Jaime, Zhirui, Ye and Albert, Steve. Grand Canyon National Park Variable Message Sign. *Western Transportation Institute at Montana State University*. [Online] 2009. [Cited: April 1, 2019.] https://westerntransportationinstitute.org/research_projects/grand-canyon-natl-park-variable-message-sign/.
 25. John A. Volpe National Transportation Systems Center. Intelligent Transportation Systems in the National Parks System and Other Federal Public Lands - 2011 Update. *Public Lands Projects*. [Online] September 2011. [Cited: April 1, 2019.] <https://rosap.ntl.bts.gov/view/dot/9554>.
 26. U.S. Department of Transportation Volpe Center. Mississippi River Trip Planner. *National Park Service*. [Online] [Cited: April 1, 2019.] <http://rivertripplanner.org/>.

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